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Étude approfondie de l'évaluation et du traitement des difficultés acquises de la parole. (Préalables: ORA5513, ORA5512 et ORA6746)

Il est entendu que le stage en audiologie comprendra des expériences en clinique d'orthophonie et que le stage en orthophonie comprendra des expériences en clinique d'audiologie.

(REA5940) qui peut être recommandé ou exigé selon la compétence linguistique du candidat.
Education
Electrical and Computer Engineering
Electronic Business
English
Environmental Engineering
Epidemiology
Geography
History
Human and Molecular Genetics (Collaborative)
Human Kinetics
International Development
Law
Lettres françaises
Linguistics
Management
Mathematics and Statistics
Mechanical Engineering
Microbiology and Immunology
Neuroscience
Nursing
Pathology and Experimental Medicine (Collaborative)
Philosophy
Physics
Political Science
Population Health
Psychology
Public Administration
Rehabilitation Sciences
Religious Studies
Social Work
Sociology
Spanish
Theology
Translation Studies
Women's Studies

Graduate Diploma Programs
Auditory-Verbal Studies
Canon Law
Canonical Practice
Chartered Professional Accountancy
Contemplative Theology and Spiritual Mentorship
Couple Counselling and Spirituality
Ecclesiastical Administration
Ethics and Religious Beliefs in the Media
Health Professions Education
Information Studies
Internet Technologies
Leadership and Management
Mobile Device Applications
Modelling and Animation for Computer Games Technology
Orchestral Studies
Organizational Performance Management
Advanced Materials and Manufacturing

Ottawa-Carleton Joint Program

Established in 1983, the Ottawa-Carleton Institute for Mechanical and Aerospatial Engineering (OCIMAE) combines the research strengths of the Department of Mechanical Engineering at the University of Ottawa and the Department of Mechanical and Aerospace Engineering at Carleton University. The Institute offers graduate programs leading to masters (MASc / MEng) and doctoral (PhD) degrees in Mechanical Engineering and in Advanced Materials and Manufacturing.

Members of the Institute are engaged in six main research fields: thermal and fluid engineering; solid mechanics and design; materials and manufacturing; controls and robotics; biomedical engineering; and, aeronautical and space engineering. Additional information is posted in the departmental website.

Most of the requirements of these programs must be fulfilled in English. A very good knowledge of this language is therefore required.

The program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Programs

Master of Applied Science Advanced Materials and Manufacturing
Master of Engineering Advanced Materials and Manufacturing
Doctorate in Philosophy Advanced Materials and Manufacturing

Admission

Admission to the graduate program in advanced materials and manufacturing is governed by the general regulations of the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering (OCIMAE) and by the general regulations of the FGPS.

Most of the requirements of these programs must be fulfilled in English. A very good knowledge of this language is therefore required.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Applications are evaluated based on the following criteria:

- Be the holder of a bachelor's degree with a specialization, or a major in mechanical engineering (or equivalent) with a minimum average of 70% (B).
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify, for the MASc and the MEng (with project), at least one professor who is willing and available to act as a project/thesis supervisor.

NOTE: Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Program Requirements

A. Master of Applied Science (15 credits)
- 15 course credits of graduate courses at the 5000 level or above approved by the thesis supervisor and the Department.
- Participation and the regular attendance at the departmental seminar series (MCG5900).
- Presentation and defense of a thesis (MCG7999).

B. Master of Engineering (30 credits)
1. Master's with project:
   - Successful completion of 24 course credits at the 5000 level or above approved by the Department.
   - Participation in the Mechanical and Aerospace Engineering departmental seminar series (MCG5947).
   - Completion of the project MCG6998.

2. Master's by course work:
   - 30 credits of graduate courses at the 5000 level or above approved by the Department;
   - Participation in the Mechanical and Aerospace Engineering departmental seminar series (MCG5947).

Transfer from master's to PhD

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master's thesis. For additional information, please consult the "Admission" section of the PhD program.

Duration of Program

The requirements of the MSc program are usually fulfilled within two years of full-time study and within one year of full-time study for the MEng by course work. The maximum time permitted whether full-time or part-time is four years from the date of initial registration.

Residence

All students must complete a minimum of three sessions of full-time registration.

Minimum Standards

The passing grade in all courses is B. Students who fail 6 credits, or whose research progress is deemed unsatisfactory will be withdrawn from the program.

NOTE: In accordance with the B.2.7 regulation, all students of the master's program by course work are expected to complete the major part of their program requirements while registered at the University of Ottawa.

Courses

In all programs, the student may choose graduate courses from either university with the approval of the Advisor or Advisory Committee. The available graduate courses are listed below. Course descriptions are to be found in the departmental section of the calendar concerned. All courses are of one session duration. Courses of each department are indicated by the prefix of the first number given as follows:

MCG Department of Mechanical Engineering, University of Ottawa
MAAJ Department of Mechanical and Aerospace Engineering, Carleton University

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Solid Mechanics and Materials

MCG5101 (MAAJ 5001) THEORY OF ELASTICITY (3cr.)

MCG5102 (MAAJ 5002) ADVANCED STRESS ANALYSIS (3cr.)
Solutions to special beam problems including beams on elastic foundations, curved beams, multi-span beams, etc., as well as some axisymmetric problems. The significance of assumptions is discussed and solution techniques including series solutions and energy methods are utilized.
MCG5103 (MAAJ 5003) THEORY OF PERFECTLY PLASTIC SOLIDS (3cr.)

MCG5104 (MAAJ 5004) THEORY OF PLATES AND SHELLS (3cr.)
A general coverage of various approaches to plate problems and the application of these methods to practical cases. A study of the theory of shells including deformation of shells without bending, stresses under various loading conditions, general theory of shells, shells forming surfaces of revolution.

MCG5105 (MAAJ 5505) CONTINUUM MECHANICS (3cr.)

MCG5106 (MAAJ 5006) ADVANCED TOPICS IN ELASTICITY (3cr.)

MCG5107 (MAAJ 5507) ADVANCED DYNAMICS WITH APPLICATIONS (3cr.)

MCG5108 (MAAJ 5008) FINITE ELEMENT ANALYSIS (3cr.)

MCG5109 (MAAJ 5009) ADVANCED TOPICS IN FINITE ELEMENT ANALYSIS (3cr.)

MCG5110 (MAAJ 5100) MICROMECHANICS OF SOLIDS (3cr.)

MCG5114 (MAAJ 5104) ANALYSIS AND DESIGN OF PRESSURE VESSELS (3cr.)

MCG5117 (MAAJ 5107) INTRODUCTION TO COMPOSITE MATERIALS (3cr.)

MCG5118 (MAAJ 5108) INTRODUCTION TO PLASTICITY (3cr.)

MCG5119 (MAAJ 5109) FRACTURE MECHANICS (3cr.)

MCG5126 (MAAJ 5206) DEFORMATION OF MATERIALS (3cr.)
The deformation and fracture properties of metals, ceramics and polymers. Introduction to dislocation theory. Rheological models. Analysis and interpretation of constant strain rate, constant stress and stress relaxation tests in terms of the material structure.

MCG5129 (MAAJ 5209) HOT WORKING OF METALS (3cr.)
High temperature mechanical properties in metals. Types of recovery, recrystallization and precipitation in metals and their effects on hot strength and structure. Hot rolling of metals. Selection of rolling schedules. Influence of as-rolled structures on room temperature tensile and fracture stresses, impact strength.

MCG5137 (MAAJ 5307) SPECIAL STUDIES IN SOLID MECHANICS AND MATERIALS (3cr.)
MCG5138 (MAAJ 5308) ADVANCED TOPICS IN MECHANICAL ENGINEERING (3cr.)

MCG5144 SUPERALLOYS AD CERAMIX-METAL MATRIX COMPOSITES (3cr.)
Manufacture and properties of superalloys and ceramic-metal matrix composites used in aerospace, turbine, mining and energy applications. Powder metallurgy, phase diagrams, mechanical alloying, deformation, creep, fatigue, fracture mechanics, wear and corrosion. Physics-based modelling of materials’ strength including the contribution of solid solution, precipitation and ceramic particle strengthening as a function of application temperature.

MCG5180 (MAAJ 5800) FIBRE COMPOSITE MATERIALS (3cr.)
Computer-automated manufacturing techniques. Advanced topics in composite design: lamination theory, Interlaminar stresses and free edge effects, lamination and laminate failure theories. Principles of non-destructive testing. Individual projects involving the design, manufacturing and testing of a fibre composite component or material. Limited enrolment. Prerequisite: MCG 5117 (MAAJ 5107) or permission of the Institute.

MCG5181 (MAAJ 5801) ADVANCED VIBRATIONS (3cr.)
Kinematics of vibrations, the single degree of freedom system, without and with damping, two degrees of freedom, several degrees of freedom, vibration of shafts, critical speeds, complex presentation, influence coefficients, matrix method, stability of solution, approximate methods.

MCG5182 (MAAJ 5802) THEORY OF ELASTIC INSTABILITY (3cr.)

MCG7355 SPECIAL TOPICS IN ADVANCED MATERIALS (3cr.)
Topics that may be covered include the following: nanocrystalline and amorphous materials; metals and ceramic-metal composites; functional materials; fibre-based engineering materials.

Thermofluids
MCG5111 (MAAJ 5101) GAS DYNAMICS (3cr.)

MCG5131 (MAAJ 5301) HEAT TRANSFER BY CONDUCTION (3cr.)

MCG5132 (MAAJ 5302) HEAT TRANSFER BY CONVECTION (3cr.)

MCG5133 (MAAJ 5303) HEAT TRANSFER BY RADIATION (3cr.)

MCG5134 (MAAJ 5304) HEAT TRANSFER WITH PHASE CHANGE (3cr.)

MCG5136 (MAAJ 5306) SPECIAL STUDIES IN FLUID MECHANICS AND HEAT TRANSFER (3cr.)

MCG5141 (MAAJ 5401) STATISTICAL THERMODYNAMICS (3cr.)

MCG5151 (MAAJ 5501) LAMINAR FLOW THEORY (3cr.)
Derivation and exact solutions of the Navier-Stokes equations. Low Reynolds number flows, Stokes flow. Oseen flow, lubrication theory. Laminar boundary layers. Introduction to hydrodynamic stability.

MCG5152 (MAAJ 5502) THEORY OF TURBULENCE (3cr.)
MCG5155 (MAAJ 5505) INVISCID FLOW THEORY (3cr.)

MCG5156 (MAAJ 5506) MEASUREMENT IN FLUID MECHANICS (3cr.)

MCG5157 (MAAJ 5507) NUMERICAL COMPUTATION OF FLUID DYNAMICS AND HEAT TRANSFER (3cr.)

MCG5158 (MAAJ 5508) INDUSTRIAL FLUID MECHANICS (3cr.)
Application of simple flows to analysis of more complex systems. Pipe and duct systems, flow separation and control, aerosols, separation of particulates from flow, cavitation, unsteady flow.

MCG5161 (MAAJ 5601) ENVIRONMENTAL ENGINEERING (3cr.)

MCG5191 (MAAJ 5901) COMBUSTION IN PREMIXED SYSTEMS (3cr.)
Stoichiometry, thermo-chemistry, ignition, flame propagation, flame stabilization, diffusion flames, turbulent combustion, modelling.

MCG5192 (MAAJ 5902) COMBUSTION IN DIFFUSION SYSTEMS (3cr.)
Gaseous jet flames, combustion of liquid droplets, atomization, spray flames, coal combustion, fluidized bed combustion.

Design - Manufacturing - Industrial Engineering
MCG5115 (MAAJ 5105) NON-LINEAR OPTIMIZATION (3cr.)

MCG5159 (MAAJ 5509) ADVANCED PRODUCTION PLANNING AND CONTROL (3cr.)

MCG5168 (MAAJ 5608) INDUSTRIAL ORGANIZATION (3cr.)

MCG5169 (MAAJ 5609) ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

MCG5170 (MAAJ 5700) COMPUTER-AIDED DESIGN (3cr.)
The design process. Structure of computer-aided drafting software. Analysis and optimization software. Software integration. Parametric design. Major group design project which integrates concepts from all major areas of mechanical engineering. Exclusion: May not be taken for credit with MCG4322.

MCG5171 (MAAJ 5701) APPLIED RELIABILITY THEORY (3cr.)

MCG5172 (MAAJ 5702) INTRODUCTION TO MANAGEMENT OF AUTOMATION (ROBOTICS AND NUMERICAL CONTROLS) (3cr.)

MCG5173 (MAAJ 5703) SYSTEMS ENGINEERING AND INTEGRATION (3cr.)
Introduction to modelling methods employed for the planning and design of sub-systems and complex systems. Discrete and continuous time, lumped and distributed parameters models. State estimation. Parameters identification. Discretization and stochastic effects. Technological systems modelling and simulation examples.

MCG5176 (MAAJ 5706) INDUSTRIAL CONTROL SYSTEMS (3cr.)
Concept, analysis and design of classical and modern industrial control systems. Computer based control systems for robotics, automation, manufacturing and instrumentation applications. Design project of industrial control and automation systems. Not accessible to students who have taken MCG 4108.

MCG5177 (MAAJ 5707) ROBOT MECHANICS (3cr.)
Robotics overview. Transformations. Basics of robot kinematics, statics and dynamics. Introduction to practical robots, control and programming. Project in analysis, design or application of manipulators. Not accessible to students who have taken MCG 4132.

MCG5178 (MAAJ 5708) ADVANCED TOPICS IN CAD/CAM (3cr.)
Overview of totally integrated CAD/CAM systems. Details of design and manufacturing software tools. Methods of linking design and manufacturing tools to form an integrated CAD/CAM system. Students will undertake projects which will provide them with a "hands-on" experience.

MCG5179 (MAAJ 5709) MANUFACTURING SYSTEM ANALYSIS (3cr.)

MCG5184 MECHATRONICS (3cr.)
Models for passive and active components for electro-mechanical systems. Network representation of signals and energy transmission and conversion. Selection of sensors and actuators for the control of mechanical systems. Modelling and simulation for the design of mixed dynamic systems. Precludes additional credit for MCG 4136.

MCG5185 (MAAJ 5805) MULTIVARIABLE DIGITAL CONTROL (3cr.)

MCG5186 (MAAJ 5806) NON-LINEAR DISCONTINUOUS DYNAMICS AND CONTROL (3cr.)

General Course Codes

MCG5900 SÉMINAIRE DE M.A.Sc. / MASc SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars and to make one presentation. Graded S/NS.

MCG5947 SÉMINAIRE DE MAÎTRISE EN INGÉNIERIE / MASTER OF ENGINEERING SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. Les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS (Satisfaisant/Non Satisfaisant). // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars. Graded S/NS (Satisfactory/Non Satisfactory).

MCG6998 PROJET / PROJECT (6cr.)
Projet en génie mécanique ou en matériaux avancés et fabrication dirigé par un professeur approuvé par le directeur des études supérieures et donnant lieu à la rédaction d'un rapport approfondi (30-40 pages approx). Noté S (satisfaisant) ou NS (non satisfaisant) par le directeur du projet et un autre professeur nommé par le directeur des études supérieures en génie mécanique. Le projet est normalement complété en une session d'études à temps plein. Préalable : approbation du directeur des études supérieures en génie mécanique. // Project in mechanical engineering or in advanced materials and manufacturing supervised by a professor approved by the director of graduate studies and leading to the writing of an in-depth report (approx. 30-40 pages). Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the director of graduate studies in Mechanical Engineering. The project can normally be completed in one session of full-time study. Prerequisite: approval of director of graduate studies in Mechanical Engineering.

MCG7999 THÈSE DE MAÎTRISE / MASc THESIS

MCG9900 SÉMINAIRE DE DOCTORAT / PhD SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins quinze séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 15 seminars and make one presentation. Graded S/NS.

MCG9997 PRÉPARATION DU PROJET DE THÈSE DE DOCTORAT / PREPARATION FOR PhD THESIS PROPOSAL
À la suite de la réussite à l'examen de synthèse, inscription requise de tous les candidats au doctorat jusqu'à ce que le projet de thèse soit accepté par le Comité consultatif. // Following completion of the comprehensive examination, registration required for all PhD candidates until the thesis proposal is accepted by the Advisory Committee.
MCG9998 PRÉPARATION À L'EXAMEN GÉNÉRAL DE DOCTORAT / PREPARATION FOR PhD COMPREHENSIVE EXAMINATION
Inscription requise de tous les candidats au doctorat jusqu'à la réussite à l'examen de synthèse. / Registration required for all PhD candidates until the comprehensive examination is passed.

MCG9999 THÈSE DE DOCTORAT / PhD THESIS

Department of Mechanical and Aerospace Engineering Carleton University
Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings, please consult the Registration Instructions and Class Schedule booklet published in the summer. Carleton University course numbers (in parentheses) follow the University of Ottawa course number.

MCG5121 (MECH 5106) SPACE MISSION ANALYSIS AND DESIGN (3cr.)
Review of solar system and space exploration. Space mission design and geometry. Analysis of orbit design, transfers, interplanetary trajectories. Effect of environment on spacecraft design. Space propulsion and launch vehicle design. Launch sequence, windows, cost. Reusable launch systems. Also offered at the undergraduate level, with different requirements, as AERO 4802.

MCG5122 (MECH 5202) SMART STRUCTURES (3cr.)

MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS (3cr.)
Essential microstructural features of metals and alloys: crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

MCG5300 (MECH 5000) FUNDAMENTALS OF FLUID DYNAMICS (3cr.)
Differential equations of motion. Viscous and inviscid regions. Potential flow: superposition; thin airfoils; finite wings; compressibility corrections. Viscous flow: thin shear layer approximation; laminar layers; transition; turbulence modelling. Convective heat transfer: free versus forced convection; energy and energy integral equations; turbulent diffusion. Also offered at the undergraduate level, with different requirements, as AERO 4302, for which additional credit is precluded.

MCG5301 (MECH 5001) THEORY OF VISCOUS FLOWS (3cr.)
Navier-Stokes and boundary layer equations; mean flow equations for turbulent kinetic energy; integral formulations. Stability, transition, turbulence, Reynolds stresses; separation. Calculation methods, closure schemes. Compressibility, heat transfer, and three-dimensional effects.

MCG5303 (MECH 5003) INCOMPRESSIBLE NON-VISCOS FLOW (3cr.)
The fundamental equations and theorems for non-viscous fluid flow; solution of two-dimensional and axisymmetric potential flows; low-speed airfoil and cascade theory; wing-lifting-line theory; panel methods.

MCG5304 (MECH 5004) COMPRESSIBLE NON-VISCOS FLOW (3cr.)
Steady isentropic, frictional, and diabatic flow; shock waves; irrotational compressible flow, small perturbation theory and similarity rules; second-order theory and unsteady, one-dimensional flow.

MCG5308 (MECH 5008) EXPERIMENTAL METHODS IN FLUID MECHANICS (3cr.)
Fundamentals of techniques of simulation of fluid dynamic phenomena. Theoretical basis, principles of design, performance and instrumentation of ground test facilities. Applications to aerodynamic testing.

MCG5309 (MECH 5009) ENVIRONMENTAL FLUID MECHANICS RELATING TO ENERGY UTILIZATION (3cr.)
Characteristics of energy sources and emissions into the environment. The atmosphere; stratification and stability, equations of motion, simple winds, mean flow, turbulence structure and dispersion near the ground. Flow and dispersion in groundwater, rivers, lakes and oceans. Physical and analytical modelling of environmental flows.

MCG5310 (MECH 5100) PERFORMANCE AND ECONOMICS OF AIRCRAFT (3cr.)
Aircraft performance analysis with emphasis on factors affecting take-off, landing and economic performance; high lift schemes; operating economics.

MCG5311 (MECH 5101) DYNAMICS AND AERODYNAMICS OF FLIGHT (3cr.)
Static stability theory. Euler's equations for rigid body motion; the linearized equations of motion; stability derivatives and their estimation. Longitudinal and lateral dynamic response of an aircraft to control and disturbance. Also offered at the undergraduate level, with different requirements, as AERO 4308, for which additional credit is precluded.

MCG5314 (MECH 5104) GROUND TRANSPORTATION SYSTEMS AND VEHICLES (3cr.)
Performance characteristics, handling and directional stability, ride comfort and safety of various types of ground vehicle systems including road vehicles, terrain-
vehicle systems, guided transport systems, and advanced ground transport technology.

**MCG5315 (MECH 5105) ORBITAL MECHANICS AND SPACE CONTROL** (3cr.)
Orbital dynamics and perturbations due to the Earth's figure, the sun, and the moon with emphasis on mission planning and analysis. Rigid body dynamics applied to transfer orbit and on-orbit momentum management and control of spacecraft. Effects of flexible structures on a spacecraft control system.

**MCG5317 (MECH 5107) EXPERIMENTAL STRESS ANALYSIS** (3cr.)

**MCG5321 (MECH 5106/MECH 5201) METHODS OF ENERGY CONVERSION** (3cr.)
Technical, economic and environmental aspects of present and proposed large-scale systems of energy conversion.

**MCG5330 (MECH 5300) ENGINEERING ACOUSTICS** (3cr.)
Review of acoustic waves in compressible fluids; acoustic pressure, intensity and impedance; physical interpretation and measurement; transmission through media; layers, in-homogeneous media, solids; acoustic systems; rooms, ducts, resonators, mufflers, properties of transducers; microphones, loudspeakers, computational acoustics.

**MCG5331 (MECH 5301) AEROCOUSTICS** (3cr.)
The convected wave equation; theory of subsonic and supersonic jet noise; propeller and helicopter noise; fan and compressor noise; boundary layer noise, interior noise; propagation in the atmosphere; sonic boom; impact on environment.

**MCG5332 (MECH 5302) INSTRUMENTATION TECHNIQUES** (3cr.)
An introduction for the non-specialists to the concepts of digital and analog electronics with emphasis on data acquisition, processing and analysis. Topics covered include operational amplifiers, signal processing, digital logic systems, computer interfacing, noise in electronic systems. Hands-on sessions illustrate theory and practice.

**MCG5334 (MECH 5304) COMPUTATIONAL FLUID DYNAMICS OF COMPRESSIBLE FLOWS** (3cr.)
Solution techniques for parabolic, elliptic and hyperbolic equations developed for problems of interest to fluid dynamics with appropriate stability considerations. A staged approach to solution of full Euler and Navier-Stokes equations is used. Grid generation techniques appropriate for compressible flows are introduced.

**MCG5344 (MECH 5400) GAS TURBINE COMBUSTION** (3cr.)
This course covers two major topics: combustion fundamentals and gas turbine combustor design. Combustion fundamentals include fuel evaporation, chemistry of combustion, chemical kinetics and emission formation and introduction to computational combustion modeling. Combustor design addresses the interrelationship between operational requirements and combustion fundamentals. Precludes additional credit for MECH 5800 (MCG 5480) when MECH 5800 was offered with this topic.

**MCG5341 (MECH 5401) TURBOMACHINERY** (3cr.)
Types of machines. Similarity: performance parameters; characteristics; cavitation. Velocity triangles. Euler equation: impulse and reaction. Radial pumps and compressors: analysis, design and operation. Axial pumps and compressors: cascade and blade-element methods; staging; off-design performance; stall and surge. Axial turbines. Current design practice. Also offered at the undergraduate level, with different requirements, as MECH 4305, for which additional credit is precluded.

**MCG5342 (MECH 5402) GAS TURBINES** (3cr.)

**MCG5343 (MECH 5403) ADVANCED THERMODYNAMICS** (3cr.)
The course covers three major topics: review of fundamentals from a consistent viewpoint, properties and equations of state, and applications and special topics. The third topic includes an introduction to statistical thermodynamics.

**MCG5347 (MECH 5407) CONDUCTIVE AND RADIATIVE HEAT TRANSFER** (3cr.)
Analytical, numerical and analog solutions to steady-state and transient conduction heat transfer in multi-dimensional systems. Radiative heat exchange between black, grey, non-grey diffusive and specular surfaces, including effects of adherentous media.

**MCG5348 (MECH 5408) CONVECTIVE HEAT AND MASS TRANSFER** (3cr.)
Analogies between heat, mass and momentum transfer. Forced and free convection relations for laminar and turbulent flows analytically developed where possible and otherwise deduced from experimental results, for simple shapes and in heat exchangers. Mass transfer theory and applications.

**MCG5350 (MECH 5500) ADVANCED VIBRATION ANALYSIS** (3cr.)
General theory of discrete multi-degree-of-freedom vibrating systems. Emphasis on numerical techniques of solving complex vibrating systems, with selected applications from aeronautical, civil, and mechanical engineering.

**MCG5125 (MECH 5501) ADVANCED DYNAMICS** (3cr.)
Developing and applying the governing equations of motion for discrete and continuous mechanical systems. Includes Newton-Euler and Lagrangian formulations; classical and finite element approaches for continuous systems; and linear stability, frequency response, and propagation solution methods. Precludes additional credit for MECH 5500.

**MCG5352 (MECH 5502) OPTIMAL CONTROL SYSTEMS (3cr.)**

**MCG5353 (MECH 5503) ROBOTICS (3cr.)**
The history of and introduction to robotics methodology. Robots and manipulators; homogeneous transformation, kinematic equations, solving kinematic equations, differential relationships, motion trajectories, dynamics. Control; feedback control, compliance, servomotors, actuators, external and internal sensors, grippers and vision systems. Microprocessors and their application to robot control. Programming.

**MCG5354 (MECH 5504) GUIDANCE, NAVIGATION AND CONTROL (3cr.)**

**MCG5355 (MECH 5505) STABILITY THEORY AND APPLICATIONS (3cr.)**
Fundamental concepts and characteristics of modern stability definitions. Sensitivity and variational equations; linear variational equations; phase space analysis; Lyapunov's direct method. Autonomous and nonautonomous systems; stability in first approximation; the effect of force type on stability; frequency method.

**MCG5356 (MECH 5506) NEURO AND FUZZY CONTROL (3cr.)**

**MCG5124 (MECH 5507) ADVANCED KINEMATICS (3cr.)**
Algebraic-geometry applications: kinematic serial and in-parallel robots; kinematic synthesis of planar, spherical, spatial mechanisms. Various DH-parametrisations, Jacobian formulations. Topics in: projective geometry; Cayley-Klein geometries; Plücker line coordinates; Gröbner bases; Grassmannians; kinematic mapping; Burmester theory. Emphasis on practical applications.

**MCG5361 (MECH 5601) CREATIVE PROBLEM SOLVING AND DESIGN (3cr.)**
Problem-solving processes and how they can be applied in engineering design. Emphasis on learning methodologies rather than accumulating information. Techniques can be successfully applied in any engineering specialty. (Also offered as IDES 5301)

**MCG5362 (MECH 5602) FAILURE PREVENTION (FRACTURE MECHANICS AND FATIGUE) (3cr.)**
Design of engineering structures to ensure against failure due to fatigue or brittle fracture. Nature of fatigue and brittle fracture; selection of suitable material, geometry, and inspection procedures for the load and environmental conditions.

**MCG5364 (MECH 5604) COMPUTATIONAL METALLURGY (3cr.)**

**MCG5381 (MECH 5603) LIGHTWEIGHT STRUCTURES (3cr.)**

**MCG5365 (MECH 5605) FINITE ELEMENT ANALYSIS I (3cr.)**
An introduction to the finite element methodology, with emphasis on applications to heat transfer, fluid flow and stress analysis. The basic concepts of Galerkin's method, interpolation, numerical integration, and isoparametric elements are taught using simple examples.

**MCG5366 (MECH 5606) FINITE ELEMENT ANALYSIS II (3cr.)**
Time marching heat flow problems with linear and nonlinear analysis. Static plasticity. Time-dependent deformation problems; viscoplasticity, viscoelasticity, and dynamic analysis. Isoparametric elements and numerical integration are used throughout.

**MCG5367 (MECH 5607) THE BOUNDARY ELEMENT (BEM) METHOD (3cr.)**
Integral equations. The BEM for potential theory and for elastostatics in two-dimensions. Boundary elements and numerical integration schemes. Practical applications.

**MCG5369 (MECH 5701) METALLIC PHASES AND TRANSFORMATIONS (3cr.)**
Thermodynamics of crystals, phase diagrams, principles of alloy phases, thermal analysis. Transformation rate and mechanisms. Short and long range diffusional transformations; diffusionless transformations. Phase transformations in engineering systems. Prerequisites: MCG2361/MCG2761 or MCG2142/MCG2542 (MAAE 2700 or the equivalent).

**MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS** (3cr.)
Essential microstructural features of metals and alloys: crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

**MCG5345 (MECH 5700) SURFACES AND COATINGS** (3cr.)
Surface characteristics of solid materials and surface degradation/failure mechanisms including wear, fretting, oxidation, corrosion, and erosion are introduced. Coating methods including PVD, CVD, laser, thermal spray and electrochemical deposition are discussed in the context of failure prevention measures.

**MCG5374 (MECH 5704) INTEGRATED MANUFACTURING CIMS** (3cr.)
Topics essential to CIMS including computer graphics, geometric modelling, numerically controlled machining, and flexible manufacturing. The fundamental data structures and procedures for computerization of engineering design, analysis and production. Also offered at the undergraduate level, with different requirements, as MECH 4704, for which additional credit is precluded.

**MCG5375 (MECH 5705) CAD/CAM** (3cr.)

**MCG5480 (MECH 5800) SPECIAL TOPICS IN MECHANICAL AND AEROSPACE ENGINEERING** (3cr.)
In-depth study of a topic in Mechanical and Aerospace Engineering.

**MCG5489 (MECH 5801) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING** (3cr.)
Topics will vary from year to year.

**MCG5483 (MECH 5802) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING** (3cr.)

**MCG5488 (MECH 5803) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING** (3cr.)

**MCG5482 (MECH 5805) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING** (3cr.)

**MCG5486 (MECH 5806) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING** (3cr.)

**MCG5487 (MECH 5807) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING** (3cr.)

**MCG5398 (MECH 5908) INDEPENDENT ENGINEERING STUDY** (3cr.)
Students pursuing a master's degree by course work carry out an independent study, analysis, and solution of an engineering problem or design project. The results are given in the form of a written report and presented at a departmental seminar. Carried out under the general direction of a faculty member.

**Other Courses of Particular Interest**

**Biomedical Engineering**

**BMG5300 (BIOM 5300) MODELLING OF RUBBER-LIKE ENGINEERING MATERIALS AND BIOLOGICAL SOFT TISSUES** (3cr.)
Overview of the analytical and computational tools necessary for modelling rubber-like engineering materials and soft biological tissues: continuum mechanics for finite deformations, specific hyper-elastic constitutive equations, material characterization and finite element implementation. Ad-hoc review of physiology and microstructure of biological materials.

**BMG5319 INTRODUCTION TO MICROFLUIDICS** (3cr.)
Physics of liquid transport in micro-fabricated systems including physics at the microscale, hydrodynamics of microfluidic systems, diffusion mixing, introduction to microfabrication, examples of microfluidics devices and Micro PIV techniques, project. Prerequisites: MCG3143 or MCG3341/MCG3741 or equivalent. Strong background in fluid mechanics. Experience with computer-based projects (CAD, Matlab, CFD).

**Chemical Engineering**
CHG8188 POLYMER PROPERTIES AND CHARACTERIZATION (3cr.)
Polymer properties are described and discussed in the context of their nature, source and means of measurement. Chemical and microstructural properties; physical states and transitions; thermal properties; mechanical properties and viscoelasticity models; degradation and stability; surface, electrical and optical properties, polymer additives; structure-property relationships.

Civil and Environmental Engineering
CVG7120 (CIVE 5101) INTRODUCTORY ELASTICITY (3cr.)
CVG7121 (CIVE 5102) ADVANCED ELASTICITY (3cr.)
CVG7122 (CIVE 5103) FINITE ELEMENT METHODS IN STRESS ANALYSIS (3cr.)
CVG7126 (CIVE 5204) BEHAVIOUR AND DESIGN OF STRUCTURAL STEEL MEMBERS (3cr.)
CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)
CVG7141 (CIVE 5602) ADVANCED METHODS IN COMPUTER-AIDED DESIGN (3cr.)

Mathematics and Statistics
MATH 4806, MATH 5806

Physics
PHYS 4407, PHYS 5101

Systems and Computer Engineering
ELG6101 (SYSC 5001) SIMULATION AND MODELLING

ELG6104 (SYSC 5004) OPTIMIZATION FOR ENGINEERING APPLICATIONS (3cr.)
Introduction to algorithms and computer methods for optimizing complex engineering systems. Includes linear programming, networks, nonlinear programming, integer and mixed-integer programming, genetic algorithms and search methods, and dynamic programming. Emphasizes practical algorithms and computer methods for engineering applications.

ELG6105 (SYSC 5005) OPTIMIZATION THEORY AND METHODS

ELG6141 (SYSC 5401) ADAPTIVE CONTROL (3cr.)

ELG6142 (SYSC 5402) ADVANCED DYNAMICS WITH APPLICATIONS TO ROBOTICS (3cr.)

ELG6152 (SYSC 5502) ADVANCED LINEAR SYSTEMS (3cr.)
ELG6153 (SYSC 5503) STOCHASTIC PROCESSES (3cr.)
Basic concepts of randomness, as applied to communications, signal processing, and queueing systems; probability theory, random variables, stochastic processes; random signals in linear systems; introduction to decision and estimation; Markov chains and elements of queueing theory. Exclusion: ELG 5119.

Engineering Management

EMP5145 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
2-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach. Case studies and application project.

Anthropology

Understand the world better.

Amid social and environmental conditions that are constantly changing, anthropology offers new critical perspectives on the world by highlighting how local and global issues are interconnected. Ethnography, the discipline's field research method, makes it possible to document in real time a host of complex phenomena pertaining to diverse topics such as medicine, the environment, minorities, the media and indigenousness. Anthropology students have the opportunity to gain first-hand experience, observing and understanding contemporary issues through field research taking place around the world.

The School of Sociological and Anthropological Studies offers a Master of Arts in anthropology program. This MA in anthropology is offered as a full-time and a part-time program, in French and in English. In English, the maximum number of annual admissions is fixed according to the procedure explained in the Admission section below.

Two options are available for the master's program: the MA with thesis and the MA with research paper. Admissible students may submit a request to add the co-op option to their program.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Anthropology

Admission

Students who have a BA with honours or major in anthropology with a minimum average of 70% (B), calculated in accordance with FGPS guidelines, may be admitted to the MA program.

Students who have an honours BA with a minimum average of 70% (B) in another discipline, calculated in accordance with FGPS guidelines, may be accepted into a qualifying program, requiring them to complete a maximum of eight courses.

All students must be able to read and understand texts in French and in English. Students must indicate, in their application, the language in which they plan to take the majority of their courses. The School reserves the right to require a language test for either language.

The maximum number of students admitted annually in the MA in anthropology in English is limited to the average of admissions to the French version in the previous three years. The maximum number of admissions for the current year is available from the secretariat of the School of Anthropological and Sociological Studies

Program Requirements

MA with thesis

The requirements of the MA with thesis are the following:

- 9 compulsory course credits
  - ANT5100 COMPARATIVE THEORETICAL APPROACHES IN ANTHROPOLOGY: THE FRENCH AND ANGLO-AMERICAN TRADITIONS (3cr.)
  - ANT5141 RESEARCH METHODOLOGY IN ANTHROPOLOGY (3cr.)
  - ANT5150 RESEARCH PROPOSAL IN ANTHROPOLOGY (3cr.)
Candidates must begin the process of selecting a thesis topic and a supervisor at the beginning of their program. The supervisor must be a member of the School of Sociological and Anthropological Studies and of the FGPS. The choice of thesis topic and supervisor must be registered in the FGPS no later than the end of the second session.

One three-credit graduate course from another program may be included as an elective in the master’s program with thesis, subject to the approval of the coordinator of graduate studies in anthropology, and following consultation with the department responsible for the course.

**MA with research paper**

The requirements of the MA with research paper are the following:

- 9 compulsory credits
  - ANT5100 COMPARATIVE THEORETICAL APPROACHES IN ANTHROPOLOGY: THE FRENCH AND ANGLO-AMERICAN TRADITIONS (3cr.)
  - ANT5141 RESEARCH METHODOLOGY IN ANTHROPOLOGY (3cr.)
  - ANT6150 RESEARCH PROPOSAL IN ANTHROPOLOGY (3cr.)

- 12 elective credits
  - ANT7990 PROJET DE RECHERCHE/RESEARCH PROPOSAL
  - ANT7999 THÈSE DE MAîTRISE/MASTER’S THESIS

Up to two graduate courses (6 credits) from another program may count as coursework for the master’s program with research paper, subject to the approval of the coordinator of graduate studies in anthropology, and following consultation with the department responsible for the course concerned.

**Co-op option**

The MA in Anthropology, in collaboration with the University of Ottawa’s Co-op office, offers a co-op stream to a limited number of students. The co-op option gives selected students the opportunity to acquire practical work experience by completing two one-session (four months), work placements.

The option for the co-op stream is as follows. The first co-op placement will be in the summer of the first year and the second work placement will take place in the fall of the second year. Each work term is graded P (Pass) / F (Fail), based on the employer’s report and on a written report completed by the student. The student’s report must be 15 to 20 pages, including appendices. A Regular Professor from the Department will evaluate the student reports.

The credits awarded for co-op terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain enrolled in the co-op program, a student must:

- maintain full-time status;
- maintain a 7.0 grade point average; and
- obtain a passing grade for each co-op work term.

**Duration of program**

Full-time students are expected to fulfill all requirements of the thesis option within two years, and the research paper option within sixteen months. The maximum time permitted to complete the program is four years from the date of initial registration in the program.

**Residence**

Students admitted full-time must register full-time for at least three sessions.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) or the research proposal, or whose research progress is deemed unsatisfactory will be withdrawn from the program.

**Courses**

Not all of the courses listed are given each year. The course is offered in the language in which it is described.

**ANT5100 COMPARATIVE THEORETICAL APPROACHES IN ANTHROPOLOGY: THE FRENCH AND ANGLO-AMERICAN TRADITIONS** (3cr.)

In-depth and comparative examination of the main theoretical currents in social and cultural anthropology in the French and Anglo-American traditions. The course will also focus on the development and the points of convergence and divergence of these currents throughout the history
of anthropological thought as well as on their relative influence on anthropology in Francophone and Anglophone Canada.

**ANT5141 RESEARCH METHODOLOGY IN ANTHROPOLOGY (3cr.)**
Methodological approaches specific to anthropology: ethnographic fieldwork methods; validation problems; content analysis; relationship between research question, methods, theoretical framework, and results. Debates about the analysis of anthropological data collected in “traditional” and “modern” societies in the West and elsewhere; the qualitative-quantitative continuum; objectivity, involvement of the researcher and reflexivity; research ethics and responsibilities of the researcher.

**ANT6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)**
Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : admission au régime coop. / Prerequisite: admission to the co-op option.

**ANT6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)**
Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : ANT6001 / Prerequisite: ANT6001

**ANT6101 SELECTED TOPICS IN POLITICAL ANTHROPOLOGY AND SOCIO-CULTURAL CHANGE (3cr.)**
In-depth analysis of selected questions in the field of political anthropology and socio-cultural change (relating, for example, to indigenous peoples, immigration, cultural diversity, globalization, minority-majority relations, citizenship, gender relations, governance, security, human rights, environmental management, health, knowledge, and technology).

**ANT6102 SOCIAL AND CULTURAL ANTHROPOLOGY: FUNDAMENTAL ISSUES (3cr.)**
In-depth analysis of fundamental issues touching on one or more of the broad domains of social and cultural anthropology with the exception of political anthropology.

**ANT6103 THE ‘CULTURE’ QUESTION IN ANTHROPOLOGY (3cr.)**
Historical and critical in-depth analysis of the contributions and limitations of the notion of ‘culture’ in anthropology revolving around major issues in the discipline: identity transformations; decolonization; socio-economic upheavals and migration; global dynamics and problems of pluralism; multiculturalism and interculturalism.

**ANT6112 SELECTED TOPICS IN CONTEMPORARY ANTHROPOLOGY I (3cr.)**
In-depth examination of a question or topic linked to new trends or research areas in social and cultural anthropology.

**ANT6122 SELECTED TOPICS IN CONTEMPORARY ANTHROPOLOGY II (3cr.)**
In-depth examination of a question or topic linked to new trends or research areas in social and cultural anthropology.

**ANT6150 RESEARCH PROPOSAL IN ANTHROPOLOGY (3cr.)**
In-depth reflection on how to conceptualize and shape a research proposal, providing students with the tools required to design a research project and to discuss each stage of the project as a group. Prérequisites: ANT5541/AUT5141 and ANT5300/ANT5100.

**ANT6932 LECTURES DIRIGÉES EN ANTHROLOGIE/DIRECTED READINGS IN ANTHROPOLOGY (3cr.)**
Cours individuel ayant pour objectif d’approfondir les connaissances de l’étudiant dans un domaine particulier ou de lui permettre de se familiariser avec un nouveau domaine. Le sujet est déterminé et développé en consultation avec le professeur responsable et en conformité avec les directives du département. Le travail remis dans ce cours doit être différent de ce qui a pu être soumis dans d’autres cours, y compris le projet de recherche, la thèse ou le mémoire. On permet un maximum d’un cours de lectures dirigées par étudiant et la permission n’est accordée que dans des circonstances exceptionnelles. Préalable : permission du responsable des études supérieures en anthropologie. / Individual course aimed at deepening a student’s knowledge of a particular area or at gaining knowledge of a new area. The topic is selected and developed in consultation with the supervising professor in accordance with departmental guidelines. The work submitted for this course must be different from that submitted for other courses, including the research proposal, the thesis or the research paper. Maximum of one directed readings course per student and permission granted only under exceptional circumstances. Prerequisite: Permission of the Director of graduate studies in anthropology.

**ANT7990 PROJET DE RECHERCHE/RESEARCH PROPOSAL**
Projet individuel. Examen critique approfondi de documents dont la liste est établie conjointement par l’étudiant-e et le directeur ou la directrice de thèse ou de mémoire. Rédaction d’un projet de thèse ou de mémoire soumis à l’évaluation de deux autres membres du corps professoral (thèse) ou d’un autre (mémoire). Noté : S (satisfaisant)/ NS (non satisfaisant). Préalables : ANT 5500 et ANT 5541 / Individual Project. Critical review of a set of readings selected jointly by student and advisor. Drafting of a thesis or research paper proposal. Submission of the thesis or research paper proposal for evaluation by two other professors in the case of a thesis or one other professor in the case of the research paper. Graded: S(Satisfactory)/NS (Not satisfactory). Prerequisite: ANT7300 and ANT75141

**ANT7998 MÉMOIRE/RESEARCH PAPER**
Mémoire d’une cinquantaine de pages préparé sous la direction d’un ou deux membres du corps professoral choisis en accord avec la personne responsable des études supérieures. Le mémoire est évalué par le ou les personnes qui l’ont dirigé et un autre membre du corps professoral. Noté : S (satisfaisant) / NS (non satisfaisant). Préalable : ANT 7990 / Fifty-page research paper prepared under the direction of one or two professors chosen in consultation with the department’s graduate studies coordinator. The paper is evaluated by the (co-)advisor(s) and another professor. Graded: S(Satisfactory)/NS (Not satisfactory). Prerequisite: ANT7990
Audiology

La Faculté des sciences de la santé offre des programmes menant au diplôme d'études supérieures en études auditives-verbales et au grade de maîtrise ès sciences de la santé (M.Sc.S.) en audiologie et en orthophonie. Le programme de maîtrise a pour objectif de former des professionnels de la santé capables de travailler en français en Ontario. Les candidats devront posséder une connaissance des principes fondamentaux de la psychologie et de la linguistique et recevront une formation hautement spécialisée dans le domaine des troubles de la communication.

Le volet audiologie vise à former des cliniciens capables de faire des évaluations poussées des troubles du système auditif périphérique et central. La formation en audiologie couvrira les domaines du diagnostic audiologique, de la réadaptation auditive, de la pédoaudiologie, de l'audiologie en milieu de travail, et de l'audiologie pour personnes âgées.

Le volet orthophonie vise à former des cliniciens capables de faire des analyses et d'intervenir dans les cas de troubles du langage et de la parole, tels que des troubles de voix et de résonance, du bégaiement, de la dysphagie, des troubles de communication d'origine neurologique, et des troubles du développement du langage chez l'enfant.

Le programme d'audiologie et d'orthophonie offre deux volets d'études de deuxième cycle, soit l'audiologie et l'orthophonie, comprenant certains cours en commun.

Le programme d'études suit les normes établies par l'ACOA (l'Association canadienne des orthophonistes et audiologistes). Ainsi, les diplômés devraient être en mesure de satisfaire aux exigences en matière d'inscription à l'Ordre des audiologistes et des orthophonistes de l'Ontario, ainsi qu'à l'Ordre québécois.

Le programme à l'Université d'Ottawa est contingenté et requiert six sessions d'études à temps plein y compris les stages et l'externat de 300 heures. Les stages obligatoires au programme peuvent s'effectuer dans le sein des hôpitaux, des conseils scolaires, et des centres de réadaptation de la région de la capitale nationale. Ces stages peuvent également avoir lieu à l'extérieur de la région.

Les buts du programme sont la formation de professionnels de la santé et la poursuite de recherches en orthophonie et en audiologie, de façon à fournir des services en priorité à la population francophone. La maîtrise de la langue française étant l'outil nécessaire à la pratique de la profession, la langue première d'enseignement est le français. Aussi, à moins de permission de la part d'un responsable de cours, il est exigé que les travaux écrits, y compris les examens, soient rédigés en français et que la langue d'usage de l'étudiant soit le français. Les stages de formation clinique se font dans les deux langues.

Le programme est régi par les règlements généraux de la Faculté des études supérieures et postdoctorales (FÉSP).

Consortium national de formation en santé pour Francophones (CNFS)

Le CNFS est un organisme pancanadien dont le financement est assuré par Santé Canada. Il regroupe dix institutions d’enseignement postsecondaire offrant des programmes d’études en français dans différentes disciplines de la santé. Il vise à faciliter l’accès à des études en sciences de la santé et en médecine à des étudiants provenant de milieux francophones en contexte minoritaire. Le CNFS a permis l’ajout de places supplémentaires en audiologie/orthophonie pour des francophones issus des provinces autres que le Québec et l’Ontario. Les étudiants ainsi accueillis dans le cadre du CNFS sont fortement encouragés à faire la majorité de leurs stages cliniques dans leur province ou territoire d’origine ou encore dans un autre milieu francophone en contexte minoritaire.

Programs

Master of Health Sciences Audiology

Admission

Pour les deux volets (auudiologie et orthophonie)

Il faut :

- Détenir un baccalauréat de spécialisation (ou l’équivalent) avec une moyenne d’au moins B (70%).
- Avoir une excellente connaissance du français écrit et parlé. Il faut aussi être capable de communiquer oralement en anglais et de comprendre des articles scientifiques rédigés dans cette langue. Afin d’évaluer ces compétences linguistiques, des tests de français et (ou) d’anglais, sont exigés. Les coûts des tests de compétences linguistiques devront être assumés par le candidat.
- Avoir obtenu un minimum de 3 crédits en statistiques de niveau intermédiaire ou en méthodes quantitatives (par exemple PSY 2116/2516). Ces crédits ne sont pas inclus dans le nombre de crédits mentionné aux points b) et-dessous.
- Avoir obtenu un minimum de 3 crédits en physiologie ou en anatomie humaine (par exemple PSY 2301/2701 Fondements biologiques).
Ces crédits ne sont pas inclus dans le nombre de crédits mentionné aux point b) ci-dessous.

- Avoir obtenu 3 crédits en acoustique ou en analyse du son ou de la parole (par exemple HSS 2525).
- Passer une entrevue personnelle : Les candidats jugés admissibles devront passer une entrevue avec les représentants du programme de maîtrise.

**Pour le volet orthophonie**

Il faut de plus :

a) Avoir obtenu un minimum de 9 crédits en sciences linguistiques* comprenant :

- 3 crédits en phonétique générale (LIN 1320/1720**) ou en phonétique-phonologie.
- 3 crédits en syntaxe (LIN 2310/2710) ou en morphologie (LIN 3328/3728) ou en morphosyntaxe.
- 3 crédits pertinents de niveau avancé au 1er cycle en linguistique, de préférence en sémantique, acquisition du langage, bilinguisme, neuralinguistique ou psycholinguistique.

b) Avoir obtenu 3 crédits en psychologie du développement de l’enfant (PSY 2105/2505) ou en psychologie du développement normal au cours de la vie.

* Il est entendu que ces crédits doivent être reconnus comme des crédits en étude du langage dans le cadre de la linguistique contemporaine, et non en étude d’une langue particulière, de la littérature, de la rédaction, de la culture, ou du folklore, peu importe le département dans lequel ils ont été suivis.

** Les cotes de cours entre parenthèses représentent des équivalents à l’Université d’Ottawa, et sont donnés à titre d’exemples pour aider le candidat dans son choix de cours.

**Pour le volet audiologie**

Il faut de plus :

a) Avoir obtenu un minimum de 3 crédits pertinents en sciences linguistiques*, de préférence en phonétique générale (LIN 1320/1720**) ou en phonétique-phonologie.

b) Avoir obtenu un minimum de 3 crédits en psychologie dans un domaine pertinent (par exemple : développement de l’enfant (PSY 2105/2505), vieillissement (PSY 3128/3528), perception (PSY 3108/3508)).

* Il est entendu que ces crédits doivent être reconnus comme des crédits en étude du langage dans le cadre de la linguistique contemporaine, et non en étude d’une langue particulière, de la littérature, de la rédaction, de la culture, ou du folklore, peu importe le département dans lequel ils ont été suivis.

** Les cotes de cours entre parenthèses représentent des équivalents à l’Université d’Ottawa et sont donnés à titre d’exemples pour aider le candidat dans son choix de cours.

N.B. Des connaissances en linguistique, en psychologie ou en biologie humaine au-delà des exigences minimales décrites ci-dessus sont souhaitables. De même, le Comité d’admission sera bien disposé à l’égard des dossiers qui démontrent une familiarité avec la discipline proposée.

**Cours de conversation anglaise**

Pour préparer les étudiants à passer leurs stages en milieu bilingue, l’École des sciences de la réadaptation offre un cours de conversation anglaise (REA5940) qui peut être recommandé ou exigé selon la compétence linguistique du candidat.

**Program Requirements**

**Exigences de la maîtrise**

- Deux cours communs obligatoires pour le volet audiologie et le volet orthophonie (total : 6 crédits)
  ORA5520 FONDEMENTS SCIENTIFIQUES DE LA RECHERCHE EN AUDILOGIE ET EN ORTHOPHONIE (3cr.)
  ORA5530 SÉMINAIRE OU TRAVAIL DIRIGÉ (COURS FACULTATIF) (3cr.)
- Des cours obligatoires spécifiques à chaque volet
  - En audiologie (total : 48 crédits)
    ORA5511 SCIENCES DE L’OUÏE (3cr.)
    ORA5515 PÉDOAUDILOGIE I (3cr.)
    ORA5521 RÉADAPTATION AUDILOGIQUE AUPRÈS DE L’ADULTE (3cr.)
    ORA5541 PRATIQUE AUDILOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES I (3cr.)
    ORA5542 PRATIQUE AUDILOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES II (3cr.)
    ORA5551 PSYCHOACOUSTIQUE DE L’OREILLE ENDOMMAGÉE ET PHARMACOLOGIE (3cr.)
    ORA6510 CONCEPTS D’ORTHOophonie PERTINENTS À L’AUDILOGIE (3cr.)
    ORA6515 PÉDOAUDILOGIE II (3cr.)
Le programme est régi par les règlements généraux de la FÉSP.

**Durée du programme**

On s'attend à ce que les étudiants complètent toutes les exigences dans une période de deux ans. Le projet de recherche doit être soumis dans les deux années qui suivent l'inscription initiale au programme.

**Exigences minimales**

Une moyenne globale non cumulative calculée pour chacune des sessions doit être maintenue à un minimum de B. La note de passage dans chaque cours individuel est C+. L'étudiant qui échoue deux cours ou un stage est retiré du programme. De point de vue de ce règlement, les stages I, II, III, et IV sont équivalents à trois crédits chacun et l'externat (ORA 5660) est équivalent à six crédits.

**Courses**

La réussite dans les cours de pratique professionnelle, les stages, l'externat et le projet de recherche est obligatoire. Ces cours, qui ne portent pas de note alphabétique, seront notés S (satisfaisant) ou NS (non satisfaisant).

Il est entendu que le stage en audiologie comprendra des expériences en clinique d'orthophonie et que le stage en orthophonie comprendra des expériences en clinique d'audiologie.

**Cours en commun**

**ORA5517 PRATIQUE PROFESSIONNELLE EN AUDIOLOGIE ET EN ORTHOPHONIE** (3cr.)

Préparation aux rôles professionnels de l'audiologiste et de l'orthophoniste en milieux cliniques.

**ORA5519 STAGE I**

Préparation théorique et pratique aux stages cliniques. Observation hebdomadaire pendant 5 semaines de différents milieux de travail en audiologie et en...
étude avancée de l'évaluation et de l'intervention en contexte d'utilisation des moyens de suppléance à la communication orale et écrite. (Préalables : ORA6710 CONCEPTS D'AUDIOLOGIE PERTINENTS À L'ORTHOPHONIE

Étude des dimensions acoustiques et électroacoustiques des systèmes d'amplification et des technologies pour personnes ayant une déficience auditive.

REA6547 SANTÉ ET RÉADAPTATION AU TRAVAIL (1.5cr.)

Cours en audiologie

ORA5511 SCIENCES DE L’OUÏE (3cr.)

ORA5515 Pédoaudiologie I (3cr.)
Acquérir une connaissance des techniques de détection précoce et des méthodes d'évaluation de l'audition ainsi que des techniques d'intervention audiologique auprès de l'enfant Préalable: ORA6521) (Concomitant: ORA6541)

ORA5521 RÉADAPTATION AUDIOLOGIQUE AUPRÈS DE L’ADULTE (3cr.)
Étude appliquée des fonctions scientifiques de la recherche clinique en audiologie et en orthophonie.
Planifier et réaliser les étapes inhérentes au processus de réadaptation permettant de pallier aux conséquences des troubles du système auditif chez l’adulte. (Préalables: ORA 5511 et ORA 6521)

ORA5541 PRATIQUE AUDIOLOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES I (3cr.)
Évaluation et approches de réadaptation pour les troubles du traitement auditif et pour les problèmes audiologiques liés au vieillissement (Préalables : ORA5551 et ORA6523)

ORA5542 PRATIQUE AUDIOLOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES II (3cr.)
Évaluation et approches de réadaptation pour l’acouphène, l’hyperacousie et les troubles du système vestibulaire. (Préalables : ORA5551 et ORA6523)

ORA5551 PSYCHOACOUSTIQUE DE L’OREILLE ENDOMMAGÉE ET PHARMACOLOGIE (3cr.)
Physiologie du système auditif périphérique endommagé. Phénomènes psychoacoustiques de l'audition altérée. Pharmacologie et ototoxicité. (Préalables : ORA5511, ORA6520 et ORA6521)

ORA6510 CONCEPTS D’ORTOPHONIE PERTINENTS À L’AUDIOLOGIE (3cr.)
Une introduction aux troubles de la parole et du langage chez l’enfant et l’adulte, leurs caractéristiques et leurs effets sur la communication.

ORA6515 PÉDOAUDIOLOGIE II (3cr.)

ORA6520 ÉVALUATION AUDIOLOGIQUE I (3cr.)
Planifier et réaliser les étapes inhérentes au processus d’évaluation permettant d’identifier et de comprendre un problème du système auditif périphérique (oreille externe, moyenne et interne), et de mesurer les progrès effectués suite à une intervention le cas échéant.

ORA6521 AIDES AUDITIVES I (3cr.)
Étude des dimensions acoustiques et électronicoacoustiques des systèmes d'amplification et des technologies pour personnes ayant une déficience auditive. (Concomitant: ORA5511 et ORA6520).

ORA6522 INSTRUMENTATION EN AUDIOLOGIE (3cr.)
Étude des composantes et principes de fonctionnement des principaux appareils utilisés en pratique audiological. Rôle de l’instrumentation lors de l’évaluation, de l’intervention et du calibrage. (Concomitants : ORA5511 et ORA6520)

ORA6523 ÉVALUATION AUDIOLOGIQUE II (3cr.)
Principes avancés d'évaluation de troubles audiologiques chez des populations avec dysfonction auditive périphérique et centrale. (Préalables : ORA5511, ORA6520 et ORA6522)

ORA6541 ÉVALUATIONS ÉLECTROPHYSIOLOGIQUES (3cr.)
Étude des fondements des réponses neurophysiologiques du système auditif et de l'importance clinique des potentiels évoqués du tronc cérébral et des émissions oto-acoustiques pour l'évaluation audiologique. Introduction aux potentiels évoqués de latence courte, moyenne, longue et réponses corticales. (Préalable: ORA5511)

ORA6542 AIDES AUDITIVES II (3cr.)
Méthodes de sélection, d'ajustement, de vérification et de validation des appareils auditifs. Préalable : ORA6521)

ORA6544 AIDES AUDITIVES III (3cr.)
Étude des systèmes d’amplification implantables et hybrides pour personnes ayant une déficience auditive. (Préalables : ORA5515, ORA6523 et ORA6542)

ORA6550 LE BRUIT ET L'AUDIOLOGIE (3cr.)
Effets psychologiques et physiologiques du bruit, inventaire des réglementations, normes et solutions aux problèmes de bruit. L’audiologiste en tant que consultant en milieu environnemental, industriel, professionnel et scolaire. (Préalables: ORA6522 et ORA6523)

Cours en orthophonie
ORA5512 SCIENCES DE LA PAROLE APPLIQUÉES À L’ORTOPHONIE (3cr.)
Étude approfondie de la production (respiration, phonation, articulation, résonance, prosodie et fluidité) et de la perception (traitement auditif) de la parole.

ORA5513 ANATOMIE ET PHYSIOLOGIE APPLIQUÉES À L’ORTOPHONIE (3cr.)
Étude appliquée de l’anatomie, de la physiologie, et de la neurologie de la communication, de la déglutition et de l’audition.

ORA5522 TROUBLES DE LA COMMUNICATION LIÉS AUX TROUBLES D’AUDITION (3cr.)
Étude avancée de l’évaluation et de l’intervention des difficultés de communication des individus ayant une perte auditive périphérique ou neurosensorielle ou encore un trouble de traitement auditif. (Préalables : ORA6710, ORA6713, ORA6721, ORA6723, ORA6724, ORA6743 et ORA6753)

ORA6710 CONCEPTS D'AUDIOLOGIE PERTINENTS À L'ORTOPHONIE (3cr.)

**ORA6713 TROUBLES DÉVELOPPEMENTAUX DU LANGAGE EN PETITE ENFANCE (3cr.)**
Étude approfondie de la prévention, de l'évaluation et du traitement des difficultés développementales du langage oral et écrit chez les enfants d’âge préscolaire. (Préalables : ORA5513 et ORA6746 Concomitants : ORA6721 et ORA6723)

**ORA6721 TROUBLES DÉVELOPPEMENTAUX DES SONS DE LA PAROLE (3cr.)**
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés développementales des sons de la parole pendant les périodes préscolaire et scolaire. (Préalables: ORA 5512, ORA5513 et ORA6746 Concomitants : ORA6713 et ORA6723)

**ORA6723 TROUBLES DÉVELOPPEMENTAUX DU LANGAGE EN MILIEU SCOLAIRE (3cr.)**
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés développementales du langage oral et écrit chez les jeunes d’âge scolaire. (Préalables : ORA 5513 et ORA6746 Concomitants : ORA6721 et ORA6713)

**ORA6724 APHASIES (3cr.)**
Étude approfondie de l’évaluation et du traitement des difficultés acquises du langage oral et écrit reliées à l’aphasie. (Préalables : ORA 5513 et ORA6746 Concomitants : ORA6741 et ORA6753)

**ORA6741 TROUBLES ACQUIS DE LA PAROLE (3cr.)**
Étude approfondie de l’évaluation et du traitement des difficultés acquises de la parole. (Préalables: ORA5513, ORA5512 et ORA6746 Concomitants : ORA6724 et ORA6753)

**ORA6742 TROUBLES DE LA FLUIDITÉ (3cr.)**
Étude approfondie de la prévention, de l'évaluation et du traitement des difficultés de la fluidité. (Préalables: ORA5512 et ORA5513)

**ORA6743 TROUBLES DE LA VOIX (3cr.)**
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés de la phonation et de la résonnance. (Préalables : ORA5512, ORA5513 et ORA6746)

**ORA6744 TROUBLES DE LA COMMUNICATION DES CLIENTÈLES SPÉCIFIQUES (3cr.)**
Étude avancée de l’évaluation et du traitement des difficultés de la communication reliées aux troubles du spectre de l’autisme, à la déficience intellectuelle, aux maladies congénitales, au mutisme et aux malformations crânio-faciales. (Préalables : ORA6713, ORA6721, ORA6723, ORA6724, ORA6741, ORA6743, ORA6752 et ORA6753)

**ORA6745 SUPPLÉANCE À LA COMMUNICATION ORALE ET ÉCRITE (3cr.)**
Étude avancée de l’évaluation et de l’intervention en contexte d’utilisation des moyens de suppléance à la communication orale et écrite. (Préalables : ORA6713, ORA 6721, ORA6723, ORA6724, ORA6741, ORA6743 et ORA6753)

**ORA6746 DÉVELOPPEMENT ET FONCTIONNEMENT TYPIQUES DE LA COMMUNICATION ET DE LA DÉGLUTITION (3cr.)**
Étude approfondie des modèles de développement et de fonctionnement typiques de la communication et de la déglutition.

**ORA6752 TROUBLES DE LA DÉGLUTITION ET ALIMENTATION (3cr.)**
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés de la déglutition et des difficultés d’alimentation qui en découlent. (Préalables : ORA5513 et ORA6746)

**ORA6753 TROUBLES COGNITIVO-LINGUISTIQUES ACQUIS (3cr.)**
Étude approfondie de l’évaluation et du traitement des difficultés cognitivo-linguistiques acquises suite à une lésion de l’hémisphère non-dominant, un traumatisme crânien et des maladies dégénératives incluant les démences. (Préalables : ORA5513 et ORA6746 Concomitants : ORA6724 et ORA6741)
Programs

Master of arts Bilingualism Studies

Admission

To be admitted to the MA program in Bilingualism Studies, candidates must have one (1) of the following:

- An honours bachelor’s degree or equivalent in Second Language Teaching / Didactique des langues secondes, in Applied Linguistics or in a related discipline.
- A three-year bachelor’s degree in Applied Linguistics or a related discipline in addition to a university-level, university-administered advanced certificate in TESOL (Teaching of English to Speakers of Other Languages), representing a minimum of 30 credits.

The minimum admission average is 70% (B), calculated in accordance with FGPS guidelines.

Language requirements

All applicants must be able to understand, speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the specific requirements of the program.

Additional coursework

The Admissions Committee may, depending on the students’ academic background, require them to complete one or two additional courses beyond the basic MA degree requirements.

Program Requirements

MA with thesis (12 credits)

The requirements of the MA with thesis are the following:

- 6 credits of compulsory courses (BIL5101/ BIL5501 and BIL5102/BIL5502).
  Note that one compulsory course must be completed in English and the other in French.
- Electives (6cr.)
- Thesis Proposal (BIL7990)
- Master’s Thesis (BIL7999)

Candidates must begin the process of selecting a thesis topic and supervisor during their first session in the program. The supervisor must be a member of the Faculty of Graduate and Postdoctoral Studies (FGPS). The choice of thesis topic and supervisor must be registered officially no later than the end of the second session.

Thesis Proposal (BIL7990)

The thesis proposal is prepared under the direction of the thesis supervisor and must be defended orally. The proposal must normally be successfully completed by the end of the third session. In the event of failure, the proposal can be resubmitted and defended the following session at the latest. A second failure leads to withdrawal from the program. The proposal must be successfully completed before submitting it to the Research Ethics Board (if required) and before undertaking any independent data collection.

MA with research paper (18 credits)

The requirements of the M.A. with research paper are the following:

- 6 credits of compulsory courses (BIL5101/5501 and BIL5102/5502).
  Note that one compulsory course must be completed in English and the other in French.
- 12 credits of electives
  Two electives (6 credits) may, with prior approval of the program director, be selected from graduate courses offered by other departments.
- Research Paper (BIL7998)

Duration of the program

Full-time students are expected to fulfill all requirements of the thesis option within two years and of the research paper option within sixteen months. The maximum time permitted is four years from the date of initial registration in the program.
Residence

Students admitted full-time must register full-time for at least three sessions.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), or the thesis proposal or whose research progress is deemed unsatisfactory must withdraw from the program.

Courses

Please note that not all courses listed are offered every year. Students should consult the website of the department for a list of courses offered in a given academic year.

BIL.5101 Issues in Bilingualism Studies (3cr.)
Theories of language and language learning. Social factors, processes, conditions, and learner factors in second language learning. Bilingualism, multilingualism, and cross-cultural communication. Political, social, and cultural factors in planning and implementing language policy. Language planning and policy evaluation. Research applications in these areas.

BIL.5102 Research Methodology in Bilingualism Studies (3cr.)
Approaches to the design of studies, data collection instruments and procedures and analysis of data in second language learning and use. The role of statistics. Experimental and quasi-experimental methods. Quantitative and qualitative methodologies.

BIL.5103 Assessment of Second Language Competence (3cr.)

BIL.5104 Trends and Issues in Research on Technology-Assisted Language Learning (3cr.)
Critical analysis of trends and issues in research on the design, integration, use and evaluation of multimedia and information and communication technologies in adult second language learning. Overview of innovative research and development methods, and tools and unique techniques used in Computer-assisted language learning (CALL).

BIL.5105 Electronic Corpora in Second Language Learning (3cr.)

BIL.5106 Adult Second/Foreign Language Skills Development (3cr.)
Critical examination of the theoretical principles underlying learning of the major language skills (listening, speaking, reading and writing) and component skills (grammar, vocabulary and pronunciation). Survey of research and practice related to learning language skills.

BIL.5107 Language Planning and Policy in Canada (3cr.)

BIL.5108 The Politics of Language, Power and Identity: Canada and the World (3cr.)
Exploration of the politics of language, language policy, planning and practice of “global” languages in a second, minority or foreign language teaching contexts. Critical evaluation of social control of language use and through language. Macro (national) to micro (classroom) contexts of teaching. Reproduction, resistance and transformation of sociopolitical and linguistic ideologies and practices.

BIL.5120 SPECIAL TOPICS IN BILINGUALISM STUDIES (3cr.)
In-depth study of a selected topic in bilingualism studies.

BIL.5501 Questions en études du bilinguisme (3cr.)
BIL.5502 Méthodologies de recherche en études du bilinguisme (3cr.)

BIL.5503 Évaluation de la compétence en langue seconde (3cr.)

BIL.5504 Tendances et enjeux de la recherche en apprentissage des langues assisté par ordinateur (3cr.)
Analyse critique des tendances et enjeux de la recherche portant sur la conception, l'intégration, l'utilisation et l'évaluation du multimédia et des technologies de l'information et de la communication en apprentissage des langues assisté par ordinateur (ALAO). Vue d'ensemble des méthodes innovantes de recherche et développement sur les outils ainsi que techniques utilisées en ALO.

BIL.5505 Corpus électroniques en apprentissage des langues secondes (3cr.)

BIL.5506 Développement des compétences en langue seconde/étranger chez les adultes (3cr.)
Exploration critique des principes théoriques sous-jacents à l’apprentissage des compétences langagières (écouter, lire, parler, écrire) et linguistiques (grammaire, vocabulaire et ponctuation). Examens des recherches et des pratiques liées au développement des compétences en langue seconde.

BIL.5507 Planification et politique linguistiques au Canada (3cr.)

BIL.5508 Langue, pouvoir et politiques identitaires : le Canada et le Monde (3cr.)
Exploration des politiques liées à la langue, politique linguistique, planification et pratique des langues «mondiales» en contextes d'enseignement de langue seconde, minoritaire ou étrangère. Évaluation critique du contrôle social de l'usage de la langue et par la langue. Contextes macro (national) à micro (la salle de classe) de l'enseignement. Reproduction, résistance et transformation de diverses idéologies et identités sociopolitiques et linguistiques.

BIL.5520 THÈMES CHOISIS EN ÉTUDES DU BILINGUISME (3cr.)
Étude approfondie d’un thème choisi en études du bilinguisme.

BIL.5920 SPECIAL TOPICS IN BILINGUALISM STUDIES / THÈMES CHOISIS EN ÉTUDES DU BILINGUISME (3cr.)
In-depth study of a selected topic in bilingualism studies. / Étude approfondie d’un thème choisi en études du bilinguisme.

BIL.7990 Projet de thèse/Thesis Proposal

BIL.7998 Mémoire/Research Paper
Mémoire d’une longueur de 12,500 mots (sans compter la bibliographie) préparé sous la direction d’un ou deux membres du corps professoral choisis en accord avec la personne responsable des études supérieures. Le mémoire est évalué par le ou les personnes qui l’ont dirigé et un autre membre du corps professoral. Note: S (satisfaisant) / NS (non satisfaisant). Préalables: toutes les exigences de cours. // Research paper (about 12,500 words, excluding the bibliography) prepared under the direction of one or two professors chosen in consultation with the director of graduate studies. The paper is evaluated by the (co)-advisor(s) and another professor. Graded: S (Satisfactory)/NS (Not satisfactory). Prerequisites: All course requirements.

BIL.7999 Thèse de maîtrise/Master’s Thesis
Préalable: BIL.7990 / Prerequisite: BIL.7990

**Biochemistry**

The Department of Biochemistry, Microbiology and Immunology located in the Faculty of Medicine offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in Biochemistry.
The programs prepare candidates for a variety of careers in teaching and research both within and outside of academia. Graduate students are actively involved in laboratory research, course work, and presentation of research seminars. Thus, they acquire autonomy in conducting research and in preparing publications. The programs create a stimulating and challenging environment which will allow students to achieve excellence in research. Graduates of the programs must demonstrate research skills and credibility as professionals in their area of research.

Members of the Department are involved in three main research fields: general biochemistry, molecular biology, and, nutrition and metabolism. Further information is posted on the departmental website.

The Department is a participating unit in the following collaborative programs: the Bioinformatics program (at the master’s level), the Human and Molecular Genetics program (at the master’s and doctoral levels), and the Pathology and Experimental Medicine program (at the master’s and doctoral levels).

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Biochemistry and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Science Biochemistry

Master of Science Biochemistry Specialization in Bioinformatics

Master of Science Biochemistry Specialization in Human and Molecular Genetics

Master of Science Biochemistry Specialization in Pathology and Experimental Medicine

Doctorate in Philosophy Biochemistry

Doctorate in Philosophy Biochemistry Specialization in Human and Molecular Genetics

Doctorate in Philosophy Biochemistry Specialization in Pathology and Experimental Medicine

**Admission**

Admission to the graduate program in Biochemistry is governed by the general regulations of the FGPS.

To be considered for admission, applicants must:

- Hold a bachelor’s degree with a specialization or a major (or equivalent) in science, an MD (Doctor of Medicine) degree, or a DVM (Doctor of Veterinary Medicine) degree with a minimum average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The Department may require students to take additional courses depending on their backgrounds.

**Collaborative program in Bioinformatics**

The Department of Biochemistry, Microbiology and Immunology is a participating unit in the collaborative program in Bioinformatics (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. The thesis director must be a member of the collaborative program. For further details, see the description of the Bioinformatics program posted on the FGPS website.

**Collaborative program in Human and Molecular Genetics**
The Department of Biochemistry, Microbiology and Immunology is a participating unit in the collaborative program in Human and Molecular Genetics (master’s and doctoral levels). Students should indicate in their initial application for admission that they wish to be accepted into this program. The thesis director must be a member of the collaborative program. For further details, see the description of the Human and Molecular Genetics program posted on the FGPS website.

**Collaborative program in Pathology and Experimental Medicine**

The Department of Biochemistry, Microbiology and Immunology is a participating unit in the collaborative program in Pathology and Experimental Medicine (master’s and doctoral levels). Students should indicate in their initial application for admission that they wish to be accepted into this program. The thesis director must be a member of the collaborative program. For further details, see the description of the Pathology and Experimental Medicine program posted on the FGPS website.

**Program Requirements**

**MSc in Biochemistry**

The following requirements must be met:

- Successful completion of compulsory course MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS.
- Successful completion of 6 credits of approved 8000-level and above BCH courses.
- Successful completion of the seminar BCH5366, which involves the presentation of a seminar and regular attendance at the departmental seminars until permission to write the thesis is granted.
- Successful presentation and defense of a thesis (BCH7999) based on original research carried out under the direct supervision of a research faculty member in the Department.

**Collaborative program in Bioinformatics**

The requirements specific to the collaborative program are as follows:

- 3 compulsory credits in bioinformatics (BNF5106/BIO5106).
- Registration in the seminar course in bioinformatics (BNF6100), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.
- Successful presentation and defense of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the bioinformatics collaborative program.

The primary program may require students to take additional courses, depending on their backgrounds.

**Collaborative program in Human and Molecular Genetics**

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The requirements specific to the collaborative program are:

- Six credits of courses, three credits of which must be from the student’s primary program and three of which must be HMG credits.
- Enrolment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Successful presentation and defense of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Master's candidates intending to transfer directly to the doctoral program must meet the conditions set by their primary program.

Course selection is subject to the approval of the HMG program director.

The Department may require students to take additional courses, depending on their backgrounds. Students wishing to take a course in a related discipline must obtain prior approval from the Department.

**Collaborative program in Pathology and Experimental Medicine**

The requirements and regulations of both the primary program and of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Successful presentation and defense of a thesis on a topic in pathology and experimental medicine based on original research carried out under the supervision of a professor who is a member of the Pathology and Experimental Medicine collaborative program. At least one of
the thesis examiners must be a member of the Pathology and Experimental Medicine collaborative program.

Transfer from master’s to PhD

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

Duration of program

The requirements of the program are usually fulfilled within two years of full-time studies. The maximum time permitted in four years.

Residence

All students must complete a minimum of three sessions of full-time registration.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) will be withdrawn from the program.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

BCH5101 ANALYSIS OF –OMICS DATA (3cr.)
Theoretical and practical aspects of various methods currently used to analyze the plethora mountain of –omics data. Methods: sequence alignment and database searches; sequence analysis and bioinformatics of gene regulation; DNA microarray and sequencing technologies to identify transcription factor binding sites; analysis of proteomics data; statistical analysis of preprocessed gene expression and protein/metabolite abundance data; epidemiology applications. Critical reading of the literature and strategies for making informed choices of methods for the analysis of students’ own data. Prerequisites: BCH2333, BCH3170.

BCH5366 MSc SEMINAR (3cr.)
Attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Biochemistry. Students must present at least one poster and one oral presentation during the course of their program. Graded S/NS

BCH7999 RECHERCHE POUR LA THÈSE DE MAÎTRISE / MSC THESIS RESEARCH
À l’intention des étudiants faisant de la recherche en vue de l’obtention de la maîtrise. Les étudiants doivent soumettre au Département un plan détaillé de la recherche qu’ils se proposent de faire. Ils doivent rencontrer leur comité consultatif de thèse au moins une fois par année et soumettre un rapport de progrès au Département. / For students doing research leading to the master’s degree. Students must ensure that a detailed outline of their proposed research is on file with the Department. They must meet at least once per year with their thesis advisory committee and submit a progress report to the Department.

BCH8101 PHYSICAL AND CHEMICAL METHODS IN BIOCHEMISTRY (3cr.)
Current applications of physical and chemical methods to the study of macromolecule structure-function relationships.

BCH8102 SELECTED TOPICS IN PROTEIN STRUCTURE AND FUNCTION (3cr.)
An advanced study of recent literature dealing with structure-function relationships in selected proteins.

BCH8103 ADVANCED TOPICS IN GENE EXPRESSION AND PROTEIN SYNTHESIS (3cr.)
An advanced study of the recent literature dealing with the chemistry, metabolism and function of nucleic acids, the biosynthesis of proteins, biochemical and genetic control mechanisms, genetic engineering and the control of gene expression. Offered every second year in alternation with BCH8105. Prerequisite: BPS 4101 or equivalent with the permission of the instructor.

BCH8104 ADVANCED TOPICS IN CELL REGULATION (3cr.)
An advanced study of recent literature dealing with signal transduction processes and the regulation of metabolism, cell proliferation and differentiation. Prerequisites: Offered in alternate years.

BCH8105 ADVANCED TOPICS IN MOLECULAR BIOLOGY OF HUMAN DISEASES (3cr.)
Topics will be selected and representative of current developments in the field. The course consists of a repeated series of a 3 hour lecture by an expert in the field one week, followed by student presentations, discussions and critique of assigned papers on that topic the following week. Topics on selected diseases will focus on various aspects of cancer, apoptosis, disease gene identification and gene therapy. In the past these topics have included the molecular aspects of various cancers, spinal muscular atrophy, tissue regeneration, the discovery of disease genes, infectious disease (HIV) and gene therapy. Students will write a grant proposal and participate in mock grant review panels. Depending on enrolment, the course may be limited to HMG students only. Prerequisite: Permission of the HMG program director.

BCH8106 ADVANCED TOPICS IN NUTRITION AND REGULATION OF METABOLISM (3cr.)
An advanced study of the recent literature dealing with metabolism, nutrition and metabolic control theory, with emphasis on both whole body and cell metabolism in metabolic and nutritional disorders such as obesity and non-insulin-dependent diabetes mellitus (NIDDM).
BCH8107 ADVANCED TOPICS IN STRUCTURE AND FUNCTION OF PLASMA LIPOPROTEINS (3cr.)
Recent advances in our knowledge of the plasma lipoproteins with a special emphasis on their role in the etiology of atherosclerosis. The subject will be introduced by an overview of the general structural properties of lipoproteins which will be followed by detailed discussion of the structure, metabolism and genetics of the apolipoproteins, the proteins and enzymes that modify lipoproteins and cell surface lipoprotein receptors. Other topics will include cholesterol homeostasis, plasma cholesterol transport and disorders of lipoprotein metabolism.

BCH8108 ADVANCED METHODS OF MACROMOLECULAR STRUCTURE DETERMINATION (3cr.)
A detailed examination of modern methods used to determine the structures of proteins, nucleic acids, and carbohydrates. May include X-ray crystallography, electron diffraction, nuclear magnetic resonance, and other spectroscopic methods.

BCH8109 ADVANCED TOPICS IN CELL DEATH (3cr.)
Molecular mechanisms of cell death. Particular attention to be paid to role of aberrant cell death in human disease. Offered in the Fall of odd numbered years.

BCH8110 ADVANCED TOPICS IN SYSTEMS BIOLOGY (3cr.)
Recent advances in genomics, proteomics, bioinformatics, and neuroinformatics including functional and chemical genomics, RNA analyses, microarrays, mass spectrometry, and neural imaging. Course requirements include student presentations and writing a mock research proposal based on Canadian Institutes of Health Research (CIHR) guidelines. Limited enrollment. Offered in alternate years with BCH 8101 Physical and Chemical Methods in Biochemistry. Prerequisite: Permission of the program director.

BCH8111 CHROMOSOME AND CHROMATIN RECOMMENDATION (3cr.)
Higher order chromosome and chromosome remodeling and their impact on regulation of gene expression, DNA replication, repair and recombination, and chromosome segregation. Histone modifications and nucleosome positioning and their influence on higher order chromosome structure. Importance of chromosome and chromatin in the context of the cell cycle, development, and disease. Critical reading of the literature on chromosome and chromatin biology.

BCH8114 ADVANCED TOPICS IN THE CELL CYCLE (3cr.)
Mechanisms of cell cycle regulation. Model systems critical to deciphering the cell cycle in eukaryotes: budding and fission yeast, Xenopus laevis egg extracts, Aspergillus nidulans, Drosophila melanogaster, sea urchin and mouse oocytes and cultured vertebrate cells. Overview of the prokaryotic cell cycle.

BCH8116 MODEL ORGANISMS AND SYSTEMS BIOLOGY (3cr.)
Utilization of model organisms in the development and advancement of the systems biology field. Particular attention will be paid to the use of organisms such as Saccharomyces cerevisiae as a model platform for cell cycle progression/cancer. Other models may also be included. The basics of the technology will be discussed along with the application of technology to complex biological questions, in particular relating to the cell cycle. Course offered in alternate years.

BCH8117 ADVANCED TOPICS RELATING TO THE CELL CYTOSKELETON AND MEMBRANES (3cr.)
Advanced study of recent literature dealing with the mammalian cellular cytoskeleton and membrane with an emphasis on the regulation of cell motility, adhesion and cell division.

BCH8134 STRUCTURE AND EXPRESSION OF EUKARYOTIC AND PROKARYOTIC GENOMES (3cr.)
Sequencing of eukaryote and prokaryote genomes with emphasis on recent technologies, sequence alignments and databases and assembly of genomes from massively parallel sequencing data. Focus on mapping studies, including linkage disequilibrium-based genome-wide association study (GWAS), to characterize functional variants associated with complex traits. Analysis and structure of microbial metagenomes from environmental and human habitats, including structure-function analysis of microbial communities, microbiota-human disease correlations, and molecular phylogeny. Genome expression, including measures of RNA transcripts and proteins and statistical analysis of data. Combination of various -omics data to understand gene-environment interactions.

BCH8165 SPECIAL TOPICS IN BIOCHEMISTRY I (3cr.)
A survey of recent advances in selected areas of biochemistry.

BCH8166 Special Topics in Biochemistry II (3cr.)
A survey of recent advances in selected areas of biochemistry.

BCH8310 CURRENT TOPICS IN RNA MOLECULAR BIOLOGY (3cr.)
Properties, mechanisms associated with regulation and the functions of RNAs and Ribonucleoprotein (RNP) as well as RNA organisms. Current knowledge on RNA expression (synthesis, processing, transport and localization), the structure-function relationship and molecular mechanisms associated with RNAs and RNA genomes, RNA in evolution and in the origin of life, and RNA as therapeutic agents. Prerequisites: BCH/BIO 3570-3710 or equivalent with the permission of the program director. Exclusion: CMM 8310.

BCH8366 PhD SEMINAR (3cr.)
Attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Biochemistry. Students will present a poster in their first and every alternate year, and an oral presentation the second and every alternate year until they have permission to write their thesis. Graded S/NS

BCH9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)
À l’intention des étudiants inscrits au programme de Ph.D. L’inscription à ce cours est limitée à trois sessions consécutives. / For students enrolled in the doctoral program. Enrollment in this course is limited to three consecutive academic sessions.

BCH9999 RECHERCHE POUR LA THÈSE DE DOCTORAT / DOCTORAL THESIS RESEARCH
À l’intention des étudiants faisant de la recherche en vue de l’obtention du doctorat. Les étudiants doivent soumettre au Département un plan détaillé de la recherche qu’ils se proposent de faire. Ils doivent rencontrer leur comité consultatif de thèse au moins une fois par année et soumettre un rapport de progrès au Département. / For students doing research leading to the doctoral degree. Students must ensure that a detailed outline of their proposed research is on file with the Department. They must meet at least once per year with their thesis advisory committee and submit a progress report to the Department.

**CMM 5315 Cellular and Molecular Basis of Cardiovascular Function/Dysfunction (3cr.)**
Mechanism of failing heart and cardiovascular system, its associated functions and associated conditions. Therapies for restoring function. Topics include: regulation of heart development, cell signaling, cellular and molecular mechanisms of atherosclerosis and heart disease, hormonal regulation, hypertension, bioenergetics, cardiovascular genomics and genetics, cell therapy, and regenerative medicine.

**HMG 8106 Clinical Cytogenomics (3cr.)**
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG 8107 Clinical Biochemical Genetics (3cr.)**
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG 8108 Clinical Molecular Genetics (3cr.)**
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**MED 8106 Professionalism and Professional Skills**
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

**Bioinformatics (Collaborative)**

**Ottawa-Carleton joint program**

The collaborative program in bioinformatics combines the research strength of the University of Ottawa and Carleton University. The Institutes offer graduate programs leading to the master’s (MSc and MAsC) and doctoral (PhD) degrees in several fields (biology, chemistry, earth sciences, etc.).

Bioinformatics is an emerging and increasingly important scientific discipline dedicated to the pursuit of fundamental questions about the structure, function and evolution of biological entities through the design and application of computational approaches. Fundamental research in these areas is expected to increase our understanding of human health and disease which translates into innovation in industry. Bioinformaticians today must be able to appreciate significant research in other fields and therefore require an understanding of the basic principles of other disciplines. To meet this challenge Carleton University and the University of Ottawa offer a collaborative program leading to a master of science degree in the primary program with specialization in Bioinformatics or, in the case of computer science, a master of computer science degree with specialization in Bioinformatics.

The program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The **general regulations** of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

**Participating programs**

The following primary programs participate in the collaborative program in Bioinformatics:

- Four Ottawa-Carleton joint programs:
  - MSc in Biology
  - MSc in Mathematics and Statistics
  - Master of Computer Science
  - MSc in Biomedical Engineering

- Three programs located exclusively in the University of Ottawa:
  - MSc in Cellular and Molecular Medicine
  - MSc in Biochemistry
  - MSc in Microbiology & Immunology
Programs

Master of Applied Science Biomedical Engineering Specialization in Bioinformatics
Master of Computer Science Specialization in Bioinformatics
Master of Science Biochemistry Specialization in Bioinformatics
Master of Science Biology Specialization in Bioinformatics
Master of Science Cellular and Molecular Medicine Specialization in Bioinformatics
Master of Science Mathematics and Statistics Specialization in Bioinformatics
Master of Science Microbiology and Immunology Specialization in Bioinformatics

Admission

Admission to the collaborative program in bioinformatics is governed by the general regulations of the Ottawa-Carleton Joint Institutes and by the general regulations of the FGPS.

Candidates must indicate in their admission form that they wish to be accepted in the collaborative program.

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the "Admission" section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Applications are evaluated based on the following criteria:

- Be admitted in one of the programs participating in the collaborative program.
- Provide at least one letter of recommendation from a professor who is willing and available to act as thesis supervisor.
- Be sponsored into the collaborative program by a faculty member, normally the thesis supervisor, who must be appointed, cross-appointed or stand as an adjunct at one or more of the participating units.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Program Requirements

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The requirements specific to the collaborative program are as follows:

- 3 compulsory credits in bioinformatics (BNF5106).
- Enrollment in BNF6100 (the seminar course in bioinformatics), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.
- Presentation and defence of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the bioinformatics collaborative program.

The primary program may require students to take additional courses, depending on their backgrounds.

NOTE:

- For biochemistry, biology, computer science, and mathematics:
  - BNF5106 counts towards degree requirements.
  - BNF6100 must be taken in addition to the regular seminar course of the primary program.
- For cellular and molecular medicine, and biomedical engineering:
  - Both BNF5106 and BNF6100 count towards degree requirements.
- For microbiology and immunology:
  - Both BNF5106 and BNF6100 must be taken in addition to the primary program requirements.
Minimum standards

The passing grade in all BNF courses is B. Students who fail two courses, or whose research progress is deemed unsatisfactory will be withdrawn from the program.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

BCH8102 SELECTED TOPICS IN PROTEIN STRUCTURE AND FUNCTION (3cr.)
An advanced study of recent literature dealing with structure-function relationships in selected proteins.

BCH8108 ADVANCED METHODS OF MACROMOLECULAR STRUCTURE DETERMINATION (3cr.)
A detailed examination of modern methods used to determine the structures of proteins, nucleic acids, and carbohydrates. May include X-ray crystallography, electron diffraction, nuclear magnetic resonance, and other spectroscopic methods.

BIO5207 (BIOL 5500) SELECTED TOPICS (6cr.)
Courses in selected aspects of specialized biological subjects, not covered by other graduate courses; course details will be available at registration.

BIO5302 (BIOL 5105) METHODS IN MOLECULAR GENETICS (3cr.)
Theory and associated applications of emerging methods in molecular genetics, including information gathered from large-scale genome-wide analysis and protein-protein interaction data, and how this information can advance understanding of cell biology. Prerequisites: Graduate standing and permission of the department.

BIO5306 (BIOL 5409) MODELLING FOR BIOLOGISTS (3cr.)
Use and limitations of mathematical and simulation modelling approaches for the study of biological phenomena.

BIO8100 (BIOL 5501) SELECTED TOPICS IN BIOLOGY I (3cr.)
Lectures and/or seminars dealing with current advances in a selected area or branch of biology, not covered by other graduate courses.

BIO8102 (BIOL 5502) SPECIAL TOPICS IN BIOLOGY (3cr.)
Selected aspects of specialized biological subjects not covered by other graduate courses.

BIO8301 (BIOL 5201) EVOLUTIONARY BIOINFORMATICS (3cr.)
Fundamental concepts in molecular evolution and hands-on experience with computer analysis of DNA sequences. Topics may include molecular sequence databases, multiple alignments and phylogenetic trees. Prerequisite: Graduate standing plus basic courses in genetics and evolution; permission of the department.

BMG5111 (BIOM 5403) ADVANCED TOPICS IN MEDICAL INFORMATICS AND TELEMEDICINE (3cr.)
Recent and advanced topics in the field of medical informatics and telemedicine and its related areas. Prerequisite: permission of the program director.

BMG5317 (BIOM 5400) MEDICAL COMPUTING (3cr.)
Introduction to the information technology research used in medically related fields such as biotechnology, cancer treatment, and biometrics. Topics of current interest such as medical imaging, telemedicine, telesurgery, DNA analysis, and medical information systems.

BNF5106 BIOINFORMATICS (3cr.)
Major concepts and methods of bioinformatics. Topics may include, but are not limited to: genetics, statistics & probability theory, alignments, phylogenetics, genomics, data mining, protein structure, cell simulation and computing.

BNF5107 APPLIED BIOINFORMATICS (3cr.)
Computational knowledge discovery in and the dynamic nature of cellular networks. Includes, but is not limited to, knowledge representation, large scale data integration, data mining and computational systems biology.

BNF6100 MSc SEMINAR (3cr.)
Current topics in bioinformatics presented by program professors and invited speakers. Oral presentation and written report required. Graded S/NS.

CMM5111 COMPUTATIONAL CELL BIOLOGY (3cr.)
Emphasis is on providing students with the background knowledge and the tools needed to develop and analyze models of cellular processes. Topics include modeling enzyme kinetics, signal transduction pathways, and gene regulatory networks, using differential equations, nonlinear dynamics, and stochastic processes. Prerequisite: permission of program director and course coordinator.

CMM5304 INTRODUCTION TO DEVELOPMENTAL BIOLOGY (3cr.)
Concepts in development and signalling pathways during development including formation of the germ layers; establishment of the body axis and principles of segmentation; patterning and homeobox genes; neurogenesis; axonal and neuronal guidance; stem cell concepts; germ cells; animal models in developmental biology.

**CMM8310 CURRENT TOPICS IN RNA MOLECULAR BIOLOGY (3cr.)**
Properties, mechanisms associated with regulation and the function of RNAs and Ribonucleoprotein (RNP)s as well as RNA organisms. Current knowledge on RNA expression (synthesis, processing, transport and localization), the structure-function relationship and molecular mechanisms associated with RNAs and RNA genomes, RNA in evolution and in the origin of life, and RNA as therapeutic agents. Prerequisites: BCH/BIO 3570-3170 or equivalent with the permission of the program director. Exclusion: BCH 8310.

**CSI1500 (COMP 5306) DATA INTEGRATION (3cr.)**
Materialized and virtual approaches to integration of heterogeneous and independent data sources. Emphasis on data models, architectures, logic-based techniques for query processing, metadata and consistency management, the role of XML and ontologies in data integration; connections to schema mapping, data exchange, and P2P systems. Prerequisite: COMP 3005 or equivalent.

**CSI1501 (COMP 5307) KNOWLEDGE REPRESENTATION (3cr.)**
KR is concerned with representing knowledge and using it in computers. Emphasis on logic-based languages for KR, and automated reasoning techniques and systems; important applications of this traditional area of AI to ontologies and semantic web. Prerequisites: COMP 1805 and COMP 3005, or equivalents.

**CSI1526 (COMP 5108) ALGORITHMS IN BIOINFORMATICS (3cr.)**
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including alignment and probabilistic models), genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell. Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI3105 or (in case of graduate students) permission of the instructor.

**CSI1531 (COMP 5704) PARALLEL ALGORITHMS AND APPLICATIONS IN BIOINFORMATICS (3cr.)**
Multiprocessor architectures from an application programmer’s perspective: programming models, processor clusters, multi-core processors, GPUs, algorithmic paradigms, efficient parallel problem solving, scalability and portability. Projects on high performance computing in Data Science, incl. data analytics, bioinformatics, simulations. Programming experience on parallel processing equipment. Prerequisite: COMP 3804 or equivalent.

**CSI1563 (COMP 5703) ALGORITHM ANALYSIS AND DESIGN (3cr.)**
Topics of current interest in the design and analysis of computer algorithms for graph-theoretical applications; e.g. shortest paths, chromatic number, etc. Lower bounds, upper bounds, and average performance of algorithms. Complexity theory.

**CSI1565 (COMP 5709) COMBINATORIAL ALGORITHMS (3cr.)**
Design of algorithms for solving problems that are combinatorial in nature, using both sequential and parallel models of computation. Parallel algorithms for enumerating basic combinatorial objects (permutations, combinations, set partitions) and for solving optimization problems (knapsack, minimal cover, branch-and-bound). Polymatroids, polygonal systems, enumeration and classification and benzenoid and coronoid hydrocarbons in chemistry. Combinatorial geometry (Voronoi diagrams, polytopes arrangements). Algorithmic problems in many-valued logics (base enumeration, tautology checking, minimization, finding the spectra).

**CSI5387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)**

**ELG6114 (SYSC 5104) METHODOLOGIES FOR DISCRETE-EVENT MODELLING AND SIMULATION (3cr.)**

**ELG6173 (SYSC 5703) INTEGRATED DATABASE SYSTEMS**
Database definitions, applications, and architectures. Conceptual design based on the entity-relationship and object-oriented models. Relational data model: relational algebra and calculus, normal forms, data definition and manipulation languages. Database management systems: transaction management, recovery and concurrency control. Current trends: object-oriented, knowledge-based, multimedia and distributed databases. Prerequisite: SYSC 5704 (ELG 6174) or the equivalent.

**MAT3170 (STAT 5708) PROBABILITY THEORY I (3cr.)**
Probability spaces, random variables, expected values as integrals, joint distributions, independence and product measures, cumulative distribution functions and extensions of probability measures, Borel-Cantelli lemmas, convergence concepts, independent identically distributed sequences of random variables. Prerequisites: Permission of Program Director. Prerequisites: MAT3125 and MAT3172 (MATH 3001, MATH 3062 and MATH 3500).

**MAT5171 (MATH 5709) PROBABILITY THEORY II (3cr.)**
Laws of large numbers, characteristic functions, central limit theorem, conditional probabilities and expectation, basic properties and convergence theorems for martingales, introduction to Brownian motion. **Prerequisite: MAT 5170 (STAT 5708).**

**MAT5181 (STAT 5703) DATA MINING I (3cr.)**
Visualization and knowledge discovery in massive datasets; unsupervised learning: clustering algorithms; dimension reduction; supervised learning: pattern recognition, smoothing techniques, classification. Computer software will be used. **Prerequisite: Permission of the Instructor.**

**MAT5182 (STAT 5702) MODERN APPLIED / COMPUTATIONAL STATISTICS (3cr.)**
Resampling and computer intensive methods: bootstrap, jackknife with applications to bias estimation, variance estimation, confidence intervals, and regression analysis. Smoothing methods in curve estimation; Statistical classification and pattern recognition: error counting methods, optimal classifiers, bootstrap estimates of the bias of the misclassification error.

**MAT5190 (STAT 5600) MATHEMATICAL STATISTICS I (3cr.)**
Statistical decision theory; likelihood functions; sufficiency; factorization theorem; exponential families; UMVU estimators; Fisher's information; Cramer-Rao lower bound; maximum likelihood and moment estimation; invariant and robust point estimation; asymptotic properties; Bayesian point estimation. Prerequisites: MAT 3172 and MAT 3375. **Prerequisites: MAT3172 and MAT3375.**

**MAT5191 (STAT 5501) MATHEMATICAL STATISTICS II (3cr.)**
Confidence intervals and pivots; Bayesian intervals; optimal tests and Neyman-Pearson theory; likelihood ratio and score tests; significance tests; goodness-of-fit tests; large sample theory and applications to maximum likelihood and robust estimation. **Prerequisite: MAT 5190.**

**MAT5198 (MATH 5701) STOCHASTIC MODELS (3cr.)**
Markov systems, stochastic networks, queuing networks, spatial processes, approximation methods in stochastic processes and queuing theory. Applications to the modelling and analysis of computer-communications systems and other distributed networks.

**MAT5314 (MATH 6508) TOPICS IN PROBABILITY AND STATISTICS (3cr.)**

**MAT5319 (MATH 6507) TOPICS IN PROBABILITY AND STATISTICS (3cr.)**

**SYS5120 APPLIED PROBABILITY (3cr.)**
An introduction to stochastic processes, with emphasis on regenerative phenomena. Review of limit theorems and conditioning. The Poisson process. Renewal theory and limit theorems for regenerative processes; Discrete-time and continuous-time Markov processes with countable state space. Applications to queuing. **Prerequisites: MAT2341 and MAT2371 and MAT2375.**

**Biology**

**Ottawa-Carleton Joint Program**

Established in 1984, the Ottawa-Carleton Institute of Biology (OCIB) combines the research strengths of the University of Ottawa and Carleton University. The Institute offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in Biology.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in three main research fields: cell and molecular biology; ecology, behaviour and systematics; and, physiology and biochemistry. Additional information is posted in the departmental website.

The Institute is a participating unit in the collaborative programs in Bioinformatics (at the master’s level), in Chemical and Environmental Toxicology (at the master’s and doctoral levels), in Environmental Sustainability (at the master’s level) in Bioinformatics, and in Science, Society and Policy (at the master’s level).

The doctoral program participates in the Combined Program for Degrees in Medicine and Philosophy (MD / PhD). For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The **general regulations** of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

**Programs**
Master of Science Mathematics and Statistics Specialization in Biostatistics
Master of Science Epidemiology Specialization in Biostatistics

Admission

Admission to the graduate program in biology is governed by the General Regulations of the Ottawa-Carleton Institute of Biology (OCIB) and by the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Be the holder of a bachelor’s degree with a specialization, or a major in Biology (or equivalent) with a minimum average of 70% (B).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Transfer from master’s to PhD

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of two graduate courses (6 credits) with a grade of A- or better in each; successful completion of the BIO5900 seminar course (over two sessions with one presentation required).
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the thesis advisory committee.
- Approval by the graduate studies committee.

If the student meets the requirements, the transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met. Following transfer, all the requirements of the doctoral program must be met (see the section on “PhD Requirements”).

Collaborative programs

The Department of Biology is a participating unit in the collaborative programs in Bioinformatics (master’s level only), in Chemical and Environmental Toxicology (master’s and PhD levels), in Environmental Sustainability (master’s level only) and in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

Program Requirements

MSc in Biology

The following requirements must be met:

- Six credits of graduate courses at the 5000 level or above in biology or in related disciplines approved by the Department of Biology.
- Enrollment in the seminar course BIO5900, which involves the presentation of a seminar and regular attendance at the departmental seminars.
- Thesis (BIO7999).
The primary program may require students to take additional courses, depending on their backgrounds.

**Collaborative program in Bioinformatics**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

The requirements specific to the collaborative program are as follows:

- 3 compulsory credits in bioinformatics (BNF5106 / BIO5106).
- Enrollment in the seminar course in bioinformatics (BNF6100), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.
- Presentation and defence of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the bioinformatics collaborative program.

**Collaborative program in Environmental Sustainability**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

**Collaborative program in Science, Society and Policy**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

**Collaborative program in Chemical Environmental Toxicology**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

- 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
- Enrollment in the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defense of a thesis in toxicology based on original research carried out under the supervision of a faculty member participating in the chemical and environmental toxicology collaborative program.

**Transfer from master’s to PhD**

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

**Duration of program**

The requirements of the program are usually fulfilled within two years. The maximum time permitted is four years from the date of initial registration.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will consist of a minimum of three members, including the thesis supervisor, and two of whom must be full-time, adjunct, or cross-appointed professors in the OCIB.

One of the members of the committee, in addition to the thesis supervisor, must have expertise in the field of the student’s thesis research. To provide outside perspective, one of the members should be from a different research group. The members of the committee should be chosen by
the supervisor in consultation with the student and approved by the director of the Graduate Studies Program. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

Meetings between the student and thesis committee members will take place regularly until the project is completed. The thesis examining board may include members who are not part of the TAC.

**Minimum standards**

The passing grade in all courses is 70% (B). Students who fail two courses, or the thesis proposal, or whose research progress is deemed unsatisfactory must withdraw from the program.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**BIO5101 (BIOL 5001) TOPICS IN BIOTECHNOLOGY (3cr.)**
A course concerned with the utilization of biological substances and activities of cells, genes and enzymes in manufacturing, agricultural and service industries. A different topic will be selected each year. **Prerequisite:** A course in cell physiology or biochemistry, or permission of instructor.

**BIO5102 (BIOL 5605) ADVANCED FIELD ECOLOGY (3cr.)**
Field experience in a new environment (e.g. local, national, international) to learn about ecological processes (note – extra fees associated with course).

**BIO5103 (BIOL 5003) ADVANCED BIOCHEMISTRY (3cr.)**
Advanced topics in biochemistry: the chemical structure and function of biological macromolecules, biochemical thermodynamics, metabolism, photosynthesis, lipids and membranes.

**BIO5104 ADVANCES IN APPLIED BIOCHEMISTRY (3cr.)**
Contemporary methods of recombinant DNA technology proteins and protein characterization, including advanced techniques in proteomics.

**BIO5105 (BIOL 5801) ADVANCED NEUROETHOLOGY (3cr.)**
A comparative and evolutionary approach to studying neural mechanisms underlying animal behaviour, including genetic, neural and hormonal influences on behaviour. **Prerequisites:** BIOL 3305 and BIOL 3601 or equivalents and registration in a graduate program, or written permission of the department.

**BIO5106 (BIOL 5506) BIOINFORMATICS (3cr.)**
Major concepts and methods of bioinformatics. Topics may include, but are not limited to genetics, statistics and probability theory, alignments, phylogenetics, genomics, data mining, protein structure, cell simulation and computing.

**BIO5111 BIOPHYSICAL TECHNIQUES (3cr.)**
Theory and application of current biochemical/biophysical instrumentation and techniques including X-ray crystallography, nuclear magnetic resonance spectrometry, infrared, circular dichroism and fluorescence spectroscopy, isothermal titration and differential scanning calorimetry.

**BIO5121 ADVANCES IN PROTEIN ENGINEERING (3cr.)**
Theory, development and current techniques of protein and enzyme engineering. Topics to be discussed may also include applications in biotechnology, nanotechnology and new frontiers in basic and applied research.

**BIO5302 (BIOL 5105) METHODS IN MOLECULAR GENETICS (3cr.)**
Theory and associated applications of emerging methods in molecular genetics, including information gathered from large-scale genome-wide analysis and protein-protein interaction data, and how this information can advance understanding of cell biology. **Prerequisites:** Graduate standing and permission of the department.

**BIO5303 BIOLOGICAL SCIENCE IN PRACTICE (3cr.)**
Cross-cutting skills and issues in common to all biological disciplines. Key perspectives on philosophy of science, practical approaches to scientific publication and peer-review, data analysis and presentation, scientific inference, and technical writing will be provided through discipline-specific examples and associated practical work.

**BIO5305 (BIOL 5407) BIOSTATISTICS I (3cr.)**
Application of statistical analyses to biological data. Topics include ANOVA, regression, GLMs, and may include loglinear models, logistic regression, general additive models, mixed models, bootstrap and permutation tests. **Prerequisites:** Graduate standing, courses in elementary ecology and statistics and permission of the department.
BIO5306 (BIOL 5409) MODELLING FOR BIOLOGISTS (3cr.)
Use and limitations of mathematical and simulation modelling approaches for the study of biological phenomena.

BIO5308 (BIOL 5106) LABORATORY TECHNIQUES IN MOLECULAR GENETICS (3cr.)
Laboratory course designed to give students practical experience in recent important techniques in molecular genetics. Prerequisites: Graduate standing and permission of the department.

BIO5310 ADVANCED EVOLUTIONARY BIOLOGY (3cr.)
Advances in micro-and macroevolution including the mechanisms both driving and constraining evolutionary change, phylogenetic relationships, patterns of evolutionary change at the molecular or phenotypic level, and evolutionary theory and techniques as applied to these areas.

BIO5311 ADVANCED EVOLUTIONARY ECOLOGY (3cr.)
The ecological causes and consequences of evolutionary change, focussing on how the ecological interactions among organisms and their biotic and abiotic environments shape the evolution of phenotypic and species diversity.

BIO5312 PRINCIPLES AND METHODS OF BIOLOGICAL SYSTEMATICS (3cr.)
Biological systematics with reference to morphological and molecular character evolution and phylogeny reconstruction.

BIO5314 ADVANCES IN AQUATIC SCIENCES (3cr.)
Advanced theoretical and applied aquatic sciences including current topics in limnology and oceanography (e.g. impacts of climate change, invasive species, and atmospheric pollution) with implications for lake, river, coastal and wetland management.

BIO5318 BIOSTATISTICS II (3cr.)
Application of multivariate methods to biological data, including methods such as discriminant functions analysis, cluster analysis, MANOVA, principal components analysis.

BIO5320 ADVANCES IN CONSERVATION BIOLOGY (3cr.)
Interdisciplinary exploration of the science of scarcity and diversity in a human dominated world.

BIO5321 EVOLUTIONARY GENETICS (3cr.)
Genetic mechanisms and processes responsible for variation and evolutionary change in natural populations. Topics may include population and quantitative genetics as applied to protein and genome evolution, molecular phylogenies, DNA sequences in population biology, and the evolution of multigene families.

BIO5900 SÉMINAIRE DE MAÎTRISE / MSc SEMINAR (3cr.)
Obligatoire à la maîtrise. L'obtention de crédit est fondée sur la présentation d'un séminaire jugé satisfaisant par le personnel et sur la participation à l'ensemble du cours. / Compulsory for all MSc students. For credit, each student must present one seminar judged to be satisfactory by the staff and must participate in the course as a whole.

BIO6103 SPECIAL TOPICS IN NEUROSCIENCE (3cr.)
An in-depth study of current topics in neuroscience. Course content varies yearly and has recently included cognitive neuroscience, neuropharmacology, neurodegeneration, and behavioural medicine. (Also listed as PSYC 6300).

BIO6303 ADVANCED SEMINAR IN NEUROSCIENCE (3cr.)
A seminar focusing on the active research areas and interests of faculty, guest lecturers and graduate students, and on trends in diverse areas of neuroscience. (Also listed as PSYC 6200).

BIO6304 TECHNIQUES IN NEUROSCIENCE (3cr.)
Completion of a research project carried out under the supervision of a neuroscience faculty member. The student will learn a new neuroscience technique and apply it to a research objective. May be repeated for different projects. (Also listed as PSYC 6204).

BIO6305 ADVANCED SEMINAR IN NEUROSCIENCE (3cr.)
A comprehensive pro-seminar series, covering issues ranging from cellular and molecular processes through to neural systems and behaviours as well as psychopathology. (Also listed as PSYC 6202). Precludes additional credit for BIOL 6303.

BIO8102 (BIOL 5502) SPECIAL TOPICS IN BIOLOGY (3cr.)
Selected aspects of specialized biological subjects not covered by other graduate courses.

BIO8104 SELECTED TOPICS IN BIOLOGY III (3cr.)
Lectures and/or seminars dealing with current advances in a selected area or branch of biology, not covered by other graduate courses.

BIO8105 ADVANCES IN APPLIED ECOLOGY (3cr.)
The application of ecological and evolutionary principles in addressing resource management challenges and environmental problems.

BIO8108 (BIOL 6505) ADVANCED TOPICS IN DEVELOPMENT (3cr.)
Recent advances in developmental biology. Topics may include embryonic induction, regulation of morphogenesis and differentiation, mechanisms of regional specification and pattern formation, and developmental genetics. Offered in alternate years. (Offered in alternate years).

BIO8109 (BIOL 6001) ADVANCED MOLECULAR BIOLOGY (3cr.)
In-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins.

**BIO8116 (BIOL 6002) ADVANCES IN PLANT MOLECULAR BIOLOGY (3cr.)**
Use of molecular genetics in general plant biology and the contribution of plant genomics to our understanding of plant metabolism, plant development, and plant interactions with the environment at the molecular, genome, and cellular levels. **Prerequisite:** BIO8109/61.601F1 and this course normally will be offered together in the same year but only in alternate years.

**BIO8117 (BIOL 6201) ADVANCED CELL BIOLOGY I (3cr.)**
Recent advances in cell biology, including such topics as membranes, signaling, the cytoskeleton and control of the cell cycle. **Prerequisite:** BIO8118/61.222W1 and this course normally will be offered together in the same year but only in alternate years.

**BIO8118 (BIOL 6202) ADVANCED CELL BIOLOGY II (3cr.)**
Topics for discussion may include the following: the structure, composition and three-dimensional organization of the nucleus, mechanisms and regulation of genome replication, structural organization of transcription. Nuclear reorganization during gamete development, fertilization, viral infection and the mitotic cell cycle. Normally offered in alternate years. **Prerequisite:** BIO8117/61.621F1 and this course normally will be offered together in the same year but only in alternate years.

**BIO8120 DIRECTED STUDIES IN BIOLOGY (3cr.)**
One-on-one instruction in selected aspects of specialized biological subjects not covered by other graduate courses. Students may not take this course from their thesis supervisor(s), and are limited to one directed studies course per program.

**BIO8122 (BIOL 5307) ADVANCED INSECT BIOLOGY (3cr.)**
Overview of the biological processes that allow insects to function in their environments and to overcome the constraints and limitations that the environment places on them. **Prerequisite:** In addition to the course material, students will write two term papers (Alternate years).

**BIO8162 (BIOL 5402) ADVANCED ENDOCRINOLOGY (3cr.)**
Major topics in comparative endocrinology: understanding the structure, function and evolution of vertebrate endocrine systems, including endocrine disruption. **Prerequisite:** An undergraduate Endocrinology course (BIO4127 or equivalent).

**BIO8204 ECOLOGY SEMINAR (3cr.)**

**BIO8301 (BIOL 5201) EVOLUTIONARY BIOINFORMATICS (3cr.)**
Fundamental concepts in molecular evolution and hands-on experience with computer analysis of DNA sequences. Topics may include molecular sequence databases, multiple alignments and phylogenetic trees. **Prerequisite:** Graduate standing plus basic courses in genetics and evolution; permission of the department.

**BIO8302 (BIOL 5202) TOPICS IN EVOLUTIONARY GENETICS (3cr.)**
A lecture/seminar course on the genetic mechanisms and forces responsible for variation and evolutionary change in natural populations. Topics to include protein and genome evolution, molecular phylogenies, DNA sequences in population biology, and the evolution of multigene families. **Prerequisite:** Graduate standing plus basic courses in genetics and evolution; permission of the department (alternate years).

**BIO8303 (BIOL 5203) ADVANCED MICROSCOPY (3cr.)**
Development of the practical skills of microscopy through original research and supporting theory lectures. **Prerequisite:** Open to 4th year and graduate students with consent of the instructor.

**BIO8306 (BIOL 5508) ADVANCED TOPICS IN ECOLOGY (3cr.)**
Recent developments in population, community and/or ecosystem ecology.

**BIO8320 (BIOL 6300) ADVANCED PLANT BIOLOGY (3cr.)**
Recent developments in plant biology. Topics may include plant anatomy, systematics, evolution, genetics, ecology, ethnobotany, cell biology, and/or biotechnology. **Prerequisite:** Biology 61.425 and Biology 61.426/427, or permission of the department.

**BIO8361 (BIOL 6304) ADVANCED ANIMAL PHYSIOLOGY (3cr.)**
Recent advances in animal physiology, emphasizing comparative, evolutionary and environmental approaches.

**BIO8365 (BIOL 5802) ADVANCED BEHAVIOURAL ECOLOGY (3cr.)**
Recent advances in behavioural ecology including topics such as the evolution of tactics and strategies of group living, foraging, anti-predation, resource use and defence, cooperation, reproduction, and parental care.

**BIO8510 THÈMES CHOISIS EN BIOLOGIE (3cr.)**
Aspects de sujets biologiques spécialisés qui ne sont pas couverts dans d'autres cours d'études supérieures.

**BIO8900 SÉMINAIRE DE DOCTORAT / PhD SEMINAR (2cr.)**
Obligatoire au doctorat. L'obtention de crédit est fondée sur la présentation de deux séminaires jugés satisfaisants par le personnel et sur la participation à l'ensemble du cours. / Compulsory for all PhD students. For credit, each student must present two seminars judged to be satisfactory by the staff and must participate in the course as a whole.

**BIO8910 SPECIAL TOPICS IN BIOLOGY / THÈMES CHOISIS EN BIOLOGIE (3cr.)**
Aspects de sujets biologiques spécialisés qui ne sont pas couverts dans d'autres cours d'études supérieures. Prérequis : connaissance passive de l'anglais. / Selected aspects of specialized biological subjects not covered by other graduate courses. **Prerequisite:** Passive knowledge of French.
BIO8938 (BIOL 6404) INTERACTIONS ENTRE PLANTES ET ANIMAUX / PLANT ANIMAL INTERACTIONS (3cr.)
Les substances métaboliques secondaires des plantes et leur rôle en tant que phagorépresseurs ou phagostimulants pour les animaux et en tant qu'agents antifongiques ou allélopathiques. On discutera de la coévolution des plantes et des organismes phytophages (insectes et mammifères) et des dimensions physiologique et écologique de cette relation / Secondary metabolites of plants and their role as attractants or antifeedants to animals and as allelopathic or antifungal agents. Emphasis will be placed on co-evolution of plants and phytophagous organisms such as insects and mammals, and the ecological and physiological dimensions of this relationship (alternate years.)

BIO9104 (BIOL 6403) ECOTOXICOLOGY (3cr.)
Advances in ecotoxicology with emphasis on the biological effects of contaminants. The potential for biotic perturbation resulting from chronic and acute exposure of ecosystems to selected toxicants will be covered along with the methods, pesticide, herbicide and pollutant residue analysis and the concept of bound residues. (Also listed as CHEM 5705 / CHM 9109/TOX9104. Prerequisite: BIO9101/CHM8156 (BIO6402/CHM5708)

BIO9105 (BIOL 6405) SEMINAR IN TOXICOLOGY (3cr.)
Highlights current topics in toxicology. The student will present a seminar and submit a report on the seminar topic. Student, faculty and invited seminar speakers. (Also listed as CHM8167/TOX 9105/CHM5805).

BIO9301 (BIOL 5306) PHOTOBIOLOGY
The interaction of light and living organisms. Topics include an introduction to photochemistry and the detailed study of such topics as photosynthesis, vision, photosensitivity and photoperiodism.

BIO9301 (BIOL 5306) PHOTOBIOLOGY
The interaction of light and living organisms. Topics include an introduction to photochemistry and the detailed study of such topics as photosynthesis, vision, photosensitivity and photoperiodism.

BIO7999 (BIOL 5909) THÈSE DE MAÎTRISE / MSc THESIS

BIO9101 (BIOL 6402) PRINCIPLES OF TOXICOLOGY
Basic theorems of toxicology with examples of current research problems. The concepts of exposure, hazard and risk assessment will be defined and illustrated with experimental material from some of the more dynamic areas of modern research. (Also listed as CHEM 5708/CHM8156/TOX8156).

BIO9998 Examen de synthèse / Comprehension Examination

BIO9999 (BIOL 6609) THÈSE DE DOCTORAT / PhD THESIS

BNF5107 APPLIED BIOINFORMATICS (3cr.)
Computational knowledge discovery in and the dynamic nature of cellular networks. Includes, but is not limited to, knowledge representation, large scale data integration, data mining and computational systems biology.

ESG5310 COMMUNITY OUTREACH AND MEDIA RELATIONS IN THE SCIENCES (3cr.)
Lectures and an outreach practicum that aim to develop skills to effectively communicate complex scientific concepts to the public, to interact with news media, and to become effective mentors. Graded S/NS. Cannot be counted towards the credits required for the student's degree program unless explicitly permitted by the student's program. Prerequisite: Permission of the program director.

TOX8157 CHEMICAL TOXICOLOGY (3cr.)
Advanced course in chemical toxicology dealing with both chemical hazards and exposure. Overview of empirical data relating to the toxicity of various classes of chemicals for test organisms, followed by study of toxicity at the cellular level, including studies of interactions between toxic substances and enzymatic systems. Data applicable to the interpretation and monitoring of WHMIS health regulations. Initial events in enzyme induction and mutagenesis. Study of predictive capabilities in the areas of structure-activity relationships and mechanisms of enzyme induction, followed by assessment of mechanisms of exposure to toxic chemicals.

TOX9106 (BIOL 6406) GENETIC TOXICOLOGY (3cr.)
Topics in mutagenesis and DNA repair, including spontaneous and induced mutagenesis, genetic toxicology testing, the genetics and biochemistry of replication, DNA repair and recombination, and the role of mutagens in the development of genetic disease and cancer.

Biomedical Engineering

Ottawa-Carleton Joint Program

Established in 2006, the Ottawa-Carleton Institute of Biomedical Engineering (OCIBME) combines the teaching and research strengths of many academic units across the University of Ottawa and Carleton University.

Graduate education in biomedical engineering is multidisciplinary, and it combines the teaching and research input of seven primary
participating academic units at:

**University of Ottawa:**
- Department of Mechanical Engineering (MCG)
- School of Electrical Engineering and Computer Science (EECS)
- Department of Chemical Engineering (CHG)

**Carleton University:**
- Department of Systems and Computer Engineering
- Department of Mechanical and Aerospace Engineering
- School of Computer Science
- Department of Physics

The Institute benefits from the expertise of a number of prominent medical researchers and well established University of Ottawa medical research units including : the University of Ottawa Heart Institute and the University of Ottawa Eye Institute. In addition to the participating academic units listed above, a number of others are involved in the program through the research activities of some of their faculty members, or through graduate courses that may be taken as electives by students in the program.

The Institute is a participating unit in the collaborative programs in Bioinformatics (at the master’s level).

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of their thesis supervisor if they are enrolled in the MAsc option, or of their project supervisor if they are enrolled in the MEng with project/internship.

Members of the Institute are engaged in four main research fields: medical instrumentation; biomedical image processing; biomechanics and biomaterials; medical informatics and telemedicine.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

**Programs**

Master of Applied Science Biomedical Engineering
Master of Applied Science Biomedical Engineering Specialization in Bioinformatics
Master of Engineering Biomedical Engineering
Master of Engineering Biomedical Engineering Concentration in Clinical Engineering

**Admission**

Admission to the graduate programs in biomedical engineering is governed by the general regulations of the Ottawa-Carleton Institute of Biomedical Engineering (OCIBME) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:
- Hold a bachelor’s degree with a specialization or a major (or equivalent) in engineering, science, computer science, or a related discipline, with a minimum admission average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with their work.
- Provide a statement of purpose indicating their career goals and, for applicants to the MAsc program, their interests in the proposed research area.
- Identify, in the case of applicants to the MAsc program, at least one professor who is willing and available to act as thesis supervisor.
- Identify, in the case of applicants to the MEng with project option or with concentration in Clinical Engineering, at least one professor who is willing and available to act as project supervisor.
- Be proficient (understand, speak and write) in English.

NOTE: For the MAsc and the MEng with project option, the choice of supervisor will determine the primary campus location of the student. It
Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Collaborative programs**

The Institute of Biomedical Engineering is a participating unit in the collaborative program in Bioinformatics (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of this program posted on the FGPS website.

**Program Requirements**

MASc in Biomedical Engineering

The requirements for the program are as follows:

- Completion of the compulsory course: BMG5112 (BIOM 5010).
- Completion of two biomedical engineering (BMG/BIOM) courses to be selected from the list of biomedical engineering courses in the graduate calendar.
- Completion of two courses at the graduate level with the approval of the thesis supervisor and the director of the program.
- Completion of the Biomedical Engineering Seminar course BMG6996 (BIOM 5800) (no credit).
- Completion and successful oral defence of a research thesis (BMG7995/BIOM 5909).

The Department may require students to take additional courses, depending on their backgrounds. Courses taken in related disciplines must be previously approved by the Department.

**MEng in Biomedical Engineering**

At least 50% of the credits must be obtained from the student’s home university. The project and internship each count for 6 credits.

**MEng coursework option**

The requirements are as follows:

- BMG5112 (BIOM 5010) FUNDAMENTALS OF BIOMEDICAL ENGINEERING (3cr.)
- Four BMG/BIOM courses to be selected from the list of BMG/BIOM courses in the graduate calendar (12cr.)
- Five elective courses selected with prior approval of the director of the program (15cr.)
- BMG6996 (BIOM 5800) SEMINAR

The Admissions Committee may require students to take additional courses, depending on their backgrounds. For elective courses in related disciplines, prior approval must be obtained from the BMG Program Director and from the academic unit offering the course.

**MEng project option**

The requirements are as follows:

- BMG5112 (BIOM 5010) FUNDAMENTALS OF BIOMEDICAL ENGINEERING (3cr.)
- Three BMG/BIOM courses to be selected from the list BMG/BIOM courses in the graduate calendar (9cr.)
- Three elective courses selected with prior approval of the director of the program (9cr.)
- BMG6996 (BIOM 5800) SEMINAR
- BMG6000 BIOMEDICAL ENGINEERING PROJECT (6cr.)

The Admissions Committee may require students to take additional courses, depending on their backgrounds. For elective courses in related disciplines, prior approval must be obtained from the BMG Program Director and from the academic unit offering the course.

**MEng with concentration in Clinical Engineering**

The requirements are as follows:

- BMG5112 (BIOM 5010) FUNDAMENTALS OF BIOMEDICAL ENGINEERING (3cr.)
- BMG5100 (BIOM 5103) BIOMEDICAL INSTRUMENTATION (3cr.)
- BMG5105 (BIOM 5200) MEDICAL IMAGE PROCESSING (3cr.)
- BMG5113 (BIOM 5406) CLINICAL ENGINEERING (3cr.)
- BMG5130 (HILTH 5201) FUNDAMENTALS OF POLICY I: POLICY ANALYSIS (3cr.)
- BMG6996 (BIOM 5800) SEMINAR
- BMG5001 (BIOM 5801) CLINICAL ENGINEERING INTERNSHIP (6cr.)
BMG6001 (BIOM 5901) CLINICAL ENGINEERING PROJECT (6cr.)

The Admissions Committee may require students to take additional courses, depending on their backgrounds.

**Collaborative program in Bioinformatics**

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The requirements specific to the collaborative program are as follows:

- 3 compulsory credits in bioinformatics (BNF5106).
- Enrollment in BNF6100 (the seminar in bioinformatics), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.
- Presentation and defence of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the bioinformatics collaborative program.

The biomedical engineering program allow the two bioinformatics courses (BNF5106 and BNF6100) to count towards degree requirements.

**Duration of program**

The requirements of the program are usually fulfilled within two years of full-time studies. The maximum time permitted is four years.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is B. Students who fail six credits, or the thesis proposal, or whose research progress report is deemed unsatisfactory will be withdrawn from the program.

**Courses**

Courses specific to this program are designated BMG at the University of Ottawa and BIOM at Carleton University. The codes for courses from other disciplines are CHG, CSI, ELG, EPI, MAT, MCG, and PHY (all at the University of Ottawa) and COMP, EAJC, MAAJ, MECH, PHYS, SYSC, and STAT (all at Carleton University).

All courses, with the exception of the seminar and the thesis, are worth 3 credits at the University of Ottawa and 0.5 credits at Carleton University.

BMG5001 (BIOM 5801) STAGE EN GÉNIE CLINIQUE / CLINICAL ENGINEERING INTERNSHIP (6cr.)

Stage en génie clinique dans un établissement extérieur à l’université. Rédaction d’un rapport ayant trait aux activités menées durant l’internat. Note S (satisfaisant) ou NS (non satisfaisant) par le superviseur et un professeur nommé par le directeur du programme. / Internship in an institutional setting outside the university. Requires a formal written paper relating to the internship activities. Graded S (satisfactory) or NS (not satisfactory) by the supervisor and a professor appointed by the program director. Préalable : approbation du directeur du programme. / Prerequisite: approval of the program director.

BMG5103 (BIOM 5100) BIOMEDICAL INSTRUMENTATION (3cr.)

Instrumentation designed to measure physiological variables related to the function of the heart, lungs, kidney, nervous and musculo-skeletal systems; emergency, critical care, surgery and anesthesia equipment. Precludes additional credit for ELG 6320/SYSC 5302. Prerequisite: permission of the program director.

BMG5104 (BIOM 5101) BIOLOGICAL SIGNALS (3cr.)

Modeling of neuromuscular biological signals, including subthreshold phenomena, active behaviour of cell membranes, and innervation processes. Measurement of biological signals, including electrode effects. Time domain, frequency domain, and adaptive filtering techniques for noise reduction. Precludes additional credit for ELG 6131/X/SYSC 5301X.

BMG5105 (BIOM 5200) BIOMEDICAL IMAGE PROCESSING (3cr.)

Mathematical models of image formation based on the image modality and tissue properties. Linear models of image degradation and reconstruction. Inverse problems and regularization for image reconstruction. Image formation in radiology, computed tomography, magnetic resonance imaging, nuclear medicine, ultrasound, positron emission tomography, electrical impedance tomography. Precludes additional credit for ELG 5376/SYSC 5602. Prerequisite: permission of the program director.

BMG5106 (BIOM 5201) INTRODUCTION TO MEDICAL IMAGING PRINCIPLES AND TECHNOLOGY (3cr.)

Basic principles and technological implementation of x-ray, nuclear medicine, magnetic resonance imaging (MRI), and other imaging modalities used in medicine; contrast, resolution, storage requirements for digital images; applications outside medicine, future trends. Prerequisite: permission of the Department of Physics (Carleton).
BMG5107 (BIOM 5202) WAVELET APPLICATIONS IN BIOMEDICAL IMAGE PROCESSING (3cr.)

Introduction to the methods of wavelet analysis and processing techniques for the quantification of biomedical images and signals. Topics include: frames and over-complete representations, multiresolution algorithms for denoising and image restoration, multiscale texture segmentation and classification methods for computer aided diagnosis and compression for transmission and storage. Applications of such techniques to various biomedical imaging modalities, such as computed tomography, nuclear medicine, magnetic resonance imaging and ultrasound. Prerequisites: ELG 5376/SYSC 5602 and BMG 5105/BIOM 5200 or permission of the program director.

BMG5108 (BIOM 5203) ADVANCED TOPICS IN BIOMEDICAL IMAGE PROCESSING (3cr.)

Recent and advanced topics in the field of biomedical image processing and its related areas. Prerequisite: permission of the program director.

BMG5109 (BIOM5106) ADVANCED TOPICS IN MEDICAL INSTRUMENTATION (3cr.)

Recent and advanced topics in the field of medical instrumentation and its related areas. Prerequisite: permission of the program director.

BMG5110 (BIOM5304) ADVANCED TOPICS IN BIOMECHANICS AND BIOMATERIALS (3cr.)

Recent and advanced topics in the field of biomechanics and biomaterials and its related areas. Prerequisite: permission of the program director.

BMG5111 (BIOM 5403) ADVANCED TOPICS IN MEDICAL INFORMATICS AND TELEMEDICINE (3cr.)

Recent and advanced topics in the field of medical informatics and telemedicine and its related areas. Prerequisite: permission of the program director.

BMG5112 (BIOM 5010) FUNDAMENTALS OF BIOMEDICAL ENGINEERING (3cr.)

Research ethics and methods. Engineering systems approach to analysis and modelling of human anatomy and physiology. Topics will include biomechanics, electrophysiology, computational biology, biomedical technologies, impact of technology on society.

BMG5113 (BIOM 5406) CLINICAL ENGINEERING (3cr.)

Overview of the Canadian health care system; brief examples from other countries; clinical engineering and the management of technologies in industrialized and in developing countries; safety, reliability, quality assurance; introduction to biomedical sensor Technologies; applications of telemedicine; impact of technology on health care.

BMG5130 (HLTH 5201) FUNDAMENTALS OF POLICY I: POLICY ANALYSIS (3cr.)

Policy analysis and policy processes with an emphasis on the stages of the policy process, as well as the influences of institutions, ideas and interests.

BMG5300 (BIOM 5300) MODELLING OF RUBBER-LIKE ENGINEERING MATERIALS AND BIOLOGICAL SOFT TISSUES (3cr.)

Overview of the analytical and computational tools necessary for modelling rubber-like engineering materials and soft biological tissues: continuum mechanics for finite deformations, specific hyper-elastic constitutive equations, material characterization and finite element implementation. Ad-hoc review of physiology and microstructure of biological materials.

BMG5301 (BIOM 5301) BIOMECHANICS OF SKELETAL SYSTEM, MOTION AND TISSUE (3cr.)


BMG5302 (BIOM 5302) BIOFLUID MECHANICS (3cr.)


BMG5303 (BIOM 5303) ERGONOMICS & DESIGN (3cr.)

Review of ergonomic issues encountered in engineering design, including biomechanical, physical and physiological issues. Course will present strategies for human interaction with complex systems, such as aircraft cockpits, equipment control consoles, human-robotic interactions, and tele-operated equipment.

BMG5304 (BIOM 5402) INTERACTIVE NETWORKED SYSTEMS AND TELEMEDICINE (3cr.)

Telemanipulation; human motor and sensory capabilities; typical interface devices; mathematical model of haptic interfaces; haptic rendering; stability and transparency; remote control schemes; time delay compensation; networking and real-time protocols, history and challenges of telemedicine; telemedicine applications: telesurgery, tele-monitoring, tele-diagnosis and tele-homecare. Exclusion: ELG 6173 (EACJ 5127 / SYSC 5301). Prerequisite: permission of the program director.

BMG5306 (BIOM 5306) SPECIAL TOPICS IN MECHANICAL & AEROSPACE ENGINEERING: BIOMECHANICS (3cr.)

Overview of human anatomy and physiology with emphasis on artificial organ and prosthetic device design requirements. Application of engineering principles to cells and tissues, biofluid mechanics, human body energetics, measurement techniques, mechanics of human body systems, with emphasis on the artificial heart.

BMG5311 (BIOM 5311) DESIGN OF MEDICAL DEVICES AND IMPLANTS (3cr.)

Solutions to clinical problems through the use of implants and medical devices. Pathology of organ failure and bioengineering and clinical aspects of artificial organs. Examples: blood substitutes, pacemakers, ventricular assist devices, artificial hearts and heart valves.

BMG5312 (BIOM 5312) DESIGN OF ORTHOPAEDIC IMPLANTS AND PROSTHESSES (3cr.)

BMG5314 (BIOM 5314) BIOCONTROLS (3cr.)
Application of traditional control system principles to the human body. Functionality of sample actuators and sensors. Characterization of human body control loops with emphasis on system stability, robustness, and effect of adverse external disturbance. Course project. Prerequisite: knowledge of basic control system analyses and design concepts using root locus and frequency response methods.

BMG5315 (BIOM 5315) BIOROBOTICS (3cr.)
Interpretation of physical laws as applied to human motion; kinematics and dynamics of humanoid robots, modeling of biological sensors and actuators, artificial muscles, tele-manipulation, dual arm robots, robot-assisted surgery, and multi-fingered end-effectors. Approaches to design of mechatronic devices to support and enhance human movement including rehabilitators, extenders, haptic devices, and minimally invasive surgery systems. Prerequisites: knowledge of basic control system concepts, Newton’s Laws of Motion, kinematics of multi-body systems.

BMG5316 (BIOM 5316) BIOTRANSPORT PROCESSES (3cr.)
Application of chemical engineering principles to medicine and biology. Principles of mass transfer and fluid dynamics in topics such as hemodialysis, artificial kidney, diffusion in blood, mass transfer in the eye, drug distribution in the body, and advanced life support system. Prerequisite: Knowledge of integral and differential forms of mass, momentum, energy laws and fluid properties.

BMG5317 (BIOM 5400) MEDICAL COMPUTING (3cr.)
Introduction to the information technology research used in medically related fields such as biotechnology, cancer treatment, and biometrics. Topics of current interest such as medical imaging, telemedicine, telesurgery, DNA analysis, and medical information systems.

BMG5318 (BIOM 5401) ADVANCED HEALTH CARE ENGINEERING (3cr.)
Health care and technology; overview of medical devices and sensors; safe and effective use and management of technology; telemedicine; medical databases, data collection, storage, retrieval and computers in medicine; electronic patient records, PACS (picture archiving and communication systems); clinical decision-support systems. Prerequisites: Additional credit for ELG 5123 (EACJ 5303, SYSC 5300) Prerequisite: Permission from the Program Director.

BMG5336 INTRODUCTION TO MICROFLUIDICS (3cr.)
Physics of liquid transport in micro-fabricated systems including physics at the microscale, hydrodynamics of microfluidic systems, diffusion mixing, introduction to microfabrication, examples of microfluidics devices and Micro PIV techniques, project. Prerequisites: MCG3243 or MCG3244/MCG3241 or equivalent. Strong background in fluid mechanics. Experience with computer-based projects (CAD, Matlab, CFD).

BMG5320 (BIOM 5323) REHABILITATION ENGINEERING (3cr.)

BMG5330 (BIOM 5330) ELECTROMAGNETIC FIELDS AND BIOLOGICAL SYSTEMS (3cr.)
Review of electromagnetic waves at radio and microwave frequencies. Electrical and magnetic properties of tissue. Impact of electromagnetic waves on tissue. Cellular effects. Prerequisite: knowledge of electromagnetic theory.

BMG5501 (BIOM 5001) ÉTUDE TECHNIQUE ET MODÉLISATION DE L’ANATOMIE ET DE LA PHYSIOLOGIE DU CORPS HUMAIN (3cr.)

BMG5502 (BIOM 5002) ÉTHIQUES, NORMES ET MÉTHODES DE RECHERCHE (3cr.)
Théories éthiques, prise de décision, codes de déontologie; expérimentation sur des animaux et des êtres humains, consentement, comités de déontologie; méthodes de recherche et règlements concernant la conception, la fabrication et la certification d’appareils médicaux; collecte, contrôle et analyse des données, y compris la protection de la confidentialité, dilemmes bioéthiques, effets (sociaux, politiques, financiers) de la technologie et de la recherche. Exclusion : ELG 7514/EACJ 5300.

BMG6000 (BIOM 5900) PROJET EN GÉNIE BIOMÉDICALE / BIOMEDICAL ENGINEERING PROJECT (6cr.)
Projet en génie biomédicale supervisé par un professeur approuvé par le directeur du programme. Rédaction d'un rapport approfondi, qui doit être présenté oralement. Noté S (satisfaisant) ou NS (non satisfaisant) par le superviseur du projet et un autre professeur nommé par le directeur du programme. Le projet peut normalement être complété en une session d’études à temps complet. / Project in biomedical engineering supervised by a professor approved by the program director. Requires an in-depth report that must be presented orally. Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the program director. The project can normally be completed in one session of full-time study. Préalable : approbation du directeur du programme. / Prerequisite: approval of the program director.

BMG6601 (BIOM 5901) PROJET EN GÉNIE CLINIQUE / CLINICAL ENGINEERING PROJECT (6cr.)
Projet en génie clinique supervisé par un professeur du programme et un ingénieur clinique. Rédaction et présentation orale d’un rapport approfondi. Noté S (satisfaisant) ou NS (non satisfaisant) par les superviseurs du projet et un autre professeur nommé par le directeur du programme. Le projet peut normalement être complété en une session d’études à temps complet. / Project in clinical engineering supervised by a professor in the program and a clinical engineer. Requires an in-depth report that must be presented orally. Graded S (satisfactory) or NS (not satisfactory) by the co-supervisors and by another professor appointed by the program director. The project can normally be completed in one session of full-time study. Préalable : approbation du directeur du programme. / Prerequisite: approval of the program director.

BMG6996 (BIOM 5900) SÉMINAIRE / SEMINAR
Cours composé d’une série de séminaires présentés par des étudiants de deuxième cycle et des chercheurs en génie biomédical. En plus d’avoir à animer un séminaire, tous les étudiants doivent assister à au moins dix séances. Noté S/NS. / This course is in the form of seminars presented by
graduate students and other researchers in the area of Biomedical Engineering. Students must attend at least 10 seminars and make one presentation in the context of this seminar series. Graded S/NS.

**BMG7199 (BIOM5906) ÉTUDES DIRIGÉES EN GÉNIE BIOMÉDICAL / DIRECTED STUDIES IN BIOMEDICAL ENGINEERING (3cr.)**
La possibilité existe de poursuivre une étude dirigée sur un sujet spécifique approuvé par la direction du programme, si celui-ci n’est pas abordé dans les cours offerts. Préréquis : Permission de la direction du programme. Various possibilities exist for pursuing directed study on specific topics approved by the program director, when such topics are not covered by any of the regular courses being offered. Prerequisite: Permission of the program director.

**BMG7999 (BIOM 5909) THÈSE DE MAÎTRISE / MASTER'S THESIS**

**CHG8110 FLUID MECHANICS (3cr.)**
Stream function, circulation and vorticity, form drag and drag coefficients, equations of motion, boundary layer theory, modern theory of turbulent motion, flow in porous media, non-Newtonian flow.

**CHG8120 RHEOLOGY AND POLYMER PROCESSING (3cr.)**

**CHG8121 SYNTHETIC MEMBRANES IN BIOMEDICAL ENGINEERING (3cr.)**
Medical applications of synthetic membranes hemodialysis, oxygenation, hemofiltration, apheresis and plasma exchange, biofunctional membranes, biosensors, drug delivery systems and microencapsulation. Emphasis on the types and classes of membranes available, relationship between structure and properties of membranes, and other variables, techniques for fabricating membranes, and special issues involved in the design and manufacture of synthetic membranes for medical use.

**CHG8158 (ENVJ5304) POROUS MEDIA (3cr.)**

**CHG8187 INTRODUCTION TO POLYMER REACTION ENGINEERING (3cr.)**

**CHG8188 POLYMER PROPERTIES AND CHARACTERIZATION (3cr.)**
Polymer properties are described and discussed in the context of their nature, source and means of measurement. Chemical and microstructural properties; physical states and transitions; thermal properties; mechanical properties and viscoelasticity models; degradation and stability; surface, electrical and optical properties, polymer additives; structure-property relationships.

**CHG8195 (ENVJ5505) ADVANCED NUMERICAL METHODS IN TRANSPORT PHENOMENA (3cr.)**
Survey course of numerical methods for solving linear and non-linear ordinary and partial differential equations. Techniques reviewed include Runge-Kutta and predictor-corrector methods, shooting techniques, control volume discretization methods and finite elements. Example problems from the field of transport phenomena.

**CHG8196 (ENVJ5507) INTERFACIAL PHENOMENA IN ENGINEERING (3cr.)**
Interfacial tension and interfacial free energy; contact angles; spreading of liquids; wetting of surfaces; experimental techniques. Interfacial tension of mixtures; Gibbs equation; absorbed and insoluble monolayers; properties of monolayers and films. Electrical phenomena at interfaces; the electrical double layer; zeta-potential; electrokinetic phenomena (electrophoresis, electro-osmosis, streaming potential); surface conductance. Dispersed systems; formation and practical uses of emulsions; spontaneous emulsification; flocculation.

**CS15102 (COMP 5308) TOPICS IN MEDICAL COMPUTING (3cr.)**
Introductory course on data structures, algorithms, techniques, and software development related to medical computing (in particular spatial modeling). Topics may include: computational geometry algorithms for cancer treatment, medical imaging, spatial data compression algorithms, dynamic programming for DNA analysis. Precludes additional credit for COMP 5900 section Y offered 2001-2002 to 2005-2006 inclusive.

**CS15116 (COMP 5407) AUTHENTICATION AND SOFTWARE SECURITY (3cr.)**
Specialized topics in security including advanced authentication techniques, user interface aspects, electronic and digital signatures, security infrastructures and protocols, software vulnerabilities affecting security, non-secure software and hosts, protecting software and digital content. Prerequisites: Basic course in Statistics or permission of the program director.

**CS15131 (COMP 5704) PARALLEL ALGORITHMS AND APPLICATIONS IN BIOINFORMATICS (3cr.)**
Multiprocessor architectures from an application programmer’s perspective: programming models, processor clusters, multi-core processors, GPUs, algorithmic paradigms, efficient parallel problem solving, scalability and portability. Projects on high performance computing in Data Science, incl. data analytics, bioinformatics, simulations. Programming experience on parallel processing equipment. Prerequisite: COMP 5804 or equivalent.
CSI5164 (COMP 5008) COMPUTATIONAL GEOMETRY (3 cr.)
Study of design and analysis of algorithms to solve geometric problems; emphasis on applications such as robotics, graphics, and pattern recognition. Topics include: visibility problems, hidden line and surface removal, path planning amidst obstacles, convex hulls, polygon triangulation, point location.

CSI5311 (COMP 5101) DISTRIBUTED DATABASES AND TRANSACTION PROCESSING SYSTEMS (3 cr.)
Principles involved in the design and implementation of distributed databases and distributed transaction processing systems. Topics include: distributed and multi-database system architectures and models, atomicity, synchronization and distributed concurrency control algorithms, data replication, recovery techniques, and reliability in distributed databases.

ELG5104 (EACJ 5401) ELECTROMAGNETIC WAVES: THEORY AND APPLICATIONS (3 cr.)

ELG5108 (EACJ 5305) ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE (3 cr.)

ELG5161 (EACJ 5207) ROBOTICS: CONTROL, SENSING AND INTELLIGENCE (3 cr.)

ELG5162 (EACJ 5005) KNOWLEDGE-BASED SYSTEMS: PRINCIPLES AND DESIGN (3 cr.)

ELG5163 (EACJ 5105) MACHINE VISION (3 cr.)

ELG5196 (EACJ 5709) AUTOMATA AND NEURAL NETWORKS (3 cr.)

ELG5376 (EACJ 5507) DIGITAL SIGNAL PROCESSING (3 cr.)

ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3 cr.)

ELG6106 (SYSC 5006) DESIGN OF REAL-TIME AND DISTRIBUTED SYSTEMS (3 cr.)
Characteristics of real-time and distributed systems. Modern midware systems, such as CORBA, DCE, RMI for building distributed applications: advantages and disadvantages. Analyzing designs for robustness, modularity, extensibility, portability and performance. Implementation issues. Major course project. Prerequisites: Engineering SYSC 3503 and SYSC 5708 or similar experience. Prerequisites: Engineering SYSC 3503 and SYSC 5708 or similar experience.

ELG6115 (SYSC 5105) SOFTWARE QUALITY ENGINEERING AND MANAGEMENT (3 cr.)
All aspects of software quality engineering. Software testing, at all stages of the software development and maintenance life cycle. Software reviews and inspections. Use of software measurement and quantitative modelling for the purpose of software quality control and improvement. Precludes additional credit for CSI5111 (COMP 5501). Prerequisites: an undergraduate course in software engineering such as SYSC 4800 or SEG 3500, or equivalent, and basic statistics.

ELG6127 (SYSC 5207) DISTRIBUTED SYSTEMS ENGINEERING (3 cr.)
Techniques for representing distributed systems: precedence graphs, petri nets, communicating state-machines etc. Processes, threads, synchronization and interprocess communication techniques, RPC. Protocol: OSI model, application and presentation layers. Middleware for
ELG6136 (SYSC 5306) MOBILE COMPUTING SYSTEMS (3cr.)
Systems to build mobile applications. Covers data link layer to application layer. Emphasis on existing wireless infrastructure and IETF protocols. Focuses on view of mobile application developer; communication systems, middleware and application frameworks, de facto standards proposed/developed by industry consortia.

ELG6142 (SYSC 5402) ADVANCED DYNAMICS WITH APPLICATIONS TO ROBOTICS (3cr.)

ELG6152 (SYSC 5502) ADVANCED LINEAR SYSTEMS (3cr.)

ELG6160 (SYSC 5600) ADAPTIVE SIGNAL PROCESSING (3cr.)
Theory and techniques of adaptive filtering, including Wiener filters, gradient and LMS methods; adaptive transversal and lattice filters; recursive and fast recursive least squares; convergence and tracking performance; implementation. Applications, such as adaptive prediction; channel equalization; echo cancellation; source coding; antenna beamforming, spectral estimation. Prerequisites: SYSC 5503 or ELG 5119, or equivalent; SYSC 5602 or ELG 5376 or equivalent. Prerequisite: SYSC5503 or ELG5119, or equivalent; SYSC5602 or ELG5376 or equivalent.

ELG6165 (SYSC 5603) DIGITAL SIGNAL PROCESSING: MICROPROCESSORS, SOFTWARE AND APPLICATIONS (3cr.)
Characteristics of DSP algorithms and architectural features of current DSP chips: TMS320, DSP-56xxx, AD-21xx and SHARC. DSP multiprocessors and fault tolerant systems. Algorithm/software/hardware architecture interaction, program activity analysis, development cycle, and design tools. Case studies: LPC, codecs, FFT, echo cancellation, Viterbi decoding. Prerequisite: SYSC 5602 or ELG 5376 or the equivalent.

ELG6164 (SYSC 5604) ADVANCED TOPICS IN DIGITAL SIGNAL PROCESSING: SPEECH COMMUNICATIONS AND APPLICATIONS (3cr.)
Prerequisites: SYSC 5602 or ELG 5376, or the equivalent, and permission of the Department.

ELG6168 (SYSC 5608) WIRELESS COMMUNICATIONS SYSTEMS ENGINEERING (3cr.)
Multiuser cellular and personal radio communication systems; frequency reuse, traffic engineering, system capacity, mobility and channel resource allocation. Multiple access principles, cellular radio systems, signalling and interworking. Security and authentication. Wireless ATM, satellite systems, mobile location, wireless LANs, wireless local loops, broadband wireless etc. Corequisites: SYSC 5503 or ELG 5119, and SYSC 5504 or ELG 5375, or their equivalents. Prerequisite: SYSC5503 or ELG5119, and SYSC5504 or their equivalents.

ELG6171 (SYSC 5701) OPERATING SYSTEM METHODS FOR REAL-TIME APPLICATIONS (3cr.)
Principles and methods for operating system design with application to real-time, embedded systems. Concurrent programming: mechanisms and languages; design approaches and issues; run-time support (kernel). Methods for hard real-time applications. Methods for distributed systems; I/O handling. Prerequisites: Engineering SYSC 3303 or SYSC 5704 or equivalent and/or experience. Programming experience in high level and assembly languages. Prerequisite: SYSC3303 or SYSC5704 or equivalent courses and/or experience. Programming experience in high level and assembly languages.

ELG6175 (SYSC 5703) INTEGRATED DATABASE SYSTEMS
Database definitions, applications, and architectures. Conceptual design based on the entity-relationship and object-oriented models. Relational data model: relational algebra and calculus, normal forms, data definition and manipulation languages. Database management systems: transaction management, recovery and concurrency control. Current trends: object-oriented, knowledge-based, multimedia and distributed databases. Prerequisite: SYSC 5704 (ELG 6174) or the equivalent.

ELG6180 (SYSC 5800) NETWORK COMPUTING (3cr.)
Design and Java implementation of distributed applications that use telecommunication networks as their computing platform. Basics of networking; Java networking facilities. Introduction to open distributed processing; CORBA, JavaDL, JavaRMI, CGI/HTTP, DCOM, Componentware; Enterprise JavaBeans, ActiveX. Agents: Java code mobility facilities. Security issues; Java security model.

ELG6377 (ELEC 5707) MICROELECTRONICS SENSORS (3cr.)
Physical design of microelectromechanical systems (MEMS) and microfabricated sensors and actuators. An overview of thin and thick film processes and micromachining techniques will provide fabrication background. Design of a variety of devices including piezoresistive, piezoelectric, electromagnetic, thermal, optical, and chemical sensors and actuators.

ELG7171 (EACJ 5600) TOPICS IN SIGNAL PROCESSING I (3cr.)

ELG7173 (EACJ 5601) TOPICS IN SIGNAL PROCESSING II (3cr.)

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.
GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3 cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3 cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

MAT5190 (STAT 5600) MATHEMATICAL STATISTICS I (3 cr.)
Statistical decision theory; likelihood functions; sufficiency; factorization theorem; exponential families; UMVU estimators; Fisher’s information; Cramer-Rao lower bound; maximum likelihood and moment estimation; invariant and robust point estimation; asymptotic properties; Bayesian point estimation. Prerequisites: MAT 3172 and MAT 3375. Prerequisites: MAT 3172 and MAT 3375.

MAT5191 (STAT 5501) MATHEMATICAL STATISTICS II (3 cr.)
Confidence intervals and pivotal; Bayesian intervals; optimal tests and Neyman-Pearson theory; likelihood ratio and score tests; significance tests; goodness-of-fit tests; large sample theory and applications to maximum likelihood and robust estimation. Prerequisite: MAT 5190.

MAT5198 (MATH 5701) STOCHASTIC MODELS (3 cr.)
Markov systems, stochastic networks, queuing networks, spatial processes, approximation methods in stochastic processes and queuing theory. Applications to the modelling and analysis of computer-communications systems and other distributed networks.

MAT5317 (STAT 5602) ANALYSIS OF CATEGORICAL DATA (3 cr.)
Analysis of one-way and two-way tables of nominal data; multi-dimensional contingency tables, log-linear models; tests of symmetry, marginal homogeneity in square tables; incomplete tables; tables with ordered categories; fixed margins, logistic models with binary response; measures of association and agreement; applications biological.

MAT5992 (STAT 5902) SEMINAR IN BIOSTATISTICS (3 cr.)
Students work in teams on the analysis of experimental data or experimental plans. The participation of experimenters in these teams is encouraged. Student teams present their results in the seminar, and prepare a brief written report on their work.

MCG5117 (MAAJ 5107) INTRODUCTION TO COMPOSITE MATERIALS (3 cr.)

MCG5122 (MAAJ 5502) THEORY OF TURBULENCE (3 cr.)

MCG5173 (MAAJ 5703) SYSTEMS ENGINEERING AND INTEGRATION (3 cr.)
Introduction to modelling methods employed for the planning and design of sub-systems and complex systems. Discrete and continuous time, lumped and distributed parameters models. State estimation. Parameters identification. Discretization and stochastic effects. Technological systems modelling and simulation examples.

MCG5177 (MAAJ 5707) ROBOT MECHANICS (3 cr.)
Robotics overview. Transformations. Basics of robot kinematics, statics and dynamics. Introduction to practical robots, control and programming. Project in analysis, design or application of manipulators. Not accessible to students who have taken MCG 4132.

MCG5317 (MECH 5107) EXPERIMENTAL STRESS ANALYSIS (3 cr.)

MCG5332 (MECH 5302) INSTRUMENTATION TECHNIQUES (3 cr.)
An introduction for the non-specialists to the concepts of digital and analog electronics with emphasis on data acquisition, processing and analysis. Topics covered include operational amplifiers, signal processing, digital logic systems, computer interfacing, noise in electronic systems. Hands-on sessions illustrate theory and practice.

PHY5112 (PHYS 5204) PHYSICS OF MEDICAL IMAGING (3 cr.)
Physical foundation of, and recent developments in, transmission x-ray imaging, computerized tomography, nuclear medicine, magnetic resonance imaging, and ultrasound, for the imaging physics specialist. Imaging system performance: contrast, resolution, modulation transfer function, signal-to-noise ratio, detective quantum efficiency. Essentials of image display and processing.

**Biostatistics (Collaborative)**
Ottawa–Carleton Joint Programs

The Ottawa–Carleton Institutes combine the research strengths of the University of Ottawa and Carleton University. The Institutes offer graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in several fields (biology, chemistry, earth sciences, etc.).

MSc with specialization in biostatistics

Biostatistics is an interdisciplinary area of research linking statistics, biology, medicine, and health sciences. This growing area demands knowledge of the theory behind statistical procedures, an ability to put that theory into practice, and an understanding of the area of application. The applications range from clinical trials to population epidemiology and the development of new procedures. The specialization is intended to prepare a graduate for a career as a biostatistician in a health-related industry, or for a career in research.

The program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Participating programs

The following primary programs participate in the collaborative program in Biostatistics:

- The MSc in Mathematics offered by the Ottawa–Carleton Institute of Mathematics and Statistics (OCIMS), the joint graduate program of the Department of Mathematics and Statistics at the University of Ottawa and of the School of Mathematics and Statistics at Carleton University.
- The MSc in Epidemiology graduate program of the Department of Epidemiology and Community Medicine at the University of Ottawa.

Programs

Master of Science Epidemiology Specialization in Biostatistics

Master of Science Mathematics and Statistics Specialization in Biostatistics

Admission

Admission to the collaborative program in biostatistics is governed by the general regulations of the Ottawa–Carleton Institute and by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Candidates must indicate in their admission form that they wish to be accepted in the collaborative program.

All applicants must be able to understand speak and write proficiently in either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the "Admission" section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

To be considered for admission candidates must:

- Be admitted in one of the two primary participating programs.
- Be the holder of a bachelor's degree with a major or a specialization in biostatistics (or equivalent) with a minimum average of 75% (B+).
- Provide at least one letter of recommendation from a professor who is willing and available to act as thesis supervisor.
- Be sponsored into the collaborative program by a faculty member, normally the thesis supervisor, who must be appointed, cross-appointed or stand as an adjunct at one or more of the participating units.

NOTE: (1) The choice of thesis supervisor will determine the primary campus location of the student. It will also determine which university awards the degree. (2) Students pursuing the MSc in Mathematics by coursework do not need to have found a thesis supervisor.

Program Requirements

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.
**MSc in Mathematics (specialization in Biostatistics)**

The following requirements must be met:

- 21 course credits
  - EPI5240
  - EPI5241
  - EPI6178
  - EPI6278
  - MAT5190
  - MAT5191
  - 3 credits of graduate course in mathematics and statistics
- Enrollment in the seminar course in biostatistics MAT5992 (STAT5902), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defence of a thesis in biostatistics (MAT7999) based on an original research carried out under the supervision of a faculty member participating in the biostatistics collaborative program.

**MSc in Epidemiology (specialization in Biostatistics)**

This two-year program requires a minimum of 21 course credits (9 compulsory, 6 optional, and 6 elective) and a thesis, as follows:

- 9 compulsory credits:
  - EPI5240 (3cr.)
  - EPI5242 (3cr.)
  - EPI6178 (3cr.)
- 6 optional credits, selected from among the following:
  - EPI5340 (1.5cr.)
  - EPI5341 (1.5cr.)
  - EPI5342 (1.5cr.)
  - EPI5343 (1.5cr.)
  - EPI5344 (1.5cr.)
  - EPI5345 (1.5cr.)
  - EPI5346 (1.5cr.)
  - EPI5241 (3cr.)
  - EPI6188 (3cr.)
  - EPI6189 (3cr.)
  - EPI6276 (3cr.)
  - EPI6278 (3cr.)
  - EPI7184 (3cr.)
- 6 elective credits
  
  These may be taken from graduate courses offered in the Department of Mathematics and Statistics.

- Thesis (EPI7999)

Participation in approved departmental seminars (bi-weekly community medicine rounds, weekly clinical epidemiology rounds or other approved seminars organized by the department) is compulsory.

**Master’s by coursework (available only for the Mathematics program)**

The following requirements must be met:

- 27 credits
  - EPI5240
  - EPI5241
  - EPI6178
  - EPI6278
  - MAT5190
  - MAT5191
  - 3 graduate courses (3 credits each) in mathematics and statistics
- Enrollment in the seminar course in biostatistics MAT5992 (STAT5902), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department of Mathematics and Statistics.

**Minimum standards**

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), or whose progress is deemed unsatisfactory will be withdrawn from the program.

**Courses**
Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

MAT5190 (STAT 5600) MATHEMATICAL STATISTICS I (3cr.)
Statistical decision theory; likelihood functions; sufficiency; factorization theorem; exponential families; UMVU estimators; Fisher's information; Cramer-Rao lower bound; maximum likelihood and moment estimation; invariant and robust point estimation; asymptotic properties; Bayesian point estimation. Prerequisites: MAT 3172 and MAT 3375. Prerequisite: MAT 3172 and MAT 3375.

MAT5191 (STAT 5501) MATHEMATICAL STATISTICS II (3cr.)
Confidence intervals and pivots; Bayesian intervals; optimal tests and Neyman-Pearson theory; likelihood ratio and score tests; significance tests; goodness-of-fit tests; large sample theory and applications to maximum likelihood and robust estimation. Prerequisite: MAT 5190.

MAT5317 (STAT 5602) ANALYSIS OF CATEGORICAL DATA (3cr.)
Analysis of one-way and two-way tables of nominal data; multi-dimensional contingency tables, log-linear models; tests of symmetry, marginal homogeneity in square tables; incomplete tables; tables with ordered categories; fixed margins, logistic models with binary response; measures of association and agreement; applications biological.

MAT5375 (STAT 5610) MATHEMATICAL STATISTICS (3cr.)
Limit theorems; sampling distributions; parametric estimation; concepts of sufficiency and efficiency; Neyman-Pearson paradigm, likelihood ratio tests; parametric and non-parametric methods for two-sample comparisons; notions of experimental design, categorical data analysis, the general linear model, decision theory and Bayesian inference. Prerequisites: MAT 2121, MAT 2141 or MAT 2342, MAT 2375. Exclusion: Students in the MSc program cannot combine this course with MAT 5190 (STAT 5600) for credit towards the master's program.

MAT5992 (STAT 5902) SEMINAR IN BIOSTATISTICS (3cr.)
Students work in teams on the analysis of experimental data or experimental plans. The participation of experimenters in these teams is encouraged. Student teams present their results in the seminar, and prepare a brief written report on their work.

MAT7999 THÈSE DE MAÎTRISE / MSc THESIS

EPI5240 EPIDEMIOLOGY I - INTRODUCTORY EPIDEMIOLOGY (3cr.)
An overview of epidemiology - uses, methods, and data sources. Descriptive and analytical epidemiology. Lectures and assignments in which students will work with data and will gain experience in critically reviewing epidemiologic literature. Prerequisites: EPI 5242 (Biostatistics I) or equivalent; may be taken concurrently with the permission of the program director. Prerequisites: EPI 5242 (Biostatistics I) or equivalent; may be taken concurrently. Permission of instructor.

EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
This second level epidemiology course covers major principles of design, analysis, and interpretation of epidemiologic research. Material presented in a quantitative manner. Prerequisites: EPI 5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology); EPI 6276 may be taken concurrently with the permission of the program director. Prerequisites: EPI 5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology).

EPI6178 INTERVENTION STUDIES IN HEALTH RESEARCH (3cr.)
Practical introduction to intervention studies in the health field, including experimental and quasi-experimental studies and clinical and community trials. Question formulation; conduct of literature reviews; design issues (choice of research design and study population, implications for validity of results); ethical issues; instrument development; data collection and management; approach to data analysis; report writing and presentation. Examples drawn from both population and clinical research. Development and presentation of proposal for an intervention study. Prerequisite: Permission of the program director.

EPI6278 ADVANCED CLINICAL TRIALS (3cr.)
Lectures and laboratories on the detailed principles, design, methodology and statistical techniques associated with clinical trials. Emphasis on emerging topics and procedures. Prerequisites: EPI 5242 and EPI 6178 and permission of the program director. Prerequisites: EPI 5242 and EPI 6178 and permission of instructor.

EPI5330 VITAL AND HEALTH STATISTICS AND DEMOGRAPHY (3cr.)
Techniques of demography, health and vital statistics with particular reference to health care and epidemiologic research. The Canadian demographic structure and trends, vital registration procedures, calculation and interpretation of vital rates, life table analysis and record linkage. Lectures and exercises. Prerequisite: Permission of the program director.

EPI6276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
Application of advanced topics in statistical methods for epidemiologic data analysis: logistic regression and discriminant analysis, Poisson regression, contingency table analysis (including log-linear modelling), time series, survival analysis, Cox regression with and without time-dependent covariates, principle components and factor analysis. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5242 or equivalent, and EPI 5241 (may be done concurrently), or permission of the professor.

EPI7999 THÈSE DE MAÎTRISE EN ÉPIDÉMIOLIOGIE / MSc THESIS IN EPIDEMIOLOGY

Business Administration

The Telfer School of Management offers the following graduate programs: Master of Business Administration (MBA), Master of Health Administration (MHA), Master of Science (MSc) in Management, Master of Science (MSc) in Health Systems as well as two combined programs: MBA-Juris Doctor, MBA-L.L.L. In addition, it is a partner in a number of interdisciplinary graduate programs, such as Engineering Management, Systems Science and E-Business Technologies. Each of these programs has its own section in the graduate calendar. All the programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

The MBA program is conceived for candidates with at least three years of work experience. The program may be completed on a full-time basis over twelve (12) consecutive months. If the degree requirements are completed on a part-time basis, program duration is then normally thirty-six (36) months. However, part-time students may choose to complete the intensive International Summer Exchange Program which would allow them to complete their MBA in as little as twenty-eight (28) months. The Telfer School of Management also offers an Executive MBA (EMBA) program which is designed for mid-career and senior level executives who seek a Global, Practical and Relevant experience all while earning a graduate degree. For more information please refer to the EMBA website.

The program provides a strong foundation in all management disciplines, develops management and people skills, and refines the students' ability to view and analyze issues, opportunities and situations from a strategic perspective, allowing them to become responsible agents of change. Emphasis is placed on the applications of relevant, contemporary management concepts, models and philosophies with an integrated approach to problem solving and an appreciation of all aspects of the organization.

The pedagogical approach stresses teamwork and managerial skills development. It allows the student to grapple with real-world challenges facing organizations through industry-based integrating projects that draw upon multiple disciplines.

The student population is drawn from around the world and brings to the program a variety of educational backgrounds as well as professional expertise from the private and public sectors.

The program combines academic excellence with a strong concern for the practical challenges facing modern managers. To this end, it makes significant use of practitioner-oriented teaching materials and business simulations, and allows students to become actively involved with organizations.

NOTE: Throughout this text, the terms "course" refers both to three-credit courses and to 1.5 credit modules.

Program delivery

Cohorts and work groups

The MBA Program is designed to build on the academic and cultural diversity of its student body. A cohort environment allows students to work and learn together, benefiting from each other’s strengths, capabilities and experience. The program carefully creates work groups composed of students with different academic, cultural and professional profiles. Progressing through the program in these work groups provides students with an enriching learning experience and a unique opportunity to develop their ability to function within a culturally diverse environment.

The integrated MBA curriculum prepares students to become leaders in a technology-intensive global economy and as such is delivered around five major themes:

• Understanding Management Foundations and the Global Business Environment

• Developing a Strategic Perspective

• Integrating Business Functions

• Managing in a Technology-Intensive Global Economy

• Providing Value to the Business Community

Courses

Many of the program requirements consist of 3-credit courses, normally offered on the basis of three hours per week over twelve weeks during a university session. Each session has been divided into two blocks, allowing the program to also offer 1.5-credit courses, also known as modules. The 18-hour modules, normally offered over a six-week period, provide more variety in course offerings and allow flexibility in course delivery, as some modules may be offered in an intensive format such as over a 3-day weekend. Any given course is normally offered only once a year in a specific academic session or block. Multiple sections (day and evening) of each course may be scheduled in the same session or block, given the program structure and based on enrollment figures; some courses are offered only in the evenings. The Telfer School of Management may
choose not to offer a course for which the demand is too low.

The Telfer School of Management offers graduate courses under four different course codes. The course codes identify to which student population the course is open, as summarized below. All students must have the appropriate prerequisites.

- **MBA 5XXX, MBA 6XXX**: Courses specifically designed for the MBA program. Access to these courses is normally limited to MBA students, to graduate exchange students coming to the Telfer School of Management, to graduate students on letter of permission, and to alumni of the MBA, MHA or Executive MBA programs. Some sections of some MBA courses are also open to students in the Master's of Engineering Management (EMP) program. All MBA 5000-level courses are compulsory for all MBA students.

- **MAH 6XXX**: Courses specifically designed for the MHA program. These courses are open to all MHA students, as well as to other University of Ottawa graduate students. Exchange graduate students, graduate students on letter of permission, as well as alumni of the MBA, MHA or Executive MBA programs may also register.

- **ADM 5YYY, ADM 6YYY**: Courses specifically designed for the multi-disciplinary programs in which the Telfer School of Management is involved. These courses are open to all students registered in a University of Ottawa graduate program, and in particular the Master's in Engineering Management Program (EMP), and the Graduate Diploma Programs offered by the FGPS. Exchange graduate students, graduate students on letter of permission, as well as alumni of the MBA, MHA or Executive MBA programs may also register.

- **ADX ZZZZ**: Courses that are exclusively offered to the Telfer School of Management Executive MBA (EMBA) students and alumni. See the EMBA web page for more details (www.emba.uottawa.ca).

**Computer facilities**

The Telfer School of Management offers students well-equipped computer facilities. Hardware and software common in business are available. Computers are also used as a main teaching tool in the many multimedia classrooms available on campus.

The MBA program fosters the development of its students’ computer skills by providing them with continuous access to the most current suite software, to financial databases, to specialized business software, as well as to the Internet and electronic mail. It also makes available computer and multimedia equipment for the preparation of assignments and class presentations required by the program. Twelve study rooms have been set aside for the exclusive use of MBA students: each room is equipped with two PCs, one white board, one work table and six chairs and are ideal for group work and discussions.

In addition to those tools and services provided by the Telfer School of Management, students can access computer, communication and multimedia services provided to all University students. Some of these services are available by dial-in access outside the campus.

**Career services**

The Telfer School of Management has an internal career service that supplements the services offered by the Career and Employment Centre on campus. Our Career Centre offers a large variety of free services to the Telfer School of Management students and alumni. Our mission is to provide a service that builds, develops and maintains successful partnerships between students and employers by: creating employment opportunities, enhancing student value and facilitating the employers’ recruitment process.

Students can take advantage of our MBA Career Development program. This four stage program consists of a series of workshops covering multiple topics ranging from resume building to career planning. Some of our other services include: career testing, several networking events, employer panels, the MBA student trip, our Career Navigator, and our resource centre.

All of our services are designed to complement the students’ academic knowledge with self-understanding and career development tools that will lead them to establish a meaningful and successful career.

www.telfer.uOttawa.ca/careercentre  
careers@telfer.uottawa.ca

**Programs**

Master of Business Administration (M.B.A.)

**Admission**

Entry into the MBA program takes place in the fall (full-time and part-time students). Classes normally start at the beginning of the last week of August. The deadline for the receipt of completed admission applications is May 15 of the year of potential entry.

Due to immigration requirements, all applications other than those from Canada, the United States and Europe must be received no later than February 1. Late applications may be considered but only at the discretion of the Telfer School of Management.

In the application to the MBA program, students must elect to study in English or in French and are placed, once admitted, in a cohort/study
Admission criteria

Admission to the program is competitive and the number of candidates admitted is limited. Admission will be granted only to those who clearly demonstrate a high promise of success in the MBA program.

Admission to the master of business administration program is open to candidates:

- Holding a Canadian baccalaureate degree or its equivalent with minimum standing of B, or a 70 per cent overall average. The Faculty of Graduate and Postdoctoral Studies will determine the equivalency of qualifications for applicants from non-Canadian institutions. All post-secondary studies are considered at the time of admission, with the most recent studies being considered in the first instance. In addition, a limited number of candidates may be considered for admission on the basis of substantial managerial or professional training and experience (at least 10 years), provided there is strong evidence of management responsibilities and career progression, even if they do not hold a university degree or do not meet the minimum academic requirements.
- Having acquired a minimum of three years full-time work experience. In general, preference is given to those applicants who have greater work experience, particularly when there is evidence of management responsibilities and career progression. Co-op placements and work internships completed to meet the requirements of a postsecondary academic program will be viewed favorably at the time of admission, but do not constitute a replacement for the full-time work experience requirement.
- Having achieved at least a 50th percentile score on the Graduate Management Admission Test (GMAT), with strong standing for each individual test component, including at least a 4.5 score on analytical essay writing. Applications for the GMAT can be obtained from Educational Testing Service, Box 966-R, Princeton, New Jersey, USA, 08540; consult www.mba.com for more details.

Candidates whose mother tongue is neither English nor French are required to provide evidence of proficiency in one of these languages. Candidates applying to the English MBA must submit one of the following to the FGPS to confirm their English proficiency (the test scores cannot be more than two years old as of September 1 of the year of potential entry into the MBA program):

- A score of at least 250 on the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, New Jersey, USA, 08540; see also www.toefl.org.
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: www.ielts.org.
- A score of at least 14 on the CAE test, administered by the University of Cambridge, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years over the last six years).

Candidates applying to the French MBA must submit one of the following to confirm their French proficiency:

- A score of at least 14 on the TESTCAN, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in a French language university.
- Proof of recent prolonged residence and exercise of a profession in a French-speaking country (normally at least four years over the last six years).

It is recommended to students opting for the French cohort to have passive knowledge of English (ability to read and understand spoken English).

Recognition of courses

Exemptions, retained credits and advanced standing

At the time of admission, students may be granted exemptions, retained credits or advanced standing for graduate courses in management previously completed as a regular student in a Canadian MBA program or similar program accredited by the AACSB International or equivalent.

Exemptions, retained credits and advanced standing may also be granted for graduate courses previously completed in a University of Ottawa interdisciplinary program in which the Telfer School of Management is involved.

The maximum number of credits that can be granted as exemption, retained credits or advanced standing is 24, and all students must complete a minimum of 50 credits of MBA or ADM courses following admission to be granted the degree. No exemption or advanced standing will be granted for courses completed more than five years previously or for which the grade was lower than B (70 per cent). Retained credits and advanced standing are granted only for 5000-level MBA courses.

Computer skills

Students must be proficient in the use of computers and basic applications related to management, such as word processing, spreadsheets, presentation software, internet browsers and email.

Program Requirements
MBA full-time studies

To obtain the MBA degree, students must successfully complete fifty-four (54) graduate level credits consisting of:

- 34.5 credits of 5000-level MBA courses.
- 13.5 credits of elective 6000-level MBA, ADM or HHA courses.
- 6 credits for the Management Consulting Project (MCP), namely MBA6269 Management Consulting (1.5cr.) and MBA6499 MBA Consulting Project (4.5cr.).

As described below, part-time students who complete 12 credits in international exchange are exempted from the six-credit MCP requirement.

The courses for the full-time MBA students are offered in a specific sequence over twelve (12) months. Full-time sections of courses are normally offered between 8:30 am and 5:30 pm on weekdays. However, in the case of low enrollment, the full-time and part-time cohorts may be combined for some courses offered in the evening (between 4:00 pm and 10:00 pm). The schedule of courses for full-time students appears on the Full-Time Studies Master Schedule on the MBA program website.

SUMMARY OF COURSE REQUIREMENTS

- Understanding Management Foundations and the Global Business Environment (13.5cr.)
  This set of courses introduces the tools and skill sets needed by senior managers and provides a good understanding of the context in which businesses operate. The MBA program begins with a period dedicated to management skills development (MBA5235). This is normally scheduled during the last two weeks of August for full-time students.

  - MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
  - MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
  - MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
  - MBA5300 DATA ANALYSIS (3cr.)
  - MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)
  - MBA5355 ECONOMICS FOR THE GLOBAL MANAGER (3cr.)

- Developing a Strategic Perspective (7.5cr.)
  This set of courses focuses on strategic thinking. Scheduled during the last week of August, the module "The World of the General Manager and of Strategic Management" sets the stage for the continuous integration of the strategic perspective throughout the curriculum. This perspective also permeates the coverage of the business functions. Students must apply models of performance and value in strategic management on the basis of their underlying understanding of all management disciplines and functions, and their relative strategic role and importance.

  - MBA5211 CORPORATE GOVERNANCE AND ETHICS (1.5cr.)
  - MBA5237 CHANGE MANAGEMENT (1.5cr.)
  - MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
  - MBA5360 STRATEGY FORMULATION AND IMPLEMENTATION (3cr.)

- Understanding and Integrating Business Functions (10.5cr.)
  This set of courses presents the strategic importance of the major functions of the firm. Models of integration of the business functions through information technology and the tools of the new economy are explored.

  - MBA5280 OPERATIONS MANAGEMENT (1.5cr.)
  - MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
  - MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
  - MBA5350 CORPORATE FINANCIAL MANAGEMENT (3cr.)

- Managing in a Technology-Intensive Global Economy (3cr.)
  The common core includes courses which present the methods and processes, with regard to the management of technology, used by organizations in establishing and using performance management systems to achieve strategic success. Moreover, the program offers a variety of elective courses that address technological issues faced daily by managers in today’s fast-paced highly competitive economy, such as technology strategies, information management, management of innovation and R&D activities and growth management. As the globalization of markets and technology and the growth of the Internet and of e-business push firms of all sizes to develop and pursue growth strategies beyond national boundaries, it is important for students to develop a strategic vision as well as the tools needed to become the next leaders in a technology-intensive global economy.

  - MBA5270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
  - MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)

- 12 credits of 6000 level courses (MBA, ADM, HAH)
  See titles and description in the course description section of the calendar.

- Providing Value to the Business Community (6cr.)
  In partnership with the Canadian Association of Management Consultants (CAMC), the MBA program allows students to learn about and apply best practices in management consulting. Under the joint supervision of a faculty member, of an executive from the client organization, and of a practicing and experienced Certified Management Consultant, students address an issue or a problem of importance being faced by a private or public organization. Client organizations gain access to motivated, experienced and talented MBA candidates for addressing real-time organizational needs and challenges. Students get to apply newly acquired knowledge and skills as well as recognized
consulting practices and gain relevant practical experience through exposure to concrete managerial challenges.

MBA6269 MANAGEMENT CONSULTING (1.5cr.)
MBA6499 MBA CONSULTING PROJECT (4.5cr.)

MBA part-time studies

Part-time students may choose to complete the entire program on campus, or to participate in one of the School’s intensive International Exchange Programs (see the International Summer Intensive Programs section for more details). In both cases, students must complete all 5000-level courses, (for a total of 37.5 credits) as well as 16.5 credits of 6000-level courses. The compulsory MBA orientation and management skills development (MBA 5235) period for part-time students normally takes place in the last weekend of August.

Part-time students completing the entire program on campus can meet the degree requirements within twenty-four (24) months. To complete the program in 24 months, all part-time students must follow the same cohort sequence (see the MBA program web site). Exceptions will increase program duration, as most courses are offered once annually. Students must apply in writing to the graduate program’s office for permission to deviate from the set sequence.

Students who deviate from the cohort sequence will take longer to complete the program. All degree requirements must, however, be completed within five (5) years. Courses for part-time MBA students are normally offered one weekday evening and all day every other Saturday. Some courses are offered in an intensive format over a week or a three-day weekend, and occasionally on Sundays (see the MBA program website for further details).

International Summer Intensive Exchange Program

Part-time students have an opportunity to complete up to twelve (12) credits of the program requirements through the intensive International Summer Exchange Program. The program is offered in English at the École Supérieure de Commerce de Reims (France). Students may complete two courses (6 credits) over two weeks, or four courses (12 credits) over four weeks, normally in June or July. In both cases they must complete a research project on a topic set by the MBA program, to be submitted prior to their departure. Selection is competitive. Interested students should contact the International Exchange Office early in the program for more details regarding the exchange.

In order to be able to complete the MBA degree requirements in twenty-eight (28) months, students must complete the four-week Exchange Program, and must register to three week-long intensive courses offered in Ottawa in the Spring/Summer session (the list of courses offered in an intensive format may vary from year to year).

Four-week option

- Students who choose to register in the four-week Exchange program must complete the following 6000-level courses (3 credits each):
  - MBA6616 INTERNATIONAL EXCHANGE COURSE I
  - MBA6616 INTERNATIONAL EXCHANGE COURSE II
  - MBA6616 INTERNATIONAL EXCHANGE COURSE III
  - MBA6616 INTERNATIONAL EXCHANGE COURSE IV
- In addition to completing these four courses, students will be required to submit a 20- to 25-page report on an International Business issue to be determined by the program. A grade of S (satisfactory) or NS (not satisfactory) will be granted for this paper. However, students must obtain the S (satisfactory) grade on the paper to be granted the 6 credits.
- Student must take at least three credits from any of the 6000-level elective courses beginning with the code MBA, HAH or ADM.
- Students participating in the four-week exchange program are exempted from the Management Consulting course (MBA6269) and project (MBA6499).

Two-week option

- Students who choose to register in only two weeks of the Exchange Program must complete the following 6000-level courses:
  - MBA6616 INTERNATIONAL EXCHANGE COURSE I
  - MBA6616 INTERNATIONAL EXCHANGE COURSE II
  - MBA6616 INTERNATIONAL EXCHANGE COURSE III
  - MBA6616 INTERNATIONAL EXCHANGE COURSE IV
- In addition to completing these two courses, students will be required to submit a 15- to 20-page report on an International Business issue to be determined by the program. A grade of S (satisfactory) or NS (not satisfactory) will be granted for this paper. However, students must obtain the S (satisfactory) grade on the paper to be granted the 6 credits.
- Students participating in the two-week exchange program must complete the Management Consulting course (MBA6269) and project (MBA6499) (6 cr.)
- At least 3 credits from any 6000-level course beginning with the code MBA, HAH or ADM.
- In addition to the Reims exchange program, part-time students may also take part in the two-week exchange program (6 credits) in collaboration with the École de Management de Nantes (Audencia). The first-week session, offered in French, will take place in Nantes and Brussels (between blocks 1 and 2) while the second week, offered in English, will take place in Ottawa during the Spring session (beginning of block 5). This program will be followed with the Executive MBA students from Audencia. For additional details pertaining to this unique opportunity, consult the Graduate Secretariat.

Language of instruction

In their application to the MBA program, students must choose between English and French as their language of instruction. Students opting for the French cohort must have at least a passive knowledge of English (ability to read and understand spoken English). All 5000-level courses will be taught in the chosen language of instruction. At the 6000-level, priority will be given to students from the English cohorts for courses offered in English, and to students in the French cohorts for courses offered in French. Students wishing to take a 6000-level course given in a language
other than that of their cohort will have to show evidence of proficiency.

**Change of classification**

Students wishing to change their registration classification from full-time status to part-time status, and vice versa, must consult an academic advisor, who will assist in planning their course schedule. A full analysis of the courses completed at the time of the change of classification request will determine the exact remaining program requirements and expected time to completion. All requests for change in registration status are subject to the approval of the FGPS.

**Evaluation and promotion**

The term "courses" refers both to 3-credit courses and to 1.5-credit modules.

Grades are awarded according to the following scale:

- A+ 90 - 100 % 10 points Exceptional
- A 85 - 89 % 9 points Excellent
- A- 80 - 84 % 8 points Excellent
- B+ 75 - 79 % 7 points Very Good
- B 70 - 74 % 6 points Very Good
- C+ 65 - 69 % 5 points Good
- All grades below C+ are failing grades for graduate students.
- C 60 - 64 % 4 points
- D+ 55 - 59 % 3 points
- D 50 - 54 % 2 points
- E 40 - 49 % 1 point
- F 0 - 39 % 0 point

ABS-EIN*

* ABS - (absent, no work submitted) Awarded to a student who has not attended the course and has not informed the academic unit and the FGPS in writing, within two weeks of the start of the course. This symbol is equivalent to a failing grade (F).

* EIN - (incomplete) Awarded when at least one of the compulsory elements of evaluation have not been provided. This symbol is equivalent to a failing grade (F).

**Dropping courses**

Given the integrative nature of the program delivery, full-time and part-time students are not allowed to drop 5000-level courses: however, they may drop 6000-level courses, but only during the first two weeks of classes.

**Transfer of credits**

Under certain circumstances, students registered in the program may take courses in another faculty or at another university and have the credits transferred towards the requirements of the degree. Arrangements for registration in such courses must be approved in advance by the Telfer School of Management and completed by the closing date for registration in the MBA program in the session concerned.

Students who intend to take courses at Ontario universities must complete in advance the form entitled Ontario Visiting Graduate Student Application, available at the secretariat of the School or at the FGPS. Students who intend to take courses at a university outside of Ontario must obtain in advance a Letter of Permission from the School or from the FGPS.

The combined maximum number of credits allowed in retained credits, advanced standing or in transferred credits is 24. The regular rules of evaluation and promotion apply to all courses taken for transfer.

**Change of grade on the record**

**Revision**

Students wishing to request a review of any marked assignments returned while the course is in progress must do so within one week of receipt of the marked assignment from the professor. Students wishing to request a review of final examinations and term work returned after the end of a course must do so within one week following the posting of grades by the graduate programs secretariat.

The request must be made in writing to the graduate programs secretariat using the special form available for this purpose. A copy of the student’s request will be forwarded to the professor, who will submit his decision to the director of the MBA program, using the Change of Grade Report. The graduate programs secretariat will inform the student of the decision: if applicable, the revised grade will be forwarded to the FGPS.

**Appeal process**

A student who is not satisfied with the professor’s decision, and who wishes to proceed with a formal review, must submit a written request to the graduate programs secretariat within one week of communication of the professor's decision. The Director of the MBA program will proceed with a reevaluation according to the procedure approved by the Senate of the University, a copy of which can be found at the graduate programs secretariat or at the FGPS. One or two professors qualified in the discipline and appointed by the director of the MBA program will re-assess the assignment, test or examination in question and will submit their decision to the Director of the MBA program, who will communicate the decision to the student.

A student who disagrees with this decision may, within a week of communication of the Telfer School of Management decision, submit a written
Appeal to the dean of the FGPS, who will refer the appeal to the Executive Committee of the FGPS.

**Graduate Diploma in Business Administration**

The Graduate Diploma is awarded only to students already registered in the MBA or MHA programs who are not continuing in these programs. In order to receive the Graduate Diploma, candidates must:
- Be admitted and registered in either the MBA or the MHA program;
- Have completed at least 27 credits of MBA or MHA or ADM courses with satisfactory performance (normally with a 6.0 cumulative grade point average), including at least 12 credits of MBA 5000-level courses from the following list:

  - MBA5211 CORPORATE GOVERNANCE AND ETHICS (1.5cr.)
  - MBA235 MANAGEMENT SKILLS 1 (1.5cr.)
  - MBA236 LEADERSHIP AND MANAGEMENT (1.5cr.)
  - MBA237 CHANGE MANAGEMENT (1.5cr.)
  - MBA238 MANAGEMENT SKILLS 2 (1.5cr.)
  - MBA241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
  - MBA260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
  - MBA265 PERFORMANCE MANAGEMENT (1.5cr.)
  - MBA266 PERFORMANCE MANAGEMENT: BUSINESS PROCESS MODELLING (1.5cr.)
  - MBA270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
  - MBA271 DATA ANALYSIS (3cr.)
  - MBA272 STRATEGIC MARKETING MANAGEMENT (3cr.)
  - MBA273 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
  - MBA274 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)
  - MBA275 CORPORATE FINANCIAL MANAGEMENT (3cr.)
  - MBA276 ECONOMICS FOR THE GLOBAL MANAGER (3cr.)
  - MBA277 STRATEGY FORMULATION AND IMPLEMENTATION (3cr.)
  - MBA278 OPERATIONS MANAGEMENT (1.5cr.)

**Combined programs**

Two different combined programs – MBA-JD, MBA-LL.L, and MBA-LL.M. (droit notarial) – offer students the possibility of completing the MBA degree in conjunction with a degree in law. The total time required is shorter than if the degrees are completed separately. These programs are described under A and B below.

**Combined MBA-JURIS DOCTOR / MBA-LLL Program**

**Jay Hennick MBA-Juris Doctor / MBA-LLL**

The Telfer School of Management and the Faculty of Law jointly offer a combined MBA-Law program. This program allows the student a choice between the two areas of study in Canadian law. The student may obtain a combination of the MBA and JD (Juris Doctor) degrees or the MBA and LLL (licentiate in law) degrees within 40 months on a full-time basis. This program is intended for individuals who wish to acquire the skills and knowledge of the two major disciplines, management and law, which are becoming increasingly valuable in modern business, in government and in the practice of law.

**Objectives**

The primary objective of this program is to enable students to acquire a set of skills and knowledge which is extremely important in today’s market. Another objective of this program is to foster interdisciplinary studies, which will enrich both faculties, and to encourage inter-faculty cooperation in teaching and research.

**Admission**

Only students registered in the first year of either program may apply. Candidates must hold a baccalaureate degree and satisfy the admission requirements of both programs. Those interested should consult the MBA calendar and the appropriate section of the Faculty of Law calendar (common law or droit civil). Students starting with the MBA program must apply for admission to the Common Law Section prior to November 1 or to the Section de droit civil by March 1. Candidates requesting admission to the MBA program must apply by April 1.

**Promotion**

In order to be admitted to the combined program, the student must successfully complete one year of the first chosen program (Program 1) and place in the top 25% of the class. The student will generally spend the second year in the other faculty to complete one year of Program 2. Promotion in the following years will be subject to the regulations of each faculty (see calendars).

**Additional requirements**

In its evaluation of applicants, the admission committee will identify those who lack mathematical background and will strongly recommend that they complete four Quantitative Analysis for Business Modules (namely "Basic Mathematics", "Spreadsheet for Statistics", "Mathematics for
Finance", and "Calculus for Microeconomics") offered in an hybrid delivery mode (on-line with some one-on-one tutorials with a professor. the modules can be done completely on-line for students who cannot attend live tutorials).

Furthermore, all students admitted will be invited to complete these four modules to refresh their quantitative analysis skills.

For students in the combined program, the MBA requirements are 48 credits as follows:
- All thirty nine (39) credits of 5000-level MBA courses
- Three (3) credits of elective 6000-level MBA, ADM or MHA courses
- Six (6) credits for the Management Consulting Project (MCP), namely MBA 6269 Management Consulting (1.5-cr.) and MBA 6499 MBA Consulting Project (4.5-cr.)

Candidates are asked to consult the MBA guidelines on recognition of courses taken outside the program.

**MBA-Juris Doctor / MBA-LLL curriculum**

Students who wish to follow the combined program may choose to begin either with the first year of the Juris doctor or LLL program or with the MBA program. However, students are strongly encouraged to begin with the Law program. The program requires students to complete 48 credits within the MBA program, and 82 credits within the Law program.

First year -- All requirements of the first year of the Law program.

Second year -- All requirements of the MBA program, for a total of 48 credits. This can be achieved over twelve (12) consecutive months on a full-time basis.

Third and fourth years -- In the third and fourth years of the combined program, students must take all remaining courses to meet the Law degree requirements (including all remaining courses required for the Law program, and the required number of electives).

**Minimum standards**

Students must meet the following requirements throughout their program:

1. **Minimum cumulative grade point average and probation period**

   Students must maintain a cumulative grade point average (CGPA) of 6.0 throughout the program and their overall CGPA upon completion of all requirements must be 6.0 in order to qualify for graduation. Those who fail to maintain an average of 6.0 at the time of the periodic review are placed on probation. All courses, passed and failed, are included in the calculation of the CGPA.

   The CGPA of full-time students will be reviewed at the end of each academic session. Part-time students' performance will be reviewed at the end of Block 6 for the first year of the program. Thereafter, their performance will be evaluated upon completion of each additional 12 credits.

   Students who fail to qualify for removal from probation at the next review must withdraw from the program.

2. **Failures**

   The general regulation of the FGPS (Regulation E.7) applies.

**Duration of program**

**Full-time : 5 sessions**

The MBA program may be completed on a full-time basis. The curriculum and full-time course sequencing have been designed to support the high level of coordination and integration across courses that make it possible to deliver the program over twelve (12) consecutive months. This in turn allows students to return quickly to the work force upon completion of their MBA studies.

The MBA program is also offered on a part-time basis for students who wish to complete MBA studies while maintaining full-time employment. It can be completed within thirty-six (36) consecutive months but students must fulfill the degree requirements in a maximum of five (5) years. Moreover, students may choose to accelerate their studies by participating in the intensive International Summer Exchange Program in Europe.

**Graduation**

Upon successful completion of the requirements for the combined program, the Faculty of Law and the Telfer School of Management will each grant its own degree in recognition of its requirements being met.

Students who have chosen to withdraw from the combined program at any time, or who do not meet the promotion requirements for the combined program, may complete the law or MBA degrees separately, according to the regular degree requirements.

**Courses**

**Explanation of Course Codes**

**MBA:** courses specifically designed for the MBA program opened selectively to non-MBA students

**ADM:** courses specifically designed for Interdisciplinary programs in which the Telfer School of Management is involved
1st digit:

**5000 level**: required courses (for all MBA students)

**6000 level**: advanced courses

2nd digit:

1: Exchange program courses
2: 1.5-cr. courses in English
3: 3-cr. courses in English
4: 4.5-cr. courses in English
5: Exchange program courses
6: 1.5-cr. courses in French
7: 3-cr. courses in French
8: 4.5-cr. courses in French
9: Bilingual courses

3rd digit:

0: Data Analysis, Statistics
1: Governance, Corporate governance
2: Marketing
3: Organizational Behaviour, Human Resources
4: Accounting
5: Finance, Economics
6: Business Policy, International Management, High Technology
7: Information Systems
8: Management Decision Models, Operation Management
9: Directed Readings, Seminars, Projects

**5000-LEVEL MBA COURSES**

**MBA5100 FOUNDATIONS IN STATISTICS: DESCRIBE AND CONVINCE** (1.5cr.)
Data analysis as used to support performance based decision-making and in dealing with change. Understanding of how to analyse data and the limitations of said analysis. Introduction to the role of data analysis in doing business, including the summary and presentation of data. Use of statistical and probability tools for business and the treatment of data as well as the mastery of widely available statistical software. Interpretation of concepts and basic techniques in data analysis. MBA5100 and MBA5101, together, are equivalent to MBA5300.

**MBA5101 STATISTICAL INFERENCE: PREDICTIONS AND DECISIONS** (1.5cr.)
Analysis of data as decision support tools within the different functions of an organisation. Analysis of questionnaires in human resources and in marketing. Correct interpretation of results, in particular in the context of performance-based management. Ability to draw conclusions based on samples and to recognize and capitalize on the relationship between two variables. **Prerequisite: MBA5100. MBA5100 and MBA5101, together, are equivalent to MBA5300.**

**MBA5120 STRATEGIC MARKETING MANAGEMENT I** (1.5cr.)
Issues in marketing management. Differences between product and service types. Pricing policy. Distribution and logistics. Electronic marketing and communication. Understanding of key strategic marketing concepts, including tools and procedures, analysis of market opportunities, and establishing performance objectives. MBA5120 and MBA5125, together, are equivalent to MBA5320.

**MBA5125 STRATEGIC MARKETING MANAGEMENT II** (1.5cr.)
Practical applications, using case studies, of key concepts in strategic marketing management. Development of a marketing plan, including its implementation using a simulation in order to satisfy targets in an ethical manner. **Prerequisite MBA5120. MBA5120 and MBA5125, together, are equivalent to MBA5320.**

**MBA5131 ORGANIZATIONAL BEHAVIOUR** (1.5cr.)
Determining the key organizational factors (e.g. structure, culture) influencing organizational performance. Understanding and application of principles favoring motivation, workplace satisfaction and mobilization of teams; Understanding of human diversity and its impact on decision-making. Understanding the notions of power and politics underpinning management decisions. **Prerequisite: MBA5225. MBA5131 and MBA5132, together, are equivalent to MBA5330.**

**MBA5132 HUMAN RESOURCES MANAGEMENT** (1.5cr.)
Understanding the strategic importance of human resources and their impact on organizational performance; Acquisition of skills related to employee selection, performance evaluation and managing individual and team performance. Differentiate recognition strategies which foster equity and workplace performance. Differentiate features of human resource management in an international context. **Prerequisite: MBA5131. MBA5131 and MBA5132, together, are equivalent to MBA5330.**
MBA5140 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS I (1.5cr.)
Use of accounting information in decision-making by internal users. The role of accounting in the evaluation, control, and decision-making of business managers. Using ratio analysis, perform a business diagnostic in terms of management, profit, liquidity and solvency. The relationship between cost structures and profit (profit threshold, cost-volume-benefit analysis). Use of appropriate costs in making performance-driven decisions. Understanding budgets for planning purposes. Differentiate different types of budget. Gap analysis in budgetary control. MBA5141 and MBA5142, together, are equivalent to MBA5340.

MBA5141 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS II (1.5cr.)
Activities accounting. Treatment of indirect costs in costing (products and services). Activity and process management. Use of cost inducers in cost management strategy. Evaluating performance. Accounting issues related to sustainable development. Prerequisite: MBA5140. MBA5140 and MBA5141, together, are equivalent to MBA5340.

MBA5161 STRATEGY FORMULATION (1.5cr.)
Develop the skills and competencies to drive an analysis for strategy development. Describe the value chain of the organization in order to identify potential sources of competitive advantage as well as product and market selection, which characterize the group strategy. Integration within the global perspective of strategic management, diverse functional knowledge bases. Prerequisite: All 5000-level MBA courses associated with the student’s delivery method. MBA5161 and MBA5162, together, are equivalent to MBA5360.

MBA5162 STRATEGY IMPLEMENTATION AND CONTEMPORARY ISSUES (1.5cr.)
The goal of this course is understanding the levers involved in strategy implementation. It also studies the context of the modern business including emerging strategy, systemic thinking, strategy and learning and internet businesses. Organizational processes and strategy. Value stream mapping and process management. The Six Sigma approach and the performance of business processes. Prerequisite: MBA5161. MBA5161 and MBA5162, together, are equivalent to MBA5360.

MBA5211 CORPORATE GOVERNANCE AND ETHICS (1.5cr.)
Introduction to Corporate Governance, Accountability and Ethics; Shareholder Interests - Accountability and Governance Alignment; Technology & Ethics - Security and Privacy in an Online World; Managing When Agendas Collide - Making Ethical Business Decisions; Governance & Growth - Balancing Uncertainty, Scrutiny & Transparency.

MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
Development of increased skills and understanding of participant preferences for the management of interpersonal and team-based issues and processes in a work environment. Special focus on diversity and ethics in a team environment. Effective business communications, including skills for delivery of high quality business presentations; exposure to common business software for inclusion in the student's professional toolbox.

MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
Leadership versus management; participatory leadership; transactional leadership; transformational leadership; reciprocity and mutual influence between leaders and followers; leadership style; situational determinants of effective leadership. Course delivery involves class discussions, experiential exercises, guest speakers and case studies. Prerequisite: MBA 5330 or permission of the MBA program director.

MBA5237 CHANGE MANAGEMENT (1.5cr.)
Development of skills in the effective conceptualization, planning, implementation and evaluation of change interventions in human systems. Behavioral science frameworks explaining and guiding the practice of change in an organizational context. Systemic nature of change and intervention practice, including the generation and management of resistance to change. Organizational change processes at the levels of individual, team, and overall organizational design including the necessary system conditions that underlie effective human system intervention efforts. Cross-cultural change, knowledge based organizations, socio-technical change processes, system vs. cultural change.

MBA5238 MANAGEMENT SKILLS 2 (1.5cr.)
Understanding and development of the management skills required to manage people and processes in an organizational setting. Conflict resolution, negotiation, problem-solving, team development and applied emotional intelligence. Prerequisite: MBA 5235 or permission of the MBA program director.

MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
This course focuses on the role of the accounting function internal to the organization. It takes a broad view of managerial accounting, introducing students to various costing systems, cost behaviour patterns and cost structures. It demonstrates the use of accounting for the evaluation of product, managerial and divisional performance thus helping students to understand what accounting can do for decision makers and how accounting choices affect decisions. Emphasis on the strategic importance of aligning accounting systems with firm technologies and goals. Current issues in management accounting and internal reporting are discussed.

MBA5250 INTRODUCTION TO CORPORATE FINANCE (1.5cr.)

MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
Understanding the role of the general manager in setting direction, creating competitive advantage, allocating resources, integrating operations and projects, framing the organizational infrastructure and context and managing change. Introduction to the concept of strategy and alternative models of strategic making.
MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
The focus will be on learning about business intelligence and performance management approaches at operational levels in the organization. Frameworks such as the Balanced Score Card and Quality Management will be covered, as well as the use of business intelligence to explore performance problems.

MBA5266 PERFORMANCE MANAGEMENT: BUSINESS PROCESS MODELLING (1.5cr.)
This course will build on the functional knowledge students have gained in the program thus far to explore the use of business intelligence at strategic levels in the organization. Core concepts will include strategy mapping, business modelling, firm-level analytics and decision models as well as the contribution of key business processes to organizational performance across a variety of different industries. Prerequisite: MBA 5265

MBA270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
Role of information in organizations. Overview of systems used to capture, transform and disseminate information to managers. Linkages between information and knowledge management. The process of knowledge creation and application within and among organizations.

MBA280 OPERATIONS MANAGEMENT (1.5cr.)
Strategic issues and long-term planning in manufacturing and service operations. Concepts, problem solving and quantitative techniques commonly used in decision making and in monitoring production systems. Operational strategy, forecasting, aggregate planning, enterprise resource planning and material requirements planning, supply chain and inventory management, lean operations and quality management. Sustainability issues as they relate to operations management as well as the challenges associated with integrating new technologies. Prerequisite: MBA5300. Exclusion: MBA5380/ADX5380.

MBA5300 DATA ANALYSIS (3cr.)
Introduction to statistical data analysis. Basic concepts important to management: problem-solving and decision-making using data. Application of univariate and bivariate methods to various datasets. Use of software and the interpretation of statistical output. Models and tools to assist students in collecting, organizing, understanding, analyzing, presenting and communicating data. MBA5100 and MBA5101, together, are equivalent to MBA5300.

MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
Overview of the Marketing process: key concepts, tools and procedures, in the context of a technology-intensive global economy. Definition of Marketing, the Marketing Concept and Marketing Management, and the significance of operating in a technology-intensive global economy. Analyzing market opportunities, setting performance goals, formulating marketing and implementation plans to meet those goals. Introduction to e-marketing management and some of the e-marketing tools available. MBA5120 and MBA5125, together, are equivalent to MBA5320.

MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
The strategic advantage of understanding and integrating organizational behaviour (OB) frameworks in designing and implementing effective human resource (HR) activities (namely attraction, development, maintenance and retention of employees), in measuring performance and in achieving high-performance outcomes in various global organizational contexts. OB topics covered include motivation, rewards, leadership, group dynamics, organizational politics, job and organization design, and culture. Prerequisite: MBA 5235 for MBA students only. MBA5131 and MBA5132, together, are equivalent to MBA5330.

MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)
This course focuses on the role of the accounting function external to the organization. It takes a broad view of financial accounting, encompassing a wide range of external financial and economic information, both national and international. The orientation will help students to understand what accounting can do for decision makers and how accounting and ethical choices affect decisions. Current issues in financial accounting and reporting are discussed. MBA5140 and MBA5141, together, are equivalent to MBA5340.

MBA5350 CORPORATE FINANCIAL MANAGEMENT (3cr.)

MBA5355 ECONOMICS FOR THE GLOBAL MANAGER (3cr.)

MBA5360 STRATEGY FORMULATION AND IMPLEMENTATION (3cr.)
Understanding how to assess the performance of a business, what determines performance, how to conduct a strategic audit and to develop a specific course of action to deal with strategic issues. Enhancing value by aligning strategy and organizational infrastructure. Implementing change in order to enhance competitiveness. Developing general management abilities that integrate prior knowledge and skills acquired in other courses. Co-requisite: all 5000-level MBA courses of the student’s mode of delivery. MBA5161 and MBA5162, together, are equivalent to MBA5360.

6000- & 7000-LEVEL MBA COURSES
MBA6120 MARKETING IN THE 21ST CENTURY (1.5cr.)
Marketing's place in society and in business. Overview of the marketing function: creating value for consumers, the organization and society, all within the global economic context, centered on technology and sustainable development. Measurement and performance factors in marketing. Types of competition in the marketplace and their impact on the organization’s marketing strategy. Consumer and corporate buying behavior. Market analysis and demand. Market
MBA6142 MANAGERIAL ACCOUNTING II (1.5cr.)
This course allows students to discover specific topics in managerial accounting. It focuses on the management of activities and processes, evaluation and performance and accounting issues related to sustainable development. **Prerequisite**: MBA5241.

MBA6155 FINANCIAL RISK MANAGEMENT (1.5cr.)
Role of financial markets. Understanding the relationship between return and risk of financial securities. Introduction to diversification of financial risk and portfolio management techniques. Use of derivatives in the coverage of financial risk. **Prerequisite**: MBA5350.

MBA 6165 / 6166 / 6167 / 6168 INTERNATIONAL EXCHANGE COURSES 1 / 2 / 3 / 4 (3cr. each)
Courses offered through the intensive Summer International Exchange Program in Reims, France. Focus on issues in international management. The specific topic of each of these courses changes from year to year. Students must complete a research project defined by the program prior to departure to obtain the credits; see section “6000-Level Course Requirements for Part-Time Students in the Exchange Program” for details.

MBA6198 MBA CONSULTING PROJECT I (1.5cr.)
Preparation for the Consulting project. General and substantive analysis of the organization and its competitive environment using such tools as a PESTLE, the Porter’s five forces and SWOT; participation in co-development sessions. **Exclusion**: MBA6499

MBA6199 MBA CONSULTING PROJECT II (3cr.)
Definition of the issue, diagnostic, analysis and proactive recommendations in the context of a company or organisation. Under the supervision of an MBA program professor, the project will address a problem related to performance management. The focus will be on implementation of the consulting project. **Prerequisite**: MBA6198 MBA Consulting Project 1 (1.5 cr.) Together, MBA6198 and MBA6199 are equivalent to previous course MBA6499. **Exclusion**: MBA6499.

MBA6210 / ADX6210 BUSINESS GOVERNMENT RELATIONS (1.5cr.)

MBA6220 MANAGING CUSTOMER RELATIONS (1.5cr.)
Introduction to management of customer relations, special issues in a technology-driven global context. Building long-term relationships from pre-sales to repeat business. Gathering and analyzing information about the customer. Converting information to value-added product and service. Measuring the effect on corporate sales and profits. Demonstration and workshop with a software decision support tool.

MBA6226 NEW PRODUCT DEVELOPMENT (1.5cr.)
How to develop new products for high-tech applications in an environment of global competition and shrinking cycle times. Topics include creating the climate, generating ideas, screening ideas, product portfolio selection, team building, managing the formal gating process, testing, killing, New product launch. Product migration strategies. **Prerequisite**: MBA 6225.

MBA6232 INTERNATIONAL HUMAN RESOURCE MANAGEMENT (1.5cr.)
Introduction to international HR strategy: examining strategic business objectives to identify human resource staffing needs. Global staffing: identifying qualified candidates for international assignments. Cross-cultural training: preparing those candidates for the overseas experience. Appraisal of international employees: appraising the performance of international employees at a distance. Development of the careers of international employees: managing relocation issues surrounding the movement of dual career couples and repatriating international employees in a manner that maximizes the internationally-acquired competencies and minimizes post-return turnover. Procedural justice and other international labour relations issues for the international workforce (includes compensating the international assignee and managing pay-equity issues among an international workforce, as well as attending to other ethical issues such as child labour).

MBA6250 INTERNATIONAL CORPORATE FINANCIAL POLICY (1.5cr.)
Managing foreign exchange risk by corporate treasurers. Financial management of multinational firms. Determination of a corporation's transaction and operating exposures. Use of foreign exchange derivatives, such as currency futures, options, and swaps to hedge foreign exchange risk. International portfolio and direct investments. International capital structure and cost of capital of multinational firms. Capital budgeting techniques used for foreign operations. **Prerequisite**: MBA 5350.

MBA6262 ENTREPRENEURSHIP (1.5cr.)
Creating, growing, and sustaining or exiting a new firm in a technology-intensive industry. Issues important to the technology (the scope and nature of technological knowledge and intellectual property protection), financing (seed capital, venture capital, and initial public offerings), and inter-firm relationships (spin-offs, alliances and equity alliances, and acquisitions). The course is practically oriented and will draw upon local expertise to enhance its pertinence and appeal.

MBA6266 PRINCIPLES OF NEGOTIATION FOR THE GLOBAL MANAGER (1.5cr.)
MBA6267 MULTINATIONAL CORPORATIONS AND STRATEGIES (1.5cr.)
Study of the different types of strategies being used by multinational corporations, including global, transnational, etc. Organizational and management leadership and coordination issues that arise from instituting these various strategies. Implementation is a constant focus throughout this module.

MBA6269 MANAGEMENT CONSULTING (1.5cr.)
Introduction to management consulting; the five phase consulting process, and the various business models associated with managing a consulting practice. Principles of project management. Case study format: students work in teams on a comprehensive case receiving feedback on their presentations from the course instructor and from practicing consultants invited as external presenters. The course draws heavily on analytical skills learned in other MBA courses, and prepares students to undertake the MBA Consulting Project.

MBA6271 ENTERPRISE MODELING FOR E-BUSINESS (1.5cr.)

MBA6280 PERFORMANCE AND OPERATIONS MANAGEMENT (1.5cr.)
Frameworks and models for improving operations management, defining and testing core business processes, and designing performance improvement strategies. Corporate performance management methodologies, analytic concepts, and use of business intelligence. Prerequisite: MBA 5280

MBA 6291 / 6292 / 6293 / 6294 DIRECTED READINGS IN MANAGEMENT 1 / 2 / 3 / 4 (1.5cr. each)
Advanced study in an area of management. Students may propose topics and, if approved, investigate the area under the guidance of a professor. A major paper is expected from the student. Enrolment is subject to approval by the administration of the MBA program. Normally, students must show evidence of superior performance - minimum CGPA of 7.0/B+ or equivalent - in their previous studies. Students on probation are ineligible.

MBA 6295 / 6296 SEMINAR IN MANAGEMENT 1 and 2 (1.5cr. each)
MBA 6297 / 6298 MOBILIZING SEMINAR IN MANAGEMENT 1 and 2 (1.5cr. each)
These seminars focus on current issues and topics in management. The focus of these seminars may change from year to year.

MBA6365 HIGH PERFORMANCE ORGANIZATIONS OPERATING IN EUROPE (3cr.)
History of European integration, European institutions, innovation and European competitiveness, corporate strategy and European integration, corporate governance and performance management – a European perspective. Prerequisite: MBA 5265

MBA6396 INTEGRATIVE CASES AND TEAM MANAGEMENT (3cr.)
In a team-taught, multi-disciplinary setting, the course integrates management concepts, principles and tools seen in program courses to date. Using the case study approach as well as team presentations, students understand the multifunctional links required to arrive at a sound managerial decision. The inherent characteristics of effective teams and the creative power of high performance teams are integrated via constructive feedback, conflict resolution and the team’s self-assessment. Prerequisite: MBA5235.

MBA6397 INTEGRATIVE CASES AND STRATEGY SIMULATION (3cr.)
Integrates content from the previous courses in strategy by exposing students to its formulation and implementation cycle in a simulated competitive environment. Integrates knowledge in marketing, finance, production and operations management, and human resources management, by means of a learning tool calling on multidisciplinary knowledge.

MBA6499 MBA CONSULTING PROJECT (4.5cr.)
Problem definition, diagnosis, analysis and recommendations for solution/action within a selected business organization. Normally to be completed in groups of four or five students. Supervision by MBA program faculty and MBA Project Mentor from the Canadian Association of Management Consultants. Regular progress reports submitted by e-mail or Internet, or in person. Evaluation by MBA program faculty taking into account feedback received from host organization and MBA Project Mentor. Prerequisite: successful completion of 30 credits within the MBA program, and acceptance of a project proposal by a review committee composed of the supervisor, the MBA program director and a representative of the business organization. Students must register to MBA 6269 Management Consulting in order to register to the MBA Consulting Project. A maximum of two consecutive University sessions is allowed to complete the project.

MBA6900 STAGE / INTERNSHIP (6cr.)
Stage de travail en entreprise ou un autre milieu de travail sous la direction d'un représentant de l'entreprise et un professeur de programme. Le rapport de stage sera évalué S/NS par le professeur en consultation avec l'autre directeur. / Internship in a company or other work setting under the direction of a company representative and a professor from the program. Report to be graded S/NS by the professor with input from the other supervisor. Préalable : approbation de la direction du programme. / Prerequisite: approval of the MBA program director.

ADM6260 PROJECT MANAGEMENT I (1.5cr.)
Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK®) of the Project Management Institute (PMI®), project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning,
realization and close-out). Students will have hands-on experience using MS Project.

ADM6261 PROJECT MANAGEMENT II (1.5cr.)
Focus on projects that have incomplete and/or unstable requirements such as IT projects or software development projects. Topics covered include: portfolio management; risk management; determining requirements and solutions; quality management; communication management; design methods (Quality Function deployment, Value Analysis); iterative and adaptive project management; fast tracking and concurrent methods of project management.

ADM6271 BUSINESS TELECOMMUNICATIONS SYSTEMS (1.5cr.)
Concepts of voice, data, image and video communications and their integration into local and long distance networks. Business communication systems examples.

ADM6274 INTERNATIONAL E-BUSINESS STRATEGIES (1.5cr.)
International trends in the global economy together with assessment of risks, and associated international e-business opportunities. Strategies for translating international opportunities into e-businesses, including localizing international web-based content, developing international supply networks, international crowdsourcing, international payments and international collaboration. How to address local laws on privacy, intellectual property and business contracts. **Prerequisite**: MBA 5270 (for EMP, MBA and MHA students).

ADM6275 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS (1.5cr.)
Business Intelligence (BI) as a concept; review of major BI tools and methods; identification of the right types of BI for different types of decision making environments; Introduction to Big Data; Business applications of Big Data; review of the supporting technologies such as data bases and data warehouses and Big Data Platforms for integrating structured and unstructured data including Hadoop, sandbox analytics; Streaming Analytics, and advances in data warehousing appliances that accelerate analytics. **Prerequisite**: MBA5270 (for EMP, MBA and MHA students).

ADM6276 ENTERPRISE RESOURCE PLANNING SYSTEMS MANAGEMENT (1.5cr.)

ADM6277 E-BUSINESS ENERGY MANAGEMENT (1.5cr.)
Reduction of e-business power requirements by locating data centres in areas with low cost electricity and where cold outside air can be used for cooling, e.g. British Columbia, Québec, Finland, Iceland and Sweden. Reduction of power requirements in other industries, e.g. using smart grid, smart buildings and smart cities. Calculation of energy requirements for specific e-business services, e.g. e-banking, e-newspapers, media download, media streaming and web-based advertising. Review of current international standardization work on sustainability for and by IT.

ADM6279 SOCIO-TECHNICAL CHANGE (1.5cr.)
This course explores the structural-, cultural- and process-based organizational change management challenges facing business strategists during new technology implementation initiatives. Toward this, the course draws upon management frameworks, support tools and best practices for the joint optimization of technology and social subsystems within organizations. Adopting a complex adaptive system viewpoint of the organization, the course will highlight issues of technological and social embeddedness, and illustrate the use of configuration modeling and analysis tools for enterprise engineering and strategy models to facilitate change sustainability and continuity.

ADM6281 SUPPLY CHAIN MANAGEMENT (1.5cr.)
Introduction to supply chain management; overview of its role in the organization as an operational, a strategic, and a competitive tool; role of information systems and technology in supply chain management; managing the flow of materials, and inventory management across the supply chain; developing and maintaining supply chain relationships; future challenges including sharing risks in inter-organizational relationships, managing the global supply chain and design for supply chain management. **Prerequisite**: MBA 5380 or equivalent for MBA students or EMP 5101 for EMP students.

ADM6395: CASE COMPETITION (3 CR.) (FALL - SEPT. TO DECEMBER)
Every year the University of Ottawa competes in several national and international MBA Case Competitions. This course prepares students for participation in these competitions. Entry into this course is limited and students will compete for placements. Only students who participate in the mini-case competitions schedule early September and are selected by the judges will be able to register to the course.

The mini-case competition is the only entry point to the course! Consult the MBA office for further information.

ADM6420 ELECTRONIC MARKETING (1.5cr.)

ELECTIVES OUTSIDE THE TELFER SCHOOL OF MANAGEMENT: Students may take courses or modules outside the Telfer School of Management as electives. To do so, they must receive permission of the School. Normally this would involve providing a description of the proposed course along with a rationale as to why this course is relevant to the student's program of study.

The School reserves the right to refuse such requests, particularly when a student is on academic probation. Students may take graduate level courses in any
discipline recognized by the Faculty of Graduate and Postdoctoral Studies. For more information on these courses, please consult the relevant program
calendars that are available at the graduate programs secretariat.

Canon Law

The Faculty of Canon Law of Saint Paul University offers programs leading to the Graduate Diplomas in Canon Law (GDCL), in Ecclesiastical
Administration (GDEA) and in Canonical Practice (GDCP), and to the Master of Canon Law (MCL) and the Doctor of Philosophy in Canon Law
(PhD(CL)). These degrees are conferred jointly by the Senates of the University of Ottawa and Saint Paul University under the terms of the
federation agreement between them.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies(FGPS) of the University of Ottawa,
which are posted on the FGPS website. The specific regulations of the programs and the course descriptions are approved by the Senate of both
the University of Ottawa and of Saint Paul University.

Programs

Graduate Diploma Canon Law
Master of Canon Law
Doctorate in Philosophy Canon Law

Admission

- An honours bachelor's degree or equivalent four years of post-secondary studies with at least a B average.
- At least 18 credits in the theological disciplines either by course work and/or equivalent pastoral experience in keeping with criteria
  established by the Executive Committee of the Faculty of Canon Law.
- Two (2) letters of recommendation by persons who know the applicant and can attest to the applicant's capacity to pursue graduate study.
  In addition, a letter of permission from the applicant's bishop (for secular clergy) or superior (for members of institutes of consecrated life
  or societies of apostolic life).
- A curriculum vitae.
- Excellent knowledge of English or French and, for DCA 6921 Canonical Latin, a passive knowledge of the other language.

Language requirements

All candidates must understand and speak fluently the language of instruction, either English or French. A basic knowledge of Latin is
recommended.

Program Requirements

Courses

The Master of Canon Law requires 45 credits of coursework, of which 15 are from compulsory courses.

- Compulsory courses (15cr.)
  DCA5129 GENERAL NORMS (3cr.)
  DCA5132 ADMINISTRATIVE INSTITUTES (3cr.)
  DCA5136 INTRODUCTION TO CANON LAW (3cr.)
  DCA6995 RESEARCH SEMINAR (3cr.)
  DCA6921 LATIN CANONIQUE / CANONICAL LATIN (3cr.)

- Optional courses (30cr.) from among the courses below:
  DCA5103 UNIVERSAL AND SUPRA DIOCESAN CHURCH STRUCTURES (3cr.)
  DCA5127 PARTICULAR CHURCHES (3cr.)
  DCA5128 SANCTIFYING OFFICE (3cr.)
The primary participating units are:

- DCA5130 MATRIMONIAL LAW (3cr.)
- DCA5131 CHRISTIAN FAITHFUL (3cr.)
- DCA5133 PROCEDURES I (3cr.)
- DCA5134 EASTERN CANON LAW (3cr.)
- DCA5135 MATRIMONIAL JURISPRUDENCE (3cr.)
- DCA5137 TEACHING OFFICE (1.5cr.)
- DCA5138 SPECIAL MATRIMONIAL CASES AND PROCEDURES (1.5cr.)
- DCA5203 INSTITUTES OF CONSECRATED LIFE AND SOCIETIES OF APOSTOLIC LIFE (3cr.)
- DCA5304 COMPARATIVE PARTICULAR LAW (3cr.)
- DCA5396 DIRECTED STUDIES I (3cr.)
- DCA5397 DIRECTED STUDIES II (3cr.)
- DCA5398 DIRECTED STUDIES III (3cr.)
- DCA6112 ADMINISTRATIVE PROCEDURES (3cr.)
- DCA6113 TEMPORAL GOODS (3cr.)
- DCA6114 PROCEDURES II (3cr.)
- DCA6115 PENAL LAW (3cr.)
- DCA6116 FOUNDATIONS OF CANON LAW (3cr.)
- DCA6117 INSTITUTES OF LAW (3cr.)
- DCA6301 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
- DCA6302 SPECIAL PROBLEMS IN CANON LAW II (3cr.)
- DCA6515 LITURGICAL LAW OUTSIDE THE CODE (3cr.)
- DCA6516 THE LAITY AND THE POWER OF GOVERNANCE IN THE CHURCH (3cr.)
- DCA6521 SEMINAR ON TRIBUNAL PRACTICE (3cr.)
- DCA6563 SPECIAL PROBLEMS IN CANON LAW III (1.5cr.)
- DCA6564 SPECIAL PROBLEMS IN CANON LAW IV (1.5cr.)
- DCA6596 SELECTED TOPICS IN CANON LAW I (3cr.)
- DCA6597 SELECTED TOPICS IN CANON LAW II (3cr.)
- DCA6598 SELECTED TOPICS IN CANON LAW III (3cr.)
- DCA6622 STAGE EN MILIEU DE TRAVAIL / FIELD PRACTICUM (3cr.)
- DCA6661 VOYAGE DE FORMATION À LA CURÉE ROMAINE / STUDY VISIT TO THE ROMAN CURIA (1.5cr.)
- DCA6662 QUESTIONS SPÉCIALES RELATIVES À LA VIE CONSACRÉE / SPECIAL ISSUES IN CONSECRATED LIFE (1.5cr.)

Duration of program

Students are expected to fulfill all requirements of the program within two years. The maximum time permitted is four years from the date of initial registration in the program for full-time and part-time students alike.

Residence

Students admitted full-time must register full-time for a minimum of three sessions.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) will be withdrawn from the program.

Courses

**DCA5103 UNIVERSAL AND SUPRA DIOCESAN CHURCH STRUCTURES** (3cr.)

Supreme authority of the Church: Roman Pontiff, College of Bishops and Ecumenical Council. Synod of Bishops, College of Cardinals, Roman Curia, legates. Groupings of particular Churches: ecclesiastical provinces and regions, metropolitans, particular councils (plenary and provincial), conferences of bishops. (cc. 330-367; 431-459)

**DCA5127 PARTICULAR CHURCHES** (3cr.)


**DCA5128 SANCTIFYING OFFICE** (3cr.)


**DCA5129 GENERAL NORMS** (3cr.)

DCA5130 MATRIMONIAL LAW (3cr.)

DCA5131 CHRISTIAN FAITHFUL (3cr.)

DCA5132 ADMINISTRATIVE INSTITUTES (3cr.)
General decrees and instructions. Singular administrative acts: singular decrees and precepts, rescripts, privileges, dispensations. Ecclesiastical offices. Presentation and drafting of singular and general decrees, precepts, and rescripts for routine and exceptional matters. Practical application: internal and external diocesan structures, sacraments, finances, civil law. (cc. 29-93, 145-183) [Previously: DCA 5306, DCA 6322]

DCA5133 PROCEDURES I (3cr.)
Trials in general. Competent forum. Different grades and kinds of tribunals: first instance, second instance, tribunals of the Apostolic See. Discipline to be observed in tribunals: duties of judges and tribunal ministers, order of adjudication, time limits and delays, place of the trial, persons to be admitted to the court, manner of preparing and keeping the acts. Parties in a case. Actions and exceptions. Oral contentious process. (cc. 1400-1500, 1656-1677)

DCA5134 EASTERN CANON LAW (3cr.)

DCA5135 MATRIMONIAL JURISPRUDENCE (3cr.)
Study of jurisprudence focusing on the grounds of nullity of matrimonial consent, with special focus on the jurisprudence of the Roman Rota. [Previously: DCA 6321]

DCA5136 INTRODUCTION TO CANON LAW (3cr.)
Methodology for canonical research and writing. History of canonical sources. History of canonical institutions.

DCA5137 TEACHING OFFICE (1.5cr.)

DCA5138 SPECIAL MATRIMONIAL CASES AND PROCEDURES (1.5cr.)
Separation of the spouses with the dissolution of the marriage bond (dissolution of ratified and non-consummated marriages, dissolution in virtue of the Pauline privilege, dissolution in favour of the faith). Separation of the spouses with the bond remaining. Convalidation of marriage. Procedure in presumed death of a spouse. (cc. 1141-1165, 1692-1707) [Previously: DCA 5133]

DCA5203 INSTITUTES OF CONSECRATED LIFE AND SOCIETIES OF APOSTOLIC LIFE (3cr.)
Common norms. Religious institutes: religious houses, governance of institutes, admission of candidates and formation of members, obligations and rights of the institutes and of their members, apostolate of institutes, separation of members from the institute, religious who are bishops, conferences of major superiors. Secular institutes. Societies of apostolic life. (cc. 573-633; 641-717, 719-740, 742-746)

DCA5310 CHURCH LAW AND PASTORAL MINISTRY (3cr.)
Theological reflection on and practical application of Canon Law to some areas of pastoral ministry, specifically marriage and reconciliation.

DCA5396 DIRECTED STUDIES I (3cr.)

DCA5397 DIRECTED STUDIES II (3cr.)

DCA5398 DIRECTED STUDIES III (3cr.)

DCA5401 SELECTED TOPICS IN CANON LAW
Study of a particular topic in Canon Law. Graded S/NS.

DCA5304 COMPARATIVE PARTICULAR LAW (3cr.)
Comparative study of the development of particular canon law at the level of conferences of bishops.

DCA6112 ADMINISTRATIVE PROCEDURES (3cr.)

DCA6113 TEMPORAL GOODS (3cr.)
Ecclesiastical goods. Acquisition of goods. Administration of goods, ordinary and extraordinary. Contracts: alienation, threatening transactions,

DCA6114 PROCEDURES II (3cr.)

DCA6115 PENAL LAW (3cr.)

DCA6116 FOUNDATIONS OF CANON LAW (3cr.)
Theology of Law. Philosophy of Law. Elements of Roman Law. Previously: DCA6415

DCA6117 INSTITUTES OF LAW (3cr.)
An introduction to the juridical system of civil law (common law). A comparison of selected themes of civil law to principles established by canon law. An examination of the tension between Church and State, with an analysis of civil law court judgments. Previously: DCA6415.

DCA6301 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6302 SPECIAL PROBLEMS IN CANON LAW II (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6315 LITURGICAL LAW OUTSIDE THE CODE (3cr.)
Selected Praenotanda of liturgical books and post-Code legislation on the Liturgy.

DCA6316 THE LAITY AND THE POWER OF GOVERNANCE IN THE CHURCH (3cr.)
Collaboration of the laity faithful in the exercise of the power of governance: law, theory, and practice.

DCA6321 SEMINAR ON TRIBUNAL PRACTICE (3cr.)

DCA6363 SPECIAL PROBLEMS IN CANON LAW III (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6364 SPECIAL PROBLEMS IN CANON LAW IV (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6365 SPECIAL PROBLEMS IN CANON LAW V (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6366 SPECIAL PROBLEMS IN CANON LAW VI (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6367 SPECIAL PROBLEMS IN CANON LAW VII (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6395 RESEARCH SEMINAR (3cr.)
Research on a particular canonical subject resulting in its presentation to the seminar group and director, and in submission of a written project.

DCA6396 SELECTED TOPICS IN CANON LAW I (3cr.)

DCA6397 SELECTED TOPICS IN CANON LAW II (3cr.)

DCA6398 SELECTED TOPICS IN CANON LAW III (3cr.)

DCA6921 LATIN CANONIQUE / CANONICAL LATIN (3cr.)
Etude du latin ecclésiastique de niveau avancé. Traduction de textes canoniques: Codex iuris canonici, Codex canonum ecclesiarum orientalium,
of science or a PhD degree with specialization in chemical and environmental toxicology. Today, toxicologists must be able to appreciate significant research in other fields and therefore require an understanding of the basic principles of different ion channels in excitable and non-excitable cells. The channels that are studied include the sodium, potassium, calcium and chloride cell polarity with emphasis on tight junctions and Claudins (tight junction molecules). Topics include: the molecular basis of cell polarity and microscopy and methodology. (ii) Concepts in flow cytometry, tissue/cell fractionation. (iii) Histo-/cytochemistry and immunohisto-

CMM5105 INTRODUCTION TO CANCER BIOLOGY

CMM5001 THE PATHOLOGICAL BASIS OF DISEASE

Experimental Medicine as part of their degree in Cellular and Molecular Medicine.

Master of Science Cellular and Molecular Medicine Programs

DCA9997 PROJET DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL

DCA9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION

DCA9999 THÈSE DE DOCTORAT / PhD THESIS

**Cellular and Molecular Medicine**

The Department of Cellular and Molecular Medicine is located in the Faculty of Medicine and offers graduate programs leading to the degrees of Master of Science (MSc) and Doctor of Philosophy (PhD) in Cellular and Molecular Medicine.

The programs prepare candidates for a variety of careers in teaching and research both within and outside of academia. During training, the student will develop a critical approach to published work and to his own work. Graduates acquire an excellent knowledge of their chosen field and a general understanding of the areas related to their own particular research project. They must demonstrate research skills and credibility as professionals in their area of research.

Most research groups in the Department are part of a research centre. These centres include the Centre for Neuromuscular Disease, the Kidney Research Centre, and the Centre for Research in Biopharmaceuticals. Members of the Department are involved in three main research fields: growth and development, pharmacology, and physiology. Further information is posted on the departmental website.
The Department is a participating unit in the collaborative programs in Bioinformatics (at the master's level), in Human and Molecular Genetics (at the master's and doctoral levels), and in Pathology and Experimental Medicine (at the master's and doctoral levels).

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Cellular and Molecular Medicine and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Science Cellular and Molecular Medicine

Master of Science Cellular and Molecular Medicine Specialization in Bioinformatics

Master of Science Cellular and Molecular Medicine Specialization in Human and Molecular Genetics

Master of Science Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine

Doctorate in Philosophy Cellular and Molecular Medicine

Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Human and Molecular Genetics

Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine

**Admission**

Admission to the graduate program in Cellular and Molecular Medicine is governed by the general regulations of the FGPS.

To be considered, applicants must:

- Hold a bachelor of sciences (BSc) degree with a specialization or major (or equivalent) in one of the following areas: biology, biochemistry, pharmacology, physiology, human kinetics (kinesiology), biopharmaceutical or biomedical sciences.
- Have achieved a minimum average of 75% (B+) calculated in accordance with FGPS guidelines in their previous studies. For additional information, applicants should consult the CMM graduate program web site.
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with his or her work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

**Collaborative program in Bioinformatics at the master's level**

The Department of Cellular and Molecular Medicine is a participating unit in the collaborative program in Bioinformatics at the master's level. This program has been established for students wishing to include an interdisciplinary component in Bioinformatics as part of their degree in Cellular and Molecular Medicine.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the Collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Bioinformatics program.

**Collaborative program in Human and Molecular Genetics at the master's level**

The Department of Cellular and Molecular Medicine is a participating unit in the collaborative program in Human and Molecular Genetics at the master's level. This program has been established for students wishing to include an interdisciplinary component in Human and Molecular Genetics as part of their degree in Cellular and Molecular Medicine.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the Collaborative...
program at the same time as being informed about their admission into the primary program. For further details, see the Human and Molecular Genetics program.

**Collaborative program in Pathology and Experimental Medicine at the master’s level**

The Department of Cellular and Molecular Medicine is a participating unit in the collaborative program in Pathology and Experimental Medicine at the master’s level. This program has been established for students wishing to include an interdisciplinary component in Pathology and Experimental Medicine as part of their degree in Cellular and Molecular Medicine.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Pathology and Molecular Medicine program.

**Program Requirements**

**MSc in Cellular and Molecular Medicine**

- Successful completion of compulsory course MED8166 *Professionalism and Professional Skills*
- Six credits of courses at the 5000 level or above with at least 3 credits in CMM approved by the the graduate program Director
- Enrolment in the seminar course (CMM8324S), which involves the presentation of a seminar and attendance at the seminars approved by the Department
- Presentation and defense of a thesis (CMM7999) based on original research carried out under the direct supervision of a faculty member of the Department

NOTE: The Department may require students to take additional courses, depending on their backgrounds. The list of courses being offered in each field in any given year will be indicated on the program website.

**Collaborative program in Bioinformatics**

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The requirements specific to the collaborative program are as follows:

- 3 compulsory credits in bioinformatics (BNF5106/ BIO5106).
- Enrollment in the seminar course in bioinformatics (BNF6100), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.
- Presentation and defense of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the bioinformatics collaborative program.

The primary program may require students to take additional courses, depending on their backgrounds.

**Collaborative program in Human and Molecular Genetics**

- Six credits of courses, three credits of which must be from the student's primary program and three of which must be HMG credits.
- Enrolment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Presentation and successful defence of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Master's candidates intending to transfer directly to the doctoral program must meet the conditions set by their primary program.

Course selection is subject to the approval of the HMG program director.

**Collaborative program in Pathology and Experimental Medicine**

The requirements and regulations of both the primary program and of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Presentation and defence of a thesis on a topic in pathology and experimental medicine based on original research carried out under the supervision of a professor who is a member of the Pathology and Experimental Medicine collaborative program. At least one of the thesis examiners must be a member of the Pathology and Experimental Medicine collaborative program.

**Transfer from master’s to PhD**
Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

**Duration of program**

The requirements of the program are usually fulfilled within two years of full-time studies.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**CMM5001 THE PATHOLOGICAL BASIS OF DISEASE** (3cr.)
Introductory Course for Non-Medical Graduate Students in the Life Sciences. This course will consist of a brief introduction to pathology describing the manifestation of disease at the macroscopic and microscopic level. This will be followed by (i) A description of various types of microscopy and methodology. (ii) Concepts in flow cytometry, tissue/cell fractionation. (iii) Histo-/cytochemistry and immunohisto-/cytochemistry. (iv) Normal cells and tissues. (v) Organs. (vi) The general pathology of cells and tissues including hypertrophy, aplasia, atrophy, hyperplasia, metaplasia, dysplasia, neoplasia, storage diseases, extracellular space pathologies, necrosis and apoptosis. Blood vessel and cardiac pathologies will be covered as well as concepts in neuropathology, organ/system specific pathologies and genetic diseases.

**CMM5105 INTRODUCTION TO CANCER BIOLOGY** (3cr.)
An introduction to the biology of cancer. Major topics in cancer biology include the following: tumor suppression/oncogenes; apoptosis in cancer; cell immortalization and senescence; genomic instability; multistep tumorigenesis/inflammation in cancer; biology of angiogenesis; rational therapies.

**CMM5111 COMPUTATIONAL CELL BIOLOGY** (3cr.)
Emphasis is on providing students with the background knowledge and the tools needed to develop and analyze models of cellular processes. Topics include modelling enzyme kinetics, signal transduction pathways, and gene regulatory networks, using differential equations, nonlinear dynamics, and stochastic processes. Prerequisite: permission of program director and course coordinator.

**CMM5202 COMPREHENSIVE PHARMACOLOGY I** (3cr.)
Extensive coverage of pharmacodynamics, pharmacokinetics, and the pharmacology of the autonomic and central nervous system. Students cannot obtain credit for both CMM 5301 and CMM 5302.

**CMM5203 COMPREHENSIVE PHARMACOLOGY II** (3cr.)
Extensive coverage of the pharmacology of antibiotic and anti-inflammatory drugs, of chemotherapeutic agents, and of the cardiovascular and gastro-intestinal systems. Students cannot obtain credit for both CMM 5301 and CMM 5303.

**CMM5204 INTRODUCTION TO DEVELOPMENTAL BIOLOGY** (3cr.)
Concepts in development and signalling pathways during development including formation of the germ layers; establishment of the body axis and principles of segmentation; patterning and homeobox genes; neurogenesis; axonal and neuronal guidance; stem cell concepts; germ cells; animal models in developmental biology.

**CMM5311 PHYSIOLOGY AND PATHOPHYSIOLOGY OF ENERGY METABOLISM AND MUSCLE FUNCTIONS** (3cr.)
Advanced comprehensive training in mammalian and human physiology with emphasis on pathophysiology. Topics include: neural and endocrine control of the hypothalamus-hypophysis axis; role of pancreas, adipose tissue and skeletal muscle in carbohydrate and lipid metabolism; cellular and molecular aspects of muscle contraction and fatigue in cardiac and skeletal muscle.

**CMM5313 PHYSIOLOGY AND PATHOPHYSIOLOGY OF THE REPRODUCTIVE, RENAL AND GASTROINTESTINAL SYSTEMS** (3cr.)
Advanced comprehensive training in mammalian and human physiology with emphasis on pathophysiology. Topics covered include reproductive physiology, molecular and bulk transport processes in the renal system, enteric control of the gastrointestinal tract.

**CMM5345 CELLULAR AND MOLECULAR BASIS OF CARDIOVASCULAR FUNCTION/DYSFUNCTION** (3cr.)
Mechanism of failing heart and cardiovascular system, its associated functions and associated conditions. Therapies for restoring function. Topics include: regulation of heart development, cell signaling, cellular and molecular mechanisms of atherosclerosis and heart disease, hormonal regulation, hypertension, bioenergetics, cardiovascular genomics and genetics, cell therapy, and regenerative medicine.

**CMM5326 EXPERIMENTAL PREPARATIONS AND ANIMAL MODELS** (3cr.)
Applied and theoretical course intended to give the potential researcher basic surgical skills. Lectures followed by demonstrations and/or practical
CMM5341 STEM CELLS (3cr.)
Topics in stem cell biology which will include an in-depth look at the properties of embryonic and adult stem cell populations, tissue-specific stem cells (muscle, skin, neural, etc), differentiation and reprogramming, the stem cell niche, induced pluripotent stem cells, and therapeutic advances using stem cell therapy.

CMM5360 Imaging in Cell Biology (3cr.)
Microscopy, biological imaging, and image generation. Overviews of common transmitted light, electron microscopic and epifluorescent techniques. Discussion of enhanced fluorescence microscopy and live cell imaging techniques, including image acquisition, processing and analysis with focus on quantitative and ethical issues.

CMM5372 CELL SIGNALLING AND HORMONE ACTION (3cr.)
Topics will include the major cell signaling pathways and the action of steroid and non-steroid hormones. These signaling pathways will be discussed in the context of biological function and pharmacology.

CMM7301 DIRECTED STUDIES (3cr.)
A program of study designed for a given student according to the student's educational requirements.

CMM7999 THÈSE DE MAÎTRISE / MSc THESIS

CMM8103 EPITHELIAL CELL POLARITY (3cr.)
Cell polarity with emphasis on tight junctions and Claudins (tight junction molecules). Topics include: the molecular basis of cell polarity and permeability barrier during development, organogenesis and disease including inflammatory disease and cancer.

CMM8105 ADVANCED TOPICS IN CANCER BIOLOGY (3cr.)
Advanced study of recent developments in the field of cancer biology with emphasis on cellular and molecular aspects. Specific topics to be covered include: angiogenesis, apoptosis, cancer genetics, cell signaling, genetic instability, oncogenes and tumour suppressors.

CMM8300 SPECIAL TOPICS IN REPRODUCTIVE AND DEVELOPMENTAL BIOLOGY (3cr.)
In-depth study of current topics in reproductive and developmental biology, with emphasis on state-of-the-art molecular and cell biology techniques as well as their applications to reproductive diseases. Topics may include assisted reproductive technologies, embryonic stem cells, contraception, endocrine disruptors, reproductive toxicology, and transgenics.

CMM8310 CURRENT TOPICS IN RNA MOLECULAR BIOLOGY (3cr.)
Properties, mechanisms associated with regulation and the function of RNAs and Ribonucleoprotein (RNPs) as well as RNA organisms. Current knowledge on RNA expression (synthesis, processing, transport and localization), the structure-function relationship and molecular mechanisms associated with RNAs and RNA genomes, RNA in evolution and in the origin of life, and RNA as therapeutic agents. Prerequisites: BCH/BIO 3570-3170 or equivalent with the permission of the program director. Exclusion: BCH 8310.

CMM8311 CURRENT TOPICS IN TRANSCRIPTIONAL REGULATION (3cr.)
Topics will include chromatin structure and its impact on gene expression, protein-DNA interactions, the assembly of transcriptional complexes, and the control of gene expression in mammalian systems.

CMM8324 SEMINARS I
Compulsory for one year for all students enrolled in the master's program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series.

CMM8325 SEMINARS II
Compulsory for all students enrolled in the doctorate program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series.

CMM8340 NEUROMUSCULAR FUNCTION AND DYSFUNCTION (3cr.)
Topics to be covered include factors controlling muscle - and synapse-specific gene expression, regulation of myogenesis and muscle cell growth, formation of the neuromuscular junction, motor neuron - muscle interactions, the role of the cytoskeleton in organization of post-synaptic domains, functional role of ion channels in muscle, molecular genetics of neuromuscular disease. Prerequisite: CMM5340.

CMM8341 CELL STRESS (3cr.)
Topics will include cellular responses to cell stress and will include hypoxia, oxidative stress, ER stress, autophagy, apoptosis and aging.

CMM8345 SPECIAL TOPICS IN GASTROENTEROLOGY (3cr.)
Lectures, tutorials and seminar-discussion sessions, designed to provide advanced training in gastrointestinal function. Emphasis on pathophysiological mechanisms.

CMM8350 ION CHANNELS: CELLULAR AND MOLECULAR ASPECTS OF MEMBRANE FUNCTIONS (3cr.)
A study of the diversity, molecular structure, structure-function relationship, electrophysiological characteristics and physiological roles of different ion channels in excitable and non-excitable cells. The channels that are studied include the sodium, potassium, calcium and chloride channels.

CMM8355 RENAL PHYSIOLOGY (3cr.)
Lecture and seminar course with emphasis on electrolyte transport. Topics to include: detailed structure and function of nephron segments, localization of primary and secondary active transport carriers, theories of autoregulation, hormone action in the kidney, drug action in the kidney, and regulation of renal vascular resistance.

CMM9908 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAM (PhD)

CMM9999 THÈSE DE DOCTORAT / PhD THESIS

HMG8106 CLINICAL CYTOGENOMICS (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

Chemical and Environmental Toxicology (Collaborative)

The Institute
The Ottawa-Carleton Institute combines the research strength of the University of Ottawa and Carleton University. The Institute offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in several fields (biology, chemistry, Earth sciences, etc.).

General information
Toxicology is the study of effects of toxic substances on living systems. These toxic substances can either be organic or inorganic, synthetic or natural materials. Environmental toxicology further extends to aspects of chemical transport, fate, persistence and biological accumulation of toxic substances and their effects at the population and community levels. While individual researchers usually specialize in a particular area, toxicologists today must be able to appreciate significant research in other fields and therefore require an understanding of the basic principles of other disciplines. To meet this challenge the University of Ottawa and Carleton University offer a joint collaborative program leading to a master of science or a PhD degree with specialization in chemical and environmental toxicology.

This Ottawa-Carleton collaborative program in Chemical and Environmental Toxicology is intended to augment the research and training available to students through the individual supporting institutes.

The program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Participating units
The primary participating units are:

- The Ottawa-Carleton Institute of Biology (OCIB), the joint graduate program of the departments of Biology at the University of Ottawa and Carleton University.
- The Ottawa-Carleton Institute of Chemistry (OCIC), the joint graduate program of the departments of Chemistry at the University of Ottawa and Carleton University.
- The Ottawa-Carleton Geoscience Centre (OCGC), the joint graduate program of the departments of Earth Sciences at the University of Ottawa and Carleton University.

Programs

Master of Science Biology Specialization in Chemical and Environmental Toxicology
Admission

Admission to the collaborative program in chemical and environmental toxicology is governed by the general regulations of the Ottawa-Carleton Institute and by the general regulations of the FGPS.

Candidates must indicate in their admission form that they wish to be accepted in the collaborative program.

All applicants must be able to understand, speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Applications are evaluated based on the following criteria:

- Be admitted in one of the programs participating in the collaborative program of the Institute.
- Complete a relevant introductory course in toxicology, either:
  - (i) prior to admission to the collaborative program in chemical and environmental toxicology; Or
  - (ii) While registered in the program by taking one of the two introductory courses (CHM8156 or BIO9104).
- Provide a confidential letter of recommendation from a professor who is willing and available to act as thesis supervisor.
- Be sponsored into the collaborative program by a faculty member, normally the thesis supervisor, who must be appointed, cross-appointed or stand as an adjunct at one or more of the participating units.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Program Requirements

The requirements of both the student’s primary program and those of the collaborative specialization must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements of the specialization are as follows:

- 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
- Successful completion of the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defense of a thesis in toxicology based on an original research carried out under the supervision of a faculty member participating in the chemical and environmental toxicology collaborative program.

The Department may require students to take additional courses depending on their backgrounds.

Minimum Standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory must withdraw from the program.

Duration of the Program

Students are expected to complete all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

Courses
Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

TOX8156 PRINCIPLES OF TOXICOLOGY (3cr.)
The basic theorems of toxicology with examples of current research problems. The concepts of exposure, hazard and risk assessment will be defined and illustrated with experimental material from some of the more dynamic areas of modern research.

TOX8157 CHEMICAL TOXICOLOGY (3cr.)
Advanced course in chemical toxicology dealing with both chemical hazards and exposure. Overview of empirical data relating to the toxicity of various classes of chemicals for test organisms, followed by study of toxicity at the cellular level, including studies of interactions between toxic substances and enzymatic systems. Data applicable to the interpretation and monitoring of WHMIS health regulations. Initial events in enzyme induction and mutagenesis. Study of predictive capabilities in the areas of structure-activity relationships and mechanisms of enzyme induction, followed by assessment of mechanisms of exposure to toxic chemicals.

TOX9104 ECOTOXICOLOGY (3cr.)
Selected topics and advances in ecotoxicology with emphasis on the biological effects of contaminants. The potential for biotic perturbation resulting from chronic and acute exposure of ecosystems to selected toxicants will be covered along with the methods pesticide, herbicide and pollutant residue analysis and the concept of bound residues.

TOX9105 SEMINAR IN TOXICOLOGY (3cr.)
A one-session course in seminar format highlighting current topics in toxicology. The student will present a seminar and submit a report on the seminar topic. Student, faculty and invited seminar speakers.

TOX9106 (BIOL 6406) GENETIC TOXICOLOGY (3cr.)
Topics in mutagenesis and DNA repair, including spontaneous and induced mutagenesis, genetic toxicology testing, the genetics and biochemistry of replication, DNA repair and recombination, and the role of mutagens in the development of genetic disease and cancer.

BIO5103 (BIOL 5003) ADVANCED BIOCHEMISTRY (3cr.)
Advanced topics in biochemistry: the chemical structure and function of biological macromolecules, biochemical thermodynamics, metabolism, photosynthesis, lipids and membranes.

BIO5305 (BIOL 5407) BIOSTATISTICS I (3cr.)
Application of statistical analyses to biological data. Topics include ANOVA, regression, GLMs, and may include loglinear models, logistic regression, general additive models, mixed models, bootstrap and permutation tests. Prerequisites: Graduate standing, courses in elementary ecology and statistics and permission of the department.

BIO5306 (BIOL 5409) MODELLING FOR BIOLOGISTS (3cr.)
Use and limitations of mathematical and simulation modelling approaches for the study of biological phenomena.

BIO8109 (BIOL 6001) ADVANCED MOLECULAR BIOLOGY (3cr.)
In-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins.

BIO8116 (BIOL 6002) ADVANCES IN PLANT MOLECULAR BIOLOGY (3cr.)
Use of molecular genetics in general plant biology and the contribution of plant genomics to our understanding of plant metabolism, plant development, and plant interactions with the environment at the molecular, genome, and cellular levels. Prerequisite: BIO8109/61.601F1 and this course normally will be offered together in the same year but only in alternate years.

BIO8162 (BIOL 5402) ADVANCED ENDOCRINOLOGY (3cr.)
Major topics in comparative endocrinology: understanding the structure, function and evolution of vertebrate endocrine systems, including endocrine disruption. Prerequisite: An undergraduate Endocrinology course (BIO4127 or equivalent).

BIO8306 (BIOL 5508) ADVANCED TOPICS IN ECOLOGY (3cr.)
Recent developments in population, community and/or ecosystem ecology.

BIO8307 (BIOL 5509) ADVANCED TOPICS IN ECOLOGY II (3cr.)
Lectures, seminars and discussions on current literature on experimental approaches, concepts and findings in population and community ecology, ecosystem and landscape ecology and biostatistics. Course content to complement that of BIO 8306/BIOL 5508; not necessary to take the two in a particular order.

BIO8365 (BIOL 5802) ADVANCED BEHAVIOURAL ECOLOGY (3cr.)
Recent advances in behavioural ecology including topics such as the evolution of tactics and strategies of group living, foraging, anti-predation, resource use and defence, cooperation, reproduction, and parental care.
CHM8126 (CHEM 5303) BIOORGANIC CHEMISTRY (3cr.)
Overview of recent developments in the mechanistic understanding of selected enzyme-catalyzed reactions. Topics include Cytochrome P450, methane monoxygenase, biotin and lipoic acid biosynthesis, methyl transfer, Vitamin B12, lipoxygenase, prostaglandin synthase; etc. Emphasis will be placed on biotransformations which are relatively poorly understood from a mechanistic point of view.

CHM8322 (CHEM 5203) TOPICS IN COORDINATION CHEMISTRY (1.5cr.)
Brief introduction to basic concepts in coordination chemistry. Topics to include the following: carbon dioxide fixation, dinitrogen fixation, activation, olefin metathesis, nature of the M-M bond.

CHM8327 (CHEM 5005) PHYSICAL ORGANIC CHEMISTRY (1.5cr.)
Hammet functions, transition state energies, stereochemistry of organic compounds, and mechanisms of organic reactions and their determination.

CHM8329 (CHEM 5402) MEDICINAL CHEMISTRY (1.5cr.)
Preparation of drugs, their mode of action, their use in treating of disease. Evolution of medicine due to chemistry. Discussion of metabolic pathways and their modification to control and/or curvrent disease.

CHM8331 (CHEM 5300) PHYSICAL CHEMISTRY OF BIOLOGICAL MACROMOLECULES (1.5cr.)
Focus on how the application of physical techniques normally applied to small molecules, can be used to study macromolecular structure and function of DNA and proteins. Examples of applications to include: kinetics, electrochemistry, equilibria phenomena (thermodynamics).

CHM8332 (CHEM 5301) ELECTROCHEMICAL PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)
Description of theory accounting for the generation of membrane potentials. Application to the generation of nerve impulses.

CHM8333 (CHEM 5302) SURFACE PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)
Description of theory of surface tension phenomena in aqueous systems. Discussion of effects of cell and macromolecular structures in biological systems.

CHM8348 (CHEM 5500) ANALYTICAL INSTRUMENTATION (1.5cr.)
Principles of modern electronics, devices and instruments. Measurement of photonic and electrochemical signals. Conditioning of signals for feedback control and microcomputer interfacing. Computational data analysis techniques such as simplex optimization. Applications in chemical analysis include amperometric detector for capillary electrophoresis, and surface plasm resonance immunosensor.

CHM8349 (CHEM 5304) FREE RADICALS IN CHEMISTRY AND BIOLOGY (1.5cr.)
Oxidative stress induced by free radicals plays a significant role in most fatal and chronic diseases. The chemistry of bio-radicals will be described and related to pathobiological processes such as lipid peroxidation and atherosclerosis, protein nitration and cross linking, and DNA scission.

CHM8352 (CHEM 5501) ANALYTICAL APPROACH TO CHEMICAL PROBLEMS (1.5cr.)
Case study of analytical approach to various chemical problems in agricultural, biochemical, environmental, food processing, industrial, pharmaceutical and material sciences. Analytical methods include capillary electrophoresis, chemiluminescence, Fourier transform infrared spectroscopy, inductively coupled plasma emission spectroscopy, mass spectrometry, biochemical sensors, and fiber optics for remote sensing.

CHM8353 (CHEM 5502) TRACE AND ULTRATRACE ANALYTICAL CHEMISTRY (3cr.)
Criteria for evaluation and selection of analytical techniques and methods. Electroanalytical techniques. Simultaneous and sequential multielement determination. Atomic absorption, atomic emission and atomic fluorescence spectrometry, using optical spectrometric and mass-spectrometric determination. Applications of these techniques at trace and ultratrace levels in complex matrices.

CHM8354 (CHEM 5503) CHEMICAL SPECIATION IN THE NATURAL ENVIRONMENT (3cr.)
Evaluation of analytical techniques and their capability for quantitative determination of chemical species (as opposed to total element-determination) in the natural environment. Electro-chemical techniques for determination of chemical speciation of nutrient and toxicant elements present in the natural environment.

GEO5136 (ERTH 5306) PALEOBIOLOGY (3cr.)
Selected topics in paleobiology of micro- and macro-invertebrates and vertebrates. Topics include extinctions, micro- and macro-evolutionary processes, long-term trends and cycles in the Phanerozoic, and functional morphology, as well as application of invertebrates to biostratigraphy, paleoceanography and paleolimnology.

GEO5141 (GEOL 5401) PERMAFROST HYDROLOGY AND INVESTIGATIVE METHODS
An examination of groundwater flow in permafrost regions. The importance of groundwater in the formation of various types of ground ice, and the effect of groundwater flow on permafrost distribution.

GEO5142 (GEOL 5402) ENVIRONMENTAL GEOSCIENCE (3cr.)
A study-seminar course in which students will examine, in depth, certain environmental problems, including geological hazards, mineral and energy consumption and environmental degradation. The relation between development and the environment will be considered. Students will prepare a report and present a seminar on a subject of their choice, and will participate in a research project centered in the Ottawa area.

GEO5143 (GEOL 5403) ENVIRONMENTAL ISOTOPES AND GROUNDWATER GEOCHEMISTRY (3cr.)
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radiocarbon, and exotic radioisotopes (e.g. 36Cl, 39Ar, 85Kr). Low temperature aqueous geochemistry and
mineral solubility with emphasis on the carbonate system. Some applications to paleoclimatology will be discussed. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO 4342) or equivalent.

GEO5147 (ERTH 5407) GEOCHEMISTRY OF NATURAL WATERS (3cr.)
Aqueous speciation, solubility of metals, minerals and gas, reaction kinetics and equilibria. Chemistry and dynamics of groundwaters and hydrothermal fluids.

GEO5153 (ERTH 5503) COMPUTER TECHNIQUES IN THE EARTH SCIENCES (3cr.)
A practical course in the application of computer techniques in the acquisition and interpretation of geoscientific data. Topics will be selected from the following: remote sensing and geographic information systems; geostatistical analysis techniques; analysis and modelling of geoscientific data. Prerequisite: Permission of the Institute.

GEO5163 (ERTH 5603) STABLE ISOTOPE GEOCHEMISTRY (3cr.)

Chemical Engineering

The Department of Chemical and Biological Engineering located in the Faculty of Engineering offers graduate programs leading to the degrees of Master of Applied Science (MAppSc), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Chemical Engineering.

The Department is one of the participating units in the collaborative program in Science, Society and Policy (master's level only).

The main objective of the master's programs is to refine the skills and research expertise of the students by expanding their specialized knowledge of chemical engineering primarily achieved through course work, research seminars, and technical training.

The PhD program prepares candidates for a career in teaching, research and/or development. Graduates are expected to have acquired autonomy in conducting research, preparing scholarly publications, and promoting chemical engineering.

Members of the Department are involved in four main research fields: materials development; process engineering; clean technologies and renewable energy; and, biomedical engineering. Further information is posted on the departmental website.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Applied Science Chemical Engineering
Master of Applied Science Chemical Engineering Specialization in Science, Society and Policy
Master of Engineering Chemical Engineering
Doctorate in Philosophy Chemical Engineering

Admission

Admission to the graduate program in Chemical Engineering is governed by the general regulations of the FGPS.

To be considered for admission, applicants must:

- Hold an honours bachelor's degree with specialization or a major in chemical engineering (or equivalent) with a minimum average of 70% (B).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
For admission to the MASc, identify at least one professor who is willing and available to act as thesis supervisor. Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The Department may require students to take additional courses depending on their backgrounds.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Transfer from master’s to PhD**

Students registered in the MASc program may transfer to the PhD program, without having to write a master's thesis, provided they meet the following conditions:

- Have been registered full-time in the MASc program for at least one year;
- Completed four graduate courses (12 credits) with an average of at least 80% (A-);
- Written recommendation by the supervisor and by the graduate studies committee;
- Successfully completed of a minimum of 9 credits in chemical engineering.

The transfer must take place within sixteen months of initial registration in the master’s.

**Collaborative programs**

The Department of Chemical and Biological Engineering is one of the participating units in the collaborative program in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of the program posted on the FGPS website.

**Program Requirements**

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**A. Master of applied science (MASc)**

The requirements of this program are as follows:

- Successful completion of 12 credits in chemical engineering.
- Successful completion of the seminar course CHG8101S.
- Presentation and defense of a thesis (CHG7999) based on original research carried out under the direct supervision of a research faculty member in the Department.

**B. Master of engineering (MEng)**

The requirements of this program are as follows:

- 24 course credits and an engineering report (6 cr.)
- or
- 30 course credits

The courses for the MEng

Course credits must be earned according to the following rules:

- A minimum of 15 credits (excluding the engineering project) must be taken among the courses offered by the Department of Chemical Engineering. These may be either graduate courses or fourth-year electives (requirement 2 limits the number of fourth-year electives that can be taken).
- A part of the total course-credit requirement may be satisfied by taking advanced undergraduate courses to a maximum of nine credits. These can be either fourth-year Chemical Engineering electives or fourth year courses offered by other departments of the faculties of Engineering or Science.
- Graduate courses offered by other departments may be taken for credit with permission of the program director, provided the first requirement is also satisfied.

**Thesis**

Students enrolled in the master in applied science and doctorate may submit their thesis in traditional monograph format or as a series of articles prepared for publication in scholarly journals. The regulations for submitting theses in article format can be found on the FGPS website in the guide 'Preparing a Thesis or Research Paper'.

**Duration of program**
Preference will be given to candidates who have already completed the 18 credits. However, candidates with only 12 credits will be considered on

The program is governed by the

GNG5123 ENTERPRISE ARCHITECTURE

Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection.

CVG 6301 to 6320 SPECIAL TOPICS IN CIVIL ENGINEERING

Understanding of assessment, prevention, and mitigation of geotechnical hazards, overview of natural and man-made geo-hazards; concepts of hazards,

CVG7162 (ENVE 5103) AMBIENT AIR QUALITY AND POLLUTION MODELLING

processes. Principles to be applied to the design and application of conventional and advanced BNR processes used for treatment of municipal and industrial

and advanced anaerobic processes used for treatment of municipal and industrial wastewaters. Topics to include microbiology and biochemistry fundamentals,

CVG7138 ENGINEERING MASONRY BEHAVIOUR AND DESIGN

buckling problems. Non-linear deflections and plasticity.


CVG5154 (CIVJ 5308) RANDOM VIBRATION

Program Requirements

University. The institute offers graduate programs leading to the master's (MSc) and doctoral (PhD) degrees in Chemistry.

CHG9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)

CHG8194 (ENVJ5504) MEMBRANE SEPARATION PROCESSES


Classification and structural properties of porous media. Porosity, permeability, tortuosity, pore size distribution, anisotropy, heterogeneity.

CHG8143 SPECIAL DIRECTED STUDIES II

breakthrough curves. Cyclic fluid separation processes. Pressure swing adsorption. Examples of commercial separation applications.

CHG8101 SEMINAR I

Not all of the following courses are necessarily given each year. Attendance at courses is compulsory.

CHG6000 RAPPORT EN GÉNIE CHIMIQUE / CHEMICAL ENGINEERING REPORT (6cr.)

CHG7999 THÈSE DE M.Sc.A. / MAsc. THESIS

CHG8101 SEMINAR I

CHG8102 SEMINAR II

CHG8110 FLUID MECHANICS (3cr.)

Stream function, circulation and vorticity, form drag and drag coefficients, equations of motion, boundary layer theory, modern theory of turbulent motion, flow in porous media, non-Newtonian flow.

CHG8115 HEAT TRANSFER I (3cr.)

The general law of heat conduction. Steady and unsteady heat conduction in solids with or without internal heat sources. Radiant heat transmission.

CHG8116 ADVANCED TRANSPORT PHENOMENA (3cr.)

Advanced study of momentum, heat and mass transfer relevant to chemical engineering and also to areas such as environmental engineering, medicine and other scientific disciplines. Review of the analogy between mass, momentum and thermal transport and, in particular, of the physical principles and mathematical foundations required for the analysis of fluid flow, heat transfer and mass transfer, and of the advanced methods for the analysis of transport problems. Main emphasis on formulation of a given physical problem in terms of appropriate conservation equations, and obtaining an understanding of the associated physical phenomena. Use of many chemical engineering applications to illustrate the various principles.

CHG8120 RHEOLOGY AND POLYMER PROCESSING (3cr.)


CHG8123 CHEMICAL ENGINEERING THERMODYNAMICS I (3cr.)


CHG8132 (ENVE 5105) ADSORPTION SEPARATION PROCESSES (3cr.)

Discussion of different microporous materials and molecular sieves as adsorbents. Adsorption equilibrium and adsorption kinetics. Equilibrium adsorption of single fluids and mixtures. Diffusion in porous media and rate processes in adsorbers. Adsorber dynamics: bed profiles and
breakthrough curves. Cyclic fluid separation processes. Pressure swing adsorption. Examples of commercial separation applications.

CHG8141 SPECIAL DIRECTED STUDIES I (3cr.)

CHG8143 SPECIAL DIRECTED STUDIES II (3cr.)

CHG8145 SPECIAL DIRECTED STUDIES III (3cr.)

CHG8153 (ENVJ5500) STATISTICAL MODELLING AND CONTROL OF DYNAMIC PROCESSES (3cr.)

CHG8157 STRATEGIES FOR ENGINEERING PROCESS ANALYSIS (3cr.)
Statistical experimental design and analysis techniques for industrial and laboratory investigations are presented. Topics include: the nature and analysis of process variation, comparisons of two or more processes, empirical modelling of processes, applications of factorial and fractional factorial designs, mixture designs, response surface methodologies and empirical optimization techniques. Prerequisite: MAT 2377 or equivalent, or permission of the instructor.

CHG8158 (ENVJ5304) POROUS MEDIA (3cr.)

CHG8161 CHEMICAL REACTION ENGINEERING (3cr.)
Kinetics of chemical reactions and its application to chemical engineering problems. Rate expressions and heterogeneous kinetics. Preparation and evaluation of catalyst activity. Promoters and poisons. Physical properties and transfer of mass and energy in porous catalysts. Interpretation of kinetic data and determination of mechanisms of catalyzed reactions.

CHG8175 MATERIAL TRANSPORT (3cr.)

CHG8181 (ENVJ5501) BIOCHEMICAL ENGINEERING (3cr.)

CHG8186 (ENVJ5506) MODELLING OF STEADY-STATE PROCESSES (3cr.)
A comprehensive examination of techniques for building and analyzing process models is made. Topics include: linear least squares estimation, non-linear least squares estimation, multiresponse parameter estimation, error in variables estimation, heteroscedasticity, design of experiments for precise parameter estimation and model discrimination.

CHG8187 INTRODUCTION TO POLYMER REACTION ENGINEERING (3cr.)

CHG8188 POLYMER PROPERTIES AND CHARACTERIZATION (3cr.)
Polymer properties are described and discussed in the context of their nature, source and means of measurement. Chemical and microstructural properties; physical states and transitions; thermal properties; mechanical properties and viscoelasticity models; degradation and stability; surface, electrical and optical properties, polymer additives; structure-property relationships.

CHG8189 CHEMICAL ENGINEERING ANALYSIS (3cr.)
Treatment and interpretation of experimental data. Formulation of ordinary and partial differential equations for the solution of problems arising in chemical engineering. Emphasis will be on problems requiring numerical techniques with examples taken from fluid flow, heat transfer and mass transfer. Selection of boundary conditions.

CHG8191 SELECTED TOPICS CHEM ENGINEER (3cr.)
Discussion of recent progress in chemical engineering.

CHG8192 (ENVJ5502) MEMBRANE APPLICATIONS IN ENVIRONMENTAL ENGINEERING (3cr.)
Course emphasizing the applications of membrane separation processes in the resolution of various environmental problems. Applications of reverse osmosis, ultrafiltration and pervaporation to the treatment of industrial waste waters. Applications of membrane gas and vapor permeation to the removal of pollutants from air. Discussion of fundamentals underlying each separation process.

CHG8194 (ENVJ5504) MEMBRANE SEPARATION PROCESSES (3cr.)
Advanced topics of membrane separations including reverse osmosis, ultrafiltration, gas separation, non-aqueous liquid separation, and membrane applications in biotechnology. The course involves problem solving in membrane transport, membrane design, and membrane process design.

CHG8195 (ENVJ5505) ADVANCED NUMERICAL METHODS IN TRANSPORT PHENOMENA (3cr.)
Survey course of numerical methods for solving linear and non-linear ordinary and partial differential equations. Techniques reviewed include Runge-Kutta and predictor-corrector methods, shooting techniques, control volume discretization methods and finite elements. Example problems from the field of transport phenomena.

CHG8196 (ENVJ5507) INTERFACIAL PHENOMENA IN ENGINEERING (3cr.)
Interfacial tension and interfacial free energy; contact angles; spreading of liquids; wetting of surfaces; experimental techniques. Interfacial tension of mixtures; Gibbs equation; absorbed and insoluble monolayers; properties of monolayers and films. Electrical phenomena at interfaces; the electrical double layer; zeta-potential; electrokinetic phenomena (electrophoresis, electro-osmosis, streaming potential); surface conductance. Dispersed systems; formation and practical uses of emulsions; spontaneous emulsification; flocculation.

CHG8198 (ENVJ5503) REVERSE OSMOSIS (3cr.)

CHG9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)

CHG9999 THÈSE DE DOCTORAT / DOCTORAL THESIS

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Chemistry

Ottawa–Carleton Joint Program

Established in 1981, the Ottawa–Carleton Chemistry Institute (OCCI) combines the research strengths of the University of Ottawa and Carleton University. The institute offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in Chemistry.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in the following research fields: inorganic chemistry; organic chemistry; theoretical chemistry; biological chemistry; analytical chemistry; and, physical chemistry. Additional information is posted in the departmental website.

The Institute is a participating unit in the collaborative program in chemical and environmental toxicology at the master's and doctoral levels.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Programs
Admission

Admission to the graduate program in Chemistry is governed by the general regulations of the Ottawa-Carleton Institute for Chemistry (OCIC) and by the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

To be considered, applicants must:

- Be the holder of a bachelor's degree with a specialization, or a major in Chemistry (or equivalent) with a minimum admission average of 6.0 (B).
- Demonstrate high academic achievement, as indicated in official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating their career goals and their interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

Applicants to the Accelerated Stream of the MSc must meet the following additional requirements: have an admission average of 7.0 (B+); have a thesis supervisor who has agreed to continue to direct their research at the MSc level; have identified the CHM 4000 or 5000 level course to complete with a minimal grade of A- that is to count towards the MSc.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Transfer from master's to PhD

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Completion of four graduate courses (6 credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master's. Please note that the minimal admission average requirements for the doctoral program must also be met.

Collaborative programs

The Department of Chemistry is one of the participating units in the collaborative programs in Chemical and Environmental Toxicology (master's and PhD levels) and in Science, Society and Policy (master's level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

Program Requirements

MSc in Chemistry

The following requirements must be met:

- Six credits of graduate courses at the 5000 level or above in chemistry or in related disciplines approved by the Department of Chemistry.*
- Enrollment in the seminar course CHM8256, which involves the presentation of a seminar and regular attendance at the seminars presented by the Department.
- Presentation and successful defence of a thesis (CHM7999) based on original research carried out under the direct supervision of a
professor who is a member of the FGPS.

*Students in the Accelerated Stream may be granted an equivalency of 3 credits for a 4000 or 5000-level CHM course where they obtained a minimal grade of A- during their BSc program with specialization or major in chemistry at the University of Ottawa.

**Collaborative program in Science, Society and Policy**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation of “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

**Collaborative Program in Chemical and Environmental Toxicology**

The student must fulfill both the requirements for the master’s degree, and the requirements of the collaborative program. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The following requirements must be met:

- 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
- Enrollment in the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defense of a thesis in toxicology based on an original research carried out under the supervision of a faculty member participating in the chemical and environmental toxicology collaborative program.

The Department may require students to take additional courses depending on their backgrounds.

**Transfer from Master’s to PhD Program**

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

Students in the Accelerated Stream are not eligible to fast-track to the PhD program.

**Duration of Program**

The requirements of the program are usually fulfilled within two years. The maximum time permitted is four years from the date of initial registration.

Students in the Accelerated Stream are expected to complete all requirements within three sessions.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Minimum Standards**

The passing grade in all courses is 70% (B). Students who fail two courses, or the thesis proposal, or whose research progress is deemed unsatisfactory must withdraw from the program.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**CHM7999 (CHEM 5909) THÈSE DE MAÎTRISE / MSc THESIS**

**CHM8256 (CHEM 5801) SEMINAR I**

**CHM8257 (CHEM 5802) SEMINAR II**
CHM8301 (CHEM 5001) ANALYTICAL MASS SPECTROMETRY (1.5cr.)
The principles of ion sources and mass spectrometers will be described, together with their applications to problems in chemistry and biochemistry. Introduction to the chemistry gaseous ions. Ion optics. Special emphasis on interpreting mass spectra.

CHM8302 (CHEM 5902) ADVANCED TOPICS IN INORGANIC CHEMISTRY (1.5cr.)
Topics of current interest in inorganic chemistry. Variable content from year to year.

CHM8303 (CHEM 5204) DESCRIPTIVE ORGANOMETALIC CHEMISTRY (1.5cr.)
Review of basic concepts of M-C bonds and of the preparation and reactivity of transition and non-transition metal organometallic species. Brief discussion of the most important catalytic processes (e.g. Ziegler-Natta, Fisher-Tropsch, catalytic hydrogenation and hydroformilation).

CHM8304 (CHEM 5901) ADVANCED TOPICS IN ORGANIC CHEMISTRY (1.5cr.)
Topics of current interest in organic chemistry. Variable content from year to year.

CHM8305 (CHEM 5400) SYNTHESIS METHODS (1.5cr.)
Discussion of modern reactions and reagents and their development. Modern methods such as Evans enolates, catalytic processes, organometallic methods. Combination of methods for the preparation of complex molecules and building blocks.

CHM8307 (CHEM 5205) IONS AND IONIC PROCESSES IN CHEMISTRY (1.5cr.)
Properties of water, hydration of ions, ionic interaction, colloidal and polymeric electrolytes. Ionization processes in solution.

CHM8308 (CHEM 5002) MULTINUCLEAR MAGNETIC RESONANCE SPECTROSCOPY (1.5cr.)

CHM8309 (CHEM 5903) ADVANCED TOPICS IN PHYSICAL / THEORETICAL CHEMISTRY (1.5cr.)
Topics of current interest in physical/theoretical chemistry. Variable content from year to year.

CHM8310 (CHEM 5007) INTRODUCTION TO PHOTOCHEMISTRY (1.5cr.)
Basic principles of photochemistry including selection rules, energy transfer processes and the properties of excited state reactions. Lasers and their applications to measurements of the dynamics of elementary reactions.

CHM8311 (CHEM 5008) ADVANCED AND APPLIED PHOTOCHEMISTRY (1.5cr.)

CHM8312 (CHEM 5507) APPLICATIONS OF THERMOCHEMISTRY TO CHEMICAL PROBLEMS (1.5cr.)
Measurement of and interrelationship between molecular, radical and ionic enthalpies and their relevance to bond strengths and chemical reactivity.

CHM8313 (CHEM 5508) ION STRUCTURES IN ORGANIC CHEMISTRY (1.5cr.)
Examination of the significance of structure on the generation and behaviour of organic cations and anions in gaseous and condensed phases.

CHM8314 (CHEM 5504) SURFACE CHEMISTRY ASPECTS OF ELECTROCHEMICAL SCIENCE (1.5cr.)

CHM8315 (CHEM 5505) ELECTROCHEMICAL SURFACE SCIENCE (1.5cr.)
Introduction to advanced in-situ techniques in electrochemistry: Scanning probe microscopy, Raman, infrared and laser spectroscopy. Prerequisite: CHM 8314, 8714.

CHM8316 (CHEM 5506) SURFACE CHEMISTRY (1.5cr.)
Adsorption phenomena and isotherms, surface areas of solids. Modern techniques in surface chemistry and surface science such as electron diffraction, Auger electron spectroscopy, photoelectron spectroscopy, electron energy loss spectroscopy, infrared and Raman spectroscopy. Current new techniques.

CHM8317 (CHEM 5104) IONIC REACTION INTERMEDIATES (1.5cr.)
Generation of ionic reaction intermediates in the condensed phase and their characterization by experimental techniques. Includes carbocations, zwitterionic intermediates.

CHM8318 (CHEM 5103) FREE RADICALS (1.5cr.)
Photochemical generation of free radical reaction intermediates in the condensed phase. Techniques to be explored include laser flash photolysis, pulse radiolysis, esr, CIDNP and matrix isolation.

CHM8319 (CHEM 5403) TOTAL SYNTHESSES (1.5cr.)
Discussion on philosophy and strategy development for complex syntheses, along with modern reagents and reactions that have shortened classical routes and lead to more efficient and atomic economy.
CHM8320 (CHEM 5405) PERICYCLIC AND STEREOELECTRONIC EFFECTS (1.5cr.)
Pericyclic reactions, facial selectivity, stereoelectronic effects in carbohydrates and related acetal cleavage. Applications to complex synthetic problems.

CHM8321 (CHEM 5201) SOLID STATE CHEMISTRY (1.5cr.)
Thermodynamic and kinetic aspects of solid state synthesis. Characterization of solids. Chemical and physical properties of solids that may include aspects of intercalation reactions, ionic conductors, glasses, electronic, magnetic optical and physical/mechanical properties.

CHM8322 (CHEM 5203) TOPICS IN COORDINATION CHEMISTRY (1.5cr.)
Brief introduction to basic concepts in coordination chemistry. Topics to include the following: carbon dioxide fixation, dinitrogen fixation, activation, olefin metathesis, nature of the M-M bond.

CHM8323 (CHEM 5600) QUANTUM MECHANICAL METHODS THEORY (1.5cr.)
Examination of the theory behind quantum mechanical methods (HF, MP2, CI, DFT). Semi-empirical.

CHM8324 (CHEM 5601) QUANTUM MECHANICAL METHODS APPLICATIONS (1.5cr.)
Practical applications of methods taught in CHM 8323 such as thermochemistry, reaction pathway moeling, structure predictions. Prerequisite: CHM 8323 or 8723.

CHM8325 (CHEM 5003) SOLID STATE NMR SPECTROSCOPY (1.5cr.)
Brief introduction to solid state NMR spectroscopy. Topics include dipolar coupling interactions, chemical shielding anisotropy, the quadrupolar interaction and averaging techniques such as magic angle spinning.

CHM8326 (CHEM 5004) NMR SPECTROSCOPY (1.5cr.)
Advanced NMR techniques for both proton and carbon spectra, various decoupling and related experiments. Interpretation of NOSY, COSY and related data.

CHM8327 (CHEM 5005) PHYSICAL ORGANIC CHEMISTRY (1.5cr.)
Hartree functions, transition state energies, stereochemistry of organic compounds, and mechanisms of organic reactions and their determination.

CHM8328 (CHEM 5401) APPLICATIONS OF ORGANOMETALLIC CHEMISTRY TO SYNTHESIS (1.5cr.)
Study of organometallic methods, many of which have become catalytic and involve metals such as Cu, Pd, Pt, Mo, Cr, Ru. Various applications to be discussed including Stille coupling, Heck reaction, ring closing metathesis.

CHM8329 (CHEM 5402) MEDICINAL CHEMISTRY (1.5cr.)
Preparation of drugs, their mode of action, their use in treating of disease. Evolution of medicine due to chemistry. Discussion of metabolic pathways and their modification to control and/or circumvent disease.

CHM8330 (CHEM 5404) HETERATOMS (1.5cr.)
Focus on heterocycles. Reactivity of these heterocycles and their use for drugs and applications for the total synthesis particularly of alkaloids. Extensive examination of carbohydrate chemistry and other important oxygen heterocycles.

CHM8331 (CHEM 5300) PHYSICAL CHEMISTRY OF BIOLOGICAL MACROMOLECULES (1.5cr.)
Focus on how the application of physical techniques normally applied to small molecules, can be used to study macromolecular structure and function of DNA and proteins. Examples of applications to include: kinetics, electrochemistry, equilibria phenomena (thermodynamics).

CHM8332 (CHEM 5301) ELECTROCHEMICAL PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)
Description of theory accounting for the generation of membrane potentials. Application to the generation of nerve impulses.

CHM8333 (CHEM 5302) SURFACE PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)
Description of theory of surface tension phenomena in aqueous systems. Discussion of effects of cell and macromolecular structures in biological systems.

CHM8334 (CHEM 5009) NOVEL ORGANIC AND INORGANIC MOLECULES AND RADICALS (1.5cr.)
Topics to include neutralization-reionization techniques as well as flash pyrolysis and matrix isolation studies.

CHM8335 (CHEM 5006) IONIC PROCESSES IN THE ATMOSPHERE AND INTERSTELLAR SPACE (1.5cr.)
Discussion on the importance of ionic reactions in the upper atmosphere and in the interstellar medium. Study of dynamics of ion-molecule reactions and of experimental and theoretical approaches used for studying them.

CHM8336 (CHEM 5604) NON-EQUILIBRIUM KINETICS (1.5cr.)
Gas phase chemical kinetics of elementary and complex reaction mechanisms, as seen from a microscopic viewpoint. Unimolecular and bimolecular reactions under conditions of non-Boltzmann energy distributions. Consequences for combustion and atmospheric chemistry, as well as for fundamental kinetics.

CHM8337 (CHEM 5605) NON-LINEAR CHEMICAL KINETICS (1.5cr.)
Principles of non-linear dynamics as applied to very complex chemical reaction mechanisms containing feed-back processes. Monotonic, oscillatory, and chaotic dependence of concentrations on time. Gas phase and liquid phase reactions.

CHM8338 (CHEM 5100) UNIMOLECULAR REACTION DYNAMICS: EXPERIMENT AND THEORY (1.5cr.)
Presentation of the theoretical models that have been developed for the understanding of unimolecular reactions, focusing on statistical theories such as RKKM theory. Experimental techniques for exploring the kinetics and mechanism of unimolecular reactions, including mass spectrometry, coincidence spectroscopy and ZEKE spectroscopy.

**CHM8339 (CHEM 5105) HETEROGENEOUS CATALYSIS (1.5cr.)**
Principles of catalytic reactions and topics in modern applications of catalysis. Bonding of substrates on surfaces; cluster-surface analogy; ensemble requirements; mechanisms of catalysis on metal and metal oxide surfaces.

**CHM8340 (CHEM 5106) ORGANOTRANSITION METAL CATALYSIS: E-H BOND ACTIVATION (1.5cr.)**
Focus on the catalytic activation of E-H bonds by soluble organometallic complexes. Examples to include hydrogenation, hydrosilation and hydroboration catalysis, hydroamination and hydrophosphinination.

**CHM8341 (CHEM 5107) TRANSITION-METAL CATALYZED POLYMERIZATION (1.5cr.)**
Recent developments in polymerization catalysis via transition metal complexes, including insertion, metathesis, and atom-transfer polymerization. Brief overview of relevant concepts in polymer chemistry (e.g. molecular weight, polydispersity, living polymerization, the glass transition).

**CHM8342 (CHEM 5200) CLAY MINERALS CHEMISTRY (1.5cr.)**

**CHM8343 (CHEM 5202) CHEMISTRY OF THE MAIN GROUP ELEMENTS (1.5cr.)**
Fundamental and applied aspects of main group element chemistry. Topics may include non-metal chemistry, main group organometallic chemistry, application of main group element compounds to 3 uses of main group element compounds in synthesis.

**CHM8344 (CHEM 5602) COMPUTATIONAL APPROACHES IN MEDICINAL CHEMISTRY (1.5cr.)**
Theory and application of methods used in the pharmaceutical industry including molecular mechanics.

**CHM8345 (CHEM 5603) MOLECULAR ENERGY TRANSFER (1.5cr.)**
Principles of energy transfer during non-reactive molecular collisions as deduced from experiment and theory, mostly in the gas phase. Translational, rotational, vibrational and electronic energies are discussed.

**CHM8505 SYNTHÈSE ORGANIQUE (1.5cr.)**
Stratégies de synthèse complexes. Réactifs et réactions permettant des synthèses simplifiées et plus efficaces.

**CHM8508 SPECTROSCOPIE PAR RÉSONANCE MAGNÉTIQUE MULTINUCLEAIRE (1.5cr.)**

**CHM8958 PROJET DE RECHERCHE / RESEARCH PROPOSAL**
Préparation d’un projet de recherche, sans rapport avec le sujet de thèse, à soutenir oralement devant un comité d’examen. L’étudiant doit démontrer sa capacité à défendre et justifier le mérite scientifique, la méthodologie, l’importance et la nouveauté du projet. Il doit réussir ce cours dans l’année qui suit la réussite de l’examen général. Les étudiants dont les résultats ne seraient pas satisfaits peuvent se réinscrire une fois et doivent alors réussir en une session / Preparation of a research project, unrelated to the thesis topic, to be defended orally before an examining committee. Student required to demonstrate the ability to defend and justify the scientific merit, methodology, importance, and novelty of the project. Must be completed within one year of passing the comprehensive examination. Students who fail this activity may re-register for it once and must then successfully complete it within one session.

**CHM9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION**

**CHM9999 (CHEM 6909) THÈSE DE DOCTORAT / PhD THESIS**

**PHY5130 (PHYJ 5001) EXPERIMENTAL CHARACTERIZATION TECHNIQUES IN MATERIALS SCIENCE, PHYSICS, CHEMISTRY, AND MINERALOGY (3cr.)**
Survey of experimental techniques used in materials science, condensed matter physics, solid state chemistry, and mineralogy to characterize materials and solid substances. Diffraction (X-ray diffraction, neutron diffraction...). Spectroscopy (infra-red spectroscopy, Raman spectroscopy, nuclear magnetic resonance, Mössbauer spectroscopy, electron spin resonance...). Microscopy and imaging (scanning electron microscopy, transmission electron microscopy, optical microscopy, magnetic resonance imaging...). Other analytic techniques (thermal analysis, wet chemistry, bulk thermodynamic properties, linear response and dc susceptibility...).

**Courses offered at Carleton University**

**CHM5105 (CHEM5905) RADIOCHEMISTRY (3cr.)**
A study of nuclear stability and decay; chemical studies of nuclear phenomena. Application of radioactivity. Prerequisites: permission of the Department.
CHM8104 (CHEM 5904) SCIENTIFIC DATA PROCESSING AND EVALUATION (3cr.)
Optimization of scientific measurements, calibration, uni-variate and multi-variate analysis of scientific data, 'intelligent' spreadsheets for scientific data processing and presentation, noise reduction using spreadsheets, correction for signal drifts; examples from chemistry, spectroscopy and other scientific disciplines.
Prerequisites: CHEM 4301 or CHM 4315 or permission of the Department.

CHM8126 (CHEM 5303) BIOORGANIC CHEMISTRY (3cr.)
Overview of recent developments in the mechanistic understanding of selected enzyme-catalyzed reactions. Topics include Cytochrome P450, methane monoxygenase, biotin and lipoic acid biosynthesis, methyl transfer, Vitamin B12, lipoxygenase, prostaglandin synthase; etc. Emphasis will be placed on biotransformations which are relatively poorly understood from a mechanistic point of view.

CHM8134 (CHEM 5407) SPECTROSCOPY FOR ORGANIC CHEMISTS (3cr.)
Analysis of proton NMR spectra. Fourier transform 13C NMR, strategies for structure elucidation, relaxation times, two-dimensional NMR. Aspects of mass spectrometry.

CHM8150 (CHEMS09) SPECIAL TOPICS IN MOLECULAR SPECTROSCOPY (3cr.)
Topics of current interest in molecular spectroscopy. In past years, the following areas have been covered: Electronic spectra of diatomic and triatomic molecules and their interpretation using molecular orbital diagrams; Raman and resonance Raman spectroscopy; symmetry aspects of vibrational and electronic levels of ions and molecules in solids in the presence of weak and strong resonant laser radiation.

CHM8156 (CHEM 5708) PRINCIPLES OF TOXICOLOGY (3cr.)
The basic theorems of toxicology with examples of current research problems. The concepts of exposure, hazard and risk assessment will be defined and illustrated with experimental material from some of the more dynamic areas of modern research.

CHM8157 (CHEM 5709) CHEMICAL TOXICOLOGY (3cr.)
Advanced course in chemical toxicology dealing with both chemical hazard and exposure. Overview of the empirical data relating to the toxicity of various classes of chemicals to test organisms, followed by the study of toxicity at the cellular level, including studies of interactions between toxic substances and enzymatic systems. Data applicable to the interpretation and monitoring of the new WHMIS health regulations. Initial events in enzyme induction and mutagenesis. Study of predictive capabilities in the areas of structure-activity relationships and mechanisms of enzyme induction are considered, followed by an assessment of mechanisms of exposure to toxic chemicals.

CHM8158 (CHEMS5900) DIRECTED SPECIAL STUDIES (3cr.)
Under unusual circumstances and with the recommendation of the research supervisor, it is possible to engage in a directed study on a topic of particular value to the student. This may also be used for credit if there are insufficient course offerings in a particular field of chemistry.

CHM8164 (CHEM 5406) ORGANIC POLYMER CHEMISTRY (3cr.)
Basic principles of industrial and synthetic polymers. Polymerization and polymer characterization. Selected topics to cover some important polymers with emphasis on the synthesis, commodity plastics, engineering thermoplastics and specialty polymers. Students should have a basic knowledge of organic reaction mechanisms and stereochemistry. Previously offered at University of Ottawa. Revised description and prerequisites. Prerequisites: CHM3120, CHM4120, CHM4125, equivalent. or A basic knowledge of organic reaction mechanisms and stereochemistry.

CHM8167 (CHEM 5805) SEMINAR IN TOXICOLOGY (3cr.)
A one-session course in seminar format highlighting current topics in toxicology. The student will present a seminar and submit a report on the seminar topics. Student, faculty and invited seminar speakers.

CHM8181 (CHEM 5101) CHEMICAL PHYSICS OF ELECTRON-MOLECULE COLLISIONS (3cr.)
Basic classical scattering theory and quantum mechanical scattering theory. Experimental aspects, such as electron optics, electron gun fundamentals, energy analyzers and electron detectors. Applications to the understanding of the chemistry of materials.

CHM8346 (CHEM 5102) SUPERCritical FLUIDS (1.5cr.)
Fundamental and practical aspects of the uses of supercritical fluids in the chemistry laboratory. Thermodynamic treatment of high pressure multicomponent phase equilibria, transport properties, solubilities, supercritical fluid extraction and chromatography for analytical purposes, reactions in supercritical fluids, equipment considerations, new developments.

CHM8347 (CHEM 5309) ELECTRON TRANSFER: THEORY AND EXPERIMENT (1.5cr.)
The development of classical, semi-classical and quantum mechanical electronic transfer models is described. In addition, the course will examine recent experimental results and the application of electron transfer theory to biological systems.

CHM8348 (CHEM 5500) ANALYTICAL INSTRUMENTATION (1.5cr.)
Principles of modern electronics, devices and instruments. Measurement of photonic and electrochemical signals. Conditioning of signals for feedback control and microcomputer interfacing. Computational data analysis techniques such as simplex optimization. Applications in chemical analysis include amperometric detector for capillary electrophoresis, and surface plasmon resonance immunosensor.

CHM8349 (CHEM 5304) FREE RADICALS IN CHEMISTRY AND BIOLOGY (1.5cr.)
Oxidative stress induced by free radicals plays a significant role in most fatal and chronic diseases. The chemistry of bio-radicals will be described and related to
pathobiological processes such as lipid peroxidation and atherosclerosis, protein nitration and cross-linking, and DNA scission.

CHM8350 (CHEM 5408) INTRODUCTION TO POLYMER STRUCTURE AND MORPHOLOGY (1.5cr.)
Flexible and rigid rod polymers: effect of molecular constitution and conformation; examples of various polymer architectures and function; the amorphous state and glass transition; the crystalline state: typical crystal structures of polymers; polymorphism; crystallinity and long spacing. Thermal and solvent-induced crystallization; Lamellar and Spherulitic morphology.

CHM8355 (CHEM5000) TRACE ELEMENTAL ANALYSIS USING INDUCTIVELY COUPLED PLASMA EMISSION (ICP-ES) AND MASS SPECTROMETRY (ICP-MS) (1.5cr.)
ICP-ES/MS techniques are among the most powerful tools presently available for elemental analysis for a wide range of interests such as environmental, geological and biological applications. The fundamentals, state of the art instrumentation, applications, existing challenges, and new research and developments will be covered.

CHM8351 (CHEM 5409) MORPHOLOGY OF POLYMERS AND COMPOSITES (1.5cr.)
Liquid crystalline state of polymers; morphology of block copolymers and polymer blends; plasticizers and fillers for tailoring properties; depression of glass transition and melting temperature; phase stability of polymer composites; mechanical properties; self-assembled systems; polymer nano-composites for electronic devices; common experimental techniques.

CHM8352 (CHEM 5501) ANALYTICAL APPROACH TO CHEMICAL PROBLEMS (1.5cr.)
Case study of analytical approach to various chemical problems in agricultural, biochemical, environmental, food processing, industrial, pharmaceutical and material sciences. Analytical methods include capillary electrophoresis, chemiluminescence, Fourier transform infrared spectroscopy, inductively coupled plasma emission spectroscopy, mass spectrometry, biochemical sensors, and fiber optics for remote sensing.

CHM8353 (CHEM 5502) TRACE AND ULTRATRACE ANALYTICAL CHEMISTRY (3cr.)
Criteria for evaluation and selection of analytical techniques and methods. Electroanalytical techniques. Simultaneous and sequential multielement determination. Atomic absorption, atomic emission and atomic fluorescence spectrometry, using optical spectrometric and mass- spectrometric determination. Applications of these techniques at trace and ultratrace levels in complex matrices.

CHM8354 (CHEM 5503) CHEMICAL SPECIATION IN THE NATURAL ENVIRONMENT (3cr.)
Evaluation of analytical techniques and their capability for quantitative determination of chemical species (as opposed to total element-determination) in the natural environment. Electro- chemical techniques for determination of chemical speciation of nutrient and toxicant elements present in the natural environment.

CHM8356 (CHEM5308) PHYSICAL METHODS IN INORGANIC CHEMISTRY (1.5cr.)
The characterization of inorganic materials and coordination complexes by electronic absorption and electron paramagnetic spectroscopies, temperature and field dependant magnetic susceptibilities, and crystallography will be examined.

Civil Engineering

Ottawa-Carleton Joint Program

Established in 1984, the Ottawa-Carleton Institute of Civil Engineering (OCICE) combines the research strengths and resources of the Departments of Civil and Environmental Engineering at Carleton University with that of the Department of Civil Engineering at the University of Ottawa.

The Institute offers graduate programs leading to the degrees of Master of Applied Science (MASc), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Civil Engineering.

The Institute is one of the participating units in the collaborative program in Science, Society and Policy (master's level only).

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in six main research fields: environmental engineering; fire safety engineering; geotechnical engineering; structural engineering; transportation engineering; and, water resources engineering. Additional information is posted in the departmental website.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

Programs
Master of Applied Science Civil Engineering
Master of Applied Science Civil Engineering Specialization in Science, Society and Policy
Master of Engineering Civil Engineering
Doctorate in Philosophy Civil Engineering

Admission

Admission to the graduate programs in Civil Engineering is governed by the general regulations of the Ottawa-Carleton Institute of Civil Engineering (OCICE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold an honours bachelor’s degree with specialization or a major in civil engineering, or in the sub-disciplines normally considered to be part of civil engineering;
- Have a minimum average of B (70%) in their bachelor’s degree;
- Demonstrate strong academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills;
- Provide at least two confidential letters of recommendation from professors who are familiar with the applicant’s work;
- For admission to the MASc, identify at least one professor who is willing and available to act as thesis supervisor;
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

Applicants holding an honours bachelor’s (or major) degree in an engineering discipline other than civil engineering or in science may be considered for admission to a qualifying program with the following conditions:

- Graduates from honours engineering or science programs with a mathematics content equivalent to that of the civil engineering undergraduate program will have to take a minimum of four undergraduate civil engineering courses in their area of graduate specialty.
- Graduates from other science programs (i.e. those without the mathematical content covered in a civil engineering undergraduate program) will have to take all the core engineering undergraduate mathematics courses in addition to four qualifying undergraduate civil engineering courses in their area of specialty.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree. Undergraduate civil engineering courses will not be accepted towards a graduate degree. Graduate students may still be required to take undergraduate courses for credit to fulfill the admission requirements.

Transfer from master’s to PhD

Students in a master’s program who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of 5 graduate courses (15 credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation from the supervisor and the thesis advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met. Following transfer, all the requirements of the doctoral program must be met.

Collaborative programs

The Ottawa-Carleton Institute for Civil Engineering is one of the participating units in the collaborative program in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of the program posted on the FGPS website.

Program Requirements

A. Master of applied science (MASc)

The requirements of the program are as follows:
B. Master of engineering (MEng) (30 credits)

The requirements of the MEng program are as follows:

1. Project option
   - Completion of 24 course credits;
   - (CVG6000) Completion of a 6 credit civil engineering project.

   OR

2. Course work option
   - Completion of 30 course credits.

Duration of Program

The requirements of the program are usually fulfilled within two years of full-time studies.

Residence

All students must complete a minimum of three sessions of full-time registration. The maximum time permitted is four years.

Minimum Standards

The passing grade in all courses is B. A student who has incurred two failures is withdrawn from the program.

Collaborative program in Science, Society and Policy

The requirements of both the MAsc in Civil Engineering and the collaborative program must be met. The credits completed for the specialization count also towards the MAsc degree in Civil Engineering.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the Civil Engineering program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation of “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

Courses

Graduate courses are listed below, grouped by areas of research.

Course codes in parentheses are for Carleton University.

Not all of the following courses are necessarily given each year.

Geotechnical Engineering

CVG5100 (CIVJ 5000) DEEP FOUNDATIONS (3cr.)
Deep foundation types in North American practice (driven or bored piles, and slurry trench techniques); axial and lateral capacity and settlement analysis for single piles and pile groups; field inspection methods; pile dynamics; performance and analysis of static test loading.

CVG5106 (CIVJ 5006) SITE IMPROVEMENTS (3cr.)
Description, design procedures and usage of current site improvement techniques, including preloading, earth reinforcement, dynamic consolidation, vibrocompaction, blasting densification, lime treatment, drains, and geotechnical fabrics.

CVG5161 (CIVJ 5106) MECHANICS OF UNSATURATED SOILS (3cr.)
Introduction to unsaturated soils, phases of an unsaturated soil, phase properties and relations, stress state variables for saturated and unsaturated soils. Measurement of soil suction: theory of soil suction, capillarity, measurements of total suction and matric suction. Flow Laws: flow of water and measurement of permeability, shear strength theory: history, failure envelope for unsaturated soils, triaxial and direct shear tests, typical results, simple testing procedures, volume change behavior including expansive soils behavior. Soil-water characteristic curve: its behavior and use in predicting the engineering properties of unsaturated...
soils, practical applications of the principles of unsaturated soils.

**CVG5175 NUMERICAL METHODS FOR GEOTECHNICAL ENGINEERS** (3cr.)
Non-linear analysis of stresses and deformations using the effective stress concept; analysis of consolidation using the excess pore water pressure concept; flow through porous media; finite element, discrete element and finite difference methods; applications to foundations of structures, retaining walls, dams, tunnels, pipelines, human-made and natural slopes in rock and soil.

**CVG5178 (CIVJ 5108) ICE MECHANICS** (3cr.)
Ice conditions in the Arctic; ice physics; classification of ice; mechanical properties of ice; mathematical modelling of creep and fracture behaviour of ice; offshore structures in arctic environments; ice forces acting on structures; ice induced vibrations; iceberg impact loads; physical modelling of ice-structure interaction; ice as a construction material; case histories.

**CVG7100 (CIVE 5209) CASE STUDIES IN GEOTECHNICAL ENGINEERING** (3cr.)

**CVG7101 (CIVE 5300) ADVANCED SOIL MECHANICS I** (3cr.)

**CVG7102 ADVANCED SOIL MECHANICS II** (3cr.)

**CVG7103 (CIVE 5303) PAVEMENTS AND MATERIALS** (3cr.)

**CVG7104 (CIVE 5500) EARTH RETAINING STRUCTURES** (3cr.)

**CVG7105 (CIVE 5501) FOUNDATION ENGINEERING** (3cr.)

**CVG7106 (CIVE 5502) IN SITU METHODS IN GEOMECHANICS** (3cr.)

**CVG7107 (CIVE 5503) NUMERICAL METHODS IN GEOMECHANICS** (3cr.)

**CVG7108 (CIVE 5504) SEEPAGE AND WATER FLOW THROUGH SOILS** (3cr.)

**Structural Engineering**

**CVG5142 (CIVJ 5201) ADVANCED STRUCTURAL DYNAMICS** (3cr.)
Dynamic behaviour of civil engineering structures under excitations due to earthquakes, wind, waves, etc. Advanced methods in dynamic analysis of structures. Prediction of structural response. Design considerations.

**CVG5143 (CIVJ 5202) ADVANCED STRUCTURAL STEEL DESIGN** (3cr.)
Analysis of thin-walled beams, design applications including members under combined forces, analysis and design of beams under non-uniform torsion, limit state design methodology, comparative study of modern structural steel standards, formulating elastic and plastic interaction relations for members under combined forces, designing columns, beams, beam columns, for cross-sectional strengths, local buckling and global stability considerations, design of bracing systems.

**CVG5144 (CIVJ 5300) ADVANCED REINFORCED CONCRETE** (3cr.)

**CVG5145 (CIVJ 5203) THEORY OF ELASTICITY** (3cr.)
Stress-strain relations. Theories of plane stress and plane strain. Use of stress functions, energy and variational methods in the analysis of elastostatic problems.

**CVG5146 (CIVJ 5302) NUMERICAL METHODS OF STRUCTURAL ANALYSIS** (3cr.)
Numerical procedures and methods of successive approximations for the solution of structural problems. Virtual work, principles of minimum potential and complementary energy. Applications of variation and finite difference techniques to the solutions of complicated problems in beams, plates and shells.

**CVG5147 (CIVJ 5204) THEORY OF PLATES AND SHELLS** (3cr.)
Stress distribution in flat plates of various shapes. Large deflection theory, numerical methods. Membrane theory, bending theory for cylindrical shells, bending theory for shells of revolution.
CVG5148 (CIVJ 5304) PRESTRESSED CONCRETE DESIGN (3cr.)

CVG5149 (CIVJ 5304) STRUCTURAL STABILITY (3cr.)
Elastic, inelastic, and torsional buckling of columns, beam column behaviour, plane and space frame stability, lateral torsional buckling of beams, global buckling of truss systems, plate and shell buckling, local buckling in tubulars, use of energy methods, matrix analysis, and finite element analysis in modeling stability problems, bracing requirements, standard provisions and design considerations in structural stability.

CVG5150 (CIVJ 5206) ADVANCED CONCRETE TECHNOLOGY (3cr.)
Cement: types, hydration, physical properties; aggregate: classification, grading, properties; fresh concrete: influence of basis constituents and admixtures on workability, mixing, placing; strength of hardened concrete; nature of strength, influence of constituents, curing methods; durability; chemical attack, frost action, thermal effects; elasticity, shrinkage and creep; special concrete; lightweight, high density; mix design; approaches, weigh batching, volume proportioning, special mixes; field and laboratory test methods.

CVG5151 STRUCTURAL DESIGN IN TIMBER (3cr.)
Characteristic values for timber and engineered wood products, modification factors used in design; design of members subjected to compression, bending, bi-axial bending and combined bending and axial loading; design of curved glued laminated beams, lateral design for wind and seismic loading; connection design.

CVG5153 (CIVJ 5209) WIND ENGINEERING (3cr.)
The structure and climate of wind; wind loading on structures; wind induced dynamic problems of structures; environmental aerodynamics; dispersion of pollutant; analysis of wind data; experimental investigations.

CVG5154 (CIVJ 5308) RANDOM VIBRATION (3cr.)

CVG5155 (CIVJ 5306) EARTHQUAKE ENGINEERING (3cr.)

CVG5156 (CIVJ 5301) FINITE ELEMENT METHODS I (3cr.)

CVG5157 (CIVJ 5303) FINITE ELEMENT METHODS II (3cr.)

CVG5158 (CIVJ 5307) ELEMENTS OF BRIDGE ENGINEERING (3cr.)
Introduction; limit state design; highway bridge design loads; analysis and design of concrete decks; impact and dynamics; load capacity rating of existing bridges and construction in cold climate.

CVG5159 (CIVJ 5309) LONG SPAN STRUCTURES (3cr.)

CVG7109 (CIVE 5505) GEOTECHNICAL EARTHQUAKE ENGINEERING (3cr.)

CVG7120 (CIVE 5101) INTRODUCTORY ELASTICITY (3cr.)

CVG7121 (CIVE 5102) ADVANCED ELASTICITY (3cr.)

CVG7122 (CIVE 5103) FINITE ELEMENT METHODS IN STRESS ANALYSIS (3cr.)

CVG7123 (CIVE 5104) EARTHQUAKE ENGINEERING AND ANALYSES (3cr.)
CVG7124 (CIVE 5105) ADVANCED FINITE ELEMENT ANALYSIS IN STRUCTURAL MECHANICS (3cr.)

CVG7125 (CIVE 5203) THEORY OF STRUCTURAL STABILITY (3cr.)

CVG7126 (CIVE 5204) BEHAVIOUR AND DESIGN OF STRUCTURAL STEEL MEMBERS (3cr.)

CVG7127 (CIVE 5205) ANALYSIS OF ELASTIC STRUCTURES (3cr.)

CVG7128 (CIVE 5206) PRESTRESSED CONCRETE (3cr.)

CVG7129 ADVANCED STRUCTURAL DESIGN (3cr.)

CVG7130 (CIVE 5208) ADVANCED REINFORCED CONCRETE (3cr.)

CVG7131 (CIVE 5600) PROJECT MANAGEMENT (3cr.)

CVG7132 COMPUTER-AIDED DESIGN OF BUILDING STRUCTURES (3cr.)

CVG7137 DYNAMICS OF STRUCTURES (3cr.)

CVG7138 ENGINEERING MASONRY BEHAVIOUR AND DESIGN (3cr.)

CVG7139 BEHAVIOUR AND DESIGN OF STEEL STRUCTURES (3cr.)

CVG7140 (CIVE 5601) STATISTICS, PROBABILITIES AND DECISION-MAKING (3cr.)

CVG7141 (CIVE 5602) ADVANCED METHODS IN COMPUTER-AIDED DESIGN (3cr.)

CVG7142 ENGINEERING MANAGEMENT (3cr.)

CVG7143 (CIVE 5605) DESIGN OF STEEL BRIDGES (3cr.)

CVG7144 (CIVE 5606) DESIGN OF CONCRETE BRIDGES (3cr.)

CVG7145 (CIVE 5607) INTRODUCTION TO BRIDGE DESIGN (3cr.)

CVG7170 (CIVE 5609) FUNDAMENTALS OF FIRE SAFETY ENGINEERING (3cr.)

CVG7171 (CIVE 5610) FIRE DYNAMICS I (3cr.)

CVG7172 (CIVE 5613) FIRE DYNAMICS II (3cr.)
CVG7173 (CIVE 5611) PEOPLE IN FIRES (3cr.)

CVG7174 (CIVE 5612) FIRE MODELLING (3cr.)

CVG7175 (CIVE 5614) DESIGN FOR FIRE RESISTANCE (3cr.)

Transportation Engineering
CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)

CVG7151 (CIVE 5305) TRAFFIC ENGINEERING (3cr.)

CVG7152 (CIVE 5306) HIGHWAY MATERIALS (3cr.)

CVG7153 (CIVE 5307) URBAN TRANSPORTATION AND MANAGEMENT (3cr.)

CVG7154 (CIVE 5308) GEOMETRIC DESIGN (3cr.)

CVG7155 (CIVE 5309) TRANSPORTATION SUPPLY (3cr.)

CVG7156 (CIVE 5401) TRANSPORTATION ECONOMICS AND POLICY (3cr.)

CVG7158 (CIVE 5403) AIRPORT PLANNING (3cr.)

CVG7159 (CIVE 5402) TRANSPORTATION TERMINALS (3cr.)

Water Resources Engineering
CVG5111 (CIVJ 5501) HYDRAULIC STRUCTURES (3cr.)
Classification and function of hydraulic structures; analysis and design of hydraulic works for gravity dams, arch dams, earth fill and rock-fill dams; ancillary works including water intakes, various types of spillways, control structures, energy dissipation and stilling basin, bottom outlets. Advanced topic in channel design including transitions; hydraulic transients, free surface and free surge analysis; water towers and compensation basins; penstocks. Navigation locks. Coastal protection works and maritime structures.

CVG5120 (CIVJ 5506) WATER RESOURCES SYSTEMS (3cr.)
Conservation of water resources. Multi-purpose project planning: study of domestic and foreign water development projects. Techniques for simulation, optimization, linear and dynamic programming.

CVG5123 (CIVJ 5509) ADVANCED TOPICS IN HYDROLOGY (3cr.)
Selected topics of current interest in surface and groundwater hydrology.

CVG5124 (CIVJ 5605) COASTAL ENGINEERING (3cr.)
Key concepts in coastal engineering. Wave mechanics and coastal hydrodynamics, (2) sediment transport and coastal morphodynamics and (3) coastal structures and coastal zone management. Wave mechanics and coastal hydrodynamics to include small-amplitude wave theory, finite amplitude wave theories (Stokes, Cnoidal and solitary wave), wave generation, wave transformations, development and prediction, hydrodynamics of coastal circulation. Sediment transport and coastal morphodynamics to include: wave and current-induced sediment transport, coastal sediment processes, longshore and cross-shore beach morphologic transformations, etc. Coastal structures and coastal zone management to include: beach erosion control, coastal structures (dikes, breakwaters, groins, seawalls), beach nourishment, coastal pollution and control, nearshore area development.

CVG5125 (CIVJ 5601) STATISTICAL METHODS IN HYDROLOGY (3cr.)
Concepts of probability and random variables applied to hydrology. Statistical distributions, their approximation and analysis. Statistical inference, including tests of significance and estimation theory. Linear and multivariate correlation and regression techniques. Data generation and simulation techniques for design of water-resource systems. Introduction to hydrologic and meteorologic time series.

CVG5160 (CIVJ 5503) SEDIMENT TRANSPORT (3cr.)
CVG5162 (CIVJ 5504) RIVER HYDRAULICS (3cr.)
Advanced concepts of river hydraulics, with an emphasis on field measurement techniques and application of numerical models. Navier-Stokes equations, turbulence, flow resistance, numerical modelling of simplified momentum and continuity equations, field-based measurement and statistical analysis of velocity fields. Special topics include contaminant transport, morphodynamic modelling.

Environmental Engineering
CVG5130 (ENVJ 5900) WASTEWATER TREATMENT PROCESS DESIGN (3cr.)
The physical, chemical and biological processes involved in the treatment of domestic and industrial wastes. Waste characteristics, stream assimilation, biological oxidation, aeration, sedimentation, anaerobic digestion, sludge disposal.

CVG5132 (ENVJ 5901) UNIT OPERATIONS OF WATER TREATMENT (3cr.)
Unit operations and unit processes involved in the treatment of a water supply for various uses. Topics included are: water quality, water microbiology, sedimentation, chemical treatment, disinfection, water chemistry, flocculation.

CVG5133 (ENVJ 5906) SOLID WASTE DISPOSAL (3cr.)
Collection and disposal of solid wastes. Sanitary landfill, composting, incineration and other methods of disposal. Material and energy recovery.

CVG5134 (ENVJ 5907) CHEMICAL ANALYSIS FOR ENVIRONMENTAL ENGINEERING (3cr.)

CVG5137 (ENVJ 5905) WATER AND WASTEWATER TREATMENT PROCESS ANALYSIS (3cr.)
Mass balancing in complex systems. Reaction kinetics and kinetic data analysis: classical and computer based methods. Reactor design: ideal reactors and real reactors. Analysis of tracer tests. Interfacial mass transfer: common theories. Mass transfer models. Prerequisite: CVG 3132 or equivalent. Students with a Chemical Engineering background may not take this course for credit.

CVG5138 (ENVJ 5902) ADVANCED WATER TREATMENT (3cr.)
Scope, limitations and design procedures for water treatment processes for the removal of toxic and non-standard contaminants. Current water treatment problems and regulations, activated carbon treatment, ion exchange, disinfection practices and oxidation via advanced oxidation processes (ozonation and UV oxidation), iron and manganese removal, recent developments in coagulation, membranes, air stripping. Prerequisite: CVG 3132 or equivalent.

CVG5139 (ENVJ 5700) ENVIRONMENTAL ASSESSMENT OF CIVIL ENGINEERING PROJECTS (3cr.)
Procedures and methods for systematic evaluation of the environmental impact of civil engineering projects including wastewater disposal systems, solid waste disposal systems, and water resource development systems.

CVG5179 (ENVJ 5908) ANAEROBIC DIGESTION (3cr.)
Advanced theoretical, biological, and practical aspects of anaerobic digestion processes. Principles to be applied to the design and application of conventional and advanced anaerobic processes used for treatment of municipal and industrial wastewaters. Topics to include microbiology and biochemistry fundamentals, techniques for monitoring anaerobic digestion performance, municipal sludge stabilization, anaerobic composting, anoxic/anaerobic bioremediation, Andrew's dynamic model. Design of the following: two-phase digestion; Downflow Stationary Fixed Film (DSFF) reactors; Upflow Anaerobic Sludge Blanket (UASB); Uplow Blanket Filter (UBF) reactors; and Anaerobic Sequencing Batch Reactors (ASBR).

CVG5180 (ENVJ 5909) BIOLOGICAL NUTRIENT REMOVAL (3cr.)
Advanced theoretical, biological, and practical aspects of biological nutrient removal (BNR) (nitrification, denitrification and excess biological phosphorus) processes. Principles to be applied to the design and application of conventional and advanced BNR processes used for treatment of municipal and industrial wastewaters. Topics as follows: microbiology and biochemistry fundamentals of BNR, nitrification process design of suspended growth and fixed film growth systems, denitrification process design of suspended growth and fixed film growth systems, excess biological phosphorus removal design including prefermentation. Design of 2,3,4 and 5 stage BNR systems. General activated sludge model and Simworks for BNR systems. Retrofit of exiting plants and pilot plant testing for BNR.

CVG5232 (ENVJ 5911) UNIT OPERATIONS OF WATER TREATMENT LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for particular applications, and b) design a full-scale facility. Conventional analytical techniques used in water treatment (pH, alkalinity, hardness, turbidity, color, spectrophotometric analysis). Process analysis techniques for process evaluation and scale-up including: zone sedimentation, batch flux settling tests, coagulation with iron and aluminum salts, flocculent sedimentation, filtration and fluidization, flotation. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5132.

CVG5238 (ENVJ 5912) ADVANCED WATER TREATMENT PROCESSES LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for the removal of toxic and non-standard contaminants, and b) design a full-scale facility. Tracer tests and none-ideal reactor behaviour, activated carbon adsorption equilibria and kinetics, aeration. Total organic carbon analysis, spectrophotometry. Process analysis, techniques for process evaluation and scale-up including: aeration, analysis of non-ideal
flow conditions. Tracer study of three basins, adsorption isotherm tests, activated carbon mini-column tests, oxidation kinetic tests. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5138.

CVG7160 (ENVE 5001) BIOFILM PROCESSES IN WASTEWATER TREATMENT (3cr.)

CVG7161 (ENVE 5102) TRAFFIC RELATED AIR POLLUTION (3cr.)

CVG7162 (ENVE 5103) AMBIENT AIR QUALITY AND POLLUTION MODELLING (3cr.)

CVG7163 (ENVE 5302) CASE STUDIES IN HYDROGEOLOGY (3cr.)

CVG7164 (ENVE 5203) MULTIPHASE FLOW AND CONTAMINANT TRANSPORT MODELLING (3cr.)

Additionnal courses

CVG5112 (CIVJ 5502) COMPUTATIONAL HYDRODYNAMICS (3cr.)
Finite volume methods for advection, diffusion and shallow water equations using structured and unstructured grids, finite volume methods for incompressible Navier-Stokes equations (SIMPLE, SIMPLEx, PISO), error analysis: numerical diffusion and dispersion, truncation errors and Fourier analysis, introduction to turbulence modeling, introduction to methods for tracking free surfaces and moving beds introduction to other methods in hydrodynamics; finite element, finite difference, Chebyshev and Fourier spectra, semi Lagrangian and vortex methods in hydrodynamics.

CVG5311 BRIDGE DESIGN (3cr.)
Design of highway bridges according to the Canadian Highway Bridge Design Code (CHBDC). Comparisons with other bridge codes (e.g., the American Code - AASHTO, the European, the New Zealand, and the British bridge codes). The topics covered include the following: main structural components of highway bridges; types of highway bridges; serviceability and ultimate limit state design requirements; design loads (dead loads, traffic loads, seismic loads, and wind loads); load combinations; code specifications for loading due to traffic (design lane, characteristics of design truck, positions of design truck on bridge, etc.); dynamic effects due to traffic loads; practical approaches specified in CHBDC for determining forces and deflections in structural members; principles of capacity design in highway bridges.

CVG5312 DURABILITY OF CONCRETE STRUCTURES (3cr.)
Properties of cementitious materials (constituents of concrete; hydration of cement; structure of hardened concrete; transport processes in concrete); deterioration of concrete (built-in problems; construction defects; cracking; dimensional stability; alkali-aggregate reaction; sulphate attack; corrosion of reinforcing steel; freezing-thawing cycles); (iii) evaluation of concrete structures (inspection; in-situ testing; laboratory testing); (iv) repair and maintenance of concrete (repair materials; repair procedures and techniques; prevention, protection and maintenance); and, (v) durability design (philosophy; modelling of deterioration processes; service life prediction; life-cycle cost analysis.)

CVG5313 SEISMIC ANALYSIS AND DESIGN OF CONCRETE STRUCTURES (3cr.)
Review of seismic hazards in Canada, building code provisions for earthquake loads, uniform hazard spectra, linear elastic modal response spectrum analysis, linear elastic time history analysis, equivalent static force procedure, advanced state-of-the-art nonlinear modeling techniques including the finite element method and fiber modeling, emerging methods such as performance-based earthquake engineering and displacement-based design, ductility concepts, plastic hinge formulations, capacity design philosophy for seismic resistance, seismic analysis and design of common seismic force resisting systems including slender and squat shear walls, moment resisting frames, coupled shear walls, and coupling beams, shear wall moment resisting frame interaction, and lessons learned from recent earthquakes.

CVG5314 GEOTECHNICAL HAZARDS (3cr.)
Understanding of assessment, prevention, and mitigation of geotechnical hazards, overview of natural and man-made geo-hazards; concepts of hazards, disasters, vulnerability and risks; geotechnical hazards induced by problem soils: fundamentals, assessment, and mitigation; landslide hazards and risk assessment: fundamentals, solutions (prevention, stabilization) for landslides and slope instability; monitoring of landslides and slope; mining geotechnical hazards: hazards related to surface mining geotechnical facilities; hazards related to underground mining geotechnical facilities.

CVG5320 FIRE BEHAVIOUR OF MATERIALS (3cr.)
Fundamentals and scientific aspects of the behaviour of materials during fires and the fire hazards of materials. Topics to be covered include material specifications, thermal and mechanical properties, structural fire response, residual strength, failure criteria, mechanisms of flame retardancy, and standards and testing protocols.

CVG5321 FINITE ELEMENTS IN FIELD PROBLEMS (3cr.)
Use of Galerkin and Ritz finite element formulation to solve one and two dimensional field problems, steady state and timedependent phenomena involving potentials, heat transfer, fluid flow, dispersion, and diffusion with emphasis on practical applications. Prerequisite: Basic knowledge of third year-level undergraduate engineering mathematics. Exclusion: EVG7402 (ENVE 5402).
CVG5331 (ENVJ 5902) SLUDGE UTILIZATION AND DISPOSAL (3cr.)
Introduction to sludge processing technology and procedures to be used in the planning and design of sludge treatment processes. Evaluate the economics and performance of sludge unit process operations. Selection of methods for final disposition of sludge

CVG5366 MASTER'S SEMINAR IN CIVIL ENGINEERING
Attendance and participation in the monthly seminar. All students must make one presentation and continue to attend throughout the program. Graded S/NS

CVG6000 RAPPORT EN GÉNIE CIVIL / CIVIL ENGINEERING REPORT (6cr.)

CVG6108 (CIVE 5906) DIRECTED STUDIES I (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG6109 (CIVE 5907) DIRECTED STUDIES II (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG 6301 to 6320 SPECIAL TOPICS IN CIVIL ENGINEERING (3 cr.)
CVG6108 (CIVE 5906) DIRECTED STUDIES I (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG6109 (CIVE 5907) DIRECTED STUDIES II (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG7999 THÈSE DE M.Sc.A. / MASC THESIS
Pour les étudiants qui écrivent leur thèse de maîtrise après avoir fait leur travail de recherche en laboratoire. / For students writing the Master's thesis after completion of laboratory research.

CVG8366 DOCTORAL SEMINAR IN CIVIL ENGINEERING
Attendance and participation in the monthly seminar. All students must make one presentation and continue to attend throughout the program. Graded S/NS

CVG9998 EXAMEN GÉNÉRAL DE DOCTORAT / COMPREHENSIVE EXAMINATION (PhD)

CVG9999 THÈSE DE DOCTORAT / PHD THESIS
Pour les étudiants qui rédigent leur thèse de doctorat après avoir fait leur travail de recherche en laboratoire. / For students writing their PhD thesis after completion of laboratory research.

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Classical Studies

The Department of Classical and Religious Studies, located in the Faculty of Arts, offers a master's program leading to the degree of Master of Arts in Classical Studies. The program comprises one main field: Late Antiquity (A.D. 200-700).

The objective of this program is to prepare the students for further study in the field of late antiquity, the important transitional period between classical antiquity and the Middle Ages. The Department also offers the possibility of studying Coptic, Syriac, Arabic and Ethiopic (in addition to Latin and Greek). Candidates will acquire a thorough background that will enable them to pursue doctoral studies.

The program aims to refine critical and scholarly skills and to broaden the knowledge of its graduates in certain areas. The ability to conduct
detailed research, to argue coherently, to write an academic paper, and other skills learned can be applied in careers outside academia. Several graduates find positions in local or federal government, where their training at the MA level is clearly valued.

The Department offers a collaborative program in Medieval and Renaissance Studies at the MA level. For more information on this program, see "Admission".

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

**Master of Arts Classical Studies**

**Master of Arts Classical Studies Specialization in Medieval and Renaissance Studies**

**Admission**

- An honours bachelor’s, or an equivalent degree, in Classics, in Medieval History or in a closely related area, with an overall average of at least 70% (B) and 75% (B+) in the advanced classical studies courses.
- Eighteen credits of classical language courses (twelve credits in either Greek or Latin and six credits in the other language) with a minimum average of 75% (B+).

Preference will be given to candidates who have already completed the 18 credits. However, candidates with only 12 credits will be considered on condition that the six other credits will be completed with a minimum average of 75% (B+) within the first year of the program.

**Collaborative program in Medieval and Renaissance Studies**

The Department of Classical Studies is a participating unit in the collaborative program in Medieval and Renaissance Studies (master’s level only). This program has been established for students wishing to enrich their training in Classical Studies by including an interdisciplinary component in Medieval and Renaissance Studies. The specific requirements of the collaborative program include two core courses in medieval studies and a thesis on a topic related to Medieval and Renaissance Studies.

Students should apply for acceptance in the Medieval and Renaissance Studies collaborative program at the same time as they apply for admission to the master’s program in Classical Studies.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

For further details, please consult the Medieval and Renaissance Studies program on the FGPS website.

**Program Requirements**

**MA with research paper**

- Compulsory courses (6cr.)
  - CLA5901 RECHERCHE SCIENTIFIQUE ET MÉTHODOLOGIE I / SCHOLARLY RESEARCH AND METHODOLOGY I (3cr.) (Includes a sight translation requirement.)
  - CLA5902 RECHERCHE SCIENTIFIQUE ET MÉTHODOLOGIE II / SCHOLARLY RESEARCH AND METHODOLOGY II (3cr.) (Includes a sight translation requirement.)
- Optional courses (12 credits from the following list)
  - CLA5120 THE LATIN CHRONICLE TRADITION (3cr.)
  - CLA5121 LATE ROMAN HISTORIOGRAPHY (3cr.)
  - CLA5122 TOPICS IN LATIN PALAEOGRAPHY (3cr.)
  - CLA5120 THE LATIN CHRONICLE TRADITION (3cr.)
  - CLA5121 LATE ROMAN HISTORIOGRAPHY (3cr.)
  - CLA5920 LA VILLE DURANT L’ANTIQUITÉ TARDIVE / THE CITY IN LATE ANTIQUITY (3cr.)
  - CLA5921 ROME ET LES SASSANIDES / ROME AND THE EAST (3cr.)
  - CLA5922 PAIENS ET CHRÉTIENS SOUS L’EMPIRE ROMAIN TARDIF / PAGANS AND CHRISTIANS IN THE LATER ROMAN EMPIRE (3cr.)
  - CLA5923 ASPECTS DE LA LITTÉRATURE DE L’ANTIQUITÉ TARDIVE / TOPICS IN LATE ANTIQUE LITERATURE (3cr.)
  - CLA5924 ASPECTS DE L’HISTOIRE DE L’ANTIQUITÉ TARDIVE / TOPICS IN LATE ANTIQUE HISTORY (3cr.)
  - CLA5925 INTRODUCTION À UNE LANGUE ANCIENNE / INTRODUCTION TO AN ANCIENT LANGUAGE (3cr.)
CLA5926 LECTURES DIRIGÉES EN LANGUES ANCIENNES / DIRECTED READINGS IN ANCIENT LANGUAGE (3cr.)

- Elective courses (6cr.)
  - Students will also be able to choose, with permission of the Director of Graduate Studies, relevant graduate courses in religious studies, in history, in philosophy or other disciplines, where available. Responsibility for checking that they have any prerequisites rests with them.
- Classical language courses (6cr.)
  - This requirement applies only to students who have not completed 18 credits of classical language courses before admission. The exact number of credits is indicated at the time of admission.
- Research paper (6cr.)
  - CLA5999 MÉMOIRE / RESEARCH PAPER (6cr.)

MA with thesis

- Compulsory courses (6cr.)
  - CLA5901 RECHERCHE SCIENTIFIQUE ET MÉTHODOLOGIE I / SCHOLARLY RESEARCH AND METHODOLOGY I (3cr.)
  - CLA5902 RECHERCHE SCIENTIFIQUE ET MÉTHODOLOGIE II / SCHOLARLY RESEARCH AND METHODOLOGY II (3cr.)
- Optional courses (12 credits from the following list)
  - CLA5120 THE LATIN CHRONICLE TRADITION (3cr.)
  - CLA5121 LATE ROMAN HISTORIOGRAPHY (3cr.)
  - CLA5122 TOPICS IN LATIN PALAEOGRAPHY (3cr.)
  - CLA5120 THE LATIN CHRONICLE TRADITION (3cr.)
  - CLA5121 LATE ROMAN HISTORIOGRAPHY (3cr.)
  - CLA5920 LA VILLE DURANT L’ANTIQUITÉ TARDIVE / THE CITY IN LATE ANTIQUITY (3cr.)
  - CLA5921 ROME ET LES SASSANIDES / ROME AND THE EAST (3cr.)
  - CLA5922 PAIENS ET CHRÉTIENS SOUS L’EMPIRE ROMAIN TARDIF / PAGANS AND CHRISTIANS IN THE LATER ROMAN EMPIRE (3cr.)
  - CLA5923 ASPECTS DE LA LITTÉRATURE DE L’ANTIQUITÉ TARDIVE / TOPICS IN LATE ANTIQUE LITERATURE (3cr.)
  - CLA5924 ASPECTS DE L’HISTOIRE DE L’ANTIQUITÉ TARDIVE / TOPICS IN LATE ANTIQUE HISTORY (3cr.)
  - CLA5925 INTRODUCTION À UNE LANGUE ANCIENNE / INTRODUCTION TO AN ANCIENT LANGUAGE (3cr.)
  - CLA5926 LECTURES DIRIGÉES EN LANGUES ANCIENNES / DIRECTED READINGS IN ANCIENT LANGUAGE (3cr.)

Collaborative program in Medieval and Renaissance Studies

Students in the program must complete the requirements of their primary program and those of the collaborative program. One of the two 3-credit courses in medieval and Renaissance Studies (MDV5100 or MDV5500) will be counted towards the requirements of the primary program. Consequently, students in the specialization will have only one extra course to take.

The requirements of the collaborative program are as follows:

- Two compulsory courses, which must be completed before students register for the major research paper or the thesis:
  - One of the following:
    - MDV5100 MEDIEVAL AND RENAISSANCE STUDIES RESEARCH METHODS AND TOOLS (3cr.)
    - MDV5500 MEDIEVAL AND RENAISSANCE STUDIES RESEARCH METHODS AND TOOLS (3cr.)
  - MDV5900 SÉMINAIRE DE RECHERCHE INTERDISCIPLINAIRE / INTERDISCIPLINARY RESEARCH SEMINAR (3cr.)
- A thesis or major research paper on a topic related to Medieval and Renaissance studies.
  - The proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program.
  - The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.
  - In both cases, the title of the degree will indicate the discipline of the participating unit with the specification "specialization in Medieval and Renaissance Studies."

Duration of program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.
Courses

Wit the exception of CLA 5999, all courses carry three credits. Not all of these courses will be offered every year.

CLA5120 THE LATIN CHRONICLE TRADITION (3cr.)
Survey of Latin chronicles from the first century B.C. to the sixth century A.D.

CLA5121 LATE ROMAN HISTORIOGRAPHY (3cr.)
Survey of the historians of late antiquity, including ecclesiastical and secular historians, with some attention to chroniclers.

CLA5122 TOPICS IN LATIN PALAEOGRAPHY (3cr.)
Consideration of various issues to be confronted in the transmission of texts from late antiquity.

CLA5901 RECHERCHE SCIENTIFIQUE ET MÉTHODOLOGIE I / SCHOLARLY RESEARCH AND METHODOLOGY I (3cr.)
Survol du IVe s. de notre ère (284-395), examen des grandes questions de la période, étude de la méthodologie et des techniques de recherche, notamment analyse et critique des arguments, et synthèse des débats entre chercheurs.

CLA5902 RECHERCHE SCIENTIFIQUE ET MÉTHODOLOGIE II / SCHOLARLY RESEARCH AND METHODOLOGY II (3cr.)
Survol des Ve et VIe siècles de notre ère (395-602), examen des grandes questions de la période, étude poussée de la méthodologie et des techniques de recherche. An overview of the fifth and sixth centuries A.D. (395-602), review of the main issues in the period, further consideration of methodology and research techniques. Préalables : CLA 5901

CLA5920 LA VILLE DURANT L’ANTIQUITÉ TARDIVE / THE CITY IN LATE ANTIQUITY (3cr.)
Analyse du destin tant débattu de la ville classique dans l'antiquité tardive. An examination of the much-disputed fate of the city in late antiquity.

CLA5921 ROME ET LES SASSANIDES / ROME AND THE EAST (3cr.)
Examen des relations entre l'Iran et l'Empire romain d'Orient depuis la prise de pouvoir des Sassanides jusqu'aux victoires de l'empereur Héraclius.

CLA5922 PAIENS ET CHRÉTIENS SOUS L’EMPIRE ROMAIN TARDIF / PAGANS AND CHRISTIANS IN THE LATER ROMAN EMPIRE (3cr.)
Étude de la christianisation progressive de l'Empire et des royaumes qui lui ont succédé.

CLA5923 ASPECTS DE LA LITTÉRATURE DE L’ANTIQUITÉ TARDIVE / TOPICS IN LATE ANTIQUE LITERATURE (3cr.)
Consideration approfondie d’un ou plusieurs auteurs ou ouvrages.

CLA5924 ASPECTS DE L’HISTOIRE DE L’ANTIQUITÉ TARDIVE / TOPICS IN LATE ANTIQUE HISTORY (3cr.)
Consideration approfondie d’un ou plusieurs aspects de l’histoire de la période.

CLA5925 INTRODUCTION À UNE LANGUE ANCIENNE / INTRODUCTION TO AN ANCIENT LANGUAGE (3cr.)
Un cours d'introduction en syriaque, copte, éthiopien ou en arabe classique.

CLA5926 LECTURES DIRIGÉES EN LANGUES ANCIENNES / DIRECTED READINGS IN ANCIENT LANGUAGE (3cr.)
Leçons dirigées en latin, grec, syriaque, copte, éthiopien ou l’arabe classique.

CLA5999 MÉMOIRE / RESEARCH PAPER (6cr.)
Le mémoire, noté S/NS, sera évalué par le professeur qui l’a dirigé et par un autre lecteur.

CLA7999 THÈSE DE MAÎTRISE / MA THESIS

Communication

The Department of Communication at the Faculty of Arts offers an MA program in Communication with thesis or with research paper, a Master of Communication (MC) by coursework to which a co-op option can be added, and a PhD in Communication.

The Department of Communication, in collaboration with the University of Ottawa’s Co-op office, offers a co-op option to a limited number of students in the MC program. Students must request this option in their admission file. The co-op option provides the opportunity to acquire practical work experience by completing two one-session paid work placements.

The School is one of the participating units in the collaborative program in Science, Society and Policy (master's level only).

The PhD in Communication program is designed for students with academic and professional training.

The program focuses on two fields of research: media studies and organizational communication. The media studies field examines the content and the modes of operation of traditional and emerging media in their social, cultural, economic, political and regulatory contexts.
Organizational communication focuses on interpersonal and group interactions in the workplace; planning for internal and external communication in private, public, and nonprofit organizations; risk/crisis communication, public relations, ICT’s uses within organizations, etc.

The program aims to develop in graduates the following skills:

- Evaluate critically the theories, concepts and assumptions underlying media studies or organizational communication with particular attention to their chosen research interest.
- Demonstrate an ability to identify and work with the varying epistemological traditions developed by French-speaking and English-speaking scholars in communication studies.
- Contribute to the development of skills, theories, approaches, and materials for both academics and professionals.
- Analyze data and communicate research results to diverse audiences, including scholars, policymakers, and professionals in communication studies.

The master’s programs are offered on a full-time or on a part-time basis. The PhD program is offered full-time. The master’s programs are offered in English and in French whereas the PhD program is offered in bilingual (English-French) format.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Communication

Master of Arts Communication Specialization in Science, Society and Policy

Master of Communication

Doctorate in Philosophy Communication

**Admission**

The requirements for admission to the MA program in Communication or to the Master of Communication program are as follows:

- An honours bachelor’s degree (or equivalent) with a specialization or major in Communication or a related discipline.
  - or
- An honours bachelor’s degree (or equivalent) in another discipline, with a minor in Communication and two or more years of relevant experience.
  - or
- An honours bachelor’s degree (or equivalent) in another discipline, with three or more years of relevant experience.
- A minimum overall average of 70% (B), calculated in accordance with FGPS guidelines.
- All applicants must be able to understand, speak, and write proficiently either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. In addition, a passive knowledge of the other language (ability to understand the spoken and written word) is necessary. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

**Co-op option**

The Department of Communication, in collaboration with the University of Ottawa’s Co-op office, offers a co-op option to a limited number of students in the MC program. Students must request this option in their admission file. The co-op option provides the opportunity to acquire practical work experience by completing two one-session paid work placements.

Candidates who do not fully meet the above requirements may be admitted upon successful completion of a maximum of five advanced undergraduate qualifying courses in Communication. The specific courses are determined by the Admissions Committee based on its evaluation of the candidate’s previous academic and professional experience relevant to Communication.

Please be advised that, given the high level of competition for admission into the Department of Communication’s graduate programs and the limited number of available spaces, an overall average of 70% does not guarantee entry. The Department of Communication reserves the right to alter the minimum average required in accordance with the quality and quantity of applications it receives each year.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

**Transfer from master’s to PhD**
Students enrolled in the MA program in Communication at the University of Ottawa have the opportunity to go directly to the PhD program without having to write the thesis provided the following conditions are met:

- Have an average of A- in the last two years of undergraduate studies;
- Have successfully completed four courses of the MA program (12 credits) with an average of at least A-;
- Have shown satisfactory progress in their research;
- Have a letter of recommendation from the proposed doctoral thesis supervisor;
- Have the approval of the Graduate Studies Committee of the Department of Communication.

The student must make a written request to transfer to the PhD program no later than the beginning of the fourth session of enrolment and must enrol in the doctoral program in the fifth session at the latest. Once the transition is made, all the requirements of the doctoral program must be met. The total number of course credits required is 27 (12 at the master's level, plus 15 at the doctoral level).

**Collaborative programs**

The Department of Communication is one of the units participating in the collaborative program in Science, Society and Policy (master's level only). Students should indicate in their initial application for admission that they wish to be accepted into this collaborative program. For further details, see the description of the program posted on the FGPS website.

**Program Requirements**

The Department offers a Master of Arts (MA) in Communication with thesis or with research paper as well as a Master of Communication (MC) by coursework to which a co-op option can be added.

**Master of Arts (MA)**

**MA with thesis**

The MA with thesis has the following requirements:

- 12 credits as follows:
  - CMN5100 RESEARCH METHODS (3cr.)
  - One theory seminar (3cr.) specific to the student’s chosen field of specialization
  - Two optional seminars (6 cr.) from the student’s field of specialization, selected from the list of graduate courses in Communication OR from other graduate programs, subject to approval by the director of graduate studies in Communication.
  - CMN6990 PROPOSITION DE RECHERCHE / RESEARCH PROPOSAL
    - The student must have his thesis or research paper director and topic approved by the graduate studies committee before the end of their second session of studies.
  - CMN6999 THESE DE MAÎTRISE / MASTER'S THESIS
    - The thesis can take one of two forms.
      - The traditional form involves research work consisting of a review of the literature, critical analysis and synthesis (100 pages).
      - The second form can be a creative work. In this case, it includes two parts: a production of some sort (video, CD-Rom, multimedia, etc.); a written commentary on the creative process based on a review of the work of key researchers in the field (50 pages).
    - In both cases, the thesis must meet the standards specified by the FGPS. For details consult section G of the general regulations of the FGPS and the guide Preparing a Thesis or a Research Paper.

**MA with research paper**

The MA with research paper has the following requirements:

- 18 credits as follows:
  - CMN5100 RESEARCH METHODS (3cr.)
  - One theory course specific to the student’s chosen field of specialization (3cr.)
  - Four optional seminars (12cr.) with at least three in the student’s chosen field of specialization, selected from the list of graduate courses in Communication OR from other graduate programs, subject to approval by the director of graduate studies in Communication.
  - CMN6990 PROPOSITION DE RECHERCHE / RESEARCH PROPOSAL
    - The student must have his thesis or research paper director and topic approved by the graduate studies committee before the end of their second session of studies.
  - CMN6998 MÉMOIRE / RESEARCH PAPER
    - The research paper is approximately 50 pages long and is evaluated by another professor once the student's supervisor has approved it. The research paper analyses and broadens one of the topics discussed in the courses. The work surrounding the research paper can be theoretical in nature (for instance, based on a literature review) or can adopt a more empirical approach (based on observation or on a case study). The subject matter will relate to the student’s chosen field of specialization.

**Master of Communication (MC)**
The MC has the following requirements:

- 30 credits as follows:
  - CMN5100 RESEARCH METHODS (3cr.)
  - CMN5132 THEORIES AND EFFECTS OF THE MEDIA (3cr.)
  - Five seminars specific to the student’s chosen field of specialization (15cr.)
    - The student’s chosen field of specialization governs course selection, which requires approval from the graduate program director.
  - Three electives (9cr.)
    - Electives are selected from the list of graduate courses in Communication or from other graduate programs subject to approval by the director of graduate studies.

Co-op option

The sequence for the co-op option is as follows:

The first co-op placement will take place in the spring/summer of the first year and the second placement will take place in the fall session of the second year. Students who enrol in the co-op option will obtain twelve credits (six credits per work placement) for their work experience. Each work term is graded P/F (Pass or Fail), based on the employer’s report and on a written report completed by the student. The student’s report must be 15-20 pages, including appendices. The Master of Communication Program’s co-op officer (a professor who also serves as the Department’s representative on the university’s co-op Committee) will evaluate the student reports.

The credits awarded for co-op terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain enrolled in the co-op option, a student must:

- maintain full-time status
- maintain a 7.0 grade point average
- obtain a passing grade for each co-op work term.

List of courses by field

MEDIA STUDIES

- Compulsory courses
  - CMN5100 RESEARCH METHODS (3cr.)
  - CMN5132 THEORIES AND EFFECTS OF THE MEDIA (3cr.)
- Non-credit compulsory courses
  - CMN6990 PROPOSITION DE RECHERCHE / RESEARCH PROPOSAL
  - CMN6998 MÉMOIRE / RESEARCH PAPER
  - CMN6999 THÈSE DE MAÎTRISE / MASTER’S THESIS
- Optional courses
  - CMN5105 CONTEMPORARY COMMUNICATION ISSUES (3cr.)
  - CMN5110 SOCIAL HISTORY OF COMMUNICATION TECHNOLOGIES (3cr.)
  - CMN5115 COMMUNICATION ETHICS (3cr.)
  - CMN5120 PUBLIC Communication CAMPAIGNS: THEORIES AND APPLICATIONS (3cr.)
  - CMN5133 HEALTH COMMUNICATION THEORIES (3cr.)
  - CMN5140 Communication, Globalization and Change (3cr.)
  - CMN5142 RISK AND CRISIS COMMUNICATION (3cr.)
  - CMN5150 KNOWLEDGE MANAGEMENT (3cr.)
  - CMN5160 POLITICAL USES OF MEDIA (3cr.)
  - CMN5161 CONSTRUCTION OF SOCIAL REALITY BY THE MEDIA (3cr.)
  - CMN5165 NEW DIRECTIONS IN JOURNALISM (3cr.)
  - CMN5170 INTERNATIONAL COMMUNICATION (3cr.)
  - CMN5190 MEDIA, IDENTITY AND DIVERSITY (3cr.)
  - CMN5195 SPECIAL TOPICS (3cr.)
  - CMN5906 ÉTUDES DIRIGÉES EN COMMUNICATION / DIRECTED STUDIES IN COMMUNICATION (3cr.)
  - CMN5995 THÈMES SPÉCIAUX EN COMMUNICATION/SPECIAL TOPICS IN COMMUNICATION (3cr.)

ORGANIZATIONAL COMMUNICATION

- Compulsory courses
  - CMN5100 RESEARCH METHODS (3cr.)
  - CMN5131 ORGANIZATIONAL COMMUNICATION THEORIES (3cr.)
- Non-credit compulsory courses
  - CMN6990 PROPOSITION DE RECHERCHE / RESEARCH PROPOSAL
  - CMN6998 MÉMOIRE / RESEARCH PAPER
**Residence**

- CMN5999 THÈSE DE MAÎTRISE / MASTER'S THESIS

**Optional courses**

- CMN5105 CONTEMPORARY COMMUNICATION ISSUES (3cr.)
- CMN5115 COMMUNICATION ETHICS (3cr.)
- CMN5130 DIVERSITY IN THE WORKPLACE : COMMUNICATION CHALLENGES (3cr.)
- CMN5133 HEALTH COMMUNICATION THEORIES (3cr.)
- CMN5135 COMMUNICATION MANAGEMENT (3cr.)
- CMN5136 VIRTUAL WORK TEAMS (3cr.)
- CMN5140 COMMUNICATION, GLOBALIZATION AND CHANGE (3cr.)
- CMN5141 GOVERNMENT COMMUNICATION (3cr.)
- CMN5142 RISK AND CRISIS COMMUNICATION (3cr.)
- CMN5150 KNOWLEDGE MANAGEMENT (3cr.)
- CMN5155 ADVANCED RESEARCH IN TRADITIONAL AND EMERGING MEDIA (3cr.)
- CMN5195 SPECIAL TOPICS (3cr.)
- CMN5170 INTERNATIONAL COMMUNICATION (3cr.)
- CMN5900 ÉTUDES DIRIGÉES EN COMMUNICATION / DIRECTED STUDIES IN COMMUNICATION (3cr.)
- CMN5995 THÈMES SPÉCIAUX EN COMMUNICATION/SPECIAL TOPICS IN COMMUNICATION (3cr.)

**Collaborative program in Science, Society and Policy**

The requirements of both the MA in Communication and the collaborative program must be met. The credits completed for the specialization count also towards the MA degree in Communication.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Satisfactory completion of the research paper (CMN5998) or the thesis (CMN6999).

**Duration of the program**

Full-time students are expected to fulfill all requirements of the thesis option of the MA program within two years and of the research paper option within 16 months. It is expected that the Master of Communication will be completed within one year full-time. Note that the co-op option will require somewhat more time. The maximum time permitted, whether registered part-time or full-time, is four years from the date of initial registration in the program.

**Residence**

All students admitted full-time to the master's program must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is C+. A student who has incurred two failures is withdrawn from the program.

**Courses**

Please consult the schedule to know the courses offered at each session.

**CMN5100 RESEARCH METHODS** (3cr.)
Research design and methods relevant to the Master’s thesis or research paper project.

**CMN5105 CONTEMPORARY COMMUNICATION ISSUES** (3cr.)
State of the art of the discipline. Exploration of major domains of communication research, along with contemporary issues being addressed by scholars in these fields of specialization.

**CMN5110 SOCIAL HISTORY OF COMMUNICATION TECHNOLOGIES** (3cr.)
Exploration of the social, political, economic, cultural and ethical ramifications of communication technologies as they have evolved over time. Relationship between innovation in new communication technologies and social and cultural change.

**CMN5115 COMMUNICATION ETHICS** (3cr.)
Emphasis on the significance of ethical principles and responsibilities of public communicators, as well as sanctions faced when communicators fail to uphold these principles. Critique of self-regulation of the media. Analysis of argumentation. Study of legal precedents with respect to defamation.

**CMN5120 PUBLIC COMMUNICATION CAMPAIGNS: THEORIES AND APPLICATIONS** (3cr.)
Theories and applications relevant to campaigns that promote issues and causes in the public interest. Strategies and techniques. Cases studies in the areas of health, environment, education and other public domains.

**CMN5130 DIVERSITY IN THE WORKPLACE : COMMUNICATION CHALLENGES** (3cr.)
Theories and pragmatics of intercultural communication as applicable to various forms of communication (verbal and nonverbal) between and among individuals of different ethnicities, races, cultures, age groups, sexual orientations, genders, classes, abilities, language, religion, and value
orientations. Focused on workplace interactions.

CMN5131 ORGANIZATIONAL COMMUNICATION THEORIES (3cr.)
Different approaches (e.g., interactionist, narrative, critical) to organizational communication research, with a focus on benchmark studies and key researchers. Role of theories in understanding communication challenges faced by contemporary organizations. Issues related to communication networks, organizational learning, management of diversity, computerization of organizations, and management of risks, among others.

CMN5132 THEORIES AND EFFECTS OF THE MEDIA (3cr.)
Critique of traditional (e.g., cultivation, social learning, and dependency), interpretive (e.g., narrative and genre), and critical/cultural (e.g., political economy) theories of the mass media. Contemporary research directions in the field of mass and emerging communications. Study of the effects on audience behavior.

CMN5133 HEALTH COMMUNICATION THEORIES (3cr.)
Concepts, research, and theories regarding health communication issues at the micro level (e.g., interactions between patient and healthcare provider), mezzo level (e.g., role of information in healthcare organizations) and macro level (e.g., role of media in shaping public perceptions of health and illness). Qualitative, quantitative, and mixed-method research, with a stress on interdisciplinary approaches to health communication and public health research.

CMN5135 COMMUNICATION MANAGEMENT (3cr.)
Role of communication in organizational development, team development, and corporate/institutional positioning. Internal and external communication in public and private organizations. Case studies of Canadian and international organizations.

CMN5136 VIRTUAL WORK TEAMS (3cr.)
Theoretical and practical issues raised by the integration of mediated and distance communication into the workplace, including those specific to the functioning of virtual teams (e.g., E-leadership, cohesion, communication, and trust).

CMN5140 COMMUNICATION, GLOBALIZATION AND CHANGE (3cr.)
Impact of information and communication technologies and political, cultural, and global dynamics on organizations. Theoretical and critical reflections on the strategic management of change in organizations, the transformation of organizational cultures, and intervention practices. Case studies of hybrid cultures.

CMN5141 GOVERNMENT COMMUNICATION (3cr.)
Issues and concerns of particular relevance to the public service communication community. Preparation of a consultation report that focuses on a specific communication challenge faced by professional communicators.

CMN5142 RISK AND CRISIS COMMUNICATION (3cr.)
The role of communication in general—and mass media and the Internet in particular—in high risk situations such as conflict, war, disaster, emergency, and acts of terrorism (including biological threats) in a variety of cultural contexts. Characteristics of modern risk societies, risk identification and management, the relationship between risk and crisis communication, and crisis management strategies. Case studies.

CMN5150 KNOWLEDGE MANAGEMENT (3cr.)
Research directions in organizational learning, collective intelligence and information architecture, situated in the technical context of the general digitization of communication and the socio-cultural context of knowledge societies and human development policies. Interdisciplinary perspectives. Case studies from the work place, education, health, and cultural industries.

CMN5155 ADVANCED RESEARCH IN TRADITIONAL AND EMERGING MEDIA (3cr.)
Empirical and critical studies of traditional and emerging media in various social contexts: organizational, domestic, educational, etc. Emerging research trends (qualitative and quantitative).

CMN5160 POLITICAL USES OF MEDIA (3cr.)
Critical review of key aspects of contemporary theory, research, and practice in political communication. Uses of traditional and emerging media by governments, politicians, and civil society (NGOs, activist groups and citizens) to communicate with their publics, influence public and policy agendas, effect social and political change, monitor public opinion, manage their reputation, and/or build networks of resistance. Impact of changing communication technologies on government media relations. Case studies.

CMN5161 CONSTRUCTION OF SOCIAL REALITY BY THE MEDIA (3cr.)
Study of the media strategies that aim to create the verisimilitude of everyday life. Analysis of the contemporary production of authenticity (or its simulation) in media genres such as televised reality shows, mock news shows, cringe comedy, and polemical documentaries.

CMN5165 NEW DIRECTIONS IN JOURNALISM (3cr.)
Theoretical and empirical studies of recent trends and changes in journalistic practices. Impact of social, economic and technological factors on journalism (e.g., commoditization of information, concentration of ownership, and digital media convergence). New socio-critical practices. Audience research.

CMN5170 INTERNATIONAL COMMUNICATION (3cr.)
Contemporary approaches to international communication. The role of traditional and emerging media, international institutions, governmental agencies, and NGOs. Analysis of problems related to participatory communication and alternative models.

CMN5190 MEDIA, IDENTITY AND DIVERSITY (3cr.)
Study of identity issues as seen through the prism of the media and relating to ethnicities, races, cultures, age groups, sexual orientations,
genders, classes, abilities, language, religion, and value orientations. Study of the representations and challenges posed by "otherness" and diversity in an era of globalization and accelerated circulation of information.

**CMN5195 SPECIAL TOPICS (3cr.)**
In-depth examination of a topic in Communication.

**CMN5195 SPECIAL TOPICS (3cr.)**
In-depth examination of a topic in Communication.

**CMN5900 ÉTUDES DIRIGÉES EN COMMUNICATION / DIRECTED STUDIES IN COMMUNICATION (3cr.)**
Étude d’une problématique particulière ou approfondissement de ses connaissances dans un domaine des communications. Le sujet de recherche est déterminé et développé en consultation avec le professeur responsable. Le projet doit être différent de ce qui a pu être soumis dans d’autres cours. Limite d’un cours d’études dirigées par étudiant. Préalable: Permission du Comité des études supérieures. / Opportunity to study an area of particular interest or to pursue an interest in greater depth. Research topic to be selected and developed in consultation with the supervising professor. Should not repeat work submitted in other courses. Maximum of one directed studies course per student. Prerequisite: Permission of the Graduate Studies Committee.

**CMN5995 THÈMES SPÉCIAUX EN COMMUNICATION/SPECIAL TOPICS IN COMMUNICATION (3cr.)**
Étude approfondie d’un sujet en communication. / In-depth examination of a topic in Communication.

**CMN6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)**
Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : admission au régime coop. / Prerequisite: admission to the coop option.

**CMN6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)**
Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : CMN6001 / Prerequisite: CMN6001

**CMN6990 PROPOSITION DE RECHERCHE / RESEARCH PROPOSAL**
Rédaction d’une proposition de thèse ou de mémoire conformément aux lignes directrices du département de communication. La proposition doit comprendre une recension critique, préparée en consultation avec le directeur ou la directrice de thèse ou de mémoire, des principaux travaux consacrés au sujet. Il faut défendre la proposition devant un comité consultatif constitué de la directrice ou du directeur et d’un autre professeur (pour le mémoire) ou de deux autres professeurs (pour la thèse). L’étudiant doit normalement satisfaire à cette exigence en une session. Si la proposition n’est pas terminée et/ou acceptée lors de cette première inscription, l’étudiant pourra s’inscrire à nouveau à la session suivante pour la terminer et/ou la présenter une deuxième fois. Si la proposition n’est pas approuvée lors de la deuxième soumission, une note de “non satisfaisant” sera attribuée pour la proposition et un retrait du programme s’imposera. Le cours est noté S/NS. Préalable: CMN5900 / Preparation of an MA thesis or research paper proposal, based on guidelines established by the department of communication. The proposal should include a thorough and critical review of literature on the research topic, prepared in consultation with the supervisor of the thesis or research paper. The proposal must be defended before an advisory committee consisting of the supervisor and one other professor (research paper) or two other professors (thesis). Students must normally satisfy this requirement in one session. If the proposal is not completed and/or accepted during the first session of registration the student may register for it again the following session to complete and/or submit it a second time. Failure to obtain approval on the second attempt leads to a grade of "not satisfactory" for the proposal and a mandatory withdrawal from the program. Graded S/NS. Prerequisite: CMN5900.

**CMN6998 MÉMOIRE / RESEARCH PAPER**
Préalable : CMN 6990 / Prerequisite: CMN 6990

**CMN6999 THÈSE DE MAÎTRISE / MASTER’S THESIS**
Préalable : CMN 6990 / Prerequisite CMN 6990

**CMN8101 RESEARCH METHODS I (3cr.)**
Epistemology and research methods in communication studies. Critical analysis of the various epistemological stances in communication. Review of various intellectual tools with a view to gaining an in-depth understanding of the various steps involved in a communication research process (from the research question to the selection of a methodological approach). Review of various research techniques (interviews, observations, life stories, focus groups, surveys, etc.)

**CMN8102 RESEARCH METHODS II (3cr.)**
Review and in-depth examination of various steps in the analysis of qualitative and/or quantitative data (from the transcription/coding of data to their visualisation/presentation). Emphasis on methods of analysis specific to qualitative data (discourse analysis, conversation analysis, semiotic analysis, etc.) and/or quantitative data (descriptive analysis, computer-assisted data analysis, web cookies analysis, etc.). Students are also led to develop critical thinking on the use of different methods of analysis in the area of communication research, and ultimately to take a position with regards to them. Prerequisite: CMN8101 ou CMN8501

**CMN8111 THEORIES IN MEDIA STUDIES (3cr.)**
In-depth investigation of the epistemological underpinnings of both classical and contemporary theories in media studies in order to explore the potential problematics related to the student’s research programme. One of the key aspects of this exercise in theoretical thinking consists in establishing a link among the different methodological approaches as well as with the research experience and expertise of the Department’s
faculty members. Upon conclusion of the course, students will be in a position to grasp the theoretical specificities of the discipline and to have developed a high degree of comfort with the various concepts and theories related to media studies.

**CMN8112 ADVANCED THEORIES IN ORGANIZATIONAL COMMUNICATION** (3cr.)
In-depth investigation of the epistemological underpinnings of both classical and contemporary theories in organizational communication in order to explore the potential problematics related to the student’s research programme. One of the key aspects of this exercise in theoretical thinking consists in establishing a link among the different methodological approaches as well as with the research experience and expertise of the Department’s faculty members. Upon conclusion of the course, students will be able to grasp the theoretical specificities of the discipline and will have developed a high degree of comfort with the various concepts and theories related to organizational communication.

**CMN8130 SPECIAL TOPICS IN MEDIA STUDIES** (3cr.)
Advanced examination through reading, group research, and class discussion of a particular area in media studies.

**CMN8131 SPECIAL TOPICS IN ORGANIZATIONAL COMMUNICATION** (3cr.)
Advanced examination through reading, group research, and class discussion of a particular area in organizational communication.

**CMN8902 SÉMINAIRE DE DOCTORAT / DOCTORAL SEMINAR** (3cr.)
L’objectif de ce séminaire est de favoriser l’émergence d’une communauté de chercheurs au sein du programme de doctorat. Le séminaire sert de tribune aux étudiants, qui présent une première ébauche de leur projet de thèse, et il favorise les échanges de points de vue théoriques et méthodologiques au sein des deux volets du programme (études des médias et communication organisationnelle). The objective of the seminar is to promote the emergence of a research community within the doctoral program. The seminar will be a forum where students will present and discuss a first draft of their thesis proposal. The seminar will encourage both theoretical and methodological exchanges in the two streams of the program (media studies and organizational communication).

**CMN8930 THÈMES CHOISIS EN COMMUNICATION / SPECIAL TOPICS IN COMMUNICATION** (3cr.)
Examen approfondi de problématiques en communication. / In-depth study of communication issues.

**CMN9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION**
Préalables / Prerequisites: CMN8101/CMN8501; CMN8102/CMN8502; CMN8111/CMN8511 OU CMN8112/CMN8512; CMN8130/CMN8530 OU CMN8131/CMN8531.

**CMN9997 PROJET DE THESE / THESIS PROPOSAL**
Préalables / Prerequisites: CMN9998 et/and CMN8902

**CMN9999 THÈSE DE DOCTORAT / PHD THESIS**
Préalables / Prerequisites: CMN9997 et/and CMN9998

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**Complex Project Leadership**

The Master of Business in Complex Project Leadership is offered by the Telfer School of Management. The program is delivered in an executive delivery mode through Telfer’s Centre for Executive Leadership.

The program focus is the holistic development of experienced project and program practitioners and managers with respect to professional skills that will enable them to design, implement, and successfully lead complex projects and programs.

The program is offered in English. In accordance with University of Ottawa regulations, students have the right to produce their work and to answer examination questions in French or in English.

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**Programs**

Master of Business in Complex Project Leadership

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**Admission**

Candidates are normally sponsored by their employer, signaling that the employer understands and accommodates for the time commitment required while pursuing the program, and that participants will undertake projects within their workplace. This implies that although organizations may engage their talent management process as part of their internal selection of candidates, the final admission decision resides with the University of Ottawa.

To be considered for admission, applicants must:
1. Hold a Canadian undergraduate degree (or equivalent) in any field.*
2. Have an admission average of B (70%) calculated at admission according to the FGPS guidelines.
3. Have a minimum of 5 years management experience and responsibilities, as demonstrated by their CV.
4. Have a minimum of 2 years in a project or procurement environment, as demonstrated by their CV.
5. Provide 3 confidential references; one each from a supervisor, a peer and a subordinate.
6. Provide a statement of interest outlining career goals and how this master’s program will assist in meeting them.
7. Provide a letter of support from their employer, if applicable.
8. Be proficient in English (see Language requirements below).
9. Selected candidates may be interviewed by a member of the admissions committee.

*Candidates without a degree will be considered on the merits of their life-long learning and accomplishments, normally with at least 12 years of experience. They will additionally be asked to submit a GMAT score.

**Language requirements**

Candidates whose first language is not English must submit evidence of proficiency by providing any of the following:

- A score of at least 100 on the internet-based Test of English as a Foreign Language (TOEFL). The TOEFL is administered by Educational Testing Service: www.toefl.org.
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: www.ielts.org.
- Proof of completion, within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and employment in an English-speaking country (at least four of the last six years).

**Mode of delivery**

The delivery mode of the Master of Business in Complex Project Leadership combines both on-site, face-to-face interactions and the use of distance learning technologies. This delivery mode, captured by the term “blended learning model,” is analogous to executive retreats, and accommodates the needs of senior managers and executives.

**Program Requirements**

The program consists of 36 compulsory credits as follows:

- CPL5101 SYSTEMS THINKING (1.5cr.)
- CPL5102 SELF REALIZATION AND PERSONAL DEVELOPMENT (1.5cr.)
- CPL5103 STRATEGIC MANAGEMENT OF COMPLEX PROJECTS AND PROGRAMS (1.5cr.)
- CPL5104 ORGANIZATIONAL BEHAVIOUR OF PROJECT TEAMS AND OF PROJECT TEAM SYSTEMS (1.5cr.)
- CPL5105 PLANNING AND COMMUNICATING CHANGE EFFECTIVELY (1.5cr.)
- CPL5106 ACQUISITION STRATEGIES (1.5cr.)
- CPL5107 LAWS, REGULATIONS, INTELLECTUAL PROPERTY AND CONTRACTS (1.5cr.)
- CPL5108 STRATEGICALLY MANAGING RISK (1.5cr.)
- CPL5109 BUSINESS PLANNING AND CASES: METHODS AND IMPLEMENTATION (1.5cr.)
- CPL5110 NEGOTIATION STRATEGIES (1.5cr.)
- CPL5111 MANAGING FOR INNOVATION (1.5cr.)
- CPL5112 MANAGING CONTRACTS AND SUPPLIERS (1.5cr.)
- CPL5113 IMPLEMENTATION OF COMPLEX PROJECTS (1.5cr.)
- CPL5114 FINANCIAL ANALYSIS AND DECISION MAKING (1.5cr.)
- CPL5115 PROBLEM SOLVING IN COMPLEX ENVIRONMENTS (1.5cr.)
- CPL5116 STAKEHOLDER ENGAGEMENT AND CRISIS MANAGEMENT (1.5cr.)
- CPL5117 LEADERSHIP FOR RESULTS (1.5cr.)
- CPL5310 HUMAN FACTORS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)
- CPL5320 MANAGEMENT, GOVERNANCE, PERFORMANCE (1.5cr.)
- CPL5330 INTERNATIONAL STUDY TOUR (1.5cr.)
- CPL5340 COMPLEX PROJECT CONSULTANCY (1.5cr.)
- CPL5350 SEMINARS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)
- CPL5360 LECTURES IN PROJECT, PROGRAM AND PORTFOLIO MANAGEMENT (1.5cr.)

With the Director’s approval, and if offered, the following course may replace up to 3 credits of 5100-level courses:

- CPL6100 SPECIAL TOPICS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)

With the Director’s approval, and if offered, the following course may replace up to 3 credits of 5300-level courses:

- CPL6300 APPLICATIONS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)

**Minimum standards**

The passing grade in all courses is C+. Students who fail an activity must retake it when it is next offered. Students who fail two activities (or the
same activity twice) are withdrawn from the program, as per university regulations.

**Duration of the program**

The program is structured to be completed in 30 months on a part-time basis. The maximum time to completion is 5 years from the time of initial enrolment.

**Courses**

Tous les cours ne sont pas nécessairement offerts chaque année. Les cours sont offerts dans la langue dans laquelle ils sont décrits. / Not all of the courses listed are given each year. The course is offered in the language in which it is described.

**CPL5101 SYSTEMS THINKING** (1.5cr.)
Resolution of complex problems requires holistic approaches, sophisticated thinking and pluralist methodologies. Foundational knowledge related to systems methodologies and their underpinning epistemologies that enable project managers to solve complex project problems in context.

**CPL5102 SELF REALIZATION AND PERSONAL DEVELOPMENT** (1.5cr.)
Enables students to understand and develop their ambitions/goals, their personality, their values, and how they tend to relate to others. Different methodologies for developing and changing as individuals. Awareness of cultural differences between countries, societies and/or organizations. Self-management decision-making to achieve satisfactory work-life balance.

**CPL5103 STRATEGIC MANAGEMENT OF COMPLEX PROJECTS AND PROGRAMS** (1.5cr.)
Implementation of long range strategies; contexts of high complexity and uncertainty; and emergent project outcomes in complex projects. Strategic and systems concepts and frameworks. Understanding strategic context and developing project strategies capable of delivering successful outcomes. Innovative and non-traditional development and delivery methodologies in meeting complex project challenges.

**CPL5104 ORGANIZATIONAL BEHAVIOUR OF PROJECT TEAMS AND OF PROJECT TEAM SYSTEMS** (1.5cr.)
Project teams are key to project, program and portfolio success. There are different kinds of project teams and they interact with stakeholders and other teams in complex multi-level systems. Intra- and inter-team interdependencies, processes, emergent states, and how these relate to team and systems of teams’ effectiveness.

**CPL5105 PLANNING AND COMMUNICATING CHANGE EFFECTIVELY** (1.5cr.)
Change management and communication plans. Analyzing complex intra- and inter-organizational contexts. Understanding needs and characteristics of those targeted and impacted by change. Tailoring communication strategies.

**CPL5106 ACQUISITION STRATEGIES** (1.5cr.)
How various procurement methodologies, financing strategies, and ownership mechanisms best deliver value for money, deal with the risks and opportunities across the complete lifecycle and how this links to the acquisition business case. The need to deal with industry development objectives, the importance of robust cost estimation, and risk sharing strategies within a suitable governance framework.

**CPL5107 LAWS, REGULATIONS, INTELLECTUAL PROPERTY AND CONTRACTS** (1.5cr.)
Complex projects in diverse legal environments and jurisdictions. Examination and interpretation of environments and frameworks to comply with legal obligations and minimize operational, legal and financial exposure. Definition of intellectual property requirements and arrangements vital to complex endeavours, especially in technologically advanced goods and services and across international boundaries.

**CPL5108 STRATEGICALLY MANAGING RISK** (1.5cr.)
Viewing, balancing and acting upon the risks that threaten success while exploiting opportunities emerging from uncertainty. Causes and potential solutions to recurrent underestimates of schedule and cost risk and overstatement of project benefits. Application of systemic thinking and advanced risk analytics with focus on realizing value and considering the incentives, penalties and opportunities associated with risk transfer and insurance.

**CPL5109 BUSINESS PLANNING AND CASES: METHODS AND IMPLEMENTATION** (1.5cr.)
Focus on planning for new projects or for substantial changes to existing projects using a business case approach. Topics include gap analysis, definition of expected outcomes and creation of cost-benefit models to support the proposed project. The use of management control systems as well as formative and summative evaluation models will be introduced.

**CPL5110 NEGOTIATION STRATEGIES** (1.5cr.)
Negotiation and alternative dispute resolution skills for dealing with conflict in complex projects. Includes knowledge, skills and reflective abilities to identify potential sources of conflict; design alternative dispute resolution systems to avoid escalation; negotiate for results; identify and manage power’s impact on negotiation dynamics; effective implementation of distributive and integrative strategies in negotiations.
CPL5111 MANAGING FOR INNOVATION (1.5cr.)
Innovation is key to economic development, and organizational and corporate performance. Successful implementation requires interaction between many different areas of expertise within organizations, and increasingly across organizational boundaries (e.g. in the context of open innovation). Examination of complex context and characteristics of innovations, familiarization of concepts and tools to facilitate innovation.

CPL5112 MANAGING CONTRACTS AND SUPPLIERS (1.5cr.)
Complex project leaders need to consider the maturity of industry to provide solutions, how strategic programs can be leveraged for long term industry development and how contractual relationships can be made effective. Exploration of how to select and manage long term strategic partners and the supply chain in critical industry sectors, with attention on developing, maintaining and securing the contractual relationships within and between project partners, paying particular attention to embedding trust as a core social relation in contracts.

CPL5113 IMPLEMENTATION OF COMPLEX PROJECTS (1.5cr.)
Exploration of differences between project, program and portfolio management. Implementation science and practice applied to complex projects, programs and portfolios.

CPL5114 FINANCIAL ANALYSIS AND DECISION MAKING (1.5cr.)
Financial planning and decision-making competencies in complex projects. Analysis of the financial position of contractors or alliance partners, cost estimation, life-cycle costing, investment appraisal, application of value for money criteria, project financing to raise and maintain the flow of project capital, budget and cash flow management over the project life and selection of protection mechanisms against foreign exchange rate or inflation fluctuations.

CPL5115 PROBLEM SOLVING IN COMPLEX ENVIRONMENTS (1.5cr.)
Challenges in project or program leadership in chaotic and complex environments. Examination of complex projects from the point of view of creative problem solving processes, opportunity identification and implementation, entrepreneurial thinking at the individual, team, and larger system levels. Shift in leader mindset from challenges representing problems to problems representing opportunities.

CPL5116 STAKEHOLDER ENGAGEMENT AND CRISIS MANAGEMENT (1.5cr.)
Strategic management of relationships with various stakeholders when risks become reality. Development of skills to identify potential issues and crisis areas within programs, to establish systems to understand stakeholder expectations; to manage the crisis process from issue identification through to implementing a crisis plan and debriefing, and demonstrate the importance of integrating communication and action plans as part of issues management.

CPL5117 LEADERSHIP FOR RESULTS (1.5cr.)
The project team’s success depends on the style of leadership behaviour displayed by the project manager. Recognition and development of different styles of leadership behaviour, how each contribute to the success of the project team, depending on the circumstances in which they are displayed. Prerequisite: CPL5103 SELF REALIZATION AND PERSONAL DEVELOPMENT (1.5cr.)

CPL5310 HUMAN FACTORS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)
Students will describe and analyze an organization’s teamwork, conflict, interactions, and influence among various team members and stakeholders. They will provide evidence-based analysis and recommendations to maximize collaboration and project success.

CPL5320 MANAGEMENT, GOVERNANCE, PERFORMANCE (1.5cr.)
Students will examine an organization’s management, governance and performance in complex projects/programs and help the organization improve.

CPL5330 INTERNATIONAL STUDY TOUR (1.5cr.)
Groups of students will examine organizations’ capabilities in implementing complex projects/programs and help the organization improve.

CPL5340 COMPLEX PROJECT CONSULTANCY (1.5cr.)
Using evidence-based practices, students will examine an organization in its entirety with regards to complex projects/programs and help that organization improve. Prerequisite: Successful completion of 5100 level CPL courses.

CPL5350 SEMINARS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)
Current issues facing applications in complex project management. Particular attention will be paid to practitioner and scholarly knowledge by providing cutting-edge best practice and research-based evidence delivered by a mix of practitioners and scientists.

CPL5360 LECTURES IN PROJECT, PROGRAM AND PORTFOLIO MANAGEMENT (1.5cr.)
Applying knowledge gained throughout the program, participants will deliver knowledge, expertise and experiences on complex project/program to community stakeholders.

CPL6100 SPECIAL TOPICS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)
Selected aspects of complex project leadership not covered by other graduate courses.

CPL6300 APPLICATIONS IN COMPLEX PROJECT LEADERSHIP (1.5cr.)
Applications dealing with current advances in complex project leadership, not covered by other graduate courses.

Computer Science
Ottawa-Carleton Joint Program

Students may include courses from both universities in their programs, and may select a supervisor from either university, but they should apply to the university with which their supervisor is associated. Their study program is administered by the university at which they are enrolled and is subject to its regulations.

Students who wish to pursue studies in computer science leading to the degree of Master of Computer Science (MCS) or Doctor of Philosophy in Computer Science (PhD) can do so in joint programs offered by the School of Electrical Engineering and Computer Science (EECS) at the University of Ottawa and the School of Computer Science at Carleton University under the auspices of the Ottawa-Carleton Institute for Computer Science (OCICS). The Institute is responsible for supervising these programs and for providing a framework for interaction between the universities in graduate computer science education. In addition to the faculty members from the two computer science programs, the Institute also has members with computer science expertise from other departments. The program includes a co-op option.

The MCS program includes several options:

- Master’s with thesis option
- Master’s with thesis option, Accelerated Stream
- Master’s with thesis option, co-op
- Master’s, non-thesis option
- Master’s, non-thesis option, co-op

The degree awarded is the Master of Computer Science (MCS). Requests for information and application forms should be sent to the graduate secretaries handling the admission process.

The School of Computer Science is a participating unit in the collaborative program in bioinformatics at the master’s level.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

Programs

Master of Computer Science

Master of Computer Science Specialization in Bioinformatics

Doctorate in Philosophy Computer Science

Admission

Admission to the program is competitive. Minimum requirements are a BSc (Honours) in Computer Science or equivalent with a B (70%) or higher average.

The Accelerated Stream has three additional requirements:

- Two OCICS master’s courses each with 70% (B) or higher grade (taken during their Bachelor’s program in Computer Science or Software Engineering).
- An admission average of A- (80%) or higher.
- Have a thesis supervisor.

All candidates must demonstrate fluency in either English or French.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Co-op option

To be admitted into the co-op option, students must commence the MCS program in the fall session and be registered full time. Applications for the co-op option must be received by the end of the first month of the student’s registration in the MCS program. Acceptance into the co-op option is offered on a competitive basis and is managed by the Co-op Office. Enquiries should be directed to that office. The co-op option is not available to MCS students in the Accelerated Stream.

Collaborative programs
The Ottawa-Carleton Institute of Computer Science is a participating unit in the collaborative program in Bioinformatics (master’s level only). This program has been established for the students wishing to include an interdisciplinary component in Bioinformatics as part of their degree in Computer Science.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Bioinformatics program.

Qualifying program

Applicants who lack the required undergraduate preparation may be admitted to a qualifying-year program. The basis for admission to the qualifying year of the Masters program will normally be an honours degree in a related discipline with a B average (70%), provided that the honours program in question includes the equivalent of three years of an honours computer science program. A major degree holder with superior academic standing may be considered for admission to the qualifying year with suitable background preparation.

Program Requirements

Normally, students in the program will be expected to complete a thesis. Each candidate submitting a thesis will be required to defend it orally. However, students may be permitted to take a non-thesis option.

MCS thesis option

Students in the thesis option must take five three-credit courses (three courses in the Accelerated Stream) or equivalent, fulfill the graduate seminar requirements, and complete a thesis.

MCS non-thesis option

Students in the non-thesis option must take eight three-credit courses or equivalent, the Intensive Graduate Project Course in Computer Science, and fulfill the graduate seminar requirements. The non-thesis option is not available to MCS students in the Accelerated Stream.

Subject to the approval of the graduate coordinator, a student may take up to half of the course credits in the program in other disciplines (e.g. electrical engineering, mathematics and physics).

Graduate seminar (CSI5902)

To fulfill the requirements of the CSI5902 the student must:

- Make a successful presentation.
- Satisfy the attendance requirement as specified in the student handbook.

The graduate seminar requirements must be fulfilled within two consecutive sessions.

Course selection

Course selection must be approved by the student's academic advisor, and must include at least:

- One three-credit course in Software Engineering (category E).
- One three-credit course in the Theory of Computing (category T).
- One three-credit course in either Computer Applications (category A) or Computer Systems (category S).

For students in the Accelerated Stream, the two OCICS courses taken as part of their undergraduate degree can be used to satisfy at most two of the above category requirements.

At most, two three-credit courses at the fourth year level are permitted, but only for students in the regular MCS program.

Note that students in the Accelerated Stream of the MCS are not eligible for fast-track to the PhD.

A student may be permitted to carry out thesis work off campus provided suitable arrangements are made for supervision and experimental work, and prior approval is obtained from the Joint Program Committee and the FGPS.

Collaborative program in Bioinformatics

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The requirements specific to the collaborative program in Bioinformatics are as follows:

- 3 compulsory credits in Bioinformatics (BNF5106/ BIO5106).
Enrollment in the seminar course in Bioinformatics (BNF6100), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.

Presentation and defence of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the Bioinformatics collaborative program.

The primary program may require students to take additional courses, depending on their backgrounds.

**Co-op option (available to students registered in the thesis option or the non-thesis option)**

The requirements of the co-op option are as follows:

- Co-op students must register full-time and complete two work terms: CSI6001 Co-op Work Term I and CSI6002 Co-op work term II.

Each work term is graded P/F (pass/fail), based on the employer’s report and on the written report completed by the student. (The report must be 30 pages long, including appendices.) The report is evaluated by the professor in charge of the graduate co-op option in Computer Science.

The credits awarded for co-op terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain in the co-op option, students must:

- Be registered full-time.
- Maintain a 7.0 cumulative grade point average.
- Obtain a satisfactory grade (P) for each co-op work term.

**Transfer from master’s to PhD**

Outstanding students enrolled in the master’s program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

Note that students in the Accelerated Stream of the MCS are not eligible for fast-track to the PhD.

**Duration of the program**

Full-time students are expected to complete all requirements within two years. Students in the Accelerated Stream are, however, expected to complete all requirements within three sessions. The maximum time permitted in all cases is four years from the date of initial registration in the program.

**Residence**

All full-time students must complete a minimum of three sessions of full-time registration. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the initial registration in the program.

**Minimum standards**

The passing grade in all courses is B. Students who fail 6 credits, or whose research progress is deemed unsatisfactory are required to withdraw from the program.

**Courses**

**Courses are grouped according to the following categories:**

**Software Engineering (code E in the course list)**
- Database and Knowledge-based Systems; Software Engineering; Software Translator and Language Design.

**Theory of Computing (code T in the course list)**
- Theory of Databases; Principle of Protocols; Complexity Theory; Algebraic Algorithms; Combinatorial Algorithms; Number-Theoretic and Geometric Algorithms; Automata Theory and Formal Languages.

**Computer Applications (code A in the course list)**
- Artificial Intelligence; Computer Graphics; Modelling and Simulation; Numerical Analysis; Optimization.

**Computer Systems (code S in the course list)**
- Specialized Architectures; Signal, Image and Speech Processing; Distributed Computing; Local and Wide Area Networks; Office Information Systems.

**Software Engineering (code E in the course list)**

CSI5111 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)
Requirements capture and validation. Systematic design validation; grey-box approach, test design, implementation and management, case studies in validation and verification of communications software. Object-oriented design and test. Theoretical aspects.

CSI5112 (COMP 5207) SOFTWARE ENGINEERING (3cr.)
Topics of current interest in Software Engineering, such as software development systems, structured systems analysis and design, management of software, software tools, validation and verification, programming environments.

CSI5113 (COMP 5001) FOUNDATIONS OF PROGRAMMING LANGUAGES (3cr.)
Advanced study of programming paradigms from a practical perspective. Paradigms may include functional, imperative, concurrent, distributed, generative, aspect- and object-oriented, and logic programming. Emphasis on underlying principles. Topics may include: types, modules, inheritance, semantics, continuations, abstraction and reflection.

CSI5115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
The dimensional and multidimensional data models for data warehousing. Data dependencies and decomposition. Structure and use of data definition and manipulation languages. Database economics, engineering, deployment and evolution. Issues in integrity, security, the Internet and distributed databases. Relationships to decision support systems. Prerequisite: CSI5317 or equivalent

CSI5118 (COMP 5302) AUTOMATED VERIFICATION AND VALIDATION OF SOFTWARE (3cr.)
Topics in formal test derivation methods, test management, high-level, CASE-based verification and validation, data-flow & control-flow measures and metrics for assessing quality of designs and code, regression analysis & testing. Prerequisite: a four-year undergraduate degree in computer science, computer engineering, or software engineering.

CSI5122 (COMP 5301) SOFTWARE USABILITY (3cr.)
Design principles and metrics for usability. Qualitative and quantitative methods for the evaluation of software system usability: Heuristic evaluation, usability testing, usability inspections and walkthroughs, cognitive walkthroughs, formal usability experimentation. Ethical concerns when performing studies with test users. Economics of usability. Integration of usability engineering into the software engineering lifecycle.

CSI5134 (COMP 5004) FAULT TOLERANCE (3cr.)
Hardware and software techniques for fault tolerance. Topics include modeling and evaluation techniques, error detecting and correcting codes, module and system level fault detection mechanisms, design techniques for fault-tolerant and fail-safe systems, software fault tolerance through recovery blocks, N-version programming, algorithm-based fault tolerance, checkpointing and recovery techniques, and survey of practical fault-tolerant systems.

CSI5135 (COMP5209) INFORMATION VISUALIZATION AND VISUAL ANALYTICS (3cr.)
Principles, techniques, technology and applications of information visualization for visual data analysis. Topics include human visual perception, cognitive processes, static and dynamic models of image semantics, interaction paradigms, big data visual analysis case studies.

CSI5136 (COMP5110) COMPUTER SECURITY AND USABILITY (3cr.)
Design and evaluation of security and privacy software with particular attention to human factors and how interaction design impacts security. Topics include current approaches to usable security, methodologies for empirical analysis, and design principles for usable security and privacy.

CSI5153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line-analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/ implementations.

CSI5154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

CSI5314 (COMP 5104) OBJECT-ORIENTED SOFTWARE DEVELOPMENT (3cr.)

CSI5111 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)

CSI7161 (COMP 6603) ADVANCED TOPICS IN PROGRAMMING SYSTEMS AND LANGUAGES (3cr.)
CSI7314 (COMP 6104) ADVANCED TOPICS IN OBJECT-ORIENTED SYSTEMS (3cr.)
Advanced object-oriented software engineering, in particular the issues of reuse and testing. Sample topics include: interaction modeling; class and cluster testing; traceability; design patterns and testing; the C++ standard template library. Students will carry out research.

ELG6111 (SYSC 5101) DESIGN OF HIGH-PERFORMANCE SOFTWARE (3cr.)
Designing software to demanding performance specifications. Design analysis using models of computation, workload, and performance. Principles to govern design improvement for sequential, concurrent and parallel execution, based on resource architecture and quantitative analysis. Prerequisites: Engineering SYSC 5704 and a course in software engineering; or the equivalent.

ELG6113 (SYSC 5103) SOFTWARE AGENTS (3cr.)
Agent-based programming; elements of distributed artificial intelligence; beliefs, desires and intentions; component-based technology; languages for agent implementations; ontologies: KQML; autonomy; adaptability; security issues; mobility; standards; agent design issues and frameworks; applications in telecommunications. Prerequisites: Knowledge of Java, C/C++ or Smalltalk.

ELG6115 (SYSC 5105) SOFTWARE QUALITY ENGINEERING AND MANAGEMENT (3cr.)
All aspects of software quality engineering. Software testing, at all stages of the software development and maintenance life cycle. Software reviews and inspections. Use of software measurement and quantitative modelling for the purpose of software quality control and improvement. Precludes additional credit for CS1511 (COMP 5501). Prerequisites: an undergraduate course in software engineering such as SYSC 4800 or SEG 3300, or equivalent, and basic statistics.

ELG6178 (SYSC 5708) DEVELOPMENT OF REAL-TIME AND DISTRIBUTED SOFTWARE WITH REUSABLE COMPONENTS (3cr.)
Advanced object-oriented design and programming of real-time and distributed systems using C++ and/or Java. Object-oriented features; inheritance, polymorphism, templates, exception handling. Concurrency issues. Design patterns and frameworks for distributed systems, with examples from communication applications. Design issues for reusable software. Prerequisites: Knowledge of C++ and/or Java, of operating system concepts, and permission of the Department.

Theory of Computing (code T in the course list)

CSI5100 (COMP 5306) DATA INTEGRATION (3cr.)
Materialized and virtual approaches to integration of heterogeneous and independent data sources. Emphasis on data models, architectures, logic-based techniques for query processing, metadata and consistency modelling for the role of XML and ontologies in data integration; connections to schema mapping, data exchange, and P2P systems. Prerequisite: COMP 3005 or equivalent.

CSI5101 (COMP 5307) KNOWLEDGE REPRESENTATION (3cr.)
KR is concerned with representing knowledge and using it in computers. Emphasis on logic-based languages for KR, and automated reasoning techniques and systems; important applications of this traditional area of AI to ontologies and semantic web. Prerequisites: COMP 1805 and COMP 3005, or equivalents.

CSI5102 (COMP 5308) TOPICS IN MEDICAL COMPUTING (3cr.)
Introductory course on data structures, algorithms, techniques, and software development related to medical computing (in particular spatial modeling). Topics may include: computational geometry algorithms for cancer treatment, medical imaging, spatial data compression algorithms, dynamic programming for DNA analysis. Precludes additional credit for COMP 5900 section 'Y' offered 2001-2002 to 2005-2006 inclusive.

CSI5110 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
Methodologies in formal software specification, development, and verification. The use of theorem proving, automated deduction, and other related formal methods for software correctness. Applications in program verification, mobile code safety, and protocol verification.

CSI5121 (COMP 5408) ADVANCED DATA STRUCTURES (3cr.)
Simple methods of data structure design and analysis that lead to efficient data structures for several problems. Topics include randomized binary search trees, persistence, fractional cascading, self-adjusting data structures, van Emde Boas trees, tries, randomized heaps, and lowest common ancestor queries.

CSI5126 (COMP 5108) ALGORITHMS IN BIOINFORMATICS (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including alignment and probabilistic models); genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell. Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI3105 or (in case of graduate students) permission of the instructor.

CSI5127 (COMP 5409) APPLIED COMPUTATIONAL GEOMETRY (3cr.)
Computer-based representation and manipulation of geometric objects. Design and analysis of efficient algorithms for solving geometric problems in applied fields such as Computer-Aided Design and Manufacturing, Cartography, Materials Science, and Geometric Network Design.

CSI5148 (COMP 5103) WIRELESS AD HOC NETWORKING (3cr.)

CSI5149 (COMP 5007) GRAPHICAL MODELS (3cr.)
Bayesian networks, factor graphs, Markov random fields, maximum a posteriori probability (MAP) and maximum likelihood (ML) principles, elimination algorithm, sum-product algorithm, decomposable and non-decomposable models, junction tree algorithm, completely observed models, iterative proportional fitting algorithm, expectation-maximization (EM) algorithm, iterative conditional modes algorithm, variational methods, applications. Precludes credit for ELG5131 (EAG5131) and ELG7177 (EAC1 5605). Prerequisite: Permission of the program director.

CSI5152 (COMP5310) EVOLVING INFORMATION NETWORKS (3cr.)
Convergence of social and technological networks with WWW. Interplay between information content, entities creating it and technologies supporting it. Structure and analysis of such networks, models abstracting their properties, link analysis, search, mechanism design, power laws, cascading, clustering and connections with work in social sciences. Prerequisites: introductory-level background in networks, algorithms, and probability.

CSI5153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line-analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/ implementations.

CSI5154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

CSI5161 (COMP 5606) PRINCIPLES OF DISTRIBUTED SIMULATION (3cr.)
Distributed simulation principles and practices. Synchronization protocols: Optimistic vs Conservative, Deadlock detection in conservative simulations, Time warp simulation. Distributed interactive simulation: Data distribution management, Interest management, High Level Architectures (HLA), Run Time Infrastructure (RTI). Distributed web-based simulation. Distributed agent based simulation. Real time applications of distributed simulation. Distributed and collaborative virtual simulations.

CSI5163 (COMP 5703) ALGORITHM ANALYSIS AND DESIGN (3cr.)
Topics of current interest in the design and analysis of computer algorithms for graph-theoretical applications; e.g. shortest paths, chromatic number, etc. Lower bounds, upper bounds, and average performance of algorithms. Complexity theory.

CSI5164 (COMP 5008) COMPUTATIONAL GEOMETRY (3cr.)
Study of design and analysis of algorithms to solve geometric problems; emphasis on applications such as robotics, graphics, and pattern recognition. Topics include: visibility problems, hidden line and surface removal, path planning amidst obstacles, convex hulls, polygon triangulation, point location.

CSI5165 (COMP 5709) COMBINATORIAL ALGORITHMS (3cr.)
Design of algorithms for solving problems that are combinatorial in nature, using both sequential and parallel models of computation. Parallel algorithms for enumerating basic combinatorial objects (permutations, combinations, set partitions) and for solving optimization problems (knapsack, minimal cover, branch-and-bound). Polyminoes, polygonal systems, enumeration and classification and benzenoid and coronoid hydrocarbons in chemistry. Combinatorial geometry (Voronoi diagrams, polytopes arrangements). Algorithmic problems in many-valued logics (base enumeration, tautology checking, minimization, finding the spectra).

CSI5166 (COMP 5805) APPLICATIONS OF COMBINATORIAL OPTIMIZATION (3cr.)
Topics in combinatorial optimization with emphasis on applications in Computer Science. Topics include network flows, various routing algorithms, polyhedral combinatorics, and the cutting plane method.

CSI5169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer, Media Access Control, Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery, Clustering, Multicasting, Localization, Mobile IP/TCP (Internet Protocol/Transmission Control Protocol) , File Systems, Mobility Models, Wireless Applications. (Cannot be combined for credit with ELG 6168)

CSI5173 (COMP 5203) DATA NETWORKS (3cr.)
Mathematical and practical aspects of design and analysis of communication networks. Topics include: basic concepts, layering, delay models, multi-access communication, queuing theory, routing, fault-tolerance, and advanced topics on high-speed networks, ATM, mobile wireless networks, and optical networks.

CSI5174 (COMP 5604) VALIDATION METHODS FOR DISTRIBUTED SYSTEMS (3cr.)

CSI5185 (COMP 5107) STATISTICAL AND SYNTACTIC PATTERN RECOGNITION (3cr.)
Topics include a mathematical review, Bayes decision theory, maximum likelihood and Bayesian learning for parametric pattern recognition, non-parametric methods including nearest neighbor and linear discriminants. Syntactic recognition of strings, substrings, subsequences and tree structures. Applications include speech, shape and character recognition.
CSI5308 (COMP 5003) PRINCIPLES OF DISTRIBUTED COMPUTING (3cr.)
Formal models; semantics of distributed computations; theoretical issues in design of distributed algorithms; computational complexity; reducibility and equivalence of distributed problems. Related topics: systolic systems and computations, oligarchical systems and control mechanisms.

CSI5390 (COMP 5005) LEARNING SYSTEMS FOR RANDOM ENVIRONMENTS (3cr.)
Computerized adaptive learning for random environments and its applications. Topics include a mathematical review, learning automata which are deterministic/stochastic, with fixed/variable structures, of continuous дискретизированной, design, with ergodic/absorbing properties and of estimator families. Prerequisite(s): SYSC 5503 or equivalent.

CSI5110 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
Methodologies in formal software specification, development, and verification. The use of theorem proving, automated deduction, and other related formal methods for software correctness. Applications in program verification, mobile code safety, and protocol verification.

CSI5126 (COMP 5108) ALGORITHMS IN BIOINFORMATICS (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including alignment and probabilistic models), genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell. Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI 105 or (in case of graduate students) permission of the instructor.

CSI5165 (COMP 5709) COMBINATORIAL ALGORITHMS (3cr.)
Design of algorithms for solving problems that are combinatorial in nature, using both sequential and parallel models of computation. Parallel algorithms for enumerating basic combinatorial objects (permutations, combinations, set partitions) and for solving optimization problems (knapsack, minimal cover, branch- and-bound). Polyominoes, polygonal systems, enumeration and classification and benzenoid and coronoid hydrocarbons in chemistry. Combinatorial geometry (Voronoi diagrams, polytopes arrangements). Algorithmic problems in many-valued logics (base enumeration, tautology checking, minimization, finding the spectra).

CSI7160 (COMP 6601) ADVANCED TOPICS IN THE THEORY OF COMPUTING (3cr.)

CSI7170 (COMP 6602) ADVANCED TOPICS IN DISTRIBUTED COMPUTING (3cr.)

Computer Applications (code A in the course list)

CSI5100 (COMP 5306) DATA INTEGRATION (3cr.)
Materialized and virtual approaches to integration of heterogeneous and independent data sources. Emphasis on data models, architectures, logic-based techniques for query processing, metadata and consistency management, the role of XML and ontologies in data integration; connections to schema mapping, data exchange, and P2P systems. Prerequisite: COMP 3005 or equivalent.

CSI5101 (COMP 5307) KNOWLEDGE REPRESENTATION (3cr.)
KR is concerned with representing knowledge and using it in computers. Emphasis on logic-based languages for KR, and automated reasoning techniques and systems; important applications of this traditional area of AI to ontologies and semantic web. Prerequisites: COMP 1805 and COMP 3005, or equivalents.

CSI5102 (COMP 5308) TOPICS IN MEDICAL COMPUTING (3cr.)
Introductory course on data structures, algorithms, techniques, and software development related to medical computing (in particular spatial modeling). Topics may include: computational geometry algorithms for cancer treatment, medical imaging, spatial data compression algorithms, dynamic programming for DNA analysis. Precludes additional credit for COMP 5900 section 'Y' offered 2001-2002 to 2005-2006 inclusive.

CSI5105 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks. Prerequisites: familiarity with basic concepts in networks, network security, and applied cryptography. For example, relevant background courses may include the following (or equivalents): CEG 4185 or COMP 3203 and/or CSI 4138 or CEG 4394 or COMP 4108, and/or CSI 4108 or ELG 5373 or COMP 4109.

CSI5116 (COMP 5407) AUTHENTICATION AND SOFTWARE SECURITY (3cr.)
Specialized topics in security including advanced authentication techniques, user interface aspects, electronic and digital signatures, security infrastructures and protocols, software vulnerabilities affecting security, non-secure software and hosts, protecting software and digital content. Prerequisites: Basic course in Statistics or permission of the program director.

CSI5124 (COMP 5204) COMPUTATIONAL ASPECTS OF GEOGRAPHIC INFORMATION SYSTEMS (3cr.)
Computational perspective of geographic information systems (GIS). Data representations and their operations on raster and vector devices: e.g., quadtrees, grid files, digital elevation models, triangular irregular network models. Analysis and design of efficient algorithms for solving GIS problems: visibility queries, point location, facility location.

CSI5126 (COMP 5108) ALGORITHMS IN BIOINFORMATICS (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including...
alignment and probabilistic models), genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell. Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI3105 or (in case of graduate students) permission of the instructor.

CS15128 (COMP 5002) SWARM INTELLIGENCE (3cr.)
Collective computation, collective action, and principles of self-organization in social agent systems. Algorithms for combinatorial optimization problems, division of labour, task allocation, task switching, and task sequencing with applications in security, routing, wireless and ad hoc networks and distributed manufacturing.

CS15129 (COMP 5305) ADVANCED DATABASE SYSTEMS (3cr.)
In-depth study on developments in database systems shaping the future of information systems, including complex object, object-oriented, object-relational, and semi-structured databases. Data structures, query languages, implementation and applications.

CS15136 (COMP5110) COMPUTER SECURITY AND USABILITY (3cr.)
Design and evaluation of security and privacy software with particular attention to human factors and how interaction design impacts security. Topics include current approaches to usable security, methodologies for empirical analysis, and design principles for usable security and privacy.

CS15146 (COMP 5402) COMPUTER GRAPHICS (3cr.)

CS15147 (COMP 5201) COMPUTER ANIMATION (3cr.)

CS15151 (COMP 5205) VIRTUAL ENVIRONMENTS (3cr.)

CS15152 (COMP5310) EVOLVING INFORMATION NETWORKS (3cr.)
Convergence of social and technological networks with WWW. Interplay between information content, entities creating it and technologies supporting it. Structure and analysis of such networks, models abstracting their properties, link analysis, search, mechanism design, power laws, cascading, clustering and connections with work in social sciences. Prerequisites: introductory-level background in networks, algorithms, and probability.

CS15153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/ implementations.

CS15154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

CS15167 (COMP5210) HUMAN-COMPUTER INTERACTION MODELS, THEORIES, AND FRAMEWORKS (3cr.)
A basis for graduate study in HCI with an emphasis on the application of theory to user interface design. Review of main theories of human behaviour relevant to HCI, including especially Cognitive Dimensions of Notations Framework, Mental Models, Distributed Cognition, and Activity Theory, and their application to design and development of interactive systems.

CS15168 (COMP 5309) DIGITAL WATERMARKING (3cr.)
Overview of recent advances in watermarking of image, video, audio, and other media. Spatial, spectral, and temporal watermarking algorithms. Perceptual models. Use of cryptography in steganography and watermarking. Robustness, security, imperceptibility, and capacity of watermarking. Content authentication, copy control, intellectual property, digital rights management, and other applications. Prerequisites: ELG 4172 or CEG 4311 or CSI 4133 or equivalent.

CS15175 MOBILE COMMERCE TECHNOLOGIES (3cr.)
Wireless network support for m-commerce; m-commerce architectures and applications; mobile payment support systems; business models; mobile devices and their operating systems; mobile content presentation; security issues and solutions; relevant cross layer standards and protocols; case studies. Exclusion: EBC5175

CS15180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)
A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive
systems. Assignments will be both (a) programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special topics in current A.I. journals.

**CS 1520** (COMP 5206) **EVOLUTIONARY COMPUTATION AND ARTIFICIAL LIFE** (3cr.)
Study of algorithms based upon biological theories of evolution, applications to machine learning and optimization problems. Possible topics: Genetic Algorithms, Classifier Systems, and Genetic Programming. Recent work in the fields of Artificial Life (swarm intelligence, distributed agents, behavior-based AI) and of connectionism. Precludes additional credit for COMP 4107.

**CS 15380** (COMP 5405) **SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE** (3cr.)

**CS 15386** (COMP 5505) **NATURAL LANGUAGE PROCESSING** (3cr.)
Definitions, applications, challenges, lexicons, thesauri, corpora and other linguistic resources. Morphological analysis; tagging. Selected syntactic theories: phrase structure grammars, unification-based grammars. Parsing techniques: charts, deterministic parsing, logic grammars. Selected semantic representations: logic, logical forms, conceptual graphs, Element of semantic and pragmatic analysis: reference, scope, focus. Elements of statistical language processing and text mining. Introduction to corpus linguistics. Term projects, one on syntax and one on semantics, will be done in Prolog and logic grammars. Prerequisite: CSI 4106 or permission of the instructor

**CS 15387** (COMP 5706) **DATA MINING AND CONCEPT LEARNING** (3cr.)

**CS 15388** (COMP 5801) **TOPICS IN MACHINE LEARNING** (3cr.)
Prerequisite: CSI 4106 or permission of instructor

**CS 15389** (COMP 5401) **ELECTRONIC COMMERCE TECHNOLOGIES** (3cr.)

**CS 15126** (COMP 5108) **ALGORITHMS IN BIOINFORMATICS** (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology: physical and genetic mapping, sequence analysis (including alignment and probabilistic models), genomic rearrangement, phylogenetic inference, computational proteomics and systems modeling of the whole cell. Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI 3105 or (in case of graduate students) permission of the instructor.

**CS 15180** (COMP 5100) **TOPICS IN ARTIFICIAL INTELLIGENCE** (3cr.)
A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive systems. Assignments will be both (a) programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special topics in current A.I. journals.

**CS 15380** (COMP 5405) **SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE** (3cr.)

**CS 15387** (COMP 5706) **DATA MINING AND CONCEPT LEARNING** (3cr.)

**CS 15389** (COMP 5401) **ELECTRONIC COMMERCE TECHNOLOGIES** (3cr.)

**CS 17162** (COMP 6604) **ADVANCED TOPICS IN COMPUTER APPLICATIONS** (3cr.)

**Computer Systems (code S in the course list)**

**CS 15105** (COMP 5406) **NETWORK SECURITY AND CRYPTOGRAPHY** (3cr.)
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks. Prerequisites: Familiarity with basic concepts in networks, network security, and applied cryptography. For example, relevant background courses may include the following (or equivalents): CEG 4185 or COMP 3203 and/or CSI 4138 or CEG 4394 or COMP 4108, and/or CSI 4108 or ELG 5373 or COMP 4109.
CS15116 (COMP 5407) AUTHENTICATION AND SOFTWARE SECURITY (3cr.)
Specialized topics in security including advanced authentication techniques, user interface aspects, electronic and digital signatures, security infrastructures and protocols, software vulnerabilities affecting security, non-secure software and hosts, protecting software and digital content. Prerequisites: Basic course in Statistics or permission of the program director.

CS15129 (COMP 5305) ADVANCED DATABASE SYSTEMS (3cr.)
In-depth study on developments in database systems shaping the future of information systems, including complex object, object-oriented, object-relational, and semi-structured databases. Data structures, query languages, implementation and applications.

CS15131 (COMP 5704) PARALLEL ALGORITHMS AND APPLICATIONS IN BIOINFORMATICS (3cr.)
Multiprocessor architectures from an application programmer's perspective: programming models, processor clusters, multi-core processors, GPUs, algorithmic paradigms, efficient parallel problem solving, scalability and portability. Projects on high performance computing in Data Science, incl. data analytics, bioinformatics, simulations. Programming experience on parallel processing equipment. Prerequisite: COMP 3804 or equivalent.

CS15134 (COMP 5004) FAULT TOLERANCE (3cr.)
Hardware and software techniques for fault tolerance. Topics include modeling and evaluation techniques, error detecting and correcting codes, module and system level fault detection mechanisms, design techniques for fault-tolerant and fail-safe systems, software fault tolerance through recovery blocks, N-version programming, algorithm-based fault tolerance, checkpointing and recovery techniques, and survey of practical fault-tolerant systems.

CS15142 (COMP 5402) PROTOCOLS FOR MOBILE AND WIRELESS NETWORKS (3cr.)
Link and network layer protocols of wireless networks; applications of wireless networks may be discussed. Topics may include: protocol implementation, mobile IP, resource discovery, wireless LANs/PANs, and Spread Spectrum. Precludes additional credit for SYSC 5306.

CS15147 (COMP 5201) COMPUTER ANIMATION (3cr.)

CS15148 (COMP 5103) WIRELESS AD HOC NETWORKING (3cr.)

CS15153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line-analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/implementations.

CS15154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

CS15161 (COMP 5606) PRINCIPLES OF DISTRIBUTED SIMULATION (3cr.)
Distributed simulation principles and practices. Synchronization protocols: Optimistic vs Conservative, Deadlock detection in conservative simulations, Time warp simulation. Distributed simulation: Data distribution management, Interest management, High Level Architectures (HLA), Run Time Infrastructure (RTI). Distributed web-based simulation. Distributed agent based simulation. Real time applications of distributed simulation. Distributed and collaborative virtual simulations.

CS15168 (COMP 5309) DIGITAL WATERMARKING (3cr.)
Overview of recent advances in watermarking of image, video, audio, and other media. Spatial, spectral, and temporal watermarking algorithms. Perceptual models. Use of cryptography in steganography and watermarking. Robustness, security, imperceptibility, and capacity of watermarking. Content authentication, copy control, intellectual property, digital rights management, and other applications. Prerequisites: ELG 4172 or CEG 4311 or CSI 4133 or equivalent.

CS15169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer, Media Access Control, Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery, Clustering, Multicasting, Localization, Mobile IP/TCIP (Internet Protocol/Transmission Control Protocol), File Systems, Mobility Models, Wireless Applications. (Cannot be combined for credit with ELG 6168)

CS15173 (COMP 5203) DATA NETWORKS (3cr.)
Mathematical and practical aspects of design and analysis of communication networks. Topics include: basic concepts, layering, delay models, multi-access
communication, queuing theory, routing, fault-tolerance, and advanced topics on high-speed networks, ATM, mobile wireless networks, and optical networks.

**CSI5174 (COMP 5604) VALIDATION METHODS FOR DISTRIBUTED SYSTEMS** (3cr.)

**CSI5175 MOBILE COMMERCE TECHNOLOGIES** (3cr.)
Wireless networks support for m-commerce; m-commerce architectures and applications; mobile payment support systems; business models; mobile devices and their operating systems; mobile content presentation; security issues and solutions; relevant cross layer standards and protocols; case studies. Exclusion: EBCS5175

**CSI5185 (COMP 5107) STATISTICAL AND SYNTACTIC PATTERN RECOGNITION** (3cr.)
Topics include a mathematical review, Bayes decision theory, maximum likelihood and Bayesian learning for parametric pattern recognition, non-parametric methods including nearest neighbor and linear discriminants. Syntactic recognition of strings, substrings, subsequences and tree structures. Applications include speech, shape and character recognition.

**CSI5308 (COMP 5003) PRINCIPLES OF DISTRIBUTED COMPUTING** (3cr.)
Formal models; semantics of distributed computations; theoretical issues in design of distributed algorithms; computational complexity; reducibility and equivalence of distributed problems. Related topics: systolic systems and computations, oligarchical systems and control mechanisms.

**CSI5311 (COMP 5101) DISTRIBUTED DATABASES AND TRANSACTION PROCESSING SYSTEMS** (3cr.)
Principles involved in the design and implementation of distributed databases and distributed transaction processing systems. Topics include: distributed and multi-database system architectures and models; atomicity, synchronization and distributed concurrency control algorithms; data replication, recovery techniques, and reliability in distributed databases.

**CSI5312 (COMP 5102) DISTRIBUTED OPERATING SYSTEMS** (3cr.)
Design issues of advanced multiprocessor distributed operating systems: multiprocessor system architectures; process and object models; synchronization and message passing primitives; memory architectures and management; distributed file systems; protection and security; distributed concurrency control; deadlock; recovery; remote tasking; dynamic reconfiguration; performance measurement, modeling, and system tuning.

**CSI5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE** (3cr.)

**CSI5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES** (3cr.)

**CSI5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE** (3cr.)

**CSI5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES** (3cr.)

**CSI7131 (COMP 6100) ADVANCED PARALLEL AND SYSTOLIC ALGORITHMS** (3cr.)
Continuation of COMP 5704.

**CSI7163 (COMP 6605) ADVANCED TOPICS IN COMPUTER SYSTEMS** (3cr.)

**CSI7170 (COMP 6602) ADVANCED TOPICS IN DISTRIBUTED COMPUTING** (3cr.)

**Theses and Projects**

**CSI5140 (COMP 5900) SELECTED TOPICS IN COMPUTER SCIENCE** (3cr.)
Selected topics, not covered by other graduate courses. Details will be available from the School at the time of registration.

**CSI5900 (COMP 5902) PROJETS DE RECHERCHE EN INFORMATIQUE / GRADUATE PROJECTS IN COMPUTER SCIENCE** (3cr.)

**CSI5901 (COMP 5901) ÉTUDES DIRIGÉES / DIRECTED STUDIES** (3cr.)
A course of independent study under the supervision of a member of the School of Computer Science.

**CSI5902 (COMP 5904) COLOQUE / SEMINAR (3cr.)**
To complete this course, the student must attend 5 graduate seminars at Carleton, and at 5 SITE within a year. The student must also make one presentation in the context of this graduate seminar.

**CSI5903 STAGE EN COMMERCÉ ÉLECTRONIQUE/ ELECTRONIC COMMERCE WORK TERM (3cr.)**
Expérience en milieu de travail. Noté: S (satisfaisant)/ NS (non satisfaisant) selon les résultats du rapport écrit et l'évaluation de l'employeur. / Practical experience. S (satisfactory)/ NS (not satisfactory) grade, to be based on the grades obtained for the written report as well as on the evaluations of the employer. Préalable : Être accepté au programme de certificat en commerce électronique (option technologie) et recevoir la permission du Comité du programme. / Prerequisite: Acceptance in the Graduate Certificate in e-Commerce (Technology Option) and permission of the Program Committee.

**CSI6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)**
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

**CSI6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)**
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l’évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

**CSI6900 (COMP 5903) PROJETS DE RECHERCHE INTENSIVE EN INFORMATIQUE / INTENSIVE GRADUATE PROJECTS IN COMPUTER SCIENCE (6cr.)**
Cours de six crédits s'échelonnant sur une période de deux sessions. L'envergure du projet de recherche exigé dans ce cours est deux fois plus grande que dans le cas de CSI 5900. Les cours CSI 6900 et CSI 5900 sont mutuellement exclusifs. Cours ouvert uniquement aux étudiants inscrits à la maîtrise sans thèse / A two-session course. The project is twice the scope of projects in CSI 5900. Not to be combined for credit with CSI 5900. Not to be taken in the thesis option.

**CSI7161 (COMP 6603) ADVANCED TOPICS IN PROGRAMMING SYSTEMS AND LANGUAGES (3cr.)**

**CSI7900 (COMP 6902) PROJETS DE RECHERCHE EN INFORMATIQUE / GRADUATE PROJECTS IN COMPUTER SCIENCE (3cr.)**

**CSI7901 (COMP 6901) ÉTUDES DIRIGÉES / DIRECTED STUDIES (3cr.)**

**CSI7999 (COMP 5905) THÈSE DE MAÎTRISE EN INFORMATIQUE / MASTER OF COMPUTER SCIENCE THESIS**

**CSI9901 COLLOQUE / SEMINAR**

**CSI9902 COLLOQUE / SEMINAR**

**CSI9997 (COMP 6908) PROPOSITION DE THÈSE DE DOCTORAT / DOCTORAL THESIS PROPOSAL**
Within 8 terms following initial registration in the program, a document generally defining the problem addressed, relating it to the literature, and outlining the hypotheses, goals, research methodology, initial results and validation approach must be submitted to an examination committee and successfully defended.

**CSI9998 (COMP 6907) EXAMEN GÉNÉRAL DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION**
A committee must be assembled and approve at least 3 topics for written examination: typically, a major and two minor areas. An oral examination occurs if the written exam is passed. Both elements must take place within the first 4 terms following initial registration in the program. The comprehensive may be failed, passed conditionally (i.e., with extra course requirements) or passed unconditionally. If failed this course may be retaken at most one time.

**CSI9999 (COMP 6909) THÈSE DE DOCTORAT / PhD THESIS**

**GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)**
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

**GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)**
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection.
DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Conference Interpreting

The School of Translation and Interpretation (STI) offers graduate programs leading to the degrees of Masters of arts in translation studies (MA), Master in Conference Interpreting (MCI) and Doctor of Philosophy (PhD) in translation studies.

The master of Conference Interpreting is a professionally-oriented graduate program intended for graduates who wish to specialize in conference interpreting, which is a branch of the translation profession requiring intensive training. The program is intended for full-time students.

Languages

The aim of the program is to train interpreters primarily for the Canadian market. Therefore all courses will be conducted in either English or French. All students are expected to interpret both from English into French and from French into English, although it is recognized that they may not achieve equal proficiency in both directions.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Conference Interpreting

Admission

To be admitted to the master's, candidates must:

1. hold an honours bachelor's degree;
2. have an admission average of B (70%) calculated in accordance with FGPS guidelines; and
3. have successfully completed the STI.

Admission procedure

In addition to completing our on-line application and paying the application fee to the Ontario Universities’ Application Centre, students must also assemble all relevant documentation and forward the complete application package to the director of the School of Translation and Interpretation. Applications will not be processed without the application fee and complete file.

To find the application deadline, please check the ”program-specific requirements” under Application Procedures and Information at the following address: www.grad.uottawa.ca/apply.

Entrance examination

Applicants will be required to take an entrance examination which will test their linguistic skills, aptitude for interpretation and general knowledge.

The offer of admission is valid for one year. If applicants have not registered in the program by the end of this period, they will have to sit the entrance examination again.

Program Requirements

The master's degree requires 42 credits as follows:

- Six compulsory courses (18 credits)
  
  TRA5951 INTERPRÉTATION CONSÉCUTIVE DE L’ANGLAIS VERS LE FRANÇAIS / CONSECUTIVE INTERPRETATION FROM
ENGLISH TO FRENCH (3cr.)

TRA5952 INTERPRÉTATION CONSECUTIVE DU FRANÇAIS VERS L’ANGLAIS / CONSECUTIVE INTERPRETATION FROM FRENCH TO ENGLISH (3cr.)

TRA5921 DOCUMENTATION DE CONFÉRENCE I / CONFERENCE DOCUMENTATION I (3cr.)

TRA6907 THÉORIE DE L’INTERPRÉTATION / THEORY OF INTERPRETATION (3cr.)

TRA6950 INTERPRÉTATION SIMULTANÉE DE L’ANGLAIS VERS LE FRANÇAIS / SIMULTANEOUS INTERPRETATION FROM ENGLISH TO FRENCH (3cr.)

TRA6951 INTERPRÉTATION SIMULTANÉE DU FRANÇAIS VERS L’ANGLAIS / SIMULTANEOUS INTERPRETATION FROM FRENCH TO ENGLISH (3cr.)

- TRA6913 THÈMES CHOISIS / SPECIAL TOPICS (3cr.) or a course deemed equivalent by the STI
- Six workshop laboratories (18 credits)

TRA5970 ATELIER D’INTERPRÉTATION CONSECUTIVE DE L’ANGLAIS VERS LE FRANÇAIS / CONSECUTIVE INTERPRETATION WORKSHOP FROM ENGLISH TO FRENCH (3cr.)

TRA5971 ATELIER D’INTERPRÉTATION CONSECUTIVE DU FRANÇAIS VERS L’ANGLAIS / CONSECUTIVE INTERPRETATION WORKSHOP FROM FRENCH TO ENGLISH (3cr.)

TRA5972 L’INTERPRÉTATION EN FRANÇAIS / INTERPRETATION INTO FRENCH (3cr.)

TRA5973 L’INTERPRÉTATION EN ANGLAIS / INTERPRETATION INTO ENGLISH (3cr.)

TRA6970 ATELIER D’INTERPRÉTATION SIMULTANÉE DE L’ANGLAIS VERS LE FRANÇAIS / SIMULTANEOUS INTERPRETATION WORKSHOP FROM ENGLISH TO FRENCH (3cr.)

TRA6971 ATELIER D’INTERPRÉTATION SIMULTANÉE DU FRANÇAIS VERS L’ANGLAIS / SIMULTANEOUS INTERPRETATION WORKSHOP FROM FRENCH TO ENGLISH (3cr.)

- TRA6910 STAGE/PRACTICUM (3cr.)
  A minimum of five full working days (or equivalent time) as an interpreter at actual meetings or conferences approved by the practicum supervisor, with an attestation of satisfactory performance at each meeting. Prerequisite: a minimum grade of B in all simultaneous interpreting courses and workshops.

- TRA6998 EXAMEN FINAL / FINAL EXAMINATION
  Examinations are conducted by a board of examiners appointed by the STI. Students are tested in simultaneous and consecutive interpretation and sight interpretation. Students must sit the final examination during the examination session that immediately follows the end of their practicum. The examination is only held once a year. Admission to the examination is conditional on having passed all courses and the practicum. Students who fail at the first attempt must retake the examination at the following examination session. Students who fail at the second attempt will be withdrawn from the program.

Duration of the program

Students are expected to complete all requirements within two years.

Residence

The program extends over one year and is therefore intended for full-time students. Students admitted full-time are subject to a residence requirement of three sessions.

Minimum standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits) will be withdrawn from the program.

Courses

The School of Translation and Interpretation will be happy to send prospective students full course descriptions.

TRA5904 FORMATION PRATIQUE EN INTERPRÉTATION I / INTERPRETATION PRACTICE I

TRA5908 FORMATION PRATIQUE EN INTERPRÉTATION II / INTERPRETATION PRACTICE II

TRA5911 INTERPRÉTATION JUDICIAIRE ET QUASI-JUDICIAIRE / COURT AND COMMUNITY INTERPRETING (3cr.)

TRA5921 DOCUMENTATION DE CONFÉRENCE I / CONFERENCE DOCUMENTATION I (3cr.)

TRA5950 TECHNIQUES DE TRAITEMENT DE L’INFORMATION PAR L’INTERPRÈTE / INFORMATION PROCESSING SKILLS FOR INTERPRETERS (3cr.)
Conflict Studies

The Faculty of Human Sciences (FHS) at Saint Paul University offers an MA and a PhD in Conflict Studies. The degrees are conferred jointly by the senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The programs explore the meaning of and generate processes for reconciliation, healing, and structural change. They combine a social science orientation common to Conflict Studies programs with a philosophical, ethical and theological orientation. The field of specialization is ethnic and religious dimensions of conflict in Canada.
These bilingual (English-French) programs cater to students from both academic and professional backgrounds. They are offered on a full-time basis.

Program objectives:

- **Analysis**
  - To explore the connections between conflict, violence, social justice, conflict resolution and peacebuilding in human communities.
- **Training**
  - To develop the attitudes, knowledge, research and skills necessary to analyze ethnic and religious dimensions of conflicts so as to cultivate peace.
- **Outcomes**
  - To produce graduates who are competent in:
    - Analyzing ethnic and religious dimensions of conflicts in a multidisciplinary perspective; and
    - Devising and evaluating appropriate conflict resolution strategies.

Two levels of learning are distinguished in the MA program:

- **Foundational Level:** this level entails intensive study of major themes in Conflict Studies. Graduate training is initiated in research skills and methodologies in preparation for the research project.
- **Advanced Level:** this level of study concentrates on the development of specific dimensions of conflict studies. Research seminars meet to define the problem, purpose, scope and methodology of the master’s research project.

Students are encouraged to consult the list of professors and their areas of interest which are posted on the FHS website to determine whom they might want to ask to serve as a supervisor for their research work.

The programs operate within the framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS), which are posted on the FGPS website.

**Programs**

**Master of Arts Conflict Studies**

**Doctorate in Philosophy Conflict Studies**

**Admission**

Admission to the program is competitive. Minimum requirements are:

- Four year undergraduate degree with honours (or a major) in Political Science, Psychology, Theology, Ethics or the equivalent, such as a BA with honors (or a major) in criminology, philosophy, or law;
- A minimum (70-74%) B average in the baccalaureate degree.

Experience in the field of conflict resolution or a related area will also be taken into consideration. Candidates may be interviewed as part of the selection process.

If the minimum requirements for admission to the first year are not satisfied, a candidate may enroll in a qualifying program, the content of which is determined by the coordinator of the program on a case-by-case basis. See details below.

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the General Regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

**Qualifying program**

1. Candidates may enroll in a qualifying program on the recommendation of the Admission Committee (it is not possible to apply directly to a qualifying program).
2. The number of credits taken in a qualifying program may not exceed 36.
3. The qualifying program must be completed within three consecutive sessions or less.
4. The student must obtain a minimum grade of C+ in each course, and have an overall B average.
5. Students wishing to complete their qualifying courses at another university are advised to have their course of studies approved in advance by the program coordinator.
Program Requirements

Students may prepare for a master's degree in one of the following two ways:

- The successful completion of 27 credits at the graduate level and the preparation and effective defence of a thesis (ECS 6999) before a board of at least two examiners, members of the Faculty of Graduate and Postdoctoral Studies, and presided over by a chair appointed by the Director of Graduate Studies of the Faculty of Human sciences. The master's thesis should be approximately 100 pages and not exceed 150 pages in length.
- The successful completion of 36 credits at the graduate level including a research paper submitted at the end of the Research Seminar (ECS 6140). The research paper should be about 50 pages in length.

For the thesis option, a student admitted to the MA in Conflict Studies program must first obtain 9 credits (through courses or through advanced standing), and then apply to the Admissions Committee for permission to enroll in the thesis option. To do so, the student must find a suitable supervisor and submit a detailed topic and plan of research. The Committee will examine the application and inform the student of its decision.

If a student chooses the thesis option and the thesis uses a quantitative methodology, a course in quantitative methodology is required. If the thesis uses a qualitative methodology, one of the following is required: a course in qualitative methodology, participant observation, content analysis, evaluation research or an honours thesis in the area of qualitative methodology.

Courses

- Compulsory courses for all master's students (21 credits)
  - ECS5101 IDENTITY-BASED CONFLICT (3cr.)
  - ECS5110 HISTORY OF CONFLICT RESOLUTION (3cr.)
  - ECS5302 APPROACHES TO CONFLICT AND SOCIAL JUSTICE (3cr.)
  - ECS5304 ETHICAL DIMENSIONS OF CONFLICT (3cr.)
  - ECS5311 RELIGIOUS IDENTITIES AND CONFLICT (3cr.)
  - ECS5330 CONFLICT RESOLUTION: RESULTS ASSESSMENT (3cr.)
- Research (6 credits) (option with research paper)
  - ECS5103 RESEARCH METHODS (3cr.)
  - ECS6140 RESEARCH SEMINAR (3cr.)
- Research (3 credits) (option with thesis)
  - ECS5103 RESEARCH METHODS (3cr.)
  - ECS6999 THÈSE DE M.A. / MA THESIS
- Elective courses
  - Students select three courses (one if the thesis option is chosen) from the list of elective courses.
  - A maximum of two graduate courses (6 credits) may be taken from other faculties and universities with prior authorization from the Director of the program.

Fast-track from the master’s to the PhD

Outstanding students enrolled in the master’s program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

Duration of the program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

All courses listed, with the exception of the thesis, are worth 3 credits and may be offered either in the fall or the winter session.

**ECS5101 IDENTITY-BASED CONFLICT** (3cr.)
Theoretical concepts to understand the dynamics of religious and ethnic conflicts. Application of these concepts to particular situations. Religion, ethnicity, gender, class, and other identity signifiers. Human identity needs, mimetic theory, and structures of domination. Ethno-nationalist movements and victimization.

**ECS5103 RESEARCH METHODS** (3cr.)
Critical evaluation of research findings in the human sciences. Qualitative and quantitative methods of gathering, validating, and interpreting evidence. Issues in research ethics. Applications in graduate research projects and theses.

**ECS5110 HISTORY OF CONFLICT RESOLUTION** (3cr.)
Conflict resolution approaches and institutions created over time in different regions of the world. Traditional dispute resolution mechanisms. State and law. Democratic institutions. Third party involvement and promotion of peace.

**ECS5112 TRAUMA, HEALING AND RECONCILIATION** (3cr.)
Violence and trauma in the context of identity-based conflicts. Emotional, spiritual, physical and cognitive dimensions of the human person. Reconciliation, forgiveness and trauma healing.

**ECS5114 GENOCIDE AND RECONCILIATION** (3cr.)
Degeneration of conflicts into unforgettable and unforgivable atrocities. Causes, mechanisms, attitudes leading to extreme mass violence. Role of faith in healing memories. Case study of genocides in Germany, South Africa, Rwanda and among indigenous peoples in North and South America.

**ECS5116 POLITICAL ECONOMY OF CONFLICT** (3cr.)
Influence of development and allocation of economic resources on political conflict, including ethnic and religious strife. Influence of globalization on the propensity of societies toward violence.

**ECS5118 CONTEMPORARY PEACEBUILDING** (3cr.)
National and international policies and programs designed to eliminate the causes of violent conflict and prevent their re-emergence. Dialogue and reconciliation. Political and economic reforms. Local development and empowerment.

**ECS5119 MEDIATION AND NEGOTIATION: THEORY AND RESEARCH** (3cr.)
Theoretical and empirical aspects of strategies and processes of mediation and negotiation. Critical examination of contemporary approaches to mediation and negotiation. Cases of successful or unsuccessful negotiations. Roles, capacities and motivations of parties.

**ECS5120 SELECTED TOPICS IN CONFLICT STUDIES** (3cr.)

**ECS5131 CONFLICT RESOLUTION: ANALYSIS AND DESIGN** (3cr.)
Basic conflict analysis design and methodologies in intervention strategies for dealing with identity-based conflict. Sequencing, timing and other contingencies due to emotional factors. Case presentations. Ethical questions related to planning of conflict resolution strategies.

**ECS5140 THE ADAPTIVE LEADER** (3cr.)
Using psychological theories of the development of consciousness, this course explores how leaders can adapt to complex environments. An integral approach is used to develop a methodology to systematically reflect on practical challenges in order to refine intentions, strategies and actions.

**ECS5141 THE COMPREHENSIVE APPROACH TO COMPLEX OPERATIONS** (3cr.)
The Comprehensive Approach, within international and domestic security environments, enables the student to better understand the capabilities and constraints of a variety of institutions within today’s operational environments. Competencies are enhanced in achieving greater integration of effort among personnel and their organizations as more lasting solutions are generated to the complex challenges of international missions.

**ECS5142 COMPLEXITY THINKING FOR INTEGRATIVE PEACEBUILDING** (3cr.)
Both conflict and peacebuilding take place within complex adaptive systems with many variables. This course explores the characteristics of chaos, complexity and emerging creativity theories and how they assist in understanding the multi-dimensional dynamics of peacebuilding.

**ECS5143 INTERCULTURAL AND INTER-RELIGIOUS ENGAGEMENT** (3cr.)
Cultural competency is needed to be effective within host communities. Students will learn to identify dynamics of tensions between religious, national, economic, and ideological components of conflicts; to analyze reasons for various kinds of exclusivist and intolerant attitudes and to integrate the religious component into peacebuilding, development initiatives, and whole-of-government programming.

**ECS5144 PEACEBUILDING, IDENTITY-BASED CONFLICT AND RECONCILIATION** (3cr.)
The challenge of peacebuilding is situated in the context of historically driven, deep-rooted conflicts between identity-groups. Students will learn to use theoretical frameworks to analyze conflict and advance reconciliation. The dialectical relationship between peacebuilding and social and political reconciliation will be explored, emphasizing trust-building, structural change, symbolic conciliatory gestures, and socio-emotional transformation.

**ECS5302 APPROACHES TO CONFLICT AND SOCIAL JUSTICE** (3cr.)
Approaches employed to analyze conflict and to build peace with social justice. Contemporary theories from political sciences, social psychology, and theology addressing conflict and social justice.

**ECS5304 ETHICAL DIMENSIONS OF CONFLICT** (3cr.)
Conceptual and procedural ethical issues concerning norms of justice and reconciliation. Relation of ethical issues to self-other dialectics, dynamics of discourse and power, gender and class, memory and agency.
ECS5311 RELIGIOUS IDENTITIES AND CONFLICT (3cr.)
Implication of religious identities, traditions and actors in escalating, diverting or transforming deep-rooted conflicts in different societies. Comparative multi-religious framework. Sociology of religion and contextual theological hermeneutics.

ECS5313 SPIRITUALITY AND CONFLICT (3cr.)
Impact of conflict on spirituality and of spirituality on conflict. Part played in conflict by the spiritual life and convictions of those involved.

ECS5315 GENDER AND CONFLICT (3cr.)
Multidisciplinary examination of cases of domination and marginalization. Social and cultural constructions of gender. Role of these constructs in structures of domination. Challenges met in transforming these structures.

ECS5316 INDIGENOUS CULTURES, CONFLICT AND COEXISTENCE (3cr.)
Implication of indigenous identities in the emergence and transformation of conflicts. Ethnic and religious dimensions of indigenous cultural resurgence in Canada and other national contexts. Conflict reduction and pluralistic coexistence.

ECS5330 CONFLICT RESOLUTION: RESULTS ASSESSMENT (3cr.)
Hermeneutical and empirical methodologies used to analyze and evaluate conflict resolution strategies, conflict resolution projects and programs. Case study presentations.

ECS5333 DIALOGUE: THEORY AND RESEARCH (3cr.)
Dialogue as exploration of hidden assumptions and the flow of ideas. Conflict as a rupture of dialogue within oneself or between people. Theoretical background and research to understand processes needed for a dialogue to achieve deeper levels of mutual understanding among participants.

ECS5921 STAGE DE RECHERCHE / RESEARCH INTERNSHIP
Stage of 150 hours in analyze et/ou résolution des conflits impliquant un travail de recherche et d'analyse avancé et soutenu. Le stage est supervisé et le travail évalué par un professeur membre du programme. Noté S/NS. Réservé aux étudiants du programme de M.A. Préalables : Réussite de 9 crédits du programme de M.A. avec une moyenne d'au moins B+. Approbation de la proposition de stage par le directeur du programme. / Internship of 150 hours in Conflict analysis and/or resolution, involving advanced and sustained research and analysis work. The internship is supervised and the work evaluated by a professor member of the program. Graded S/NS. Reserved for students in the MA program. Prerequisites: Completion of 9 credits in the MA program with an average of at least B+. Approval of the internship proposal by the program director.

ECS6140 RESEARCH SEMINAR (3cr.)

ECS6999 THÈSE DE M.A. / MA THESIS

ECS8901 SÉMINAIRE DE DOCTORAT I / DOCTORAL SEMINAR I (3cr.)
Séminaire visant l’atteinte par les étudiants des objectifs suivants : approfondissement des connaissances des quatre thèmes du programme de doctorat (les dimensions ethniques, religieuses, morales et sociales des conflits); développement de la capacité d’analyser et d’évaluer de façon critique les théories, ainsi que la capacité d’examiner de façon critique les théories, concepts et présupposés sur lesquels s’appuient tant l’analyse des conflits que les pratiques de résolution de conflits, le tout en rapport avec les intérêts de recherche propres à l’étudiant. Préalable : Une connaissance active du français ou de l’anglais et la capacité de comprendre et de lire dans l’autre langue. / Seminar aimed at enabling students to achieve the following objectives: gain expertise in the four themes of the PhD program (ethnic, religious, moral and social dimensions of conflict); develop the ability to analyze and evaluate critically the theories, concepts and assumptions underlying conflict analysis and resolution practice with particular attention to the students’ own research interests. Prerequisite: Active knowledge of either English or French and the ability to comprehend and read in the other language.

ECS8902 SÉMINAIRE DE DOCTORAT II / DOCTORAL SEMINAR II (3cr.)
Séminaire ayant pour objectifs de permettre aux étudiants d’atteindre les objectifs suivants : acquérir la capacité d’évaluer et de discuter de façon critique diverses perspectives sur les dimensions ethniques, religieuses, morales et sociales des conflits; acquérir des compétences théoriques permettant de relier les différentes disciplines utilisées en études de conflits et de comprendre en quoi ces disciplines peuvent contribuer de façon significative à l’approfondissement des intérêts de recherche de l’étudiant. Préalable : ECS8901. Connaissance active du français ou de l’anglais et la capacité de comprendre et de lire dans l’autre langue. / Seminar aimed at enabling students to achieve the following objectives: develop the ability to evaluate and discuss alternative perspectives on ethnic, religious, moral and social justice aspects of conflicts; develop the ability to bridge the disciplines used in conflict studies and to understand where and how these disciplines make valuable contributions to the students’ own research interests. Prerequisite: ECS8901. Active knowledge of either English or French and the ability to comprehend and read in the other language.

ECS8903 MÉTHODOLOGIE DE RECHERCHE / RESEARCH METHODOLOGY (3cr.)
Évaluation critique des résultats de la recherche en sciences humaines. Méthodes qualitatives et quantitatives pour la collecte des données, leur validation et leur interprétation. Développement des habiletés suivantes : la capacité de conceptualiser et de conduire des recherches susceptibles de générer des connaissances et des pratiques de pointe en études de conflits; acquisition de connaissances permettant d’examiner de façon critique les différentes méthodes de recherche en études de conflits et d’en évaluer leur valeur respective. Aspects éthiques de la recherche. Applications à des projets de recherche au niveau des projets de recherches et des thèses au niveau des études supérieures. Préalable : Connaissance active du français ou de l’anglais et la capacité de comprendre et de
Analyses of capital accumulation and income distribution; measures of technical progress, general equilibrium theory, and labor markets.

Co-op students must register full-time and complete two work terms.

Faculty of Social Sciences program is offered jointly with Carleton University.

Pb). Geochronology: fundamentals and application of Sm/Nd, Rb/Sr, U/Pb, K/Ar and Lu/Hf methods. Evolution of the solid Earth from the Precambrian to the Cenozoic. Study the formation of mineral groups, and instrumental methods in mineralogical research, such as use of electronic optical instruments, spectroscopy, and X-ray diffractometry.

Examine the composition of the mantle and crust in selected tectonic settings, such as subduction zones and hot spots. Topics may include how Precambrian shields have formed, their correlation with other Precambrian shields; global Precambrian tectonic evolution through review of continental reconstructions; Precambrian paleoceanography and paleolimnology.

Doctorate in Philosophy Earth Sciences

Women as criminals and victims; the impact of the operation of the criminal justice system on women.

CRM6363 POLICE AND SOCIETY

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in English or French.

Students have a right to produce their work, their thesis, and to answer examination questions in English or French.

The Faculty of Human Sciences at Saint Paul University offers programs leading to a graduate diploma in Couple Counselling and Spirituality, a Master of Arts (MA) and a Doctor of Philosophy (PhD) in Counselling and Spirituality, all conferred jointly by the Senates of Saint Paul University and of the University of Ottawa, with which Saint Paul is federated.

Master's program

The objective of the master's program is to train specialists to counsel and guide couples or individuals with regard to their values, their spirituality, as well as both their individual and couple dynamics, and to prepare graduates for a career in research.

Each concentration of the MA program (individual counselling; couple counselling; spiritual care) includes three components: knowledge acquisition; a research project or thesis; and professional practice.

A collaborative program in Women's Studies at the MA level is also offered.

Doctoral program

The goal of this program is to educate counsellors specialized in spirituality who are also researchers capable of independent and collaborative research. As researchers, they will be able to contribute to the knowledge base that informs counselling and spirituality.

Graduates from the PhD program will be prepared to:

- Demonstrate in-depth knowledge of one of the three fields mentioned above.
- Design and conduct research that contributes to the advancement of the discipline of Counselling and Spirituality.
- Practice as counselor with a specialization in spirituality.

Students will specialize in one of three fields: issues relating to special populations within society, existential and spiritual issues in counselling, and counselling in multi-faith and cross-cultural settings. These fields are described below.

Special Populations

The unique spiritual, social, and mental health needs of special populations are studied from a multidisciplinary perspective. Systemic issues related to special populations include but are not limited to the following: the challenges facing people who are homeless, people living in poverty, victims of abuse and trauma, women diagnosed with breast cancer.

Existential and Spiritual Issues in Counselling

This field addresses clients' search for meaning and purpose in their lives. Spiritual and existential issues in counselling surface when people try to make sense of their lives, especially during moments of existential crises, trauma, major loss, death, sickness and life transitions.

Counselling in Multi-faith and Cross-cultural Settings

To respond to the personal and social needs, values and goals of diverse cultural and religious groups in Canada, counsellors must understand these cultures and their spirituality.

The programs are offered in English and in French. In accordance with the University of Ottawa regulation, assignments, examinations, research papers, and theses can be produced in either English or French.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and Saint Paul University.
Programs

Master of Arts Counselling and Spirituality
Master of Arts Counselling and Spirituality Concentration in Spiritual Care
Doctorate in Philosophy Counselling and Spirituality

Admission

The requirements for admission to the MA in Counselling and Spirituality are the following:

- An honours bachelor’s degree or its equivalent
- 12 credits of theology at university level
- 48 credits in psychology, sociology, social work, health sciences, theology, or in related fields such as, but not exclusively, animation, social communications, mission sciences or conflict studies.

Among the 48 credits;

- At least 18 credits in psychology, and at least another 6 credits which can be in psychology, sociology or social work for the concentration in counselling (individual or couple)
- At least 12 credits in psychology, at least 6 credits in sociology, and at least another 6 credits which can be in psychology, in sociology or in social work for the concentration in spiritual care

- Applicants must have a minimum 70 per cent (B) average in the honours bachelor’s degree and the credits mentioned under points 2 and 3 above. The latter credits can be included in the honours bachelor’s degree.

Applicants who lack the necessary qualifications in theology may be admitted to a qualifying year at Saint Paul University. Students wishing to complete this qualifying year at another university are advised to have their course of studies approved by the Faculty of Human Sciences.

The academic record, maturity and motivation of the candidates, as well as their experience in the field of pastoral activity, are additional credentials considered by the admissions committee. Candidates will also be required to pass an interview and write a report describing the interaction that will have taken place during the interview.

Documents required for admission

Two official transcripts of the applicant’s previous university record are required, as well as two letters of recommendation on the official forms provided. Applicants must complete a self-evaluation form and answer a questionnaire giving their reasons and purpose for applying to the program, and list previous work experience in the helping professions.

A recent criminal record check is required to do a practicum in the hospitals for the spiritual care concentration.

Collaborative program in Women’s Studies at the master’s level

The MA program in Counselling and Spirituality is a participating unit in the collaborative program in Women’s Studies at the master’s level. This program has been established for students wishing to enrich their training in Counselling and Spirituality by including an interdisciplinary component in Women’s studies. The specific requirements of the collaborative program include two compulsory FEM courses and a thesis on a topic related to Women’s studies. One of the FEM courses replaces the elective course for students in the non-thesis option. Students in the thesis option must complete the two FEM courses in addition to the 45 credits required for the MA in Counselling and Spirituality.

Students must apply for acceptance in the women’s studies collaborative program at the same time as they apply for admission to the master’s program in criminology.

For further details, please consult the Women’s Studies collaborative program.

In accordance with University of Ottawa regulations, students are permitted to write assignments, exams, and theses in either French or English.

Program Requirements

MA in Counselling and Spirituality
The MA program requires successful completion of 39 credits (non-thesis option) or 45 credits (thesis option). These credits are distributed between coursework, practica, and research. The number of practicum credits specified for each concentration is the minimum and some students, depending on their profile may be required to do a greater number. Students are evaluated in their practica at the end of each session. A written report of each evaluation is kept in the student’s confidential file. The evaluations at the end of the second and third sessions are particularly significant in assessing the student’s capacity for continued participation in the program. The practica for each year constitute a single unit and must be taken consecutively.

### The Concentrations

1. **Individual Counselling**

   Compulsory courses (36 credits)

   - IPA5131 METHODOLOGY OF EMPIRICAL RESEARCH (3cr.)
   - IPA5134 PRACTICAL THEOLOGY (3cr.)
   - IPA5144 SPIRITUALITY AND COUNSELLING (3cr.)
   - IPA5146 PROFESSIONAL ISSUES AND ETHICS IN PASTORAL COUNSELLING (3cr.)
   - IPA6108 PSYCHOPATHOLOGY AND TREATMENT (3cr.)
   - IPA6120 THEORIES OF INDIVIDUAL COUNSELLING (3cr.)
   - IPA6156 RESEARCH SEMINAR (3cr.)

   **Professional practice**

   - IPA6221 PRACTICUM IN INDIVIDUAL COUNSELLING I (6cr.)
   - IPA6321 PRACTICUM IN INDIVIDUAL COUNSELLING II (3cr.)
   - IPA7221 PRACTICUM IN INDIVIDUAL COUNSELLING III (6cr.)

   **Optional professional practice**

   - IPA7128 EXTERNAL CLINICAL PRACTICUM (0cr.)

   One elective (3 credits)

2. **Concentration in Couple and Family Counselling**

   Compulsory courses (39 credits)

   - IPA5131 METHODOLOGY OF EMPIRICAL RESEARCH (3cr.)
   - IPA5134 PRACTICAL THEOLOGY (3cr.)
   - IPA5138 THEORIES OF FAMILY SYSTEMS AND INTERVENTIONS (3cr.)
   - IPA5144 SPIRITUALITY AND COUNSELLING (3cr.)
   - IPA5146 PROFESSIONAL ISSUES AND ETHICS IN PASTORAL COUNSELLING (3cr.)
   - IPA6108 PSYCHOPATHOLOGY AND TREATMENT (3cr.)
   - IPA7104 THEORIES OF COUPLE COUNSELLING (3cr.)
   - IPA6156 RESEARCH SEMINAR (3cr.)

   **Professional practice**

   - IPA6221 PRACTICUM IN INDIVIDUAL COUNSELLING I (6cr.)
   - IPA6321 PRACTICUM IN INDIVIDUAL COUNSELLING II (3cr.)
   - IPA7205 PRACTICUM IN COUPLE AND FAMILY COUNSELLING (6cr.)

   **Optional professional practice**

   - IPA7128 EXTERNAL CLINICAL PRACTICUM (0cr.)

3. **Spiritual Care**

   Compulsory courses (36 credits)

   - IPA5131 METHODOLOGY OF EMPIRICAL RESEARCH (3cr.)
   - IPA5134 PRACTICAL THEOLOGY (3cr.)
   - IPA5144 SPIRITUALITY AND COUNSELLING (3cr.)
   - IPA6120 THEORIES OF INDIVIDUAL COUNSELLING (3cr.)
   - IPA6156 RESEARCH SEMINAR (3cr.)
Professional practice

IPA6221 PRACTICUM IN INDIVIDUAL COUNSELLING I (6cr.)
IPA6160 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM I (4cr.)
IPA6161 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM II (4cr.)
IPA7162 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM III (4cr.)

One elective (3 credits)

All practica and Clinical Pastoral Education units include supervised work with clients at hospital placements or the Counselling Centre at Saint Paul University. Advanced students may be assigned external practica in community settings.

Thesis option
To be accepted into the thesis option, students must first be admitted into the MA program and have obtained 9 credits either by completing courses following registration or through advanced standing. They must apply to the faculty research committee, which will reach a decision based on the academic file, the quality of the thesis proposal and the existence of appropriate supervisory arrangements. Students in the thesis option must complete the same program requirements as students in the non-thesis option with two exceptions: they replace IPA 6156 with the thesis and they are exempted from completing the 3 elective credits.

Collaborative program in Women's Studies

Students admitted to the Collaborative program in women’s studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5103 FEMINIST METHODOLOGIES (3cr.)

  Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.
- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.
- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women’s studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.
- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

Duration of program

Full-time students are expected to complete all requirements within two years. Students in the thesis option may need more time. The maximum time permitted is four years from the date of initial registration in the program, whether studying full- or part-time.

Minimum standards

The passing grade in all courses is C+. A student who has incurred failures in two courses, a practicum or the thesis, or whose progress is deemed unsatisfactory is withdrawn from the program.

Courses

IPA5129 GROUP DYNAMICS AND COUNSELLING (3cr.)
This course introduces theories, principles and practices in group therapy designed to help prepare future professionals to work with people in various settings. Group processes are covered through interactive discussions, small group participation, role plays, and other observations.

IPA5131 METHODOLOGY OF EMPIRICAL RESEARCH (3cr.)
This course helps the students to develop skills for the critical evaluation of empirical research in the human sciences and the application of these skills in graduate research projects and theses. Qualitative and quantitative methods of gathering and validating scientific evidence in observation, case, evaluation, correlational and experimental studies. The formation of problems, structured questions, causal and non-causal
hypotheses; operational definitions; dependent, extraneous and randomized variables; the selection of samples. Research ethics will be examined.

IPA5134 PRACTICAL THEOLOGY (3cr.)
This course presents new developments in Practical Theology with its particular interdisciplinary perspectives on faith and practice. The origins and development of Practical Theology are presented as a background to its specific methods and content. Practical Theology is situated within the modern context of theology. The course introduces the pastoral practitioner and the student of theology to theological examination of the components of ministry and of contemporary expressions of faith.

IPA5138 THEORIES OF FAMILY SYSTEMS AND INTERVENTIONS (3cr.)
This course presents a history of the family systems theories with individuals, couples, and families with a major focus on advanced family systems theories and interventions. Theories covered include Structural, Strategic, Bowen, Narrative, Solution Focused and more. Attention is paid to assessment of functional and dysfunctional family systems. The student/practitioner will learn interviewing, assessment and restructuring techniques, and how to explore family rules, systems, values and boundaries.

IPA5142 WORKING WITH TRAUMA AND VIOLENCE IN COUPLES AND FAMILIES (3cr.)
The goal of this course is to provide a conceptual framework, including theory, research and interventions that will enable the students to understand and treat trauma and violence in couples and family relationships. The course will present an attachment perspective and research on trauma and outline advanced family systems therapeutic assessments and interventions for trauma survivors and their families.

IPA5144 SPIRITUALITY AND COUNSELLING (3cr.)
This course presents the human experience as the common bond linking theology, counselling and spirituality. A variety of approaches in theology and in counselling will be studied, including: The relationship between the stages of moral (human) development and the images of God, how psychology helps make the difference between an unhealthy theology, and a healthy one, that gives rise to a spirituality enriching us in our growth and development.

IPA5146 PROFESSIONAL ISSUES AND ETHICS IN PASTORAL COUNSELLING (3cr.)
Students are oriented to relevant professional organizations; the need for liability insurance, codes of ethics, professional standards and certification is examined. The course reviews major contemporary issues that surround the practice of pastoral counselling (e.g., confidentiality and its limits, record keeping, informed consent, the legal concerns impacting pastoral counselling) and research. The student is introduced to the processes of ethical reasoning and ethical decision-making. The need for continued training and supervised practice leading to certification will be discussed. Considerable attention is given to the role of informed judgment and peer consultation in resolving ethical dilemmas.

IPA5161 UNDERSTANDING THE TRAUMA OF SEXUAL ABUSE (3cr.)
The goal of this course is to present an overview of the theory, research, clinical and treatment issues related to trauma and childhood sexual abuse. This course will introduce the theories of trauma from a family systems perspective. Effects of sexual abuse in terms of developmental issues over the life span, associated symptomatology of sexual abuse and trauma, and related clinical issues and practices.

IPA5162 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS II (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5163 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS III (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5164 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS IV (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5547 DYNAMIQUE DE LA MALADIE ET DE SES EFFETS (3cr.)
Les stresseurs reliés à la maladie, à la souffrance et à l'hospitalisation; les possibilités de développement humain et spirituel. Les stages psychodynamiques de la maladie, de la mort et du deuil; façons de répondre aux besoins des patients, de leurs familles et de la communauté professionnelle des soins de santé. Les attitudes pastorales nécessaires pour un tel travail, espérance, ouverture, acceptation de sa propre mortalité.

IPA5549 QUESTIONS PROFESSIONNELLES ET QUESTIONS D'ÉTHIQUE EN SOINS SPIRITUELS (3cr.)
Ce cours initie l'étudiant aux questions professionnelles d'éthique relatives aux services en soins de santé. L'étudiant apprend les normes professionnelles d'éthique et leur application en milieu hospitalier. Par le biais d'études de cas et de situations d'éthique difficiles, l'étudiant examine des questions d'ordre général, mais aussi des questions professionnelles plus spécifiques, i.e., l'utilisation des règles d'éthique au moment de la prise de décision, le respect de la liberté de conscience, le besoin de confidentialité et ses limites, la formulation de questions de recherche en soins de santé, et l'influence du travail d'équipe dans les soins apportés aux patients. L'étudiant aborde des questions d'éthique et de morale telles l'avortement, l'euthanasie et le prolongement de la vie. Enfin, il apprend à travailler avec des ressources souvent limitées.

IPA6103 SPIRITUALITY AND HUMAN DEVELOPMENT (3cr.)
This course examines psychological and sociological theories of human development as they relate to the religious and spiritual dimensions of the human personality. More particularly, it looks at the impact of individual growth and development, cultural and social processes of religious experience, healthy and unhealthy religion, conversion and faith, religious attitude and maturity. Practical implications will be drawn from theory.

IPA6108 PSYCHOPATHOLOGY AND TREATMENT (3cr.)
Concepts such as normality and abnormality, and the inter-relationship of perceptual, cognitive and affective dimensions are discussed. Motivational, social, behavioural and inter-personal components of human functioning and reviewed. This course presents the mental disorders, distinguishing the neurotic and psychotic disorders. The neuroses, transient reactions to stress, psychological factors in physical illnesses, personality disorders and affective disorders are treated in depth. Each class of disorders is viewed from the point of view of its etiology, diagnostic
indicators, assessment, research and treatment. An explanation of the factors that foster an individual’s invulnerability to stress, trauma, and genetic predispositions is presented. The interplay of stressors, interpersonal and intrapersonal resources, life history and community is emphasized in the etiology and course of the disorders and normal functioning. Disordered functioning is seen as a person’s attempt to come to terms with the demands of living.

**IPAI6120 THEORIES OF INDIVIDUAL COUNSELLING** (3cr.)
This course provides a brief overview of the history of counselling theory and its orientations and trends. It attends to the nature of theory building and its interconnection to practice and research. It presents, critically in depth, representative theories from the current major orientations (e.g., experiential, cognitive, psychodynamic, behavioural) with a focus on the integration of understanding, assessment and treatment in the counselling process. In the presentation of theories, attention is given to the integration of theory, research and practice. Each theory is discussed with reference to its practical application, effectiveness and limitations. The manner in which one or more of these theories has been applied to pastoral counselling practice and in the development of pastoral counselling models, and in the development of a person’s spiritual and religious life is covered.

**IPAI6130 COUPLES, FAMILIES AND ADDICTIONS** (3cr.)
The goal of this course is to present an in depth examination of the specific characteristics, dynamics and best therapeutic practices in working with individuals, couples and families affected by chronic addiction. It will focus on the challenges faced by professionals working with the addicted person or family and will teach ways to overcome those challenges. It will offer information regarding recovery issues and will provide students with systemic therapy interventions and resources for their work with this population.

**IPAI6151 SPIRITUALITY AND ADAPTATION TO ILLNESS** (3cr.)
Examines the phenomenology and etiology of health and illness. Emphasizes the creation of opportunities for human and spiritual growth. It examines the tensions that negatively affect certain types of terminal illness, their implications and effects on individuals, their families, and the community. It also examines the role of pastoral workers and how fears, guilt, feelings of inadequacy, and troubled interpersonal relationships can lead to hope, forgiveness, self-fulfillment, and human and spiritual growth. This course will enrich the critical thinking of professionals working with individuals who are at the end of life and with those close to them.

**IPAI6156 RESEARCH SEMINAR** (3cr.)

**IPAI6160 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM I** (4cr.)
This beginner practicum provides a learning situation whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of pastoral care services. Students are trained in the basic skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff. This practicum consists of group activities, placement, written exercises and personal development seminar.

**IPAI6161 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM II** (4cr.)
This practicum continues the experience gained in #1. Students learn more of the functions and concerns of spiritual care services; to the organization of a spiritual care department; to the practices and procedures for the implementation of spiritual care. The following methods encompass this experiential learning: supervised practice of ministry, lectures, seminars and didactics, personal development seminar, verbatim/virtual visit reporting, individual supervision, and reflection reports.

**IPAI6181 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM I** (4cr.)
This beginner extended unit practicum provides a learning situation in a hospital, health care institution, prison, or parish whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of pastoral care services; to the organization of a spiritual care department; to the practices and procedures for the implementation of spiritual care. Students are trained in the basic communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPAI6182 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM II** (4cr.)
This extended practicum continues the learning whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students deepen the functions and concerns of pastoral care services. Students are trained in the advanced communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPAI6185 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM III** (4cr.)
This advanced extended practicum solidifies the experience gained whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students learn more of the functions and concerns of spiritual care services. Students are trained in the greater communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPAI6184 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM IV** (3cr.)
This advanced extended practicum solidifies the experience gained whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students learn more of the functions and concerns of spiritual care services. Students are trained in the greater communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPAI6221 PRACTICUM IN INDIVIDUAL COUNSELLING I** (6cr.)
Students receive training in basic communication, interpersonal and interviewing skills. The development of attitudes and interpersonal qualities that facilitate the helping process is encouraged through a didactic experiential training approach. Assessment of the client’s needs, personal and religious development, current capabilities, and circumstances of living is carried out. The counsellor-in training is taught to evaluate the client’s emotional patterns, cognitive style, interpersonal patterns, and strategies for living. Students are instructed in a professional ethical approach to clients. Emphasis is placed on the integration of theory with an assessment of the client to plan counselling goals. These goals are continually re-evaluated with respect to theoretical and psychological theory, client responsiveness, clinical practice and research. When ready, students are
given opportunities to counsel individuals. The student is introduced to assessments and treatment of couples through observations of videotapes and of live sessions. Acquired skills are systematically applied and practiced in role-playing sessions or with clients of the Centre for Counselling and Pastoral Services. Students are taught to write professional reports on their client sessions. Video and audio recordings, staff demonstrations, case studies and coaching may be used in both individual and small group supervision. Within the practicum, the student examines the spiritual values in the client’s existential situation. A holistic approach to the person is encouraged. Face-to-face contacts with clients is determined by the availability of clients and the student’s readiness to see clients.

IPA6257 MA THESIS (12cr.)

IPA6260 CLINICAL PASTORAL EDUCATION (CPE) SUMMER PRACTICUM (6cr.)
This practicum provides a learning situation in a hospital whereby students develop personal and professional qualifications for ministry as an intern chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of spiritual care services and acquire a knowledge base of the practices and procedures for the implementation of spiritual care. Students are trained in communication and assessment skills in order to meet the spiritual, emotional and religious needs of patients, families and staff.

IPA6301 THEOLOGICAL QUESTIONS IN FAMILY LIFE (3cr.)
This course treats the interrelation of contemporary family life and Christian faith. It examines the questions raised for theology and pastoral care by new values and lifestyles in the family. It offers a critical assessment of the forces responsible for these changes. In light of this analysis, it presents new possibilities for pastoral care. Among the questions treated are: faith and the sacrament of marriage; conjugal love and procreation; pastoral care of the divorced and separated; role relations in the family; family spirituality.

IPA6312 COUPLES, FAMILY DEVELOPMENT AND GROWTH (3cr.)
Introduction to the psychology of individuals, couple and family development and growth and provided knowledge of personality development over the life span. This course will review attachment over the life span, the stages of development from childhood to adulthood, and corresponding changes in family roles, as well as advanced therapeutic interventions.

IPA6321 PRACTICUM IN INDIVIDUAL COUNSELLING II (3cr.)
Students will further their training by practicing their counselling skills through role plays, client contact, and by practicing in regular supervision.

IPA6552 THÉLOGIE ET SOINS SPIRITUELS (3cr.)
Ce cours offre aux étudiants une compréhension théologique critique et fournit les moyens de développer la pratique du ministère pastoral dans les services en soins de santé. Il présente une étude anthropologique de l'expérience humaine de la santé, de la maladie, de la guérison, de la souffrance, et de la mort, accompagnée d'une réflexion théologique basée sur différentes traditions chrétiennes. Il présente aussi les ressources suivantes : les principes du développement humain et de l'aide aux autres ; la réflexion sur la pratique des soins pastoraux et divers modèles de soins de santé ; les habiletés requises à l'exercice de ces soins, ainsi qu'une réflexion sur les rites utilisés ; enfin, l'étude de la religion personnalisée et de la spiritualité.

IPA6703 SPIRITUALITÉ ET DÉVELOPPEMENT HUMAIN (3cr.)
Ce cours examine les théories psychologiques et sociologiques du développement humain et les effets qu'elles ont en relation avec les dimensions religieuses et spirituelles de la personnalité humaine. Plus particulièrement, on étudiera la relation des processus de changement humain et des processus d'inculturation et de socialisation avec le phénomène de l'expérience religieuse, la conversion et la foi, l'attitude et la maturité religieuses et le bien-être spirituel. Diverses applications pratiques seront examinées à la lumière des théories à l'étude.

IPA7102 PHENOMENOLOGY OF HUMAN RELATIONSHIPS IN LOVE AND MARRIAGE (3cr.)
This course examines the representation, practices, and issues of love and relationships. These issues will be examined through various systems theories, and then brought into everyday applied practice for counselors. The course will present aspects of love in committed relationships, review the literature and psychology theory on these aspects, and work with doing applied therapy on these aspects.

IPA7103 THEOLOGICAL QUESTIONS IN MARITAL COUNSELLING (3cr.)
This course examines the process of pastoral counselling with special reference to marital counseling. It looks at the value orientation of the marital counsellor, the place of religious values and resources in the counselling process, and the religious and moral development of the couple. The Christian dimension of certain ethical issues in marital counselling such as human sexuality, parenthood and divorce are explored as well as religious growth as it relates to the life cycle of the couple.

IPA7104 THEORIES OF COUPLE COUNSELLING (3cr.)
The goal of this course is to provide an overview of the history and nature of theories of couple counselling. This course will introduce the central concepts and ideas guiding couple therapy, including attachment, family systems, Emotionally Focused, experiential, and humanistic and the recent research related to couple therapy. There will be a particular focus on the skills, assessment and practice associated with Emotionally Focused therapy. Couple relationships both on the conscious and unconscious levels of functioning are examined and conceptualized.

IPA7105 ASSESSMENT PROCEDURES IN PASTORAL COUNSELLING (3cr.)
This course approaches assessment from a non-testing perspective and by the use of clinical material. The major emphasis is given to the use of theoretical concepts to assess the internal and external factors that contribute to personal and interpersonal functioning or dysfunctioning. The clinical material for this assessment is derived from structured and unstructured interviews. The means and ways to assess individual’s strengths and resources to cope with life are discussed. The use of applications that are linked to major current theoretical orientations (e.g., experiential, cognitive, psychodynamic, behavioriall) are introduced. When to make referrals for assessment to another professional will be introduced. The ethics, limitations and purpose of assessments are integrated into the course.

IPA7109 SURVEY OF SEXUAL DYSFUNCTION AND TREATMENT (3cr.)
The purpose of this course is to present the history and development of dysfunctions in the field of human sexuality and to survey various treatments for couples. This course will examine the human development of sexual expressions in their male and female dysfunctions; the biological and psychological determinants; sexual dysfunction and marital interaction and sexual assessment and applied treatment within individual; and couple therapy.

**IPA7128 EXTERNAL CLINICAL PRACTICUM (ocr.)**
In this supervised field practicum, the student offers counselling services at a community centre or an agency located outside campus. Prerequisite: Have obtained an “S” (Satisfactory) in all evaluation items in the course IPAM21 Corequisites: IPAM21 or IPA7221 or IPA7205

**IPA7162 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM III (4cr.)**
Students learn advanced skills in ministry to the sick, their families, as well as other specific settings in keeping with the students learning goals. They perfect and consolidate basic attitudes. Students are responsible for more complex ministry situations such as palliative care and mental health. They are taught to foster team work in a caring community as part of a spiritual care team.

**IPA7163 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM IV (3cr.)**
Students learn advanced skills in spiritual care to the sick, their families, as well as other specific settings in keeping with the students learning goals. Students also are required to make presentations in class or to other professionals on a topic of their expertise. They are taught to foster team work in a caring community as part of a spiritual care team. The following methods encompass this experiential learning: supervised practice of ministry, lectures, seminars and didactics, integration seminar, verbatim/ virtual visit reporting, individual supervision, and reflection reports.

**IPA7205 PRACTICUM IN COUPLE AND FAMILY COUNSELLING (6cr.)**
This practicum presents 1) theoretical study on couple and family therapy, 2) therapy application to various situations and role-plays, and video of various expert intervention modalities and 3) contact with clients (couples and/or families) and supervision. Studies will focus on advanced family systems theories. As well, this study portion will provide applied practices evolving from these theoretical orientations. The emphasis is on case conceptualization, applicable assessment, and executive therapeutic skills. Prerequisite: IPA7104.

**IPA7221 PRACTICUM IN INDIVIDUAL COUNSELLING III (6cr.)**
It emphasizes the use of advances assessment and treatment skills and presupposes that the students demonstrate the utility of their knowledge and their research knowledge. Students learn to use current major individual counselling models (e.g. experiential, cognitive, psychodynamic, behavioural) so that they can respond with a wide range of therapeutic strategies to the varied needs and circumstances of clients. Practice consists of counselling sessions with clients at the Centre for Counselling and Pastoral Services under team observation and individual and small group supervision. These sessions or other case studies are used to assess the progress and plans of counselling. According to the Faculty’s regulations and at the discretion of the supervisor, audio-visual or written records are used to monitor the process. Additionally, field practice is arranged in order to ensure adequate exposure to a varied population of pastoral counselling clients.

**IPA8101 SPIRITUALITY AND COUNSELLING (3cr.)**
Study of qualitative and hermeneutical methods as these are used in the social sciences and in theological study of spirituality. Comparative study of one or more Christian spiritual traditions and one or more spiritual traditions within other religions and secular culture to increase understanding and practice of spirituality. The course is designed to highlight the role of spirituality in the well-being and adjustment of individuals. This course will treat the question of personal and spiritual growth. The importance of spiritual practices and the overall relationship of spirituality to the counselling process will also be considered.

**IPA8102 COUNSELLING IN MULTI-FAITH AND CROSS-CULTURAL SETTINGS (3cr.)**
This course examines counselling in a culturally pluralistic spiritual and religious context. It examines the possibility of mutuality and dialogue using a comparative religious approach from social science and theological perspectives. The theory and practice proposed focuses on the differing spiritual and secular humanist journeys of the counsellor and the client, and the possibility of meeting in difference. Topics covered include: the impact of enculturation, intercultural identity, inter-religious dialogue, intercultural competence on both parties; the ways in which intercultural competence and intercultural growth contribute to spiritual growth. The course enables counsellors and their clients to assess the extent to which spiritual values, beliefs and practices are an asset or a liability for clients in reaching their counselling goals.

**IPA8103 ISSUES IN SPECIAL POPULATIONS (3cr.)**
This course treats issues related to the needs and social status of certain special populations. Accumulated data on group characteristics and challenges facing some special populations, such as those who are aged or those who are homeless, are critically reviewed. Membership in some social groups may involve loss of social privileges, as well as diminished access to mental and health care resources. Students explore issues related to the unique spiritual and mental health needs of these groups, their social circumstances, and the implications for service provision. Growing problems concerning assessment, intervention, and the increased barriers to services are examined from the point of view of community approaches to research and intervention. The role of counsellors working with persons with unique needs, individually or at the community level, will be addressed.

**IPA8104 EXISTENTIAL ISSUES IN COUNSELLING (3cr.)**
This course explores meaning-of-life issues often presented by clients in a variety of contexts, including, but not limited to, the quest for increased well-being, existential crises, life transitions, loss and death, end-of-life, and trauma. Qualitative methods of data collection and analysis are critically reviewed to gain insight into the meaning participants give to their lived experience, the meaning they place on events, processes, perceptions and into the ways in which they connect these meanings to the social world around them. A variety of religious, spiritual and secular humanist sources of and responses to existential issues are treated.

**IPA8105 RESEARCH METHODS AND DESIGN PROBLEMS IN COUNSELLING AND SPIRITUALITY (3cr.)**
The focus of this course is the critical analysis and discussion of the challenges that counsellors face in choosing and applying qualitative and quantitative methods to spirituality. In-depth study of design pitfalls that arise from the complexity and unpredictability of working with human subjects given the multi-cultural complexity of pluralistic societies. Potential topics include sampling issues, measurement issues, and special
analytic techniques.

**IPA8106 DOCTORAL SEMINAR** (3cr.)
Guest lecturers will select readings and lead seminars related to relevant research topics such as proposal writing, conceptual frameworks, ethics, methods and procedures, and statistical analysis. Students must write an annotated bibliography and prepare a plan for their comprehensive exam. In addition, they must write a paper and do an oral presentation designed to facilitate their work around the thesis proposal. Evaluation by the seminar coordinator.

**IPA8201 INTERNAL CLINICAL PRACTICUM**
The internal clinical practicum takes place in the Saint Paul University Counselling Centre. The goal of the practicum is to put into practice the theoretical knowledge of counselling and spirituality. Supervisors will specify the goals, objectives and syllabus of practicum. They will use observation, debriefing, peer review, written and oral feedback, and direct intervention and observation, to instruct and evaluate students. Minimum number of hours: 250. Graded S/NS.

**IPA8202 EXTERNAL CLINICAL PRACTICUM**
Clinical practice in an external location that must be approved by the program director. Graded S/NS. Students complete a minimum of 1500 hours of supervised training, internal and external practicum combined.

**IPA9997 PROPOSITION DE THÈSE / THESIS PROPOSAL**
Présentation du projet de thèse devant un comité composé du directeur de la thèse, des membres du comité de thèse et d’un ou deux autres professeurs./ Presentation of the thesis proposal to an examining committee composed of the supervisor, the members of the advisory committee and one or two other professors.

**IPA9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAM**

**IPA9999 THÈSE DE DOCTORAT / DOCTORAL THESIS**

### Criminology

The department of Criminology offers graduate programs leading to the degrees of Master of Arts (MA) and Doctor of Philosophy (PhD) in Criminology.

Criminology is devoted to the scientific analysis of crime, justice and social control. It focuses on four broad questions: the social construction of norms and the notion of crime; the criminalization of specific behaviours, individuals and groups in our society; the analysis of the goals and functioning of the criminal justice system; and the examination of contemporary forms of intervention.

#### Master’s program

The master’s program consists of three distinct 30 credit options: one with major research paper, one with thesis, and one with a thesis and field placement. These three options are intended to equip students with knowledge of the major theoretical and methodological frameworks in criminology so that they will be able to critically analyze them and apply this knowledge to describe and explain conceptual and empirical problems of crime, justice and social control, both within the framework of optional courses or of an internship seminar with an on-site internship.

Thus, a master’s degree with three options is offered:

- Option with thesis (120 pages). In addition to the mandatory core courses, the acquisition of thematic theoretical and methodological competencies is achieved by means of a thesis and three elective courses.
- Option with thesis (120 pages) and field placement. In addition to the mandatory core courses, the acquisition of thematic theoretical and methodological competencies is achieved by means of a thesis, a field placement seminar and a field placement of 360 hours in an environment that responds to the learning interests of the student.
- Option with Major Research Paper (60 pages) that allows the student to complete the program on a part-time basis beginning in the fourth semester of registration. In addition to the mandatory core courses, the acquisition of thematic theoretical and methodological competencies is achieved by means of a major research project and five elective courses.

The department offers a collaborative program in Women’s Studies at the MA level. For more information on this program, see “Admission Requirements.”

#### Doctoral program

The doctoral program aims to prepare criminologists who have a solid understanding of contemporary issues in criminology and criminal justice policies, have in-depth knowledge of the theories and debates that characterize the discipline and are equipped to design and conduct a methodologically sound original research program.

The field is divided into two areas. The first addresses the process by means of which criminal justice policies (including laws and institutions
such as the police, prison, etc.) are created and developed. The second concerns the theoretical and empirical analysis of the implementation of such policies. It examines how institutions function and attempts to assess the social consequences of these policies so as to suggest new reforms or alternative measures of a more moderate nature and more respectful of human dignity.

The programs are offered in English and French and are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Criminology

Master of Arts Criminology Specialization in Women's Studies

Doctorate in Philosophy Criminology

**Admission**

To be eligible for admission to the MA program:

- Students must hold a Bachelor's degree with a major in Criminology or equivalent with a minimum average of 75% (B+).
- Their previous studies must have included CRM4304 QUALITATIVE RESEARCH IN CRIMINOLOGY (3cr.) and CRM3334 QUANTITATIVE RESEARCH IN CRIMINOLOGY (3cr.) or equivalent. If not, they will have to take them as additional courses during their first session in the MA program.

**The qualifying program**

If the student has an Honours degree in a related field (e.g., sociology, psychology, law, social work, political science, history, philosophy) but is considered to have insufficient training in the theoretical and methodological traditions of the criminological discipline, the student may be offered a qualifying year involving up to 24 credits in order to render the student eligible to pursue studies in the Master's program. To successfully complete the qualifying year, the student must pass all courses (passing grade is C+) and have an average of B+. It is necessary to submit a new application, during the qualifying year, for admission to the Master's program to be considered. The student will receive an offer of admission to the Master's program which will be conditional on the successful completion of the qualifying year.

**Collaborative program in Women's Studies**

The Department of Criminology is a participating unit in the collaborative master's program in Women's Studies (master's level only). This program has been established for students wishing to enrich their training in criminology by including an interdisciplinary component in women's studies. The specific requirements of the collaborative program include two core courses and a thesis or major research paper on a topic related to women's studies. In addition, for those students who have chosen the option of MA with thesis and field placement, the field placement offered to the student will be related to issues involving feminist concerns.

Students must apply for acceptance in the women's studies collaborative program at the same time as they apply for admission to the master's program in criminology.

For further details, please consult the Women's Studies program on the FGPS website.

**Language requirements**

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Program Requirements**

**MA thesis option (30 credits)**

- Compulsory courses:
  - CRM6320 RESEARCH METHODOLOGY IN CRIMINOLOGY I (3cr.)
  - CRM6325 RESEARCH SEMINAR IN CRIMINOLOGY (3cr.)
One of the following courses:
- CRM6350 CONTEMPORARY CRIMINOLOGICAL THEORIES (3cr.)
- CRM6340 THEORIES OF INTERVENTION IN CRIMINOLOGY AND ALTERNATIVE PRACTICES (3cr.)

Elective courses (9 credits)
- CRM7999 THÈSE / THESIS (12cr.)

MA with field placement option (30 credits)

Compulsory courses:
- CRM6320 RESEARCH METHODOLOGY IN CRIMINOLOGY I (3cr.)
- CRM6325 RESEARCH SEMINAR IN CRIMINOLOGY (3cr.)
- One of the following courses:
  - CRM6350 CONTEMPORARY CRIMINOLOGICAL THEORIES (3cr.)
  - CRM6340 THEORIES OF INTERVENTION IN CRIMINOLOGY AND ALTERNATIVE PRACTICES (3cr.)
- CRM6345 FIELD PLACEMENT SEMINAR (3cr.)
- CRM6400 FIELD WORK IN CRIMINOLOGY II (6cr.)
- CRM7999 THÈSE / THESIS (12cr.)

MA with major research paper option (30 credits)

Compulsory courses:
- CRM6320 RESEARCH METHODOLOGY IN CRIMINOLOGY I (3cr.)
- CRM6325 RESEARCH SEMINAR IN CRIMINOLOGY (3cr.)
- One of the following courses:
  - CRM6350 CONTEMPORARY CRIMINOLOGICAL THEORIES (3cr.)
  - CRM6340 THEORIES OF INTERVENTION IN CRIMINOLOGY AND ALTERNATIVE PRACTICES (3cr.)
- Elective courses (15 credits)
- CRM6999 MÉMOIRE DE RECHERCHE / MAJOR RESEARCH PAPER (6cr.)

Collaborative program in Women's Studies

Students admitted to the Collaborative program in women’s studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

Two compulsory courses:
- FEM5300 FEMINIST THEORIES (3cr.)
- FEM5303 FEMINIST METHODS (3cr.)

Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.

Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women’s studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.

Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

Language of instruction

In accordance with University of Ottawa policy, students have a right to produce their work and to answer examination questions in French or in English.

Duration of program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Residence

All full-time students must complete a minimum of three sessions of full-time registration.

Minimum standards

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The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

Required courses are offered in English and French every year. Optional courses are offered periodically.

**CRM6320 RESEARCH METHODOLOGY IN CRIMINOLOGY I (3cr.)**
Study of the main epistemological questions regarding research activities in criminology; in-depth analysis of data collection methods with a focus on data treatment and analysis. Prerequisites: CRM 3334 and CRM 4304 or the equivalent.

**CRM6325 RESEARCH SEMINAR IN CRIMINOLOGY (3cr.)**
Annual seminar (every two weeks) with the following objectives: (a) detailed analysis of the procedures involved in the implementation of a research activity; formulation of a research project (research problem and theoretical framework) at the end of the fall session; presentation of the final research project (research problem, theoretical framework and methodology) at the end of the winter session.

**CRM6330 QUANTITATIVE METHODS IN CRIMINOLOGY (3cr.)**
Study of various epistemological, methodological and ethical questions regarding the use of quantitative methods of data collection and analysis.

**CRM6331 QUALITATIVE METHODS IN CRIMINOLOGY (3cr.)**
Study of various epistemological, methodological and ethical questions regarding the use of qualitative methods of data collection and analysis.

**CRM6340 THEORIES OF INTERVENTION IN CRIMINOLOGY AND ALTERNATIVE PRACTICES (3cr.)**
Examination of the theories and bases of the treatment of the criminalized in our society. Analysis of alternative forms of practice.

**CRM6341 COUNSELLING IN CRIMINOLOGY (3cr.)**
Nature, analysis and limitations of counselling in criminology.

**CRM6342 COMMUNITY INTERVENTION IN CRIMINOLOGY (3cr.)**
Community methods of intervention; responsibility and limits. Use of community resources. Participation in correction and social action.

**CRM6343 SOCIAL POLICY AND CRIMINOLOGY (3cr.)**
Issues underlying social policies with respect to crime and social control. The process of policy formation; critical and comparative aspects.

**CRM6345 FIELD PLACEMENT SEMINAR (3cr.)**
Restricted to students registered in the field placement (CRM6400). Critical reflection on the field placement experience. Discussion of issues related to the field placement settings of the students. Oral presentation and written report.

**CRM6350 CONTEMPORARY CRIMINOLOGICAL THEORIES (3cr.)**
Analysis of current problems in criminological theory.

**CRM6353 REPRESENTATIONS AND IDEOLOGIES OF CRIME (3cr.)**
Study of the representations and ideologies of crime and social control.

**CRM6354 SOCIAL HISTORY OF THE CRIMINAL JUSTICE SYSTEM (3cr.)**
Problems of research on the history of penal institutions; analysis of selected cases or situations.

**CRM6355 COMPARATIVE CRIMINOLOGY (3cr.)**
Discussion of the bases of comparative analysis in criminology; analysis of specific situations.

**CRM6359 EVALUATION OF CRIMINAL JUSTICE PROGRAMS, POLICIES AND LEGISLATION (3cr.)**
Evaluation principles, approaches, models and methods; analysis of programs, policies and their theoretical underpinnings; selection of evaluation questions, preparation of a proposal and development of evaluation research tools.

**CRM6360 PHILOSOPHY OF CRIMINAL LAW (3cr.)**
Critical examination of the main theories and ideologies of the role of criminal law; the reform of criminal law.

**CRM6361 CRIME PREVENTION (3cr.)**
The impact and function of prevention research in criminology; prevention programs; evaluation.

**CRM6362 CRIMINAL JUSTICE AND THE VICTIMS OF CRIME (3cr.)**
The impact of the Victims Movement on the aims and operation of the criminal justice system.

**CRM6363 POLICE AND SOCIETY (3cr.)**
The role and functioning of the police in contemporary society; relation to the state and to civil society.

**CRM6364 SENTENCING (3cr.)**
Analysis of the aims and operation of sentencing.
CRM6365 THE SOCIO-POLITICS OF INCARCERATION (3cr.)
Analysis of the socio-political aims, functions and consequences of incarceration. The politicization of reform; abolition; prisoners rights movements.

CRM6367 WOMEN AND CRIMINAL JUSTICE (3cr.)
Women as criminals and victims; the impact of the operation of the criminal justice system on women.

CRM6370 CORPORATE CRIME (3cr.)
Analysis of the differential responses to various forms of corporate crime.

CRM6371 POLITICAL CRIME (3cr.)
Analysis of the forms of political crime and of the differential responses to the phenomenon.

CRM6380 SELECTED TOPICS I (3cr.)
Various topics will be discussed from year to year.

CRM6381 SELECTED TOPICS II (3cr.)
Various topics will be discussed from year to year.

CRM6400 FIELD WORK IN CRIMINOLOGY II (6cr.)
Restricted to students registered in the MA (Thesis and Field Placement option). Graded S/NS.

CRM6768 LE JEUNE ET LA JUSTICE PÉNALE (3cr.)
Analyse des différents aspects de la justice pour mineurs; leurs implications et les problèmes posés.

CRM6999 MÉMOIRE DE RECHERCHE / MAJOR RESEARCH PAPER (6cr.)

CRM7999 THÈSE / THESIS (12cr.)
Obligatoire pour les étudiants du M.A. / Compulsory for MA students.

CRM8100 DOCTORAL SEMINAR (3cr.)
This seminar provides students with the epistemological and theoretical tools necessary for developing an advanced level of reflection around their research topic. Attendance, active participation, an oral presentation, and a paper are compulsory.

CRM8102 CURRENT ISSUES IN CRIMINOLOGY (3cr.)
Presentation of current topics in criminology with discussions aimed at developing professional skills (facilitating/moderating a discussion, preparing for a debate, writing a grant proposal, etc.). Bi-weekly seminars with participation by different professors in the department, visiting professors, or other experts depending on the issue or topic. Graded S/NS.

CRM8110 RESEARCH METHODOLOGY IN CRIMINOLOGY II (3cr.)
Reflection on issues related to research methodology. In-depth training in a few methods. Methods of enquiry, practical considerations, data analysis, interpretation of results, etc. Acquisition of the knowledge needed to develop, direct, and administer a major research program in criminology.

CRM9997 PROJET DE THÈSE / THESIS PROPOSAL
Rédaction et soutenance orale d’un projet de thèse, à terminer normalement avant la fin de la cinquième session d’inscription au programme. Note S/NS. Writing and oral defence of the thesis proposal to be completed normally before the end of the fifth session of registration in the program. Graded S/NS.

CRM9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

CRM9999 THÈSE DE DOCTORAT / PhD THESIS
Préalable CRM9997 / Pre-requisite CRM9997

Earth Sciences

Ottawa-Carleton Geoscience Centre

Established in 1982, the Ottawa-Carleton Geoscience Centre (OCGC) combines the research strengths of the University of Ottawa and Carleton University. The Centre offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in Earth sciences.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.
Members of the Institute are engaged in the following main areas of research: environmental geoscience, geochemistry / petrology, geomatics / geomatics, mineral resources studies, sedimentary systems, and tectonics / geophysics.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The Centre is one of the participating units in the collaborative program in chemical and environmental toxicology (at the master's and doctoral levels) and in environmental sustainability (at master's level).

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Programs

Master of Science Earth Sciences
Master of Science Earth Sciences Specialization in Chemical and Environmental Toxicology
Master of Science Earth Sciences Specialization in Environmental Sustainability
Master of Science Earth Sciences Specialization in Science, Society and Policy
Doctorate in Philosophy Earth Sciences
Doctorate in Philosophy Earth Sciences Specialization in Chemical and Environmental Toxicology

Admission

Admission to the graduate program in Earth Sciences is governed by the general regulations of the Ottawa–Carleton Geoscience Centre (OCGC) and by the general regulations of the FGPS.

All applicants must be proficient in understanding, speaking and writing in either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Applications are evaluated based on the following criteria:

- Be the holder of a bachelor's degree with a specialization or a major in earth sciences (or equivalent) with a minimum average of 75% (B+) in the last two years and a 70% (B) average overall.
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with their work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Transfer from master's to PhD

Students in the master's who had achieved an A- average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Completion of two graduate courses (six credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.
The transfer must take place within sixteen months of initial registration in the master’s. Following transfer, all of the requirements of the doctoral program must be met.

**Collaborative programs**

The Ottawa-Carleton Geoscience Centre is one of the participating units in the collaborative programs in Chemical and Environmental Toxicology (master’s and PhD levels), in Environmental Sustainability (master’s level only) and in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

**Program Requirements**

**MSc in Earth Sciences**

The following requirements must be met:

- 9 credits of graduate courses at the 5000 level or above (3 credits of which may be at the 4000 level) in Earth sciences or in related disciplines approved by the Department of Earth Sciences.
- Participation in the geosciences seminar series and, presentation of a seminar.
- Presentation and defence of a thesis (GEO7999) based on original research carried out under the direct supervision of a professor who is a member of the Department and the FGPS.

The Department may require students to take additional courses, depending on their backgrounds.

**Collaborative Program in Chemical and Environmental Toxicology**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

The requirements specific to the collaborative program are as follows:

- 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
- Enrollment in the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defense of a thesis in toxicology based on an original research carried out under the supervision of a faculty member participating in the chemical and environmental toxicology collaborative program.

**Collaborative Program in Environmental Sustainability (with Thesis)**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

**Collaborative Program in Environmental Sustainability (with Research Paper)**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar course (EVD5100 or EVD5500, 3 credits).
- Satisfactory completion of one course (3 credits) selected from a list of optional courses for the Collaborative Program in Environmental Sustainability.
- Satisfactory completion of the research paper, which must be on a topic in the area of environmental sustainability, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the research paper is appropriate for the designation “Specialization in Environmental Sustainability.” The research paper is evaluated by two professors, one of whom is selected by the primary program, and the other by the Collaborative Program Director, on the advice of the Collaborative Program Committee.

**Collaborative program in Science, Society and Policy**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count
also towards the primary degree.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation of “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

**Duration of the Program**

The requirements of the program are usually fulfilled within two years. The maximum time permitted is four years from the date of initial registration.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Minimum Standards**

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory must withdraw from the program.

**Courses**

Not all of the listed courses are offered each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**GEO5114 (ERTH 5104) MINERALOGY (3cr.)**
An advanced course covering selected topics in mineralogy, such as crystallography, crystal chemistry, crystal structure, mineralogy of rock-forming mineral groups, and instrumental methods in mineralogical research, such as use of electronic optical instruments, spectroscopy, and X-ray crystallography; seminar presentations and practical exercises included.

**GEO5122 (ERTH 5202) ADVANCED IGNEOUS PETROLOGY (3cr.)**
The course focuses on particular aspects of the discipline and integrates physical and chemical processes with the dynamics of magmatic systems to understand igneous processes.

**GEO5124 (ERTH 5204) GEOLOGY AND GEOCHEMISTRY OF ORE DEPOSITS (3cr.)**
An advanced course in ore deposits examining aspects of their geology, geochemistry, and exploration. Topics will be selected from a range of different deposit types, including hydrothermal and magmatic ore deposits, as well as laboratory and field examination of different ores and their host rocks.

**GEO5131 (ERTH 5301) SILICICLASTIC SEDIMENTOLOGY (3cr.)**
Origin and significance of physical and sedimentary processes and structures. Analysis of ancient siliciclastic depositional environments in a facies model and sequence stratigraphic framework. Course involves lectures, seminars and field excursions.

**GEO5135 (ERTH 5305) CARBONATE SEDIMENTOLOGY (3cr.)**
Lectures and seminars will cover aspects of modern depositional systems, dynamic facies models, sequence stratigraphy, mineralogy, and diagenesis of carbonate sediments. Practical part of the course will consist of a field-laboratory project that integrates various techniques in carbonate sedimentology (mapping, petrography, staining, cathodoluminescence, fluorescence, SEM).

**GEO5136 (ERTH 5306) PALEOBIOLOGY (3cr.)**
Selected topics in paleobiology of micro- and macro-invertebrates and vertebrates. Topics include extinctions, micro- and macro-evolutionary processes, long-term trends and cycles in the Phanerozoic, and functional morphology, as well as application of invertebrates to biostratigraphy, paleoecography and paleoecology.

**GEO5139 (GEOL 5309) GLACIAL AND PERIGLACIAL GEOLOGY (3cr.)**
An examination of various sedimentary environments associated with glacial and periglacial processes and their significance for mineral exploration and environmental geochemistry. Study of cold climate non-glacial conditions and the development of permafrost and permafrost-related features, including the effect of groundwater flow on permafrost distribution.

**GEO5142 (GEOL 5402) ENVIRONMENTAL GEOSCIENCE (3cr.)**
A study-seminar course in which students will examine, in depth, certain environmental problems, including geological hazards, mineral and energy consumption and environmental degradation. The relation between development and the environment will be considered. Students will prepare a report and present a seminar on a subject of their choice, and will participate in a research project centered in the Ottawa area.
GEO5143 (GEOL 5403) ENVIRONMENTAL ISOTOPES AND GROUNDWATER GEOCHEMISTRY (3cr.)
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radiocarbon, and exotic radioisotopes (e.g. 36Cl, 59Ar, 85Kr). Low temperature aqueous geochemistry and mineral solubility with emphasis on the carbonate system. Some applications to paleoclimatology will be discussed. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO 4342) or equivalent.

GEO5146 (ERTH 5406) TECHNIQUES OF GROUNDWATER RESOURCES EVALUATION (3cr.)
Governing groundwater flow equations, initial and boundary conditions; simple numerical solutions (spreadsheets); complex numerical solutions (commercial software); and analytical solutions. Applications: aquifer response test analysis, capture zone analysis, groundwater flow modeling, water budgeting, and aquifer vulnerability assessment. Prerequisite: undergraduate hydrogeology.

GEO5147 (ERTH 5407) GEOCHEMISTRY OF NATURAL WATERS (3cr.)
Aqueous speciation, solubility of metals, minerals and gas, reaction kinetics and equilibria. Chemistry and dynamics of groundwaters and hydrothermal fluids.

GEO5148 (ERTH 5408) THEORY OF FLOW AND CONTAMINANT TRANSPORT IN GEOLOGICAL MATERIALS (3cr.)
Development of governing groundwater flow equations and solute transport equations from first principles, and application of principles in case studies. Topics: Forces and potentials, fluids, geological materials, contaminants, case studies. Prerequisite: undergraduate hydrogeology.

GEO5151 (ERTH 5501) PRECAMBRIAN GEOLOGY (3cr.)
Geology and tectonic history of the Canadian Shield, emphasizing modern four-dimensional interpretations (map, depth, time); comparison and correlation with other Precambrian shields; global Precambrian tectonic evolution through review of continental reconstructions; Precambrian mineral deposits; field trips and research projects.

GEO5153 (ERTH 5503) COMPUTER TECHNIQUES IN THE EARTH SCIENCES (3cr.)
A practical course in the application of computer techniques in the acquisition and interpretation of geoscientific data. Topics will be selected from the following: remote sensing and geographic information systems; geostatistical analysis techniques; analysis and modelling of geoscientific data. Prerequisite: Permission of the Institute.

GEO5157 (ERTH 5507) TECTONIC PROCESSES EMPHASIZING GEOCHRONOLOGY AND METAMORPHISM (3cr.)
Applications of empirical, analytical and quantitative techniques to problems in regional geology and crustal tectonics; orogenic processes; heat and metamorphism; isotopic geochemistry as applied to thermal history.

GEO5160 (ERTH 5600) CHEMISTRY OF THE EARTH (3cr.)
Examine the composition of the mantle and crust in selected tectonic settings, such as subduction zones and hot spots. Topics may include how geochemical data constrain geodynamic settings of study area.

GEO5163 (ERTH 5603) STABLE ISOTOPE GEOCHEMISTRY (3cr.)

GEO5169 (ERTH 5609) RADIOISOTOPE GEOCHEMISTRY (3cr.)
Nucliesynthesis; chemical differentiation of the Earth. Evolution of large-scale reservoirs. Isotopic tracers (143Nd/144Nd, 87Sr/86Sr, common Pb). Geochronology: fundamentals and application of Sm/Nd, Rb/Sr, U/Pb, K/Ar and Lu/Hf methods. Evolution of the solid Earth from the isotopic perspective.

GEO5171 (ERTH 5701) PHYSICS OF THE EARTH (3cr.)
The physics and dynamics of the solid Earth: seismology; gravitational and magnetic fields; thermal state. Geophysical constraints on the structure and composition of the interior. Geodynamic processes.

GEO5173 (ERTH 5703) STRUCTURAL GEOLOGY (3cr.)
Deformation processes and the analysis of geological structures at all scales.

GEO5174 (ERTH 5704) TECTONICS (3cr.)
Dynamical and geological aspects of plate tectonics throughout Earth history.

GEO5177 (ERTH 5707) ENGINEERING SEISMOLOGY (3cr.)

GEO5178 (ERTH 5708) GEOPHYSICAL SIGNAL PROCESSING (3cr.)
Practical aspects of earthquake and other geophysical signal processing; focus on application of Fourier analysis, digital filters, instrument response.

GEO5193 (ERTH 5903) FIELD STUDIES (3cr.)
Systematic investigations of geological problems, based on a minimum of 15 days field work plus related library research and laboratory projects. Written report required.

GEO5301 (ERTH 5001) SEMINARS IN EARTH SCIENCES I (3cr.)
One-session modular course covering a spectrum of Earth science topics and current research problems, ranging from the geology and
geophysics of the solid Earth, to its surface environment and crustal resources. A minimum of 4 modules is offered per session; 3 must be completed to obtain credit for a course. Students may not normally obtain credit for modules that are offered by their supervisors. The choice of modules must be approved by the Director of the Geoscience Centre or a designate. This course complements GEO 5302 (ERTH 5002).

**GEO5302 (ERTH 5002) SEMINARS IN EARTH SCIENCES II (3cr.)**
One-session modular course covering a spectrum of Earth science topics and current research problems, ranging from the geology and geophysics of the solid Earth, to its surface environment and crustal resources. A minimum of 4 modules is offered per session; 3 must be completed to obtain credit for a course. Students may not normally obtain credit for modules that are offered by their supervisors. The choice of modules must be approved by the Director of the Geoscience Centre or a designate. This course complements GEO 5301 (ERTH 5001).

**GEO5306 (GEOG5306) Hydrothermal Ore Deposits (3cr.)**
An advanced course in economic geology related to hydrothermal ore deposits, including their geology and geochemistry, physical and chemical controls on hydrothermal mineralization, the recognition and characterization of ore-fluid reservoirs, and the nature of large-scale fluid flow and alteration, with an emphasis on applications to exploration.

**GEO7999 (ERTH 5909) THÈSE DE MAÎTRISE / MSc THESIS**

**GEO9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAM (PhD)**

**GEO9999 (ERTH 6909) THÈSE DE DOCTORAT / PhD THESIS**

The following courses are included in the centre's program:

**Department of Geography, Carleton University**

**Geography GEOG 5300 SOIL THERMAL AND HYDROLOGIC REGIMES**
Characteristics of soil regimes, particularly in freezing soils, role of soil properties; analytical and numerical methods, including computer simulation.

**Geography GEOG 5302 SOIL THERMAL AND HYDROLOGIC PROPERTIES**
Instrumental techniques for investigation of hydrological and thermal processes near the Earth's surface; laboratory instrumentation and analysis of laboratory and field procedures in geotechnical science.

**Geography GEOG 5303 PERIGLACIAL GEOCRYOLOGY**
Permafrost, its distribution and significance, seasonal ground freezing, ground thermal regime, physical, thermodynamic, and geotechnical properties of freezing and thawing soils, terrain features ascribable to frost action, and solifluction and patterned ground.

**Geography GEOG 5304 ASPECTS OF CLAY MINERALOGY AND SOIL CHEMISTRY**
The role of clay minerals in soils will be considered from a geotechnical or biological perspective.

**Geography GEOG 5803 REMOTE SENSING AND IMAGE ANALYSIS**
Radiometric, geometric and resolution characteristics of remotely sensed data, image processing algorithms, analysis of spectral, textural, and contextual image information, applications to vegetation mapping and environmental analysis.

**Department of Geography, University of Ottawa**

**GEG5301 COLD REGIONS HYDROLOGY AND GEOMORPHOLOGY**
Selected topics in the hydrology and geomorphology of cold regions. Emphasis on glacialized, periglacial, or nival environments.

**Ottawa-Carleton Institute for Physics**

**PHYS130 (PHYJ 5001) EXPERIMENTAL CHARACTERIZATION TECHNIQUES IN MATERIALS SCIENCE, PHYSICS, CHEMISTRY, AND MINERALOGY (3cr.)**
Survey of experimental techniques used in materials science, condensed matter physics, solid state chemistry, and mineralogy to characterize materials and solid substances. Diffraction (X-ray diffraction, neutron diffraction...), Spectroscopy (infra-red spectroscopy, Raman spectroscopy, nuclear magnetic resonance, Mössbauer spectroscopy, electron spin resonance...). Microscopy and imaging (scanning electron microscopy, transmission electron microscopy, optical microscopy, magnetic resonance imaging...). Other analytic techniques (thermal analysis, wet chemistry, bulk thermodynamic properties, linear response and dc susceptibility...).

**Economics**

The Department of Economics offers a Master of arts and a PhD in Economics. The Master of arts program includes a co-op option and the PhD program is offered jointly with Carleton University.
The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa. The joint doctoral program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities.

**Ottawa-Carleton Joint Doctoral Program in Economics**

The joint doctoral program in Canadian economic policy and economic development is offered by the departments of economics at the University of Ottawa and Carleton University.

The PhD program stresses the application of economic theory to the analysis of Canadian economic policy and economic development. It offers specialization for intensive study and thesis research in:

- Public Economics - the allocative, redistributive and stabilization impact of governments.
- Industrial Organization - the effects of regulation, fiscal measures, government production, marketing boards and competition policy on the structure and performance of Canadian industries.
- Monetary Economics - the impact of money in general and on the Canadian economy in particular.
- International Economics - the interrelationships between the Canadian and world economies.
- Economic Development - the process of economic and structural change within Canada and in the developing countries.
- Economics and the Environment - an economic analysis of the environment including natural resources.
- Econometrics
- Labour Economics.

**Administration**

Further information about the Joint doctoral program in Economics is available from the Director of Doctoral Studies in economics at either University:

Department of Economics  
Faculty of Social Sciences  
University of Ottawa  
Desmarais Hall  
55 East Laurier Street, Room 10101  
Ottawa ON K1N 6N5  
CANADA

or

Department of Economics  
Carleton University  
1125 Colonel By Drive  
Ottawa ON K1S 5B6  
CANADA

**Programs**

Master of Arts Economics  
Doctorate in Philosophy Economics

**Admission**

An honours bachelor’s degree in Economics, or the equivalent, is required for admission to the master’s program. An average of at least "B" (70%) is required in the honours undergraduate program.

Applicants may, in some cases, be admitted to a qualifying program designed to bring their knowledge to the level required to pursue a master’s in Economics. To proceed to the master’s level, a new application must be submitted.

**Language requirements**

Proficiency in the English language is required for entry into the doctoral program.

Candidates who have not graduated from a French-speaking or an English-speaking university must pass the computerized Test of English as a Foreign Language (TOEFL), or equivalent, before admission. For additional information, please click on "Apply Now" or visit the FGPS website.

Proficiency in either English or French is required. Applicants whose first language is neither English nor French must provide proof of
proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

**Co-op option**

To be admitted into the co-op option, students must commence the MA in economics program in the fall session and be registered full time. Applications for the co-op option must be received by the end of the first month of the student's registration in the economics program. Acceptance into the co-op option is offered on a competitive basis and is managed by the Co-op Office. Enquiries should be directed to that office.

### Program Requirements

**MA with major paper**

Completion of six graduate courses, three of which are compulsory:

- ECO6120 MACROECONOMIC THEORY IV (3cr.)
- ECO6122 MICROECONOMIC THEORY IV (3cr.)
- ECO5185 (ECON 5005) ECONOMETRICS I (3cr.)

The remaining courses are optional and two of them may be taken outside the Department, subject to the Graduate Officer’s approval.

The candidate must write a major paper (ECO6990) devoted to a critical review of the literature on a given topic, to a limited-scope empirical research or to a critical assessment of a theoretical question under the supervision of a full-time member of the Department. The research paper will be evaluated by another professor appointed by the Department Chairperson.

**Co-op option**

Co-op students must register full-time and complete two work terms:

- ECO6001 STAGE COOP 1 / CO-OP WORK TERM I (6cr.)
- ECO6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)

Each work term is graded P/F (pass/fail), based on the employer’s report and on the written report completed by the student. (The report must be 30 pages, including appendices.) The report is evaluated by the professor in charge of the graduate co-op option in Economics.

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain in the co-op option, students must:

- be registered full-time;
- maintain a 7.0 cumulative grade point average;
- obtain a satisfactory grade (P) for each co-op work term.

**Fast-track from master’s to PhD**

Students enrolled in the MA program may be allowed to fast-track to the PhD program without being required to write a major research paper. For additional information, please consult the “Admission” section of the PhD program.

**Duration of the program**

Full-time students are expected to complete all requirements within four sessions. The maximum time permitted is four years, whether full or part-time.

**Residence**

All full-time students must complete a minimum of three sessions of full-time registration. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the initial registration in the program.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) will be withdrawn from the program.

### Courses
ECO5114 ECONOMIC GROWTH (3cr.)
Analyses of capital accumulation and income distribution; measures of technical progress, general equilibrium theory, and labour markets; growth and institutions: the State, firms, financial markets; multisectorial growth.

ECO5116 POST-KEYNESIAN THEORY: VALUE AND PRODUCTION (3cr.)

ECO5185 (ECON 5005) ECONOMETRICS I (3cr.)

ECO6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)
Expérience en milieu de travail. Évalué P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Evaluated P (Pass) / F (Fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

ECO6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)
Expérience en milieu de travail. Évalué P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Evaluated P (Pass) / F (Fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

ECO6106 (ECON 5209) HISTORY OF ECONOMIC THOUGHT AND METHODOLOGY (3cr.)
Evolution of economic thought, from the economic doctrines of antiquity to present times; critique and appraisal of scientific methods in economics.

ECO6108 ECONOMIC SYSTEM DESIGN (3cr.)
Deterministic dynamic optimization methods: economic and managerial applications of the maximum principle of Pontryagin and of dynamic programming. Discrete time stochastic dynamic optimization methods: Bayesian and Markovian decision theory, measures of risk-aversion and risk, portfolio theory, elements of search theory, applications of discrete time stochastic control to economics. Prerequisites: ECO3141 and ECO4186 or MAT2341, MAT2324, MAT2171 or (MAT2371 and MAT2375).

ECO6110 INTRODUCTION TO APPLIED GENERAL EQUILIBRIUM MODELLING (3cr.)
Computable general equilibrium (CGE) modelling: impacts of economic shocks; theoretical foundations; model specification, numerical solutions. Understanding model assumptions and interpretation of results.

ECO6120 MACROECONOMIC THEORY IV (3cr.)
Macroeconomic theory, including topics such as economic growth, consumption, investment, real and nominal frictions in the goods, labour, and credit markets, models of short-run economic fluctuations, and monetary and fiscal policy design. Prerequisite: ECO3152

ECO6122 MICROECONOMIC THEORY IV (3cr.)
Microeconomic theory, including topics such as utility maximization and individual choice, decision-making under uncertainty, producer theory (technology, costs, and profit maximization), alternative market structures (competition, monopoly, and oligopoly), general equilibrium, and the economics of information. Prerequisite: ECO3153

ECO6130 (ECON 5401) PUBLIC ECONOMICS: EXPENDITURE (3cr.)
The theory of public expenditures. Topics may include public goods and externalities, social insurance and redistribution, public provision of health care and education, public pension systems, and underemployment insurance.

ECO6131 (ECON 5402) PUBLIC ECONOMICS: TAXATION (3cr.)
The study of tax systems. Concepts of equity and efficiency in taxation. The optimal design of tax structures using commodity, income, and capital taxes. Additional topics may include political economy of taxation, low-income support, environmental taxes, and tax evasion.

ECO6133 (ECON 5403) TOPICS IN THEORY OF PUBLIC ECONOMICS (3cr.)
Topics may include political economy, tax incidence in general equilibrium, the theory and practice of tax reform, normative approaches to income redistribution, the theory of non-market decision-making, the non-profit sector, and social choice theory.

ECO6134 (ECON 5805) TOPICS IN ENVIRONMENTAL AND RESOURCE ECONOMICS (3cr.)
Topics may include international dimensions of environmental regulation, including treaties, competitiveness, and the effects of trade liberalization; development issues, including fiscal sustainability; Dutch disease, the resource curse, and population growth; resource topics, including optimal taxation, green national accounts, sustainability theory, and scarcity of extractive resources.

ECO6135 (ECON 5305) TOPICS IN INDUSTRIAL ORGANIZATION (3cr.)
Topics may include vertical restraints and vertical integration, innovation and research and development, network economies, contract theory, search theory and advertising, and industry studies.
ECO6140 (ECON 5301) INDUSTRIAL ORGANIZATION I (3cr.)
An examination of theories pertaining to industrial organization and their application by way of empirical studies. Topics include oligopoly theory, product differentiation, and strategic behaviour.

ECO6142 (ECON 5303) INDUSTRIAL ORGANIZATION II (3cr.)
Regulation and competition policy as alternative approaches for influencing industry conduct and performance and correcting market failures. Topics may include incentive regulation under asymmetric information, cost-based pricing, second-best pricing, peak-load pricing, rate-of-return regulation, price-cap regulation, access pricing, and regulatory capture.

ECO6143 (ECON 5803) ECONOMICS OF NATURAL RESOURCES (3cr.)

ECO6151 (ECON 5804) ECONOMICS OF THE ENVIRONMENT (3cr.)
Theory of environmental regulation, including command and control, incentive based mechanisms, effects of market structure, and interactions with pre-existing taxes. Valuation of non-marketed goods, including existence value, contingent valuation, hedonic price methods, health impacts, irreversibility, and recreational benefits. Prerequisite: ECO6150 or the permission of the Department.

ECO6160 (ECON 5601) INTERNATIONAL TRADE: THEORY AND POLICY (3cr.)
International trade theory and its implications for economic policy, with emphasis on topics such as determinants of trade and specialization, gains from trade and commercial policy, international factor mobility, growth, and development.

ECO6161 (ECON 5602) INTERNATIONAL MONETARY THEORY AND POLICY (3cr.)
International monetary theory and its implications for economic policy, with emphasis on topics such as sources of equilibrium and disequilibrium in the balance of payments, balance-of-payments adjustment under fixed versus flexible exchange rates, international capital movements, and recent issues in the international monetary system.

ECO6162 (ECON 5603) TOPICS IN INTERNATIONAL ECONOMICS (3cr.)
Selected topics in international economics, including theoretical analysis, quantitative methods and policy formulation, implementation and evaluation.

ECO6170 (ECON 5500) THEORY OF ECONOMIC DEVELOPMENT (3cr.)
Theoretical approaches in the economic development literature in relation to the historical, economic, environmental, social and political dimensions of the development process.

ECO6171 (ECON 5504) ECONOMIC DEVELOPMENT: DOMESTIC ASPECTS (3cr.)
Major domestic problems of economic development. Topics may include employment, income distribution, choice of technology, sectoral allocation of resources, human resources development, and domestic environment issues.

ECO6172 (ECON 5505) ECONOMIC DEVELOPMENT: INTERNATIONAL ASPECTS (3cr.)
Key problems of international economic development such as trade in primary commodities and manufactures, financial flow and debt, the role of multinational corporations, the transfer of technology, and the international dimensions of environmental issues as they relate to the developing countries.

ECO6173 (ECON 5507) ENVIRONMENTAL ASPECTS OF ECONOMIC DEVELOPMENT (3cr.)
Policy aspects of sustainable economic development and environmental quality in developing countries. Topics to include energy use, deforestation, drought and desertification, depletion of natural resources, debt, environment and poverty, sustainable industrial and agricultural development, conservation policies, pollution control and global environmental issues.

ECO6174 HEALTH ECONOMICS (3cr.)
Review of both classic and frontier work in the field of health and health care economics. Empirical work with an emphasis on theory and methodology. This course is also relevant to students interested in broader empirical microeconomic research.

ECO6175 (ECON 5712) MICRO-ECONOMETRICS (3cr.)
Analysis of the concepts and tools used in micro-econometrics with particular focus on empirical applicability. Topics may include discrete choice models, limited dependent variables, panel data, duration models, and program evaluation, together with relevant economic applications. Prerequisite: ECO 5185 (or equivalent).

ECO6176 (ECON 5713) TIME-SERIES ECONOMETRICS (3cr.)
Analysis of the concepts and tools used in time-series econometrics with particular focus on empirical applicability. Topics may include cointegration analysis, error-correction models, VAR models, volatility analysis, and non-linear time-series models, together with relevant economic applications. Prerequisite: ECO5185 (or equivalent).

ECO6180 (ECON 5606) FOUNDATIONS OF MONETARY THEORY (3cr.)
Microeconomic foundations of monetary theory. Alternative theories of the existence of money and the micro-foundations for understanding how money is integrated into aggregate macroeconomic models.

ECO6181 (ECON 5607) TOPICS IN MONETARY ECONOMICS (3cr.)
Coverage of one or more areas of current research on the frontiers of monetary economics.
ECO6182 (ECON 5608) MONETARY ECONOMICS AND FINANCIAL INTERMEDIATION (3cr.)
The evolution of the financial system and its interrelationship with the money supply process. Monetary and finance theory and empirical research applied to institutional problems in both historical and contemporary settings. Topics may include credit markets, financial instability, bubbles, and links to central bank policy.

ECO6183 (ECON 5609) EXPLORATIONS IN MONETARY ECONOMICS (3cr.)
Explorations in theory, policy recommendations, and empirical study. Course material challenges traditional approaches by examining such topics as the endogeneity of money, the role of credit, financial instability, the circuit approach, flow-of-funds analysis, sectoral stock-flow coherence, and functional finance.

ECO6191 (ECON 5361) LABOUR ECONOMICS I (3cr.)
The application of microeconomic and macroeconomic theory to the labour market. Topics include labour supply and labour demand, wage determination, human capital and the economics of education, and unemployment.

ECO6192 (ECON 5362) LABOUR ECONOMICS II (3cr.)
Personnel economics and contract theory. Topics include the economics of unions, discrimination, the economics of the household, gender and fertility, and labour mobility.

ECO6193 (ECON 5363) ADVANCED TOPICS IN LABOUR ECONOMICS (3cr.)
Topics may include program evaluation, inequality, labour markets and health, labour markets and crime, and the structural estimation of labour market models.

ECO6304 SELECTED TOPICS IN APPLIED ECONOMICS (3cr.)
Study of selected topics in applied economics; contents may change from year to year.

ECO6900 THÈMES CHOISIS EN THÉORIE ÉCONOMIQUE / SELECTED TOPICS IN ECONOMIC THEORY (3cr.)
Étude de thèmes choisis en théorie économique; contenu variable selon l’année. / Study of selected topics in economic theory; contents may change from year to year.

ECO6904 THÈMES CHOISIS EN ÉCONOMIE APPLIQUÉE / SELECTED TOPICS IN APPLIED ECONOMICS (3cr.)
Étude de thèmes choisis en économie appliquée; contenu variable selon l’année. / Study of selected topics in applied economics; contents may change from year to year.

ECO6906 THÈMES CHOISIS EN POLITIQUE ÉCONOMIQUE / SELECTED TOPICS IN ECONOMIC POLICY (3cr.)
Étude de thèmes choisis en politique économique; contenu variable selon l’année / Study of selected topics in economic policy; contents may change from year to year.

ECO6999 MÉMOIRE / MAJOR PAPER (6cr.)

ECO7002 (ECON 6907) PREMIER ATELIER / FIRST WORKSHOP (6cr.)

ECO7004 (ECON 6908) DEUXIÈME ATELIER / FIRST WORKSHOP (6cr.)

ECO7119 (ECON6019) MATHEMATICAL FOUNDATIONS FOR ECONOMIC THEORY (3cr.)
Mathematical techniques needed to understand micro- and macro-economic theory at the Ph.D level, and to carry out research. Real analysis. Review of static optimization. Continuous- and discrete-time dynamic optimization in deterministic and stochastic environments. Applications to economic theory are presented. Prerequisites: ECO6120/6520 and ECO6122/6522, or permission of the Department.

ECO7126 (ECON 6027) ECONOMETRICS II (3cr.)
Selected topics from estimating and testing the regression and simultaneous equation models. Topics include maximum likelihood estimation, statistical analysis of residuals, auto-regressive and other time-series models, multivariate regression model, and elements of asymptotic statistical theory within the context of the simultaneous equation model. Prerequisite: ECO5185 (or equivalent).

ECO7177 (ECON 6714) ADVANCED TOPICS IN ECONOMETRICS (3cr.)
Coverage of one or more areas of current econometric research. Prerequisite: ECO 7126.

ECO7922 (ECON 6020) THÉORIE ÉCONOMIQUE : MICROÉCONOMIE / ECONOMIC THEORY: MICROECONOMICS (3cr.)
Théorie microéconomique au niveau gradué avancé, incluant des thèmes tels que la théorie des jeux, les externalités et les biens publics, l’équilibre général, et le bien-être. / Advanced graduate-level microeconomic theory, including topics such as game theory, externalities and public goods, general equilibrium, and welfare. Préalables : ECO6522 et ECO7119 (ou l’équivalent). / Préalises: ECO6122 and ECO7119 (or equivalent).

ECO7923 (ECON 6021) THÉORIE ÉCONOMIQUE : MACROÉCONOMIE / ECONOMIC THEORY: MACROECONOMICS (3cr.)
Théorie macroéconomique au niveau gradué avancé avec emphase sur les modèles d’équilibre général dynamiques. Présentation des concepts théoriques principaux et exploration de la structure de base sous-jacente à ces modèles. Application à l’étude des décisions de consommation des ménages, d’investissement des entreprises, et à la croissance économique. / Advanced graduate-level macroeconomic theory with particular focus on dynamic general equilibrium models. Exposition of the main theoretical concepts and exploration of the basic structure underlying these models. Application to the study of household consumption decisions, firm investment decisions, and economic growth. Préalables :


**ECO7990 (ECON 6990) EXAMEN DE SYNTHESE EN MICROECONOMIE / PhD COMPREHENSIVE EXAM IN MICROECONOMICS**

**ECO7991 (ECON 6902) EXAMEN DE SYNTHESE EN MACROECONOMIE / PhD COMPREHENSIVE EXAM IN MACROECONOMICS**

**ECO9990 (ECON 6905) EXAMEN DE SPECIALISATION I / FIELD EXAM I**

**ECO9999 (ECON 6909) THESE DE DOCTORAT / PhD THESIS**

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**Education**

Please note that, in May 2016, changes were made to the concentration in Educational Counselling, now named Counselling Psychology. Students who were admitted to and enrolled in the concentration in Educational Counselling before May 2016 can find information about the program requirements in the archives of the FGPS calendar. They can also direct any of their related questions to the Faculty of Education.

The Faculty of Education offers graduate programs leading to the graduate diploma in Program Evaluation, the graduate diploma in Health Professions Education and to the degrees of Master of Education (MEd), Master of Arts (MA) in Education and Doctor of Philosophy (PhD) in Education.

The Faculty is directed by a council responsible to the Senate of the University. The Council is composed of the Dean, the two Vice-Deans, the Vice-Dean and Secretary of the Faculty, the four program directors, one full-time student per program, and six professors.

The Executive Committee of the Faculty is composed of the Dean, the two Vice-Deans, the Vice-Dean and Secretary of the Faculty and three professors.

The various programs offered by the Faculty are governed by the program council composed of the program director and professors.

Other regular committees of the Faculty are the Research and Staff Development Committee, the Educational Policy Committee, the Educational Equity Committee, the Graduate Studies Programs Council and the Executive Committee of Graduate Studies Programs.

The programs are offered in English and French and are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Master’s program**

The MEd and MA programs participate in the collaborative program in Women’s Studies at the master’s level. For more information, see “Admission” below.

**Master of Education (MEd)**

The master of education program includes a minimum of 10 courses (30 credits) except for the Counselling Psychology concentration, which requires a minimum of 12 courses (36 credits). A minimum of eight courses must be taken at the Faculty of Education (10 in the case of Counselling Psychology). Courses taken in other faculties and/or at other universities must be related to the field of study, and must have received prior approval from the program director. The program is offered in the following five concentrations:

- Leadership, Evaluation, Curriculum and Policy Studies
- Studies in Teaching and Learning
- Societies, Cultures and Languages
- Counselling Psychology
- Health Professions Education

**Master of Arts in Education (MA)**

The master of arts in education program is intended for candidates who wish to undertake research in a specific domain of educational studies. It is offered in the following five concentrations:

- Leadership, Evaluation, Curriculum and Policy Studies
- Studies in Teaching and Learning
- Societies, Cultures and Languages
Doctoral program

The program participates in the collaborative program in Canadian Studies at the PhD level. For more information, see “Admission” below.

The PhD program is offered in the following five concentrations:

- Leadership, Evaluation, Curriculum and Policy Studies
- Studies in Teaching and Learning
- Societies, Cultures and Languages
- Educational Counselling (suspended until further notice)
- Health Professions Education

Programs

Master of Arts Education Concentration in Counselling Psychology

Master of Arts Education Concentration in Health Professions Education

Master of Arts Education Concentration in Leadership, Evaluation, Curriculum and Policy Studies

Master of Arts Education Concentration in Societies, Cultures and Languages

Master of Arts Education Concentration in Studies in Teaching and Learning

Master of Arts Education Specialization in Women's Studies

Master of Education Concentration in Counselling Psychology

Master of Education Concentration in Health Professions Education

Master of Education Concentration in Leadership, Evaluation, Curriculum and Policy Studies

Master of Education Concentration in Societies, Cultures and Languages

Master of Education Concentration in Studies in Teaching and Learning

Doctorate in Philosophy Education Concentration in Educational Counselling

Doctorate in Philosophy Education Concentration in Health Professions Education

Doctorate in Philosophy Education Concentration in Leadership, Evaluation, Curriculum and Policy Studies

Doctorate in Philosophy Education Concentration in Societies, Cultures and Languages

Doctorate in Philosophy Education Concentration in Studies in Teaching and Learning

Doctorate in Philosophy Education Specialization in Canadian Studies

Admission

The requirements for admission listed below are minimum requirements and do not guarantee admission to the program.

1. Candidates holding an honours bachelor's degree in education or equivalent (a general bachelor's and a teaching certificate obtained after at least one year of teacher education), with a minimum overall undergraduate average of 70% (B), may be admitted directly to the master's program, except for the Counselling Psychology concentration (see item 3 below).
2. Candidates who hold an honours bachelor's degree with at least a 70% (B) average but who do not hold an honours bachelor's degree in education are required to take an Extended Program comprised of up to three additional three-credit courses during the MEd, including the course EDU5101 Perspectives in Education, which must be completed during the first session in which it is offered following admission. These courses are intended to expose candidates to foundational concepts, theories and research in education. Candidates can request a reduction in the number of required Extended Program courses on the basis of previous university course work and/or professional experience that is directly related to education. Requests must be made in writing to the Admissions Committee at the time of application to the MEd Program and no later than the second session of registration. They must include all relevant information and documents relating to the courses and/or work experience for which credit is sought.
3. Candidates for the concentration in Counselling Psychology (MA and MEd) must hold an undergraduate degree in education, psychology,
or equivalent. All candidates must also have a minimum of five university courses (15 credits) in the Social Sciences. A minimum of three out of these five courses (9 credits) must be advanced courses (i.e. 2nd year or higher) in psychology; one of the psychology courses must be a course in personality theories.

4. Candidates for the concentration in Health Professions Education (MA and MEd) must have:
   - an honours bachelor’s degree in Education or the equivalent (an honours bachelor’s degree in science, in health sciences or in a related field) and at least two years of full-time teaching experience in a health-related field at an accredited educational institution or in another teaching context (e.g. clinical supervision);
   OR
   - a professional degree (such as an MD, BScN) or a graduate degree (master’s or PhD) in science, in health sciences or in a related field.

5. Applications for admission will not be considered until all supporting documents have been received. Correspondence should be directed to the academic secretariat of the Faculty of Education.

6. Students and the Faculty are bound by conditions that exist at the time of admission and initial registration.

7. All candidates must understand and speak fluently the language of instruction, either French or English.

**Application procedure**

All completed files for admission to graduate studies will be evaluated by the Admissions Committee concerned.

For the application deadline, please check the specific requirements of the programs.

Neither the Faculty of Education nor the FGPS can guarantee that a candidate whose application and supporting documents are received after the deadline will be able to register for the session requested.

Candidates who wish to be admitted to a graduate program in Education must complete the application online. Supporting documents must be sent to the Graduate Programs Academic Secretariat of the Faculty of Education.

**Documents required**

- The application for admission, which must be completed online.
- Official transcripts of all previous university studies, including a proof of degree. Transcripts must show all courses, all grades, the awarding of degree(s) and the grading scale (i.e. passing grade).
- A curriculum vitae.
- MA (all concentrations):
  - In addition to the requirements above, candidates must present a written outline of their research interests. Admission will depend on the availability of a thesis supervisor whose research interests are compatible with the student’s area of interest.
- Concentration in Counselling Psychology (MA and MEd):
  - Candidates must also provide a curriculum vitae and a narrative statement (four pages for MA, two pages for MEd) describing:
    1. how previous academic and work experiences (whether paid or not) prepared them for the program in Counselling Psychology;
    2. how the program will help them realize their career goals, and what interests them about the program and the Faculty; and
    3. for the MA, what field of research is of interest to the candidate.
- MA (all concentrations) and MEd (concentration in Counselling Psychology):
  - At least two confidential letters of recommendation from professors or employers who have known the applicant and are familiar with the applicant’s work. These letters should describe the applicant’s aptitude for graduate studies. For Counselling Psychology, these letters must indicate the applicant’s suitability for a professional career in counselling.
- Concentration in Health Professions Education (MA and MEd):
  - Candidates without a university professional degree or a graduate degree must demonstrate teaching experience by submitting a Statement of Teaching Experience form.
  - A request for equivalence or advanced standing, if applicable (see the section "Equivalence and Advanced Standing" below).

**Evaluation of applications**

When an admission file is complete, it will be evaluated by the Admissions Committee. Candidates will be able to check the status of their application online.

In exceptional cases, an applicant may be asked to attend a selection interview at the Faculty.

Candidates for the concentration in Counselling Psychology are selected according to the following criteria, which are ranked in order of the weight they are given in selection decisions:

- academic achievement
- preparation for the MEd concentration in Counselling Psychology
- personal suitability for a career in counselling

**Language requirements**

All applicants must be proficient in understanding, speaking and writing in either French or English. Applicants whose first language is neither French nor English and who wish to be admitted to English-language graduate programs in the Faculty of Education must provide proof of proficiency in English.
Please contact the Faculty of Education at educplus@uottawa.ca or at 613-562-5804 for information about acceptable language tests.

In accordance with the University of Ottawa regulation, students may write their assignments, research papers, theses and examinations in either English or French.

**Fast-tracking from master's to PhD**

Exceptional students registered in the MA program may be permitted to transfer to the PhD program without completing an MA thesis, provided they meet the following criteria:

- Their academic performance must be exceptional: they must have successfully completed five MA courses, including EDU6290, with an average of A or A+.
- They must demonstrate an aptitude for high quality research.
- They must be recommended by their thesis supervisor, two professors who are members of the Faculty of Graduate and Postdoctoral Studies and the professor responsible for the course EDU6290. In the event that the thesis supervisor is the professor in charge of EDU6290, a recommendation from a second professor and member of the PGPS will be required.
- The transfer has been approved by the MA and PhD Admissions Committee and by the Faculty of Graduate and Postdoctoral Studies.

Students who have spent more than six sessions in the MA program will not be allowed to transfer. Transfers normally occur after the third session but can occur as early as the second session.

Transfer students must pass all the courses required for the doctoral program in addition to the five MA courses already completed. The total number of courses required is therefore eleven.

The PhD comprehensive examination must be completed within four sessions of the transfer and no later than within seven sessions following initial enrolment in the master's program. Failure to meet this deadline will lead to a return to the master's level.

**Equivalence and advanced standing**

- Upon receiving a copy of the student's official transcript and a course description, the program director may grant equivalence for graduate work done in another recognized university or as a special student in the Faculty of Education. A maximum of two courses (six credits) may be granted.
- In some cases, a student who already holds a graduate degree (master’s or doctorate) may, upon being admitted to a second master’s or a second doctoral degree, be granted equivalences for courses completed for the first degree. (NOTE: The number of transfer credits must not exceed 25% of the total course credits required for the program to which the student is applying.) To be eligible, the courses must:
  1. be deemed relevant by the program’s Admissions Committee;
  2. have been completed with a grade of at least B; and
  3. have been completed within the previous eight years.
- Three additional credits may be recognized for a candidate who has successfully completed part III of a program of additional qualifications that the Admissions Committee has identified as directly related to the MEd concentration in which the student is admitted. In order for these credits to be recognized, candidates must, upon admission, submit a written request to have additional qualifications evaluated for credit.
- No credits will be given for the following:
  - courses or work completed eight years or more before the date of the request for admission;
  - course work with a final grade lower than B.

**Collaborative programs**

The Faculty of Education is one of the units participating in the collaborative program in Women’s Studies (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into this collaborative program. For further details, see the description of the collaborative program in Women’s Studies.

**Change of program**

Students can register only for the program to which they were admitted. Transfer requests and requests to change concentrations must be submitted, using the appropriate form, at least one month prior to the intended start of the new program.

Students interested in transferring into a program at a more advanced level of study (for example, from master’s to PhD) must submit a new application for admission to the Faculty. Students may not register for the new program until they have received a new offer of admission.

**Language of instruction**

The Faculty offers courses in English, in French and, in some cases, in both of these languages. Attention is paid to offering a balanced selection of courses each year.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be completed in either French or English.

**Program Requirements**
Master of Education (MEd)

- All candidates for the Master of Education degree (MEd) must select one of the following concentrations as a focus for their studies:
  - Leadership, Evaluation, Curriculum and Policy Studies
  - Societies, Cultures and Languages
  - Studies in Teaching and Learning
  - Counselling Psychology
  - Health Professions Education.
- Candidates in the following concentrations are required to take a total of 10 courses (30 credits), at least five of which must be within the student's concentration:
  - Leadership, Evaluation, Curriculum and Policy Studies
  - Studies in Teaching and Learning
  - Societies, Cultures and Languages.
- Candidates in Counselling Psychology are required to take a total of 12 courses (36 credits), at least nine of which must be within the student's concentration.
- Candidates in Health Professions Education are required to take 10 courses (30 credits), at least four of which must be within the student's concentration.
- All candidates in all concentrations, except Health Professions Education, are required to take the following two courses as part of their MEd program:
  - EDU5190 INTRODUCTION TO RESEARCH IN EDUCATION (3cr.)
  - EDU5199 SYNTHESIS SEMINAR (3cr.)
- All candidates in Health Professions Education are required to take the following three courses as part of the MEd program:
  - EDU5190 INTRODUCTION TO RESEARCH IN EDUCATION (3cr.)
  - EDU5301 PRINCIPLES OF EDUCATIONAL PLANNING FOR THE HEALTH PROFESSIONS - PART I (3cr.)
  - EDU5302 PRINCIPLES OF EDUCATIONAL PLANNING FOR THE HEALTH PROFESSIONS - PART II (3cr.)
- Candidates in all concentrations, with the exception of Counselling Psychology, are permitted to choose three optional courses according to their professional interests. Candidates in Counselling Psychology are permitted to choose one optional course.
- Students taking courses at universities which have an agreement with the Faculty of Education may take up to three courses outside the Faculty. For other students, the maximum number permitted is two.
- Prior approval from the program director must be obtained at least one month before the beginning of any course not taken in the Faculty of Education.

### COURSE SEQUENCE

- EDU5190 INTRODUCTION TO RESEARCH IN EDUCATION (3cr.)
  - This course must be completed in the first session in which it is offered following admission.
- EDU5191 PERSPECTIVES IN EDUCATION (3cr.)
  - This course must be completed during the first session in which it is offered following admission (extended program only).
- EDU5199 SYNTHESIS SEMINAR (3cr.)
  - This course must be completed in the last session in which the student is registered in the program.

Extended Program courses can be taken concurrently with regular MEd courses. However, all Extended Program requirements must be completed before students are permitted to register in EDU5199. MEd students may include one or more of the compulsory MA courses among their optional courses.

### DISTANCE EDUCATION

The Faculty offers some of its courses in French, delivering them through different teaching formats: in class, through distance education (via audioconferencing or online), or as blended courses. Two concentrations in French (Enseignement et apprentissage; Leadership, evaluation, programmes et politiques éducationnelles) and one concentration in English (Studies in Teaching and Learning) can be taken entirely online.

### CONCENTRATIONS

- Leadership, Evaluation, Curriculum and Policy Studies
  - In addition to taking the two compulsory courses (EDU5190 and EDU5199), students must select at least five courses from the following:
    - EDU5210 PHILOSOPHIES OF EDUCATION (3cr.)
    - EDU5222 ETHNOGRAPHIES IN EDUCATION (3cr.)
    - EDU5230 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS (3cr.)
    - EDU5232 HUMAN RELATIONS IN EDUCATIONAL ADMINISTRATION (3cr.)
    - EDU5260 INTRODUCTION TO CURRICULUM STUDIES (3cr.)
    - EDU5262 CURRICULUM, CULTURE, AND TECHNOLOGIES (3cr.)
    - EDU5263 INTRODUCTION TO EDUCATIONAL ADMINISTRATION (3cr.)
    - EDU5265 INTERNATIONALIZATION OF CURRICULUM STUDIES (3cr.)
    - EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE (3cr.)
    - EDU5399 DEVELOPMENT OF ASSESSMENT INSTRUMENTS (3cr.)
    - EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS (3cr.)
    - EDU5499 CURRENT METHODS OF STUDENT ASSESSMENT (3cr.)
    - EDU6102 SEMINAR IN CURRICULUM STUDIES (3cr.)
    - EDU6110 CURRICULUM, POLITICS AND POLICY IN EDUCATION (3cr.)
EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
EDU6293 ASSESSMENT FOR LEARNING (3cr.)
EDU6426 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
EDU6422 EDUCATION AND DEMOCRATIC COMMUNITIES (3cr.)
EDU6426 CITIZENSHIP AND GLOBAL EDUCATION (3cr.)
EDU6428 SOCIAL CONTEXTS OF EDUCATION (3cr.)
EDU6460 CURRICULUM, CULTURE, AND LANGUAGE (3cr.)
EDU7102 SELECTED TOPICS IN LEADERSHIP, EVALUATION, CURRICULUM AND POLICY STUDIES (3cr.)
EDU7193 ADVANCED MEASUREMENT THEORIES (3cr.)

- Societies, Cultures and Languages
  - In addition to taking the two compulsory courses (EDU5190 and EDU5199), students must select at least five courses from the following:
    - EDU5146 SOCIAL, POLITICAL AND CULTURAL ISSUES IN SECOND LANGUAGE EDUCATION (3cr.)
    - EDU5210 PHILOSOPHIES OF EDUCATION (3cr.)
    - EDU5221 HISTORICAL NARRATIVES AND EDUCATION (3cr.)
    - EDU5222 ETHNOGRAPHIES IN EDUCATION (3cr.)
    - EDU5242 TRENDS IN SECOND LANGUAGE TEACHING (3cr.)
    - EDU5244 BILINGUAL, MULTILINGUAL AND MINORITY CONTEXTS OF LANGUAGE EDUCATION (3cr.)
    - EDU5358 TEACHING AND LEARNING IN THE ARTS (3cr.)
    - EDU5384 INTEGRATED APPROACHES TO LANGUAGE CURRICULUM (3cr.)
    - EDU5386 SEMINAR ON LITERACY (3cr.)
    - EDU5463 CULTURAL STUDIES AND EDUCATION: THEORY AND PRAxis (3cr.)
    - EDU5465 GLOBALIZATION AND COMPARATIVE EDUCATION (3cr.)
    - EDU5466 RACISM AND ANTIRACISM IN EDUCATION (3cr.)
    - EDU6109 YOUTH CULTURE, POPULAR CULTURE AND PEDAGOGY (3cr.)
    - EDU6110 CURRICULUM, POLITICS AND POLICY IN EDUCATION (3cr.)
    - EDU6111 TEACHING AND LEARNING OF LITERACIES IN A SECOND LANGUAGE (3cr.)
    - EDU6115 SOCIAL AND POLITICAL ISSUES IN LITERACY ASSESSMENT (3cr.)
    - EDU6146 SECOND LANGUAGE LEARNING THEORIES (3cr.)
    - EDU6203 LEARNING AND LITERACIES (3cr.)
    - EDU6241 SECOND LANGUAGE PROGRAM AND POLICY DEVELOPMENT AND EVALUATION (3cr.)
    - EDU6373 EDUCATION OF MARGINALIZED YOUTH (3cr.)
    - EDU6421 PUBLIC MEMORY, LIVED HISTORIES AND EDUCATION (3cr.)
    - EDU6422 EDUCATION AND DEMOCRATIC COMMUNITIES (3cr.)
    - EDU6426 CITIZENSHIP AND GLOBAL EDUCATION (3cr.)
    - EDU6428 SOCIAL CONTEXTS OF EDUCATION (3cr.)
    - EDU6429 PEDAGOGIES OF DIFFERENCE (3cr.)
    - EDU6460 CURRICULUM, CULTURE, AND LANGUAGE (3cr.)
    - EDU7193 SELECTED TOPICS IN SOCIETIES, CULTURES AND LANGUAGES (3cr.)
    - EDU7141 CURRENT RESEARCH IN SECOND LANGUAGE EDUCATION (3cr.)

- Studies in Teaching and Learning
  - In addition to taking the two compulsory courses (EDU5190 and EDU5199), students must select at least five courses from the following:
    - EDU5113 INCLUSIVE AND SPECIAL EDUCATION (3cr.)
    - EDU5160 MATHemATICAL THINKING ACROSS THE MATHEMATICS CURRICULUM (3cr.)
    - EDU5188 INTEGRATION OF TECHNOLOGY IN EDUCATION (3cr.)
    - EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5206 PROGRAM PLANNING IN ADULT EDUCATION (3cr.)
    - EDU5210 PHILOSOPHIES OF EDUCATION (3cr.)
    - EDU5230 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS (3cr.)
    - EDU5253 THEORIES OF LEARNING APPLIED TO TEACHING (3cr.)
    - EDU5258 LEARNING DIFFERENCES IN EDUCATION (3cr.)
    - EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5265 INTERNATIONALIZATION OF CURRICULUM STUDIES (3cr.)
    - EDU5274 TESTS AND MEASUREMENT IN COUNSELLING PSYCHOLOGY (3cr.)
    - EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5287 EMERGING TECHNOLOGIES AND LEARNING (3cr.)
    - EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE (3cr.)
    - EDU5357 CURRENT ISSUES IN MATHEMATICS EDUCATION (3cr.)
    - EDU5358 TEACHING AND LEARNING IN THE ARTS (3cr.)
    - EDU5381 CREATIVITY IN EDUCATIONAL SETTINGS (3cr.)
    - EDU5384 INTEGRATED APPROACHES TO LANGUAGE CURRICULUM (3cr.)
    - EDU5385 CRITICAL PERSPECTIVES ON CHILDREN'S LITERATURE AND LEARNING (3cr.)
    - EDU5386 SEMINAR ON LITERACY (3cr.)
    - EDU5391 INTERACTION OF RESEARCH AND PRACTICE (3cr.)
    - EDU5399 DEVELOPMENT OF ASSESSMENT INSTRUMENTS (3cr.)
    - EDU5499 CURRENT METHODS OF STUDENT ASSESSMENT (3cr.)
    - EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS (3cr.)
    - EDU6103 RESEARCHING PROFESSIONAL PRACTICE (3cr.)
    - EDU6106 SCIENCE, TECHNOLOGY, SOCIETY AND ENVIRONMENT (3cr.)
EDU6107 HEALTH AND PHYSICAL EDUCATION PEDAGOGY (3cr.)
EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR (3cr.)
EDU6203 LEARNING AND LITERACIES (3cr.)
EDU6204 LEARNING IN ADULTHOOD (3cr.)
EDU6241 SECOND LANGUAGE PROGRAM AND POLICY DEVELOPMENT AND EVALUATION (3cr.)
EDU6259 RESEARCH AND CONTEMPORARY ISSUES IN TEACHING MODELS AND PRACTICES (3cr.)
EDU6293 ASSESSMENT FOR LEARNING (3cr.)
EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
EDU7150 SELECTED TOPICS IN TEACHING AND LEARNING (3cr.)
EDU7151 SOCIOCULTURAL PERSPECTIVES ON LEARNING (3cr.)
EDU7163 THEORETICAL PERSPECTIVES IN MATHEMATICS EDUCATION (3cr.)
EDU7193 ADVANCED MEASUREMENT THEORIES (3cr.)
EDU7297 DATA COLLECTION INSTRUMENTS (3cr.)
EDU8253 COGNITIVE PERSPECTIVES ON LEARNING (3cr.)

Counselling Psychology
- In addition to taking the two compulsory courses (EDU5190 and EDU5199), students must take a minimum of nine courses in the concentration, including the following eight courses:
  - EDU5270 PROFESSIONAL ETHICS IN COUNSELLING PSYCHOLOGY (3cr.)
  - EDU5271 COUNSELLING AND PSYCHOTHERAPY: THEORIES AND PRACTICES I (3cr.)
  - EDU5274 TESTS AND MEASUREMENT IN COUNSELLING PSYCHOLOGY (3cr.)
  - EDU5471 SKILL DEVELOPMENT IN COUNSELLING AND PSYCHOTHERAPY (3cr.)
  - EDU5473 THEORIES OF CAREER DEVELOPMENT (3cr.)
  - EDU6375 PSYCHOPATHOLOGY AND ASSESSMENT (3cr.)
  - EDU6473 PRACTICUM IN COUNSELLING PSYCHOLOGY I (3cr.)
  - EDU6474 PRACTICUM IN COUNSELLING PSYCHOLOGY II (3cr.)
- NOTE: Students cannot enrol in more than one practicum in any one session.

Students must also take at least one of the following:
  - EDU6271 COUNSELLING AND PSYCHOTHERAPY: THEORIES AND PRACTICES II (3cr.)
  - EDU6371 SELECTED TOPICS IN COUNSELLING PSYCHOLOGY (3cr.)
  - EDU6372 MODELS OF CONSULTATION AND CASE MANAGEMENT IN EDUCATIONAL COUNSELLING (3cr.)
  - EDU6373 EDUCATION OF MARGINALIZED YOUTH (3cr.)
  - EDU6470 MULTICULTURAL COUNSELLING (3cr.)
  - EDU6472 SEMINAR AND PRACTICUM IN GROUP COUNSELLING (3cr.)

Health Professions Education
- In addition to taking the three compulsory courses (EDU5190, EDU5301 and EDU5302), students must take four courses from at least three of the four themes listed below.
  1. Teaching and Learning
    - EDU5105 INTER-PROFESSIONAL EDUCATION IN THE HEALTH PROFESSIONS (3cr.)
    - EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5463 CULTURAL STUDIES AND EDUCATION: THEORY AND PRAxis (3cr.)
    - EDU5466 RACISM AND ANTI-RACISM IN EDUCATION (3cr.)
    - EDU6103 RESEARCHING PROFESSIONAL PRACTICE (3cr.)
    - EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR (3cr.)
    - EDU6204 LEARNING IN ADULTHOOD (3cr.)
    - EDU6259 RESEARCH AND CONTEMPORARY ISSUES IN TEACHING MODELS AND PRACTICES (3cr.)
  2. Curriculum
    - EDU5206 PROGRAM PLANNING IN ADULT EDUCATION (3cr.)
    - EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE (3cr.)
    - EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
  3. Learning Assessment
    - EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
    - EDU6293 ASSESSMENT FOR LEARNING (3cr.)
  4. Technology and Education
    - EDU5188 INTEGRATION OF TECHNOLOGY IN EDUCATION (3cr.)
    - EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION (3cr.)
    - EDU5287 EMERGING TECHNOLOGIES AND LEARNING (3cr.)
- Moreover, at least one of these four courses must be specific to Health Professions Education and must be chosen from among the following:
  - EDU5105 INTER-PROFESSIONAL EDUCATION IN THE HEALTH PROFESSIONS (3cr.)
  - EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
  - EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)
  - EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION (3cr.)

Optional courses
- In addition to taking the compulsory courses and courses required by their concentration, candidates are encouraged to take their...
remaining courses from among the following:
- EDU6191 QUANTITATIVE RESEARCH (3cr.)
- EDU7190 QUALITATIVE RESEARCH I (3cr.)
- EDU7396 TECHNIQUES OF DOCUMENT ANALYSIS IN EDUCATIONAL RESEARCH (3cr.)
- EDU7397 DATA COLLECTION INSTRUMENTS (3cr.)

Research requirements for admission to the doctoral program

Candidates who have a Master in Education without thesis (MEd) and who wish to pursue a PhD must complete an interim report before requesting admission to the PhD program. The requirements of the interim report are determined by the Faculty of Education. Candidates must get in touch with the program director. To be granted permission by the Director of Graduate Studies to enrol in EDU6999 INTERIM REPORT, candidates must:

- have a master's degree;
- have basic credits in education;
- have research methodology credits related to their chosen research area;
- have a strong academic record, with at least a B+ average;
- submit a three- or four-page summary of their research interests.

The graduate studies program in Education must identify a professor who is able to supervise the student.

MA(Ed) program requirements

- MA candidates in the following concentrations must complete a minimum of six courses (18 credits):
  - Leadership, Evaluation, Curriculum and Policy Studies
  - Studies in Teaching and Learning
  - Societies, Cultures and Languages
  - Health Professions Education
- MA candidates in Counselling Psychology must complete a minimum of 10 courses (30 credits).
- Candidates in all concentrations must complete two compulsory courses:
  - EDU6290 RESEARCH IN EDUCATION (3cr.)
  - and
  - one of the following:
    - EDU6191 QUANTITATIVE RESEARCH (3cr.)
    - EDU7190 QUALITATIVE RESEARCH I (3cr.)
    - EDU7396 TECHNIQUES OF DOCUMENT ANALYSIS IN EDUCATIONAL RESEARCH (3cr.)
    - EDU7397 DATA COLLECTION INSTRUMENTS (3cr.)
- MA candidates in the following concentrations must complete four courses, at least three of which must be within their concentration:
  - Leadership, Evaluation, Curriculum and Policy Studies
  - Studies in Teaching and Learning
  - Societies, Cultures and Languages
  - Health Professions Education
- MA candidates in Counselling Psychology must complete the following eight compulsory courses:
  - EDU5270 PROFESSIONAL ETHICS IN COUNSELLING PSYCHOLOGY (3cr.)
  - EDU5271 COUNSELLING AND PSYCHOTHERAPY: THEORIES AND PRACTICES I (3cr.)
  - EDU5274 TESTS AND MEASUREMENT IN COUNSELLING PSYCHOLOGY (3cr.)
  - EDU5471 SKILL DEVELOPMENT IN COUNSELLING AND PSYCHOTHERAPY (3cr.)
  - EDU5473 THEORIES OF CAREER DEVELOPMENT (3cr.)
  - EDU6375 PSYCHOPATHOLOGY AND ASSESSMENT (3cr.)
  - EDU6473 PRACTICUM IN COUNSELLING PSYCHOLOGY I (3cr.)
  - EDU6474 PRACTICUM IN COUNSELLING PSYCHOLOGY II (3cr.)
- NOTE: Students cannot enrol in more than one practicum in any one session.
- Candidates in Health Professions Education must take two of the four courses in their concentration from among the following:
  - EDU5105 INTER-PROFESSIONAL EDUCATION IN THE HEALTH PROFESSIONS (3cr.)
  - EDU5292 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
  - EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)
  - EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION (3cr.)
  - EDU5292 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
  - EDU6101 SEMINAR IN HEALTH PROFESSIONS EDUCATION (3cr.)
- The research and thesis requirements include:
  - Submission of a written research proposal that meets with the approval of a thesis committee (EDU6997).
  - Presentation of a seminar following approval of the research proposal.
  - Presentation and defense of a thesis (EDU7999).
- All compulsory courses must be taken at the Faculty of Education. For any course taken outside the Faculty, students must obtain approval from the program director at least one month before the start of classes.
- Taking into account the student's previous studies, the Faculty reserves the right to add to the program of studies any course(s) deemed necessary. Normally, these additional requirements are specified at the beginning of the program.
- The individual program of studies is prepared by the thesis director and approved by the program director.
- Exceptional students who are registered in the MA program may, under certain conditions, be permitted to transfer to the PhD program without completing a master's thesis. For details, see "Fast-tracking from master's to PhD" under "Admission."
COURSE SEQUENCE

- EDU6290 RESEARCH IN EDUCATION (3cr.)
  - This course should be taken at the beginning of the program.

CONCENTRATIONS

Courses listed under the following concentrations are not the only courses available in the MA program. Concentration courses listed in the MEd course bank are also recognized as MA courses.

- Health Professions Education
  - EDU6101 SEMINAR IN HEALTH PROFESSIONS EDUCATION (3cr.)

- Leadership, Evaluation, Curriculum and Policy Studies
  - EDU7000 LECTURE DIRIGÉE / DIRECTED READING (3cr.)

- Studies in Teaching and Learning
  - EDU7000 LECTURE DIRIGÉE / DIRECTED READING (3cr.)
  - EDU7150 SELECTED TOPICS IN TEACHING AND LEARNING (3cr.)
  - EDU7193 ADVANCED MEASUREMENT THEORIES (3cr.)

- Societies, Cultures and Languages
  - EDU7000 LECTURE DIRIGÉE / DIRECTED READING (3cr.)

- Counselling Psychology
  - EDU6191 QUANTITATIVE RESEARCH (3cr.)

Collaborative program in Women’s Studies

Students admitted to the collaborative program in Women’s Studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the Women’s Studies program. Normally, the Women’s Studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5103 FEMINIST METHODOLOGIES (3cr.)
  - Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.

- Thesis or major research paper proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to Women’s Studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.

- Examiner or reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

Registration of thesis topic

Master’s students must register their thesis topic by the end of the second session of studies.

Thesis supervision and thesis submission

The program director ensures that all procedures for thesis supervision and submission specified by the FGPS and the Program Council of the Faculty are followed.

At the time of admission, the Faculty of Education designates a thesis adviser in consultation with the professor concerned.

Duration of the program

The requirements of the program are usually fulfilled within two years. The maximum time permitted is four years from the date of initial registration.

Residence

- MEd: All students admitted on a full-time basis must be registered full-time for a minimum of two sessions.
- MA: All students admitted on a full-time basis must be registered full-time for a minimum of three consecutive sessions.

Minimum standards
Students who started their program before May 2016 will need to consult the program description available in the Archive section.

**EDU5101 PERSPECTIVES IN EDUCATION** (3cr.)
Overview of key concepts, actors, practices and forms of organization in education; examination of diverse contexts and forms of education and their place and function in society; critical discussion of historical and contemporary debates in education. (This course is reserved for students in the M.Ed. extended program.)

**EDU5105 INTER-PROFESSIONAL EDUCATION IN THE HEALTH PROFESSIONS** (3cr.)
Examination of educational research, theory and practice related to the professional interdependence of work in the health concentration; study of the impact of interdisciplinary professional principles on teaching and learning strategies, curricular design, and evaluation strategies.

**EDU5113 INCLUSIVE AND SPECIAL EDUCATION** (3cr.)
Critical examination of current issues and research in inclusive and special education.

**EDU5146 SOCIAL, POLITICAL AND CULTURAL ISSUES IN SECOND LANGUAGE EDUCATION** (3cr.)
Examination of the social, political and cultural dimensions of learning and teaching an additional language; influences on learners, on opportunities for learning a language and on curriculum, pedagogical materials, and assessment.

**EDU5160 MATHEMATICAL THINKING ACROSS THE MATHEMATICS CURRICULUM** (3cr.)
Examination of the development of mathematical thinking with respect to a variety of concepts that appear in school mathematics curricula.

**EDU5188 INTEGRATION OF TECHNOLOGY IN EDUCATION** (3cr.)
Examination of the implications on teaching practice and learning outcomes in the integration of technology studies across the curriculum.

**EDU5190 INTRODUCTION TO RESEARCH IN EDUCATION** (3cr.)
Introduces students to understanding and applying research in education: researching a topic, critical reading, overview of various types of applied research.

**EDU5199 SYNTHESIS SEMINAR** (3cr.)
Integration of theoretical knowledge to contribute to educational practice.

**EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION** (3cr.)
Exploration of the concepts and strategies, methods of instruction in health education; examination of how instruction supports student learning.

**EDU5206 PROGRAM PLANNING IN ADULT EDUCATION** (3cr.)
Exploration of the fundamental concepts necessary to understand program development in adult education; review of conceptual frameworks for planning, recruitment, evaluation and research on program implementation and program building, procedures for making programs more meaningful to adult learners.

**EDU5210 PHILOSOPHIES OF EDUCATION** (3cr.)
Inquiry into selected philosophical perspectives and their effects on contemporary educational thought and practice.

**EDU5221 HISTORICAL NARRATIVES AND EDUCATION** (3cr.)
Critical examination of educational issues in historical perspective: exploration of the roles of race, class, ethnicity, religion and gender in education; historical narratives and their implications.

**EDU5222 ETHNOGRAPHIES IN EDUCATION** (3cr.)
Ethnographic perspectives on schools and school cultures, and on the relations between education and broader social-cultural forces.

**EDU5230 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS** (3cr.)
Examination of selected approaches to leadership theory, training, and practice pertinent to the challenges of administration in contemporary educational organizations.

**EDU5232 HUMAN RELATIONS IN EDUCATIONAL ADMINISTRATION** (3cr.)
Examination of the working functions of administration in relation to people within and otherwise associated with educational organizations; study of motivation and decision-making within static and dynamic situations and of conflict within organizations.

**EDU5242 TRENDS IN SECOND LANGUAGE TEACHING** (3cr.)
Study of conceptual frameworks and theories of second language teaching; historical overview of major developments and current trends; critical analysis of theoretical foundations, methods and practices.

**EDU5244 BILINGUAL, MULTILINGUAL AND MINORITY CONTEXTS OF LANGUAGE EDUCATION** (3cr.)
Examination of conceptualizations of bilingual and multilingual education in diverse contexts with an emphasis on Canada; analysis of issues related to the educational success of immigrants and members of minority groups and their integration into schools and society.

**EDU5253 THEORIES OF LEARNING APPLIED TO TEACHING** (3cr.)
Critical survey of theories of learning in historical and contemporary perspectives and their pedagogical implications for classroom practices.

**EDU5258 LEARNING DIFFERENCES IN EDUCATION** (3cr.)
Examination and critical analysis of research and practice related to the teaching and learning of people with learning differences; diverse educational contexts and perspectives; social construction of exceptionalities.

**EDU5260 INTRODUCTION TO CURRICULUM STUDIES** (3cr.)
Overview of recurring curriculum issues in historical and contemporary perspectives; introduction to the practices of curriculum theorizing; investigation of the effects of shifting paradigms within the field of curriculum studies.

**EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION** (3cr.)
Examination of theory for current practices related to curriculum design in health professions.

**EDU5262 CURRICULUM, CULTURE, AND TECHNOLOGIES** (3cr.)
Exploration of the theoretical and practical issues of curriculum and program design in relation to culture and technology; examination of the relationships between curriculum, information culture, and E-learning; investigation of the impact of cyber curriculum on cultural identities of teachers and learners.

**EDU5263 INTRODUCTION TO EDUCATIONAL ADMINISTRATION** (3cr.)
Survey of the theories, research, and practices that have shaped the field of educational administration as both an applied profession and as an area of scholarly inquiry; implications for people, educational structures, and institutional purposes.

**EDU5265 INTERNATIONALIZATION OF CURRICULUM STUDIES** (3cr.)
Investigation of contemporary issues in curriculum studies within an international context: analysis of curriculum reform initiatives in other countries; examination of current trends in international and transnational curriculum movements; exploration of alternative curricular arrangements within global, national, and local contexts.

**EDU5270 PROFESSIONAL ETHICS IN COUNSELLING PSYCHOLOGY** (3cr.)
Examination of professional ethical standards and codes of conduct for counsellors and psychotherapists; legal and legislative context of counselling and psychotherapy; application of ethical decision making; ethical dimensions of professional relationships.

**EDU5271 COUNSELLING AND PSYCHOTHERAPY: THEORIES AND PRACTICES I** (3cr.)
Critical examination of major personality and counselling theories.

**EDU5274 TESTS AND MEASUREMENT IN COUNSELLING PSYCHOLOGY** (3cr.)
Examination of common tests and inventories used in counselling and psychotherapy; selection, administration, scoring and interpretation of tests in counselling and psychotherapy settings.

**EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION** (3cr.)
Study of the impact of computer technology on communication and instructional techniques for health professions education; exploration of distance education, on-line learning, and low and high fidelity simulation.

**EDU5287 EMERGING TECHNOLOGIES AND LEARNING** (3cr.)
Research, theory and practice concerning the use of emerging technologies to facilitate learning; the impact of new media on teaching and learning strategies, on curriculum change, on learner attitudes and motivation, and on higher order learning.

**EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION** (3cr.)
Exploration of the assessment formats used to evaluate the domains of clinical competence in health care professional training at both the undergraduate and postgraduate levels; analysis of written and oral examinations, oral and performance-based testing.

**EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE** (3cr.)
Exploration of principles of effective program evaluation methods; planning; instrument development; data collection, processing and analysis; reporting and follow-up; survey of diverse models of evaluation. Prerequisite: EDU5190

**EDU5301 PRINCIPLES OF EDUCATIONAL PLANNING FOR THE HEALTH PROFESSIONS - PART I** (3cr.)
Exploration of practical approaches to planning, implementing, and evaluating programs in health professions education, examination of learning needs, learning objectives, learning methods and program evaluation.
EDU5302 PRINCIPLES OF EDUCATIONAL PLANNING FOR THE HEALTH PROFESSIONS - PART II (3cr.)
Exploration of concepts related to curricular reform, implementation of changes in education, selection of approaches to enable learning, and development of valid methods for evaluation of learning and programs of studies in the health professions. Prerequisite: EDU 5301

EDU5357 CURRENT ISSUES IN MATHEMATICS EDUCATION (3cr.)
Examination of current issues associated with mathematics education, such as educational equity, inquiry-based learning, classroom diversity, and the role of technology.

EDU5358 TEACHING AND LEARNING IN THE ARTS (3cr.)
Examination of the theoretical foundations of arts-based instruction and arts integration; investigation of the current methods of teaching, learning and evaluation in, about, with and through the arts in a variety of program areas.

EDU5381 CREATIVITY IN EDUCATIONAL SETTINGS (3cr.)
Analysis of theories of creativity in educational settings and their applications to education.

EDU5384 INTEGRATED APPROACHES TO LANGUAGE CURRICULUM (3cr.)
Theories and principles underlying the integrated approach to the teaching, learning and assessment of language and literacy (oral and written communication and media literacy); applications of language and literacy practices in specific contexts.

EDU5385 CRITICAL PERSPECTIVES ON CHILDREN'S LITERATURE AND LEARNING (3cr.)
Critical investigation of children's literature as a factor in social learning.

EDU5386 SEMINAR ON LITERACY (3cr.)
Theoretical perspectives in various areas of the field of literacy.

EDU5391 INTERACTION OF RESEARCH AND PRACTICE (3cr.)
Examination of the strengths, challenges, limitations and possibilities for enhancing research-based practice and practitioner-relevant research using quantitative and/or qualitative research.

EDU5399 DEVELOPMENT OF ASSESSMENT INSTRUMENTS (3cr.)
Study of the modalities of assessment of knowledge, skills, attitudes and performance; strategies for developing instruments to assess students learning; examination of instrument quality.

EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS (3cr.)
Critical examination of current literature on managing change in educational organizations; theories of change, restructuring, organizational reform and improvement.

EDU5463 CULTURAL STUDIES AND EDUCATION: THEORY AND PRACTICE (3cr.)
Introduction to the interdisciplinary study of contemporary popular culture including theories of representation, texts, social identities, and their implications for school practices.

EDU5465 GLOBALIZATION AND COMPARATIVE EDUCATION (3cr.)
Examination of the interaction between globalization and education; theories of mass education in developing and industrialized countries; comparative perspectives on issues of educational innovation and reform.

EDU5466 RACISM AND ANTI-RACISM IN EDUCATION (3cr.)
Theories of "race", racism and antiracism in education; exploration of the challenges of anti-racist education and change.

EDU5471 SKILL DEVELOPMENT IN COUNSELLING AND PSYCHOTHERAPY (3cr.)
Examination of counselling and psychotherapy models, methods and skills; focus on developing personal resources in verbal and non-verbal communication within counselling and psychotherapy models.

EDU5473 THEORIES OF CAREER DEVELOPMENT (3cr.)
Analysis of career development theories with emphasis on issues in career decision making and transition.

EDU5499 CURRENT METHODS OF STUDENT ASSESSMENT (3cr.)
Essential principles, concepts, skills relative to the selection, construction, critique and use of current student assessment methods; emphasis on classroom practices and large-scale assessments.

EDU5504 SÉMINAIRE D'INTÉGRATION EN ÉVALUATION DE PROGRAMMES (3cr.)
Intégration des théories, de la recherche et de la pratique en rapport avec l’évaluation de programmes. Production d’un rapport de recherche sur un thème lié à la théorie et/ou la pratique en évaluation de programmes. Préalables : a) EDU 5299 ou EDU 5699 ou PSY 7503 ou PSY 7103 ou CRM 6759 ou CRM 6359; b) EDU 6299 ou EDU 6699; c) PSY 7102 ou PSY 7502. Il est préférable que l’étudiant ait complété, en plus, un cours facultatif approuvé par la direction du
diplôme. Exclusion : PSY 5104.

EDU5578 INFORMATION SCOLAIRE ET PROFESSIONNELLE (3cr.)
Aperçu de l'organisation et du fonctionnement des services d'orientation et d'information scolaires et professionnelles. Étude des différents systèmes provinciaux. Analyse, évaluation, classification et utilisation de différents types de documents. Initiation aux banques de données informatisées.

EDU5581 SCIENCES ET DIVERSITÉS (3cr.)
Analyse des conditions de production du savoir scientifique dans divers contextes socio-culturels. Identification et analyse des principales problématiques reliées à l'enseignement et à l'apprentissage des sciences.

EDU5582 MODÈLES MÉDIATISÉS D'ENSEIGNEMENT (3cr.)
Étude des modèles médiatisés d'enseignement et de leurs applications en présentiel et à distance. Analyse des facteurs individuels et structurels de la réussite de ces modèles.

EDU5583 CRÉATIVITÉ ET ÉDUCATION (3cr.)
Analyse des théories de la créativité. Identification de liens entre le processus créateur, l'enseignement et l'apprentissage auprès d'une diversité d'apprenants. Mise en perspective dans les champs disciplinaires.

EDU5584 DIMENSIONS, STRATÉGIES ET GESTION DES APPRENTISSAGES (3cr.)
Étude des dimensions entrant en jeu dans la gestion des apprentissages en milieu éducatif et scolaire. Conception et révision de modèles d'enseignement et de leurs liens avec la gestion des apprentissages.

EDU5585 PSYCHOPÉDAGOGIE DE L'ENFANCE ET DE L'ADOLESCENCE
Étude du développement et de l'apprentissage des compétences physiques, émotives, sociales et cognitives d'enfants d'âges préscolaire et scolaire, incluant l'adolescent. Analyse de modèles d'intervention éducative adaptée et des modèles de prévention des difficultés chez l'enfant et l'adolescent.

EDU5600 L'APPRENTISSAGE À L'ÂGE ADULTE (3cr.)
Examen des théories de l'apprentissage appliquées à l'éducation de l'apprenant adulte. Analyse critique des modèles de mises en pratique de ces théories en situation d'apprentissage.

EDU5611 ÉTHIQUE PROFESSIONNELLE EN ÉDUCATION (3cr.)
Étude des concepts et principes du jugement éclairé dans la résolution de dilemmes éthiques. Analyse des enjeux d'une éthique professionnelle.

EDU5616 PRINCIPALES PROBLÉMATIQUES EN ÉDUCATION (3cr.)
Étude des problématiques de l'éducation reliées aux approches philosophiques, aux buts, aux programmes d'études, aux méthodes, aux structures et aux personnels en éducation.

EDU5618 ÉDUCATION COMPARÉE (3cr.)
Analyse comparative des systèmes éducationnels au Canada et sur le plan international. Analyse des différentes réformes en cours. Étude des tendances en éducation.

EDU5631 COMPORTEMENT ORGANISATIONNEL (3cr.)
Étude des interactions entre la structure organisationnelle des entités scolaires et les comportements des acteurs.

EDU5635 LA POLITIQUE ET L'ÉDUCATION (3cr.)

EDU5752 ENSEIGNEMENT EN MILIEU MINORITAIRE FRANCOPHONE (3cr.)
Examen des enjeux liés à l'apprentissage et l'enseignement en milieu minoritaire francophone permettant de préciser les démarches éducatives pertinentes.

EDU5760 COMPRÉHENSION ET RAISONNEMENT MATHÉMATIQUES EN MILIEU SCOLAIRE (3cr.)
Étude du développement de la pensée mathématique associée à différents concepts présents dans les programmes de mathématiques en milieu scolaire.

EDU5793 COURANTS EN ÉVALUATION DES APPRENTISSAGES (1cr.)

EDU5794 ÉVALUATION DES APPRENTISSAGES : PRINCIPES D'ÉQUITÉ (1cr.)

EDU5795 RESPONSABILITÉ DE L'APPRENTI ET DU SYSTÈME À L'ÉGARD DES APPRENTISSAGES (1cr.)
Mise en valeur de la participation de l'apprenti et de sa performance optimale. Étude des rôles des personnes intervenantes. Harmonisation des évaluations à
petite et à grande échelle. Approfondissement des notions de contrôle et de compte rendu.

**EDU5796 ÉVALUATION DES COMPÉTENCES** (1cr.)
Étude du concept de compétence. Comparaison des divers types d'évaluation de l'apprentissage selon les dimensions visées. Identification d'instrumentation appropriée.

**EDU5797 STRATÉGIES D'ÉVALUATION DES APRENTISSAGES** (1cr.)

**EDU5798 INTERPRÉTATION ET DIFFUSION DES RÉSULTATS D'ÉVALUATION** (1cr.)
Comparaison de divers schémas d'interprétation. Étude de divers types de bulletin scolaire. Analyse du processus de prise de décision, du suivi et de la rétrocroissance.

**EDU5830 ENJEUX ACTUELS EN ADMINISTRATION ÉDUCATIONNELLE** (3cr.)
Application des théories et principes en administration éducationnelle à partir de problèmes, d'événements et de politiques éducationnelles récents. Préalable : EDU5616 ou EDU5630.

**EDU5832 DÉVELOPPEMENT DES RELATIONS AVEC LA COMMUNAUTÉ SCOLAIRE** (3cr.)
Examen de l'importance des relations avec la communauté scolaire. Approfondissement du concept de partenariat, des modèles de répartition des pouvoirs, des techniques de communication efficace, du marketing des produits éducatifs et du concept de client et d'usager.

**EDU5833 ÉDUCATION ET CHANGEMENT SOCIAL** (3cr.)

**EDU5881 TENDANCES DE LA RECHERCHE EN ÉDUCATION INCLUSIVE** (3cr.)
Fondements théoriques et enjeux actuels de l'approche inclusive à l'éducation. Perspectives des élèves, du personnel scolaire, des intervenant/es communautaires et associatifs/ves et des parents.

**EDU6101 SEMINAR IN HEALTH PROFESSIONS EDUCATION** (3cr.)
Critical examination of selected topics in health professions education based on research and disciplinary issues. (Open to MEd Students with permission of the program director.)

**EDU6102 SEMINAR IN CURRICULUM STUDIES** (3cr.)
(Organizational Studies in Education) Critical examination of research within the field of curriculum studies.

**EDU6103 RESEARCHING PROFESSIONAL PRACTICE** (3cr.)
(Teaching, Learning and Evaluation) Critical examination of the scholarship and research on professional practice of teaching, its application to knowledge building and pedagogical improvement.

**EDU6106 SCIENCE, TECHNOLOGY, SOCIETY AND ENVIRONMENT** (3cr.)
(Teaching, Learning and Evaluation) Critical examination of the social impact of science and technology and their educational implications. Study of the roles of ecological and scientific literacies.

**EDU6107 HEALTH AND PHYSICAL EDUCATION PEDAGOGY** (3cr.)
(Teaching, Learning and Evaluation) Research in health and physical education and their implications for pedagogy.

**EDU6109 YOUTH CULTURE, POPULAR CULTURE AND PEDAGOGY** (3cr.)
(Society, Culture and Literacies) Research in youth culture, popular culture and their implications for pedagogy.

**EDU6110 CURRICULUM, POLITICS AND POLICY IN EDUCATION** (3cr.)
(Organizational Studies in Education) Critical study of the political organization of education; the role of government in shaping curriculum; the cultural politics of educational change.

**EDU6111 TEACHING AND LEARNING OF LITERACIES IN A SECOND LANGUAGE** (3cr.)
(Second Language Education) Critical examination of contextualized practices for the teaching, learning and assessment of multiple literacies in a second language.

**EDU6115 SOCIAL AND POLITICAL ISSUES IN LITERACY ASSESSMENT** (3cr.)
(Society, Culture and Literacies) Critical examination of contemporary literacy assessment practices; focus on political contexts, social consequences and validity.

**EDU6146 SECOND LANGUAGE LEARNING THEORIES** (3cr.)
Critical study of second language learning theories from linguistics, cognitive, social and pedagogical perspectives.

**EDU6191 QUANTITATIVE RESEARCH** (3cr.)
Planning, analysis and interpretation of quantitative research within experimental and quasi-experimental frameworks; application of analysis of variance, analysis of covariance and techniques of linear regression (explanation, prediction) to educational contexts. *Prerequisite: EDU5191 or equivalent.*

**EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING** (3cr.)
Classical test theory; composite variables; reliability; validity; applications to norm-referenced and criterion-referenced tests; scales standardization.

**EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR** (3cr.)
Study of functions and tasks, and the various roles of adult educators as volunteers, as trainers, as teachers of adults, as researchers; examination of the pre service and on going training of adult educators and professionalization in adult education.

**EDU6203 LEARNING AND LITERACIES** (3cr.)
Examination of literacy in relation to the construction of ethnicity, gender, social class and racialized difference; exploration of literacy theories from historical, psychological, political and educational perspectives; study of school, family, workplace and community literacy practices.

**EDU6204 LEARNING IN ADULTHOOD** (3cr.)
Examination of theories and stages of adulthood with emphasis on adult psychological development and implications for education. Critical study of adult characteristics, motivation, gender roles and other concepts related to development.

**EDU6241 SECOND LANGUAGE PROGRAM AND POLICY DEVELOPMENT AND EVALUATION** (3cr.)
Study of second language policy and how it affects program design and implementation; needs analysis, setting goals and objectives, syllabus design, materials development and classroom implementation; learning assessment, program evaluation and revision.

**EDU6259 RESEARCH AND CONTEMPORARY ISSUES IN TEACHING MODELS AND PRACTICES** (3cr.)
Analysis of current pedagogical models and practices, and of their underlying theoretical constructs; critical examination of traditional and recent perspectives on the context and process of teaching.

**EDU6271 COUNSELLING AND PSYCHOTHERAPY: THEORIES AND PRACTICES II** (3cr.)
Advanced critical examination of major personality and counselling theories. *Prerequisite: EDU5271 or its equivalent.*

**EDU6290 RESEARCH IN EDUCATION** (3cr.)
Critical review of approaches, methods and processes in educational research; examination of complementarity of different types of research methodology.

**EDU6293 ASSESSMENT FOR LEARNING** (3cr.)
Nature and role of formative assessment in instructional settings; conditions and contexts favorable for effective use of assessment for learning.

**EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES** (3cr.)
Critical exploration of theoretical orientations to program evaluation and in-depth examination of selected contemporary issues confronting evaluators. *Prerequisite: EDU 5299 or PSY 7103 or PSY 7503 or CRM 6359 or CRM 6759 (Diploma in Program Evaluation).*

**EDU6371 SELECTED TOPICS IN COUNSELLING PSYCHOLOGY** (3cr.)
An examination of current issues in counselling psychology.

**EDU6372 MODELS OF CONSULTATION AND CASE MANAGEMENT IN EDUCATIONAL COUNSELLING** (3cr.)
Analysis of roles of counsellor as leader, team member, and integral resource in developing, mobilizing, and/or utilizing school/community resources within a systems approach; personal development of the skills of co-ordination, collaboration, brokering, and consultation.

**EDU6373 EDUCATION OF MARGINALIZED YOUTH** (3cr.)
Examination of the social ecology and educational problems and needs of diverse groups of marginalized youth in different contexts in Canada and in other countries; related socio-political issues, policy implications, and intervention strategies.

**EDU6421 PUBLIC MEMORY, LIVED HISTORIES AND EDUCATION** (3cr.)
Critical examination of the social construction of public memory through schooling; relations between public memory, peoples' lived histories and the making of communities; the roles of public memory in shaping social identities of race, nation and gender.

**EDU6422 EDUCATION AND DEMOCRATIC COMMUNITIES** (3cr.)
Inquiry into the democratic purposes of schooling and the theory and practices of democratic education; implications for civic engagement, curriculum, school organizations and leadership.

**EDU6426 CITIZENSHIP AND GLOBAL EDUCATION** (3cr.)
Theories of citizenship, global education and their related pedagogies.
EDU6428 SOCIAL CONTEXTS OF EDUCATION (3cr.)
Examination of education and its role as part of the fabric of society; exploration of changing norms of schooling, school organization, and social environments; the effects of schooling on social stratification, the relationships between schools and other social institutions, and the paradoxes of education in pluralistic societies; inquiry into issues of authority, power, socialization and culture.

EDU6429 PEDAGOGIES OF DIFFERENCE (3cr.)
Exploration of diversity and education from cultural, economic, historical and political perspectives including critical pedagogy and pedagogies of transformation.

EDU6460 CURRICULUM, CULTURE, AND LANGUAGE (3cr.)
Examination of the ways in which curriculum works to reproduce and/or suppress certain identities; interdisciplinary inquiries into how current curricular language is situated in relation to identity formations; deconstruction of the marginalization of identities across various curricular contexts. Prerequisite: one of EDU5260, EDU5262 or EDU5265.

EDU6470 MULTICULTURAL COUNSELLING (3cr.)
Exploration of practical and theoretical issues relevant to counselling individuals, groups, and families from diverse cultural backgrounds. Emphasis on development of attitudes, values, and skills that promote effective interpersonal relations and counselling.

EDU6472 SEMINAR AND PRACTICUM IN GROUP COUNSELLING (3cr.)
Examination of group counselling theory and technique; emphasis on dynamics of group behaviour, social-psychological interactions in small groups, and practice in developing and providing group counselling services. Prerequisites: EDU5271 and EDU5471.

EDU6473 PRACTICUM IN COUNSELLING PSYCHOLOGY I (3cr.)
Seminar and minimum of 200 hours of supervised on-site experience in an approved counselling setting. Examination of organizational issues in the delivery of counselling and psychotherapy services; development of professional competence. Prerequisites: EDU5271, EDU5471

EDU6474 PRACTICUM IN COUNSELLING PSYCHOLOGY II (3cr.)
Seminar and minimum of 200 hours of supervised on-site experience in an approved counselling setting. Critical examination of selected helping techniques; critical examination of ethical and legal issues in counselling psychology. Prerequisites: EDU6473.

EDU6504 ÉDUCATION DANS UNE PERSPECTIVE HISTORIQUE (3cr.)
(Société, culture et littératures) Étude du rôle de la langue, de la culture, de l’ethnicité, du genre et de la religion dans le développement de l’éducation en milieu majoritaire et minoritaire au Canada et dans le monde. Analyse de diverses perspectives en histoire de l’éducation.

EDU6505 ENJEUX ACTUELS EN ENSEIGNEMENT (3cr.)
(Enseignement, apprentissage et évaluation) Étude des problématiques actuelles en éducation et de leurs enjeux en enseignement.

EDU6508 PERSPECTIVES DE LA DIDACTIQUE DU FRANÇAIS LANGUE SECONDE EN CONTEXTES NATIONAUX (3cr.)

EDU6516 ENSEIGNEMENT ET APPRENTISSAGE DE LA GRAMMAIRE DU FRANÇAIS LANGUE SECONDE (3cr.)
(Didactique des langues seconde) Analyse des différents types de grammaire. Étude critique de la recherche sur les pratiques pédagogiques dans l’enseignement de la grammaire en français langue seconde.

EDU6529 APPROCHES THÉORIQUES ET PRATIQUES EN LITTÉRATIES MULTIPLES (3cr.)
Études des approches théoriques et pratiques associées aux différents champs des littératures tels que la littérature familiale, scolaire, personnelle et critique.

EDU6571 SÉMINAIRE EN DÉVELOPPEMENT PROFESSIONNEL ET EN PLANIFICATION DE CARRIERE (3cr.)
Approfondissement de certains aspects conceptuels du counselling et de la recherche appliquée au domaine du développement professionnel et de la planification de carrière.

EDU6573 TRAVAIL ET SANTÉ MENTALE (3cr.)
Analyse des problèmes de santé mentale provoqués par le travail et l'absence de travail : perte d'estime de soi, d'identité, de motivation, humiliation, culpabilité, épuisement professionnel, mise en chômage technique, etc. Nature et diagnostic. Mise en contexte de ces troubles dans divers courants de pensée. Étude des effets thérapeutiques du travail.

EDU6634 GESTION DE LA QUALITÉ EN ÉDUCATION (3cr.)
Analyse critique des principes, des méthodes et des techniques de gestion de la qualité totale appliquées à l'organisation scolaire.

EDU6637 GESTION ET SUPERVISION DES RESSOURCES PROFESSIONNELLES EN ÉDUCATION (3cr.)
Étude des modèles de gestion des ressources humaines dans les systèmes scolaires à partir de paramètres comme les conventions collectives, l'équité, la supervision, l'évaluation du rendement, le développement professionnel.

EDU6651 ÉDUCATION À LA CITOYENNÉTÉ (3cr.)
Études des différentes approches théoriques et pratiques associées à la citoyenneté et leur lien avec les inégalités et la marginalisation sociales.

**EDU6652 LITTÉRATIE ET DIVERSITÉ** (3cr.)
Examen des divers concepts associé à la littératie et leurs rapports avec la construction de la personne en lien avec le langage et l'identité ethnique et sociale.

**EDU6670 COUNSELLING ET ORIENTATION AUPRÈS DES GROUPES MINORITAIRES** (3cr.)
Études des caractéristiques des groupes minoritaires tels que les femmes, les gais et les lesbiennes, les handicapés, les minorités linguistiques et (ou) ethniques, etc., selon la perspective du counselling et de l'orientation de carrière.

**EDU6672 MODÈLES ET STRATÉGIES D’INTERVENTION EN CONTEXTE DE LA PSYCHOLOGIE DU COUNSELLING** (3cr.)
Différents modèles d'intervention associés au développement d'habiletés interpersonnelles et sociales des élèves. Stratégies de solution de problèmes, de gestion de classe, de résolution de conflits et de gestion du temps.

**EDU6871 STAGE EN PSYCHOLOGIE DU COUNSELLING I** (3cr.)
Stage clinique supervisé d'un minimum de 200 heures dans un centre offrant des services de counselling personnel et (ou) de carrière. Préalables : EDU5671, EDU5871.

**EDU6997 PROPOSITION DE THÈSE DE MAÎTRISE / MASTER'S THESIS PROPOSAL**

**EDU7000 LECTURE DIRIGÉE / DIRECTED READING** (3cr.)

**EDU7101 SELECTED TOPICS IN HEALTH PROFESSIONS EDUCATION** (3cr.)
Critical analysis of selected topics and their implications for health professions education.

**EDU7102 SELECTED TOPICS IN LEADERSHIP, EVALUATION, CURRICULUM AND POLICY STUDIES** (3cr.)
In-depth study of a topic in leadership, evaluation and curriculum.

**EDU7133 SELECTED TOPICS IN SOCIETIES, CULTURES AND LANGUAGES** (3cr.)
Topics of current interest will be selected for intensive study.

**EDU7141 CURRENT RESEARCH IN SECOND LANGUAGE EDUCATION** (3cr.)
Examination of current research in second language education representing diverse contemporary issues and conceptual frameworks.

**EDU7150 SELECTED TOPICS IN TEACHING AND LEARNING** (3cr.)
Topics of current interest will be selected for intensive study.

**EDU7151 SOCIOCULTURAL PERSPECTIVES ON LEARNING** (3cr.)
Critical examination of theories of learning from sociocultural perspectives and their effects on educational practices.

**EDU7163 THEORETICAL PERSPECTIVES IN MATHEMATICS EDUCATION** (3cr.)
Study of theoretical perspectives in mathematics education, examination of the connection between theory, research and practice in mathematics teaching and learning.

**EDU7190 QUALITATIVE RESEARCH I** (3cr.)
Critical review of fundamental aspects of qualitative research in education: approaches, characteristics and strategies.

**EDU7193 ADVANCED MEASUREMENT THEORIES** (3cr.)
Item response models; generalizability theory; dimensionality.

**EDU7295 SELECTED TOPICS IN QUANTITATIVE RESEARCH** (3cr.)
Topics of current interest will be selected for intensive study.

**EDU7296 TECHNIQUES OF DOCUMENT ANALYSIS IN EDUCATIONAL RESEARCH** (3cr.)
Study of educational documents and approaches to textual research including historical criticism, discourse analysis and narrative theory.

**EDU7397 DATA COLLECTION INSTRUMENTS** (3cr.)
Study of the construction of data collection instruments in education and of the validation of interpretations of findings.

**EDU7534 THÈMES CHOISIS : LEADERSHIP, ÉVALUATION, PROGRAMMES ET POLITIQUES ÉDUCATIONNELLES** (3cr.)
Themes variés choisis pour une étude approfondie.

**EDU7588 THÈMES CHOISIS EN ENSEIGNEMENT ET APPRENTISSAGE** (3cr.)


EECS (School of Electrical Engineering and Computer Science)

Admission to the graduate program in Electrical and Computer Engineering is governed by the general regulations of the Ottawa-Carleton Institute. In addition, students must meet specific requirements for the doctoral program. Following the transfer, all of the requirements of the doctoral program must be met.

Electrical and Computer Engineering

Ottawa–Carleton Joint Program

Established in 1983, the Ottawa–Carleton Institute for Electrical and Computer Engineering (OCIECE) combines the research strengths of the School of Electrical Engineering and Computer Science (EECS) at the University of Ottawa and the departments of Electronics and of Systems and Computer Engineering at Carleton University.

The Institute offers graduate programs leading to the degrees of Master of Applied Science (MAsc), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Electrical and Computer Engineering.

The Institute is one of the participating units in the collaborative program in Science, Society and Policy (master’s level only).

Members of the Institute are involved in ten main research fields: computer communications, multimedia and distributed systems; computer-aided design for electronic circuits; computer and software engineering; digital and wireless communications; microwave and electromagnetics; signal, speech and image processing; integrated circuits and devices; systems and machine intelligence; photonics systems; and, biomedical
engineering. Further information is posted on the departmental websites.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

**Programs**

Master of Applied Science Electrical and Computer Engineering

Master of Applied Science Electrical and Computer Engineering Specialization in Science, Society and Policy

Master of Engineering Electrical and Computer Engineering

Doctorate in Philosophy Electrical and Computer Engineering

**Admission**

Admission to the graduate program in Electrical and Computer Engineering is governed the general regulations of the Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Be the holder of a bachelor’s degree with a specialization, or a major in electrical and computer engineering (or equivalent) with a minimum average of 70% (B).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who are familiar with the applicant’s work.
- Provide a statement of purpose indicating their career goals and interests in the proposed research area.
- For admission to the MAsc, identify at least one professor who is willing and available to act as thesis supervisor.
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Transfer from master’s to PhD**

Students enrolled in the MAsc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of all graduate courses with a minimum average of A- (80%);
- Satisfactory progress in the research program;
- Written recommendation by the supervisor and by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met. Following the transfer, all of the requirements of the doctoral program must be met.

**Collaborative programs**

The Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE) is one of the participating units in the collaborative program in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of the program posted on the FGIPS website.

**Program Requirements**
A. Master of applied science (MASc)

The requirements of the program are as follows:

- Successful completion of 15 course credits.
- Presentation and defence of a thesis (ELG7999) based on original research carried out under the direct supervision of a research faculty member in the Department.

Subject to the approval of the advisory committee in the case of the PhD program, and the departmental chairperson in the case of a master’s program, a student may take up to half of the course credits in the program in other disciplines (e.g. mathematics, computer science, physics).

B. Master of engineering (MEng)

1. Project Option

The requirements of the program are as follows:

- Successful completion of 27 course credits;
- Completion of an electrical engineering project (ELG5900).

2. Course Work Option

The requirement of this option is as follows:

- Successful completion of 30 course credits.

Subject to the approval of the advisory committee in the case of the PhD program, and the departmental chairperson in the case of a master’s program, a student may take up to half of the course credits in the program in other disciplines (e.g. mathematics, computer science, physics).

Duration of Program

The requirements of the program are usually fulfilled within two years of the full-time studies. The maximum time permitted is four years.

Residence

Students admitted full-time must register full-time for a minimum of three sessions.

Minimum Standards

The passing grade in all courses is B. A student who has incurred two failures is withdrawn from the program.

Collaborative program in Science, Society and Policy

The requirements of both the MASc in Electrical and Computer Engineering and the collaborative program must be met. The credits completed for the specialization count also towards the MASc degree in Electrical and Computer Engineering.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the Electrical and Computer Engineering program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation of “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

Courses

In all programs, the student may choose graduate courses from either university with the approval of the adviser/graduate program coordinator or Advisory Committee. The graduate courses are listed below, grouped by subject area. Course descriptions are to be found in the departmental section of the calendar concerned. All courses are of one session duration.

The Department offering the course is identified by the prefix of the number assigned to the course as follows:

UNIVERSITÉ D’OTTAWA / UNIVERSITY OF OTTAWA:

ELG / EACJ SIGE (École de science informatique et de génie électrique)

EECS (School of Electrical Engineering and Computer Science)

CARLETON UNIVERSITY:
SYSC Department of Systems and Computer Engineering

ELEC Department of Electronics

Only a selection of courses listed is given in a particular academic year. All courses extend over one session and are worth three credits at the University of Ottawa (0.5 credit at Carleton University).

**Computer & Software Engineering**

**ELG5100 (EACJ 5200) SOFTWARE ENGINEERING PROJECT MANAGEMENT** (3cr.)
Software system engineering and organization methods; work breakdown structure and task determination; effort, duration and cost estimation; scheduling and planning. Monitoring and control; analysis of options; management of risks, change, and expectations. Process and product metrics, post-performance analysis, process improvement and maturity. Management of Agile Programming methodologies such as Extreme Programming. Case studies.

**ELG5124 (EACJ 5204) VIRTUAL ENVIRONMENTS** (3cr.)

**ELG5125 (EACJ 5205) QUALITY OF SERVICE MANAGEMENT FOR MULTIMEDIA APPLICATIONS** (3cr.)
Design principles: layering, protocols, interface; models for open distributed processing; real-time requirement; request-response and stream processing, real-time scheduling, design for performance and scalability; other quality of services issues; user perspective versus system performance parameters, cost/performance trade-off, negotiations; adaptive and mobile applications; examples of multimedia applications and protocols. Prerequisite: ELG 5374 (EACJ 5607) or SYSC 5201 (ELG 6121) or equivalent.

**ELG5134 (SYSC 5404) MULTIMEDIA COMPRESSION, SCALABILITY, AND ADAPTATION** (3cr.)
Covers media compression, in-depth issues of scalability in the compression domain (including audio, images, video, 2D and 3D graphics), and adaptation towards various contexts; also covers various popular media encoding standards (including JPEG and MPEG).

**ELG5136 (SYSC 5406) NETWORK ROUTING TECHNOLOGIES** (3cr.)
Covers network routing, in-depth issues and technologies in traffic engineering, quality of service, protection for high-speed networks. Addresses the following topics: basic routing, MPLS (Multiprotocol Label Switching) system components and architecture, constraint-based routing, traffic engineering, content distribution networks, network monitoring and measurements, quality of service, protection and restoration, virtual private networks, cross layer interworking, and special topics. Prerequisite: SYSC 4602 or equivalent.

**ELG5137 (SYSC 5407) PLANNING AND DESIGN OF COMPUTER NETWORKS** (3cr.)
Planning process of computer networks; needs and technical requirements; modeling of different network planning problems; exact and approximate algorithms; topological planning and expansion problems; equipment (switch, router) location problem; approximate and optimal routing algorithms; presentation of various case studies. Prerequisites: SYSC 4602, SYSC 4701, GEG3185, GEG4190, or equivalent networking courses.

**ELG5138 (SYSC 5408) CROSS LAYER DESIGN FOR WIRELESS MULTIMEDIA NETWORKS** (3cr.)
Quality of service measures at different layers. Parameter adaptation, trade-offs, and optimization at physical, data-link, network, transport, and application layers. Examples of cross-layer design in cellular, ad hoc, sensor, local area, green, and cognitive radio networks.

**ELG5191 (EACJ 5203) DESIGN OF DISTRIBUTED SYSTEM SOFTWARE** (3cr.)
Distributed systems design and programming issues; distributed computing. Basics of object oriented technology for distributed computing. Distributed objects technologies. Object oriented models for distributed programming. Distributed computing architecture design. Component based distributed software design. Scalability, interoperability, portability and distributed services. Distributed applications design. Prerequisites: an undergraduate degree in Computer Engineering, or Computer Science, or practical experience in system software design. Prerequisite: An undergraduate education in Computer Engineering, or Computer Science, or practical experience in system software design.

**ELG5194 (EACJ 5703) DESIGN AND TESTING OF RELIABLE DIGITAL SYSTEMS** (3cr.)

**ELG5195 (EACJ 5705) DIGITAL LOGIC DESIGN: PRINCIPLES AND PRACTICES** (3cr.)

**ELG5197 (EACJ 5102) INTRODUCTION TO EMBEDDED SYSTEMS** (3cr.)
Embedded systems' general characteristics, niche, and design alternatives. Simple embedded systems: sequential event response systems and cyclic executives. Prototype based designs, multitasking and multiactivity paradigms. Multitasking system design: elements of real-time operating systems and harmony.
Multiactivity system design: process activity language (PAL) and PAL-based design tools. *Prerequisite: ELG 4161 or the equivalent.*

**ELG5198 (EACJ 5103) PARALLEL PROCESSING WITH VLSI (3cr.)**

**ELG5199 (EACJ 5104) DESIGN OF MULTIMEDIA DISTRIBUTED DATABASE SYSTEMS (3cr.)**
Database concepts and architectures. Data modelling. Relational technology and distributed databases. Examples of the new generation of databases for advanced multimedia applications such as multimedia information retrieval, VOD and the limitations of the conventional models for managing multimedia information (graphics, text, image, audio and video).

**ELG6103 (SYSC 5003) DISCRETE STOCHASTIC MODELS (3cr.)**

**ELG6106 (SYSC 5006) DESIGN OF REAL-TIME AND DISTRIBUTED SYSTEMS (3cr.)**
Characteristics of real-time and distributed systems. Modern midware systems, such as CORBA, DCE, RMI for building distributed applications: advantages and disadvantages. Analyzing designs for robustness, modularity, extensibility, portability and performance. Implementation issues. Major course project. Prerequisites: Engineering SYSC 3303 and SYSC 5708 or similar experience. *Prerequisites: Engineering SYSC3303 and SYSC5708 or similar experience.*

**ELG6111 (SYSC 5101) DESIGN OF HIGH-PERFORMANCE SOFTWARE (3cr.)**
Designing software to demanding performance specifications. Design analysis using models of computation, workload, and performance. Principles to govern design improvement for sequential, concurrent and parallel execution, based on resource architecture and quantitative analysis. *Prerequisites: Engineering SYSC 5704 and a course in software engineering; or the equivalent.*

**ELG6112 (SYSC 5102) PERFORMANCE MEASUREMENT AND MODELLING OF DISTRIBUTED APPLICATIONS (3cr.)**
Performance measurements, metrics and models of midware based systems and applications. Benchmarks, workload characterization, and methods for capacity planning and system sizing. Performance monitoring infrastructures for operating systems and applications. Introduction to the design and analysis of experiments and the interpretation of measurements. Prerequisites: SYSC 5101 or the equivalent. *Prerequisites: SYSC5101 or the equivalent.*

**ELG6113 (SYSC 5103) SOFTWARE AGENTS (3cr.)**
Agent-based programming; elements of Distributed Artificial Intelligence; beliefs, desires and intentions; component-based technology; languages for agent implementations; interface agents; information sharing and coordination; KIF; collaboration; Communion; ontologies; KQML; autonomy; adaptability; security issues; mobility; standards; agent design issues and frameworks, applications in telecommunications. Prerequisites: Knowledge of Java.

**ELG6114 (SYSC 5104) METHODOLOGIES FOR DISCRETE-EVENT MODELLING AND SIMULATION (3cr.)**

**ELG6115 (SYSC 5105) SOFTWARE QUALITY ENGINEERING AND MANAGEMENT (3cr.)**
All aspects of software quality engineering. Software testing, at all stages of the software development and maintenance life cycle. Software reviews and inspections. Use of software measurement and quantitative modelling for the purpose of software quality control and improvement. Precludes additional credit for CSIS5111 (COMP 5501). *Prerequisites: an undergraduate course in software engineering such as SYSC 4800 or SEG 3300, or equivalent, and basic statistics.*

**ELG6118 (SYSC 5108) TOPICS IN INFORMATION SYSTEMS (3cr.)**
Recent and advanced topics in the field of Information Systems and its related areas. *Prerequisite: 94.507 or 94.583 or the equivalent.*

**ELG6130 (SYSC 5402) HEALTH CARE ENGINEERING (3cr.)**
Overview of health care system/participants; biophysical measurements for diagnosis/monitoring; biomedical sensors/technology; telemedicine and applications; safety considerations; managing medical technologies/funding models for clinical engineering departments; considerations for developing countries. Precludes additional credit for ELG 5123. *Prerequisite: permission of the program director.*

**ELG6131 (EACJ 5127 / SYSC 5301) ADVANCED TOPICS IN BIOMEDICAL ENGINEERING (3cr.)**
Topics vary from year to year. *Prerequisite: Permission of the Institute.*

**ELG6136 (SYSC 5306) MOBILE COMPUTING SYSTEMS (3cr.)**
Systems to build mobile applications. Covers data link layer to application layer. Emphasis on existing wireless infrastructure and IETF protocols. Focuses on view of mobile application developer; communication systems, middleware and application frameworks, de facto standards proposed/developed by industry consortia.
Advanced course in software design dealing with design issues at a high level of abstraction. Design models: use case maps for high-level behaviour description; language and some experience in assembly language programming.

Concepts in basic computer architecture, assembly languages, high level languages including object orientation, compilers and operating system concepts New architectural concepts are introduced. Discussion of programmable architectures (micro-controllers, DSPs, GP) and FPGAs. Memory interfacing.

ELG6170 (SYSC 5703) INTEGRATED DATABASE SYSTEMS
Database definitions, applications, and architectures. Conceptual design based on the entity-relationship and object-oriented models. Relational data model: relational algebra and calculus, normal forms, data definition and manipulation languages. Database management systems: transaction management, recovery and concurrency control. Current trends: object-oriented, knowledge-based, multimedia and distributed databases. Prerequisite: SYSC 5704 (ELG 6174) or the equivalent.

ELG6174 (SYSC 5704) ELEMENTS OF COMPUTER SYSTEMS (3cr.)
Concepts in basic computer architecture, assembly languages, high level languages including object orientation, compilers and operating system concepts (including concurrency mechanisms such as processes and threads and computer communication). Designed for graduate students without extensive undergraduate preparation in computer system engineering (or the equivalent experience). Prerequisite: Programming experience in at least one high-level language and some experience in assembly language programming.

ELG6176 (SYSC 5706) ANALYTICAL PERFORMANCE MODELS OF COMPUTER SYSTEMS (3cr.)
Analytical modelling techniques for performance analysis of computing systems. Theoretical techniques covered include single and multiple class queueing network models, together with a treatment of computational techniques, approximations, and limitations. Applications include scheduling, memory management, peripheral devices, databases, multiprocessing, and distributed computing. Prerequisites: one of SYSC 5003, SYSC 5503, or ELG 5119, or the equivalent. Prerequisite: One of SYSC 5003, SYSC 5503, or ELG 5119, or the equivalent.

ELG6178 (SYSC 5708) DEVELOPMENT OF REAL-TIME AND DISTRIBUTED SOFTWARE WITH REUSABLE COMPONENTS (3cr.)
Advanced object-oriented design and programming of real-time and distributed systems using C++ and/or Java. Object-oriented features; inheritance, polymorphism, templates, exception handling. Concurrency issues. Design patterns and frameworks for distributed systems, with examples from communication applications. Design issues for reusable software. Prerequisites: Knowledge of C++ and/or Java, of operating system concepts, and permission of the Department.

ELG6179 (SYSC 5709) ADVANCED TOPICS IN SOFTWARE ENGINEERING (3cr.)

ELG6186 (SYSC 5806) OBJECT ORIENTED DESIGN OF REAL-TIME AND DISTRIBUTED SYSTEMS (3cr.)
Advanced course in software design dealing with design issues at a high level of abstraction. Design models: use case maps for high-level behaviour description; UML for traditional object-oriented concerns. Design patterns. Forward, reverse, and re-engineering. Substantial course project on applications chosen by students. Prerequisite: Permission of the Department.

ELG6187 (SYSC 5807) ADVANCED TOPICS IN COMPUTER SYSTEMS (3cr.)

ELG7186 (EACJ 5807) TOPICS IN COMPUTERS I: FORMAL METHODS FOR THE DEVELOPMENT OF REAL-TIME SYSTEM APPLICATIONS (3cr.)

ELG7187 (EACJ 5807) TOPICS IN COMPUTERS II (3cr.)

ELG7173 (EACJ 5601) TOPICS IN SIGNAL PROCESSING II (3cr.)

Systems and Machine Intelligence

ELG5113 (EACJ 5106) STOCHASTIC SYSTEMS (3cr.)

ELG5123 (EACJ 5303) HEALTH CARE ENGINEERING (3cr.)
Overview of health care system/participants: biophysical measurements for diagnosis/monitoring: biomedical sensors/technology; telemedicine and applications;
ELG5161 (EACJ 5207) ROBOTICS: CONTROL, SENSING AND INTELLIGENCE (3cr.)

ELG5162 (EACJ 5005) KNOWLEDGE-BASED SYSTEMS: PRINCIPLES AND DESIGN (3cr.)

ELG5163 (EACJ 5105) MACHINE VISION (3cr.)

ELG5196 (EACJ 5709) AUTOMATA AND NEURAL NETWORKS (3cr.)

ELG6101 (SYSC 5001) SIMULATION AND MODELLING

ELG6104 (SYSC 5004) OPTIMIZATION FOR ENGINEERING APPLICATIONS (3cr.)
Introduction to algorithms and computer methods for optimizing complex engineering systems. Includes linear programming, networks, nonlinear programming, integer and mixed-integer programming, genetic algorithms and search methods, and dynamic programming. Emphasizes practical algorithms and computer methods for engineering applications.

ELG6105 (SYSC 5005) OPTIMIZATION THEORY AND METHODS

ELG6107 (SYSC/COMP 5007) EXPERT SYSTEMS
Survey of some landmark expert systems; types of architecture and knowledge representation; inferencing techniques; approximate reasoning; truth maintenance; explanation facilities; knowledge acquisition. A project to implement a small expert system will be assigned. Prerequisite: COMP 4007 or COMP 5001 or permission from the Department.

ELG6141 (SYSC 5401) ADAPTIVE CONTROL (3cr.)

ELG6142 (SYSC 5402) ADVANCED DYNAMICS WITH APPLICATIONS TO ROBOTICS (3cr.)

ELG6152 (SYSC 5502) ADVANCED LINEAR SYSTEMS (3cr.)

ELG6182 (SYSC 5802) INTRODUCTION TO INFORMATION AND SYSTEMS SCIENCE (3cr.)
An introduction to the process of applying computers in problem solving. Emphasis is placed on the design and analysis of efficient computer algorithms for large, complex problems. Applications in a number of areas are presented: data manipulation, databases, computer networks, queuing systems, optimization.

ELG6183 (SYSC 5803) LOGIC PROGRAMMING (3cr.)
Review of relational databases, first order predicate calculus, semantics of first order models, deductive querying. Proof theory, unification and resolution.
strategies. Introduction to Prolog, and/or parallelism and Concurrent Prolog. Applications in knowledge representation and rule based expert systems.

**ELG7113 (EACJ 5209) TOPICS IN SYSTEMS AND CONTROL I (3cr.)**
Current topics in the field, including linear semigroup theory and optimal feedback control.

**ELG7114 (EACJ 5300) TOPICS IN SYSTEMS AND CONTROL II (3cr.)**
Current topics in the field, including linear and nonlinear filtering and optimal control of stochastic systems.

**ELG7574 (EACJ 5301) SUJETS CHOISIS EN SYSTÈMES ET RÉGLAGE AUTOMATIQUE (3cr.)**
Sujets d'intérêt courant dans le domaine.

**Digital and Optical Communications**

**ELG5103 OPTICAL COMMUNICATIONS SYSTEMS (3cr.)**
Optical communication system concepts and basic characteristics. Optical Transmitters. Optical detection. Optical noise sources and their mathematical models. Non-coherent (direct) detection: system model, direct detection of intensity modulation, application of photo-multiplication, optimal post-detection processing, and subcarrier systems. Coherent detection: heterodyne receivers, the field matching problem and receiver performance. Optical binary digital system, single-mode binary and heterodyne binary systems. Block coded digital optical communication systems: PPM, PAM, PSK, and FSK signalling. Integration of device technology and system architecture. Selected topics in optical communications and networking. Prerequisites: ELG 5119, and ELG 5375 or the equivalents. Prerequisites: ELG5119, and ELG5375, or the equivalents.

**ELG5106 (EACJ 5003) FOURIER OPTICS (3cr.)**

**ELG5119 (EACJ 5109) STOCHASTIC PROCESSES (3cr.)**

**ELG5126 (EACJ 5206) SOURCE CODING AND DATA COMPRESSION (3cr.)**

**ELG5131 (EACJ5131) GRAPHICAL MODELS (3cr.)**
Bayesian networks, factor graphs, Markov random fields, maximum a posteriori probability (MAP) and maximum likelihood (ML) principles, elimination algorithm, sum-product algorithm, decomposable and non-decomposable models, junction tree algorithm, completely observed models, iterative proportional fitting algorithm, expectation-maximization (EM) algorithm, iterative conditional modes algorithm, variational methods, applications. Precludes credit for ELG7177C (EACJ5605C) Prerequisite: Permission of the Institute.

**ELG5132 (EACJ5132) SMART ANTENNAS (3cr.)**

**ELG5133 (EACJ5133) INTRODUCTION TO MOBILE COMMUNICATIONS (3cr.)**
Introduction to mobile and cellular systems. Radio channel characterization: signal strength prediction techniques and coverage; indoor/outdoor models; fading; delay spread; interference models and outage probabilities. Digital modulation and transmission system performance. Signal processing techniques, diversity and beamforming. Multiple-input multiple-output (MIMO) systems. New directions and recent results. Precludes additional credit for ELG7178A (EACJ5606A) Prerequisites: ELG5119 (EACJ5109) and ELG5375 (EACJ5506), or equivalent.

**ELG5170 (EACJ 5501) INFORMATION THEORY (3cr.)**
Measure of information: entropy, relative entropy, mutual information, asymptotic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capacity: random coding bound, reliability function, Blahut-Arimoto algorithm, Gaussian channels, colored Gaussian noise and “water-filling”; Rate distortion theory; Network information theory. Prerequisite: ELG 5119 (EACJ 5109) or SYSC 5503 (ELG 5119) or the equivalent.

**ELG5179 (EACJ 5503) DETECTION AND ESTIMATION (3cr.)**
Wiener/Kalman filtering. Sequential and non-parametric detection. Prerequisites: ELG 5119 or SYSC 5503; and ELG 5375 or SYSC 5504; or the equivalents. Prerequisites: ELG5119 or SYSC5503; and ELG5375 or SYSC5504; or the equivalents.

ELG5180 (EACJ 5704) ADVANCED DIGITAL COMMUNICATIONS (3cr.)
Techniques and performance of digital signalling and equalization over linear bandlimited channels with additive Gaussian noise. Fading multipath channels: diversity concepts, modelling and error probability performance evaluation. Synchronization in digital communications. Spread spectrum in digital transmission over multipath fading channels. Precludes additional credit for SYSC 5605. Prerequisite: SYSC 5504 or ELG 5375 or the equivalent.

ELG5360 (EACJ5360) DIGITAL WATERMARKING (3cr.)
Overview of recent advances in watermarking of image, video, audio, and other media. Spatial, spectral, and temporal watermarking algorithms. Perceptual models. Use of cryptography in steganography and watermarking. Robustness, security, imperceptibility, and capacity of watermarking algorithms. Content authentication, copy control, intellectual property, and other applications. Prerequisite: ELG4172 or CEG4311 or equivalent.

ELG5369 (EACJ5369) INTERNETWORKING TECHNOLOGIES (3cr.)
IP Based Internet Technologies: Internet architecture and its protocols. Software/hardware requirements for quality of service (QoS). Integrated services, Scheduling, Fair queuing, Traffic and admission control algorithms. Differentiated services. Multiprotocol label switching (MPLS) and associated software/hardware design issues. Fast internet protocol (IP), asynchronous transfer mode (ATM), internet protocol (IP) over synchronous optical network (SONET), wavelength division multiplexing (WDM), satellite implementations. Precludes additional credit for ELG7187B (EACJ5808B) Prerequisite: CEG/ELG 4183.

ELG5371 (EACJ 5500) DIGITAL COMMUNICATION BY SATELLITE (3cr.)

ELG5372 (EACJ 5504) ERROR CONTROL CODING (3cr.)

ELG5373 (EACJ 5105) DATA ENCRYPTION (3cr.)

ELG5375 (EACJ 5506) PRINCIPLES OF DIGITAL COMMUNICATION (3cr.)
Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Analysis of digital data transmission techniques for additive Gaussian noise channels. Efficient modulation and coding for reliable transmission. Spread spectrum and line coding techniques. Prerequisite: ELG 5119 or SYSC 5503, or the equivalent (may be taken concurrently).

ELG5380 (EACJ 5002) ADVANCED CHANNEL CODING (3cr.)
Channel coding theorem, channel capacity and cutoff rate. Trellis coded modulation; Multilevel codes. Spacetime coding. Product codes. Generalized code concatenation. Turbo codes and iterative decoding techniques, interleavers for turbo codes, Turbo Trellis coded modulation. Low density parity check codes Performance analysis of iteratively decoded codes. Prerequisites: ELG 5372 (SYSC 5504) or ELG 5375 (SYSC 5506).

ELG6110 (SYSC 5506) INFORMATION THEORY (3cr.)
Measure of information: entropy, relative entropy, mutual information, asymptotic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capacity: random coding bound, reliability function, Blahut-Arimoto algorithm, Gaussian channels, coloured Gaussian noise and “water-filling”; Rate distortion theory; Network information theory. Prerequisite: SYSC 5303 (ELG 6153) or ELG 5119 (ISYS 5109) or equivalent. Precludes credit for EACJ 5501 (ELG 5170).

ELG6120 (SYSC 5200) ALGEBRAIC CODING THEORY (3cr.)
Review of Algebra, Finite Fields, Linear Block Codes and their Properties, Hamming Codes, Cyclic codes; Hadamard Matrices and Hadamard Codes, Golay Codes, Reed-Muller Codes, BCH and Reed-Solomon Codes, Decoding Algorithms, Coding Bounds. Precludes additional credit for SYSC 5507 (ELG 6157).

ELG6143 (SYSC 5403) NETWORK ACCESS TECHNIQUES (3cr.)
A range of access technologies with emphasis on broadband access. Physical channels and the state-of-the-art of coding, modulation, multiplexing strategies to overcome physical impairments, including high-speed transmission over twisted pair, wireless, fibre and co-axial media. Prerequisites: ELG 6153 (SYSC 5503) and ELG 5375 (SYSC 5504).

ELG6153 (SYSC 5503) STOCHASTIC PROCESSES (3cr.)
Basic concepts of randomness, as applied to communications, signal processing, and queueing systems; probability theory, random variables, stochastic
processes; random signals in linear systems; introduction to decision and estimation; Markov chains and elements of queueing theory. *Exclusion:* ELG 5119.

**ELG6154 (SYSC 5504) PRINCIPLES OF DIGITAL COMMUNICATION** (3cr.)

Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Optimum Receiver Theory. Modulation and coding for reliable transmission: MPSK, MQAM, M-ary orthogonal modulation. Channel coding, trellis coded modulation. Spread spectrum and CDMA communications. Precludes additional credit for EACJ 5306 (ELG 5375). *Prerequisite:* SYSC 5503 or ELG 5119 or the equivalent (may be taken concurrently).

**ELG6159 (SYSC5409) Interactive Media and Digital Art** (3cr.)

Interactive digital technologies as new media for art and entertainment. Topics include essential features of the digital media, interactivity, computer games and gamification, interactive stories, serious games, virtual worlds and social networks, and digital art. *Prerequisite:* A basic knowledge of programming and multimedia design is strongly recommended.

**ELG6189 (SYSC5500) Designing Secure Networking and Computer Systems** (3cr.)

Security issues in data networks and computer systems. The course considers the protocol layers, looks at issues that are associated with specific types of network architectures. Issues with Web security, protocol security and different classes of attacks and defences will also be addressed. Finally, security issues in emerging paradigms, and trends such as social networks and cloud computing, will be addressed. *Prerequisites:* A senior undergraduate or graduate networking course (e.g. SYSC4602 or SYSC5201 or equivalent), an operating systems course, or permission of the graduate program director.

**ELG6165 (SYSC 5605) ADVANCED DIGITAL COMMUNICATIONS** (3cr.)


**ELG6166 (SYSC 5606) INTRODUCTION TO MOBILE COMMUNICATIONS** (3cr.)

Mobile radio channel characterization: signal strength prediction techniques and statistical coverage; fading; delay spread; interference models and outage probabilities. Digital modulation and transmission system performance. Signal processing techniques: diversity and beamforming, adaptive equalization, coding. Applications to TDMA and CDMA cellular systems. *Co-requisite:* Can be taken concurrently with SYSC 5503 and SYSC 5504.

**ELG6167 (SYSC 5607) SOURCE CODING AND DATA COMPRESSION** (3cr.)

Discrete and continuous sources. Discrete sources: Huffman coding and run length encoding. Continuous sources: waveform construction coding; PCM, DPCM, delta modulation; speech compression by parameter extraction; predictive encoding; image coding by transformation and block quantization. Fourier and Walsh transform coding. Applications to speech, television, facsimile. *Prerequisite:* SYSC 5503 or ELG 5119 or the equivalent.

**ELG6168 (SYSC 5608) WIRELESS COMMUNICATIONS SYSTEMS ENGINEERING** (3cr.)

Multiuser cellular and personal radio communication systems; frequency reuse, traffic engineering, system capacity, mobility and channel resource allocation. Multiple access principles, cellular radio systems, signalling and interworking. Security and authentication. Wireless ATM, satellite systems, mobile location, wireless LANs, wireless local loops, broadband wireless etc. Corequisites: SYSC 5503 or ELG 5119, and SYSC 5504 or ELG 5375, or their equivalents. *Prerequisite:* SYSC5503 or ELG5119, and SYSC5504 or their equivalents.

**ELG6169 (SYSC 5609) DIGITAL TELEVISION** (3cr.)


**ELG6170 (SYSC 5700) SPREAD SPECTRUM SYSTEMS** (3cr.)

Types of spread spectrum systems, FH and DS-SS, TH-SS using radio. Hybrid DS/FH-SS. Pseudo-noise generators: statistical properties of M sequences, Galois field connections, Gold codes. OVSF codes. Code tracking loops, initial synchronization of receiver spreading code. Performance in interference environments and fading channels. CDMA systems. SS applications in UWB communications and Imaging systems. *Prerequisite:* ELG 6154 (SYSC 5504) or the equivalent.

**ELG6184 (SYSC 5804) ADVANCED TOPICS IN COMMUNICATIONS SYSTEMS** (3cr.)

**ELG6365 (ELEC 5605) OPTICAL FIBRE COMMUNICATIONS** (3cr.)

Transmission characteristics of and design considerations for multi-mode and single-mode optical fibre waveguides; materials, structures, and device properties of laser light sources; properties and performance of p-i-n and avalanche photodiodes; types of optical fibre signal formats, preamplifier topologies and noise, receiver sensitivity, transmitter design; link design for digital systems.

**ELG6366 (ELEC 5606) PHASE-LOCKED LOOPS AND RECEIVER SYNCHRONIZERS** (3cr.)

Phase-locked loops: components, fundamentals, stability, transient response, sinusoidal operation, noise performance, tracking, acquisition and optimization. Receiver synchronizers: carrier synchronizers including squaring loop, Costas loop, and remodulator for BPSK, QPSK BER performance; clock synchronizers including early late gate, inphase/midphase, and delay line multiplier; direct sequence spread spectrum code synchronizers including single dwell and multiple dwell serial PN acquisition, matched filter PN acquisition, delay locked loop and Tau-Dither loop PN tracking; frequency hopped spread spectrum time and frequency synchronization.

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ELG7172 (EACJ 5600) TOPICS IN SIGNAL PROCESSING I (3cr.)

Signal, Speech and Image Processing

ELG5127 (EACJ 5304) MEDICAL IMAGE PROCESSING (3cr.)
Mathematical models of image formation based on the image modality and tissue properties. Linear models of image degradation and reconstruction. Inverse problems and regularization for image reconstruction. Image formation in Radiology, Computed Tomography, Magnetic Resonance Imaging, Nuclear Medicine, Ultrasound, Positron Emission Tomography, Electrical Impedance Tomography. Also offered as SYSC 5304. Precludes additional credit for EACJ 5601 (ELG 7173) if EACJ 5601 was taken as this topic. Prerequisites: ELG 4172, CEG 4311, SYSC 4405 or permission of the Institute.

ELG5370 (EACJ 5370) MULTITRANSITION SIGNAL DECOMPOSITION: ANALYSIS AND APPLICATIONS (3cr.)
Multirate signal processing: sampling rate conversion, polyphase representation. Bases, filter banks: series expansion of discrete-time signals, series expansion of continuous-time signals, multiresolution concept and analysis, construction of wavelet, wavelet series. Complexity of multirate discrete-time processing, filter banks, and wavelet series computation. Prerequisite: a basic course in Digital Signal Processing such as ELG 5376 or ELG 4172.

ELG5376 (EACJ 5507) DIGITAL SIGNAL PROCESSING (3cr.)

ELG5377 (EACJ 5800) ADAPTIVE SIGNAL PROCESSING (3cr.)
Theory and techniques of adaptive filtering, including Wiener filters, gradient and LMS methods; adaptive transversal and lattice filters; recursive and fast recursive least squares; convergence and tracking performance; implementation. Applications, such as adaptive prediction; channel equalization; echo cancellation; source coding; antenna beamforming; spectral estimation. Precludes additional credit for Engineering ELG 6160. Prerequisite: SYSC 5003 or ELG 5119, or the equivalent; SYSC 5602 or ELG 5376 or the equivalent.

ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3cr.)

ELG5385 (EACJ5385) MATRIX METHODS AND ALGORITHMS FOR SIGNAL PROCESSING (3cr.)
Representation and approximation in vector spaces, matrix factorization, pseudoinverses, application of eigen decomposition methods, Singular Values Decomposition, least squares problems, applications of special matrices, iterative algorithms, expectation maximization algorithm.

ELG6160 (SYSC 5600) ADAPTIVE SIGNAL PROCESSING (3cr.)
Theory and techniques of adaptive filtering, including Wiener filters, gradient and LMS methods; adaptive transversal and lattice filters; recursive and fast recursive least squares; convergence and tracking performance; implementation. Applications, such as adaptive prediction; channel equalization; echo cancellation; source coding; antenna beamforming, spectral estimation. Prerequisites: SYSC 5503 or ELG 5119, or equivalent; SYSC 5602 or ELG 5376 or equivalent. Prerequisite: SYSC5503 or ELG5119, or equivalent; SYSC5602 or ELG5376 or equivalent.

ELG6161 (SYSC 5601) NEURAL SIGNAL PROCESSING (3cr.)

ELG6162 (SYSC 5602) DIGITAL SIGNAL PROCESSING (3cr.)

ELG6163 (SYSC 5603) DIGITAL SIGNAL PROCESSING: MICROPROCESSORS, SOFTWARE AND APPLICATIONS (3cr.)
Characteristics of DSP algorithms and architectural features of current DSP chips: TMS320, DSP-56xxx, AD-21xx and SHARC. DSP multiprocessors and fault tolerant systems. Algorithm/software/hardware architecture interaction, program activity analysis, development cycle, and design tools. Case studies: LPC, codecs, FFT, echo cancellation. Viterbi decoding. Prerequisite: SYSC 5602 or ELG 5376 or the equivalent.

ELG6164 (SYSC 5604) ADVANCED TOPICS IN DIGITAL SIGNAL PROCESSING: SPEECH COMMUNICATIONS AND APPLICATIONS (3cr.)
Prerequisites: SYSC 5602 or ELG 5376, or the equivalent, and permission of the Department.

ELG6321 (EACJ 5302 / SYSC 5302) PRINCIPLES AND DESIGN OF ADVANCED BIOMEDICAL INSTRUMENTATION (3cr.)
Principles of physiological measurements and related instrumentation with particular applications to cardiology, lung function, cerebral and muscle signals, surgery and anaesthesiology, ultrasound measurements, and critical care for infants. **Prerequisite: Permission of the Institute.**

**ELG7172 (EACJ 5600) TOPICS IN SIGNAL PROCESSING I** (3cr.)

**ELG7173 (EACJ 5601) TOPICS IN SIGNAL PROCESSING II** (3cr.)

**ELG7179 (EACJ 5603) TOPICS IN SIGNAL PROCESSING III** (3cr.)

**Computer Communication Networks, Distributed Systems and BISDN**

**ELG5120 (EACJ 5200) QUEUEING SYSTEMS** (3cr.)
Resource sharing issues: delay, throughput and queue length. Basic queueing theory, Markov chains, birth and death processes. M/M/m/k/n queues, bulk arrival/service systems. Little's Rule. Intermediate queueing theory: M/G/1, G/M/m queues. Advanced queueing theory: G/G/m queue, priority queue, network of queues, etc. Queueing applications. Precludes additional credit for SYSC 5107 (ELG 6117). **Prerequisite: One of ELG 5119, SYSC 5003, SYSC 5503, or the equivalent.**

**ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS** (3cr.)

**ELG5122 (EACJ 5202) MODELLING, ANALYSIS AND PERFORMANCE EVALUATION IN COMPUTER COMMUNICATIONS** (3cr.)
Network performance issues and their mathematical analysis techniques. Intermittent availability server model, probing and tree search, delay cycle, switch/network topology and reliability. Analysis of controlled and random access methods, routing allocation/ control, topological design. Selected topics from current literature on various network applications. Precludes additional credit for ELG 7186 (EACJ 5606). **Prerequisites: ELG 5120 (EACJ 5200), ELG 5374 (EACJ 5607), or SYSC 5201 (ELG 6121), or the equivalents. Prerequisites: ELG5120 (EACJ5200), ELG5374 (EACJ5607), or SYSC 5201 (ELG6121), or the equivalents.**

**ELG5128 (ELG5128I) WIRELESS AD HOC NETWORKING** (3cr.)

**ELG5374 (EACJ 5607) COMPUTER COMMUNICATION NETWORKS** (3cr.)
Network applications, structures and their design issues. Resource sharing/access methods. Network transmission and switching techniques. OSI model. Error control, flow control and various issues related to the physical, data link and network layers. Local area networks. Performance issues of delay-throughput in various protocols. Precludes additional credit for SYSC 5201. **Prerequisites: an undergraduate course in probability and statistics such as MAT 2377. Prerequisite: an undergraduate course in probability and statistics such as MAT2377.**

**ELG5381 (EACJ 5004) PHOTONICS NETWORKS** (3cr.)

**ELG5382 (EACJ 5108) SWITCHING AND TRAFFIC THEORY FOR INTEGRATED BROADBAND NETWORKS** (3cr.)
Principles of switching theory. Asynchronous Transfer Mode switching architectures. Principle of teletraffic engineering. Queueing theory and performance evaluation techniques as applied to the study of computer network architectures. Current topics in computer network modelling analysis and traffic control for high-speed multimedia networks. **Prerequisite: ELG 5374 (EACJ 5607) or ELG 6121 (SYSC 5201), or the equivalent. Co-requisite: ELG 5119 (EACJ 5109) or ELG 6153 (SYSC 5503) or ELG 6103 (SYSC 5003), or the equivalent.**

**ELG5383 (EACJ 5009) SURVivable OPTICAL NETWORKS** (3cr.)
Optical networks design with emphasis on network survivability. Wavelength division multiplexing (WDM), wavelength conversion, optical switch architectures, routing and wavelength assignment algorithms, IP over WDM, optical network protocols, optical network control architectures, protection and restoration, spare capacity allocation, survivable routing, design and performance evaluation. **Prerequisites: ELG 5374 or its equivalent.**

**ELG5386 (EACJ5386) NEURAL NETWORKS AND FUZZY SYSTEMS** (3cr.)
ELG6119 (SYSC 5109) TELETRAFFIC ENGINEERING (3cr.)
Congestion phenomena in telephone systems, and related telecommunications networks and systems, with an emphasis on the problems, notation, terminology, and typical switching systems and networks of the operating telephone companies. Analytical queueing models and applications to these systems. Prerequisite: Engineering SYSC 3503 or ELG 5119, or the equivalent.

ELG6121 (SYSC 5201) COMPUTER COMMUNICATION (3cr.)

ELG6127 (SYSC 5207) DISTRIBUTED SYSTEMS ENGINEERING (3cr.)

ELG6180 (SYSC 5800) NETWORK COMPUTING (3cr.)
Design and Java implementation of distributed applications that use telecommunication networks as their computing platform. Basics of networking: Java networking facilities. Introduction to open distributed processing; CORBA, JavaDL, JavaRMI, CGI/HTTP, DCOM, Componentware; Enterprise JavaBeans, ActiveX. Agents: Java code mobility facilities. Security issues; Java security model.

ELG6181 (SYSC 5801) ADVANCED TOPICS IN COMPUTER COMMUNICATIONS (3cr.)

ELG6188 (SYSC 5808) COMMUNICATIONS NETWORK MANAGEMENT (3cr.)
Network management issues, WANS and LANs. The Internet and ISO models of network management. Network management protocols SNMP, CMIP, CMOT, etc. Events, Managed Objects and MIBs. Fault management techniques. Current diagnostic theory and its limitations. AI and Machine learning approaches. Monitoring and fault management tools. Prerequisites: SYSC 5201 or ELG 5374, or the equivalent. Prerequisite: SYSC5201 or the equivalent.

ELG6189 (SYSC5500) Designing Secure Networking and Computer Systems (3cr.)
Security issues in data networks and computer systems. The course considers the protocol layers, looks at issues that are associated with specific types of network architectures. Issues with Web security, protocol security and different classes of attacks and defences will also be addressed. Finally, security issues in emerging paradigms, and trends such as social networks and cloud computing, will be addressed. Prerequisites: A senior undergraduate or graduate networking course (e.g. SYSC4602 or SYSC5201 or equivalent), an operating systems course, or permission of the graduate program director.

ELG7177 (EACJ 5605) TOPICS IN COMMUNICATIONS I (3cr.)
Current topics in the field.

ELG7178 TOPICS IN COMMUNICATIONS II (3cr.)

Computer-Aided Design for Electronic Circuits

ELG6353 (ELEC 5503) RADIO FREQUENCY INTEGRATED CIRCUIT DESIGN (3cr.)
Integrated radio front-end component design, with emphasis on a bipolar process. Overview of radio systems, discussion of frequency response, gain, noise, linearity, intermodulation, image rejection, impedance matching, stability, and power dissipation. Detailed design of low-noise amplifiers, mixers, oscillators and power amplifiers. Design alternatives through the use of one-chip inductors and baluns. The impact of process variations, parasitics, and packaging. Simulation issues and techniques.

ELG6354 (ELEC 5504) ANALYSIS OF HIGH-SPEED ELECTRONIC PACKAGES AND INTERCONNECTS (3cr.)
Introduction to techniques of modelling, simulation and optimization in designing high-speed VLSI packages and systems; models for IC packages, interconnects and ground/power planes; lumped element models, distributed models and EM-based models for high-speed VLSI interconnects; delay, crosstalk and switching noise analysis; simulation of multiconductor transmission line networks; asymptotic waveform evaluation (AWE) and moment matching techniques; concurrent thermal and electrical analysis of IC packages and boards; optimization of signal integrity in IC packages and printed circuit boards; macromodelling of linear and non-linear components and circuits.

ELG6356 (ELEC 5506) SIMULATION AND OPTIMIZATION OF ELECTRONIC CIRCUITS (3cr.)
Time and frequency-domain formulations for simulation, sensitivity analysis and optimization. Optimization techniques for performance, cost and yield-driven analysis of electronic circuits. Optimization approaches to modelling and parameter extraction of active and passive elements. Advanced techniques include statistical modelling, tolerance and reliability optimization, computer-aided tuning and analog diagnosis, and large-scale optimizations. Examples and case studies include FET modelling, optimization of amplifiers, filters, multiplexers, mixers, high-speed VLSI packages/interconnects, signal-integrity in high-speed ICs, printed circuit boards and multichip modules.

ELG6358 (ELEC 5508) COMPUTER METHODS FOR ANALYSIS AND DESIGN OF VLSI AND COMMUNICATION CIRCUITS (3cr.)
Basic principles of CAD tools used for the analysis and design of VLSI circuits and systems. Formulation of circuit equations. Sparse matrix techniques.

**ELG6381 (ELEC5801) HIGH-SPEED AND LOW-POWER VLSI (3cr.)**
High-Speed and Low-Power CMOS VLSI Circuit techniques covering the low and high levels of abstraction, including Transistor, Switch, Logic-Gate, Module, and System Levels. At each level students learn the state-of-the-art techniques to optimize the performance and energy consumption of a circuit. They also use one or more of these techniques in a design project. Prerequisites: ELEC 4708 or ELEC 5804 (VLSI Design) or Equivalent (Permission of the Director).

**ELG6383 (ELEC 5803) BEHAVIOURAL SYNTHESIS OF ICs (3cr.)**
Various topics related to computer analysis and synthesis of VLSI circuits including: logic synthesis, finite state machine synthesis, design methodologies, design for reuse, testing, common VLSI functions, a review of Verilog. Prerequisite: some IC design knowledge such as given in 4708.

**Microwaves and Electromagnetics**

**ELG5104 (EACJ 5401) ELECTROMAGNETIC WAVES: THEORY AND APPLICATIONS (3cr.)**

**ELG5108 (EACJ 5305) ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE (3cr.)**

**ELG5379 (EACJ 5402) NUMERICAL METHODS IN ELECTROMAGNETIC ENGINEERING (3cr.)**
Review of electromagnetic and potential theory. Formulation of static and electrodynamic problems. Introduction to numerical and field-theoretical modelling techniques. Numerical methods considered: FD, MoL, SDA, TLM and BPM. Examples of commonly encountered electromagnetic problems at microwave, millimeterwave and optical frequencies. Prerequisite: ELG 4103 or the equivalent.

**ELG6344 (ELEC 5404) NEURAL NETWORKS FOR HIGH-SPEED/HIGH-FREQUENCY CIRCUIT DESIGN (3cr.)**
Neural network methodologies for computer-aided design of high-speed/high-frequency circuits, including modeling of passive and active devices/circuits, and their applications in high-level design and optimization in wired and wireless electronic systems.

**ELG6349 (ELEC 5409) MICROWAVE AND MILLIMETERWAVE INTEGRATED CIRCUITS (3cr.)**

**ELG6351 (ELEC 5501) PASSIVE MICROWAVE CIRCUITS (3cr.)**

**ELG6355 (ELEC 5505) PASSIVE CIRCUIT THEORY (3cr.)**

**ELG6357 (ELEC 5507) ACTIVE CIRCUIT THEORY (3cr.)**
Characterization of negative-resistance one-port networks, signal general and amplification. Active two-ports; y, z, h, k, chain and scattering parameters. Measurement of two-port parameters. Activity and passivity; reciprocity, non-reciprocity, and anti-reciprocity. Gyror as a circuit element. Stability, inherent and conditional; power gain of conjugate and mismatched two-port amplifiers. Amplifier gain sensitivity. Stability, inherent and conditional; power gain of conjugate and mismatched two-port amplifiers. Active filter design; gyror, negative immittance converter (NIC) and operational amplifier used as functional elements. Practical realization of gyror and NICs. Active network synthesis. Prerequisite: ELEC 5505 or the equivalent.

**ELG6362 (ELEC 5602) MICROWAVE SEMICONDUCTOR DEVICES AND APPLICATIONS (3cr.)**
Theory of operation for microwave diodes (varactor, p-i-n, Gunn, IMPATT) and transistors (BJT, MESFET, HBT, HEMT). Small-signal, large-signal, and noise models for CAD. Diode oscillators and reflection amplifiers. Design of transistor oscillators and amplifiers. Discussion of technology/fabrication issues and MMIC applications.

**ELG6363 (ELEC 5603) ELECTROMAGNETIC WAVE PROPAGATION (3cr.)**
Review of groundwave, skywave and trosionospheric propagation modes relevant to radar, communications and other systems operating in the medium to extra-high frequency bands. The occurrence and magnitude of various types of electromagnetic noise: physical principles involved, modelling and prediction
techniques, and limitations of such techniques in practical situations.

**ELG6364 (ELEC 5604) RADAR SYSTEMS** (3cr.)

**ELG6367 (ELEC 5607) FUNDAMENTALS OF ANTENNA ENGINEERING** (3cr.)
Basic properties of antennas (gain, radiation patterns, polarization, antenna temperature). Analysis of common antennas (dipoles, loops, helices, aperture antennas, microstrip, dielectric resonator antennas, reflectors). Analysis and design of linear and planar arrays (array factors, beam scanning, amplitude weighting, feed networks).

**ELG6368 (ELEC 5608) FOURIER OPTICS** (3cr.)

**ELG6369 (ELEC 5609) NONLINEAR MICROWAVE DEVICES AND EFFECTS** (3cr.)
The physical basis and mathematical modelling of a variety of microwave/millimetre-wave devices, (some of which exhibit the most extreme nonlinear behaviour known), how they can be exploited in practical circuits and systems, and how the resulting device/circuit interactions can be analyzed. Devices include two-terminal nonlinear-resistance elements (varistors) and two two-terminal nonlinear-reactance devices (varactors) based on classical, heterostructure and superconducting technologies: pn and Schottky-barrier diodes, tunnel and resonant-tunneling diodes, BIN and BNN varactor diodes, single-barrier-varactor diodes, high-electron-mobility varactor diodes, Josephson-junction diodes, and SIS quasiparticle tunneling junctions. Three-terminal nonlinear devices include MESFETs, HBTs, and HEMTs and RFETs. Circuit applications encompass direct radiation detectors; frequency mixers; resistive, reactive, and active frequency multipliers; as well as reactive and regenerative frequency dividers. Emphasis will be placed on analytical approaches that provide global insight into the nonlinear phenomena.

**ELG6372 (ELEC 5702) PRINCIPLES OF PHOTONICS** (3cr.)
Electromagnetic wave propagation in crystals; review of geometric optics; Gaussian beam propagation; optical fibres; dielectric waveguides for optical integrated circuits; optical resonators; optical properties of materials; theory of laser oscillation; specific laser systems; electro-optic modulators; photorefractive materials and applications; holography; optical interconnects.

**ELG6379 (ELEC 5709) ADVANCED TOPICS IN ELECTROMAGNETICS** (3cr.)

**ELG7100 (EACJ 5404) TOPICS IN ELECTROMAGNETICS I** (3cr.)

**ELG7101 (EACJ 5405) TOPICS IN ELECTROMAGNETICS II**

**Solid State Devices and Integrated Circuit Fabrication**

**ELG5107 (EACJ 5501) SEMICONDUCTOR OPTICAL LOGIC** (3cr.)
Principles of Optical Amplification. Structures of Semiconductor Optical Amplifier (SOA). Steady-state model of SOA. Dynamic model of SOA. Network Applications of SOAs. SOA Nonlinearities. SOA Wavelength Converters. SOA optical gates. SOA Logic Devices. Optical Memory Devices. SOA based signal regeneration. Precludes additional credit for this course taken as a special topic in (EACJ 5807) ELG 7186. Prerequisites: ELG 5103 or equivalent course.

**ELG6320 (EACJ 5208 / ELEC 5200) ADVANCED TOPICS IN INTEGRATED CIRCUITS AND DEVICES** (3cr.)
Recent and advanced topics in the field of Integrated Circuits and Devices and its related areas.

**ELG6342 (ELEC5402) INTRODUCTION TO ELECTRONIC DESIGN AUTOMATION ALGORITHMS AND TECHNIQUES** (3cr.)
Digital design process; Overview of design automation tools/methodologies; Theory of computational complexity; Layout compaction; Placement and Partitioning; Floorplanning; Routing; Digital simulation; Switch-level simulation; Logic synthesis; Verification; Analog and RF simulation. Area: Computer-Aided Design for Electronic Circuits.

**ELG6359 (ELEC 5509) INTERGRATED CIRCUIT TECHNOLOGY** (3cr.)
Survey of technology used in integrated circuit fabrication. Crystal growth and crystal defects, oxidation, diffusion, ion implantation and annealing, gettering, chemical vapour deposition, etching, materials for metallization and contacting, and photolithography. Structures and fabrication techniques for submicron devices. Applications in CMOS and BiCMOS processes.
ELG6373 (ELEC 5703) ADVANCED TOPICS IN SOLID STATE DEVICES AND IC TECHNOLOGY (3cr.)
Recent and advanced topics in Solid State Devices and IC Technology. The subject material will vary from year to year according to research interests in the department. Students may be expected to contribute to lectures or seminars on selected topics. Prerequisite: Permission of the Department.

ELG6377 (ELEC 5707) MICROELECTRONICS SENSORS (3cr.)
Physical design of microelectromechanical systems (MEMS) and microfabricated sensors and actuators. An overview of thin and thick film processes and micromachining techniques will provide fabrication background. Design of a variety of devices including piezoresistive, piezoelectric, electromagnetic, thermal, optical, and chemical sensors and actuators.

ELG6380 (ELEC 5800) THEORY OF SEMICONDUCTOR DEVICES (3cr.)

ELG6382 (ELEC 5802) SURFACE-CONTROLLED SEMICONDUCTOR DEVICES (3cr.)

ELG7132 (EACJ 5006) TOPICS IN ELECTRONICS I (3cr.)
Current topics in the field.

ELG7133 (EACJ 5007) TOPICS IN ELECTRONICS II (3cr.)

ELG7575 (EACJ 5008) SUJETS CHOISIS EN ÉLECTRONIQUE (3cr.)

VLSI
ELG6352 (ELEC 5502) ANALOG INTEGRATED FILTERS (3cr.)
The fundamentals and details of analog integrated filters with emphasis on active continuous-time filters and SAW filters. Comparison to switched-capacitor filters. Review of filter concepts, types of filters, approximations, transformations. Building blocks such as op amps, transconductance amplifiers, and gyrators. Design using cascaded second-order sections, multiple loop feedback and LC ladder simulations. Discussion of issues such as tuning, linearity, dynamic range, and noise.

ELG6360 (ELEC 5600) DIGITAL INTEGRATED CIRCUIT TESTING (3cr.)
Production testing of digital integrated circuits. Cost and difficulty of testing. Outline of methods of testing used in production. Testing schemes and design for testability. Specific topics are: faults and fault models, yield estimates, testability measures, fault simulation, test generation methods, sequential testing, scan design, boundary scan, built-in self-test, CMOS testing.

ELG6374 (ELEC 5704) ADVANCED TOPICS IN CAD (3cr.)
Recent and advanced topics in Computer-Aided Design (CAD). The subject material will vary from year to year according to research interests in the department. Students may be expected to contribute to lectures or seminars on selected topics. Prerequisite: Permission of the Department.

ELG6375 (ELEC 5705) ADVANCED TOPICS IN VLSI (3cr.)
Recent and advanced topics in Very Large Scale Integration (VLSI). The subject material will vary from year to year according to research interests in the department. Students may be expected to contribute to lectures or seminars on selected topics. Prerequisite: Permission of the Department.

ELG6376 (ELEC 5706) SUBMICRON CMOS AND BICMOS CIRCUITS FOR SAMPLED DATA APPLICATIONS (3cr.)
The analog aspects of digital CMOS and BiCMOS circuit design in submicron technologies including reliability; sampled analog circuits, including amplifier nonidealities and switch charge injection; CMOS/BiCMOS amplifier design considerations, leading up to standard folded-cascode and two-stage circuits.

ELG6378 (ELEC 5708) ASICs IN TELECOMMUNICATIONS (3cr.)
The definition of Application Specific Integrated Circuits is given along with current ASIC technology trends. CMOS and BiCMOS fabrication technologies are compared for their potential use in communications circuits. Circuit building blocks such as amplifiers, switched-capacitor filters and analog to digital converters are overviewed in the context of their communications applications. An overview of vendor technologies is followed by application examples such as line drivers, pulse shaping and equalization circuits, high-speed data transmission over twisted pair copper cables and mobile radio components and implementation issues. Students are required to submit a related literature study and design a communications integrated circuit component using a standard cell library environment.

ELG6384 (ELEC 5804) VLSI DESIGN (3cr.)
Integrated circuit design with a strong emphasis on design methodology. Design philosophies considered include Full Custom design, standard cells, gate arrays and sea-of-gates using CMOS and BiCMOS technology. A prelude to ELEC 5805.

ELG6385 (ELEC 5805) VLSI DESIGN PROJECT (3cr.)
Using state-of-the-art CMOS and BiCMOS technologies, students will initiate their own design of an integrated circuit using tools in the CAD lab and submit it for fabrication where the design warrants.

**ELG6388 (ELEC 5808) SIGNAL PROCESSING ELECTRONICS (3cr.)**
Signal processing from the viewpoint of analog circuit design. CCDs, BBDs, transversal filters, recursive filters, switched capacitor filters, with particular emphasis on integration of analog signal processing techniques in monolithic MOS ICs. Detailed operational amplifier design in CMOS technology. Implications of nonideal operational amplifier behaviour in filter performance. Basic sampled data concepts, detailed Z transform analysis of switched capacitor filters and more complex circuits. Noise in analog and sampled analog circuits, including calculation of dynamic range and signal-to-noise ratio.

**ELG6389 (ELEC 5809) NONLINEAR ELECTRONIC CIRCUITS (3cr.)**
A unified representation of non-linear circuits used in today’s telecommunications ICs is introduced. Nonlinear representation of circuits based on operational amplifiers, sinusoidal oscillators, amplitude modulators, demodulators, frequency modulators, frequency demodulators, mixers and Phase Locked Loop (PLL) is introduced. Design implications for commonly used Complementary Metal-Oxide Semiconductor (CMOS) and bipolar circuits. Precluded additional credit for this course taken previously as a special topics course ELG 6375 (ELEC 5705) in Fall 1999, Winter 2004 and Winter 2005. **Prerequisite: Permission of the Institute.**

**Cotes de service / Service Codes**
**ELG9000 Projet / Project (3cr.)**

**ELG7199 (EACJ 5101) DIRECTED STUDIES (3cr.)**
Various possibilities exist for pursuing directed studies on topics approved by the Department and which a full-time faculty member has agreed to direct, including any of the courses listed in the Graduate Calendar that are not being offered on a formal basis in the current academic year.

**ELG7999 THÈSE DE M.Sc.A. / MASE THESIS**

**ELG8000 TRAVAIL COOPÉRATIF - 1er STAGE / CO-OP WORK-TERM I**
Pour les étudiants et les étudiantes d'un programme coopératif de maîtrise qui font leur première session de travail. / For students in a co-operative master's program who are on their first work session.

**ELG8001 TRAVAIL COOPÉRATIF - 2e STAGE / CO-OP WORK-TERM II**
Pour les candidats et les candidates à un programme coopératif de maîtrise qui font leur deuxième session de travail. / For students in a co-operative master's program who are on their second work session.

**ELG9997 PROPOSITION DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL**

**ELG9998 EXAMEN DE SYNTHÈSE DU DOCTORAT / PhD COMPREHENSIVE EXAM**

**ELG9999 THÈSE DE DOCTORAT / PhD THESIS**

**GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)**
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

**GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)**
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

**GNG5123 ENTERPRISE ARCHITECTURE (3cr.)**
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

### Electronic Business Technologies

The Faculty of Engineering, in collaboration with the Telfer School of Management, the School of Electrical Engineering and Computer Science (EECS), the Faculty of Law, and the Faculty of Arts offers two interdisciplinary master’s programs in Electronic Business Technologies. One is a course-based program leading to the Master of Electronic Business Technologies (MEBT), the other includes a thesis and leads to the Master of
Electronic Business Technologies focuses on the integration of information technologies with business processes and strategies within a dynamic legal and business environment. At the base of Electronic Business Technologies is the fact that the application of Internet and information technology to business processes leads to remarkable new ways of conceiving and organizing businesses. This in turn leads to a myriad of innovative modes of management, new organisational structures and information architectures as well as new laws and legal and corporate strategies. Each master’s program (MEBT and MSc) offers two major areas of specialization or streams: Electronic Business and Electronic Technologies.

Electronic Business focuses on organizational transformations based on information technologies. Research includes the identification of best practices and trends, the comparative analysis of new business models, the evaluation of performance based on the introduction of new technologies, the efficacy of the new services and methods in attracting and satisfying customers, and the simulation of integrated supply chains.

Electronic Technologies focuses on information technologies and system architectures, which are used to create and manage on-line commercial transactions. Research includes work on electronic commerce technologies and protocols (in particular wireless and multi-media), the analysis and development of algorithms and theories (in particular security, data mining, web data warehouses, and distributed applications), the definition of standards, architectures and software engineering methodologies for developing electronic commerce systems, the experimental development of innovative applications (virtual environments, e-learning, personalization, electronic negotiations, business reporting, legislative compliance, and health care).

The programs are offered mainly in English. They can be taken part-time or full-time. The Master in Electronic Business Technologies can be completed in 12 months of full-time study, and the Master of Science in Electronic Business Technologies in 16 months of full-time study. The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

The programs, which are only offered on a full-time basis, also offer a co-op option.

### Programs

Master of Electronic Business Technologies

Master of Science Electronic Business Technologies

### Admission

The basic requirement is an honours bachelor’s degree in a discipline relevant to the stream chosen, either e-business or e-technologies. A minimum average of B+ (75%), calculated in accordance with FGPS guidelines, is required. Candidates whose average falls between 70 and 74% may also be considered for initial admission to one of the graduate diplomas, with the possibility of transferring to the master's provided they have completed the 12 compulsory credits of the diploma with no grade below B+ (75%).

For the e-business stream, disciplines such as business administration, economics, computer science, electrical engineering, and business information are particularly relevant. For the e-technologies stream, disciplines such as computer science, computer engineering, software engineering, electrical engineering, and business information are particularly relevant and, for this stream, the degree program must have included courses in data structures, file management, operating systems, database management systems, and systems programming.

Candidates who have already completed a graduate diploma in e-business or e-commerce with an average of at least B+ (75%) may be admitted into the e-business stream or the e-technologies stream of either one of the two Electronic Business Technologies master’s programs. They will receive credit towards the master’s for courses common to the diploma and the master’s provided the courses have been completed within the preceding seven years.

Articulation between Diplomas and Master’s Students have the option of registering either in one of the graduate diplomas or in one of the master’s programs. If they choose to register in the diploma, they will be allowed to transfer to the master’s provided they have completed the 12 compulsory diploma credits, with no grade below B+ (75%) in any course. Students initially registered in the Master in Electronic Business Technologies will be allowed to transfer to the MSc under the same conditions (12 compulsory credits, with no grade below B+ (75%) in any course). In addition, to transfer either from one of the diplomas or from the Master in Electronic Business Technologies (MEBT) to the MSc, students must have identified a professor who has agreed to supervise their thesis.

Students initially registered in the master’s who do not wish to complete the program are eligible to receive one of the two diplomas as long as they have successfully met all the requirements.

To be admitted into the co-op option, students must commence the MEBT program in the fall session and be registered full time. Applications for the co-op option must be received by the end of the first month of the student’s registration in the MEBT program. Acceptance into the co-op option is offered on a competitive basis and is managed by the Co-op Office. Enquiries should be directed to that office.

### Language proficiency

The programs are offered mainly in English. Candidates whose mother tongue is neither English nor French must submit evidence of proficiency
in English by providing any of the documents in the following list (test scores cannot be more than two years old as of September 1 of the year of potential entry into the program):

- A score of at least 250 on the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, New Jersey, USA, 08540; see also www.web1.toefl.org.
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: www.ielts.org.
- A score of at least 14 on the CANTEST, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years over the last six years).

In accordance with the regulations of the University of Ottawa, examinations, assignments, and the thesis may be written in the official language of the student’s choice (either English or French).

**Program Requirements**

**Master of Science in Electronic Business Technologies (MSc)**

The Master of Science in Electronic Business Technologies requires 18 course credits and a thesis. The program comprises 2 streams: e-business and e-technologies. The choice of courses depends on which stream has been chosen.

**Course requirements (18 credits):**

1. **Electronic Business stream**
   - Compulsory courses (15 credits)
     
     ADM6286 INTERNATIONAL E-BUSINESS STRATEGIES FOR EBT (1.5cr.)
     ADM6287 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS FOR EBT (1.5cr.)
     EBC6130 WEB SERVICES (1.5cr.)
     EBC6270 INTERNET SECURITY (1.5cr.)
     EBC6220 DATA MINING FOR BUSINESS APPLICATIONS (1.5cr.)
     EBC6260 INTEGRATED NETWORKS FOR THE ENTERPRISE (1.5cr.)
     EBC7101 RESEARCH WORKSHOP IN ELECTRONIC BUSINESS TECHNOLOGIES (1.5cr.)
     EBC7102 INTERDISCIPLINARY RESEARCH METHODS IN E-BUSINESS (1.5cr.)
     *ISI5310 ETHICS, VALUES AND INFORMATION DILEMMAS (3cr.)

     *Under special circumstances, students may be allowed to substitute CMN5115 COMMUNICATION ETHICS for ISI5310 with approval of the EBT Director and the professor for CMN5115.

   - Optional courses (3 credits) (see list below)
     
     - Thesis proposal
       EBC7990 PROPOSITION DE THÈSE / THESIS PROPOSAL

   - Thesis
     EBC7999 THÈSE DE MAÎTRISE / MASTER’S THESIS (12cr.)

2. **Electronic Technologies stream**
   - Compulsory courses (15 credits)
     
     ADM6287 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS FOR EBT (1.5cr.)
     ADM6277 E-BUSINESS ENERGY MANAGEMENT (1.5cr.)
     EBC7101 RESEARCH WORKSHOP IN ELECTRONIC BUSINESS TECHNOLOGIES (1.5cr.)
     EBC7102 INTERDISCIPLINARY RESEARCH METHODS IN E-BUSINESS (1.5cr.)
     *ISI5310 ETHICS, VALUES AND INFORMATION DILEMMAS (3cr.)

     6 credits from:

     EBC5175 MOBILE COMMERCE TECHNOLOGIES (3cr.)
     EBC5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)
     EBC5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

     *Under special circumstances, students may be allowed to substitute CMN5115 COMMUNICATION ETHICS for ISI5310 with approval of
the EBT Director and the professor for CMN5115.

- Optional courses (3 credits) (see list below)
- Thesis proposal
  EBC7990 PROPOSITION DE THÈSE / THESIS PROPOSAL
- Thesis
  EBC7999 THÈSE DE MAÎTRISE / MASTER’S THESIS (12cr.)

**Master of Electronic Business Technologies (MEBT)**

The Master of Electronic Business Technologies requires 24 course credits and a research project. The program comprises 2 streams: e-business and e-technologies. The choice of courses depends on which stream has been chosen.

**Course requirements (24 credits):**

1. **Electronic Business stream**

- Compulsory courses (15 credits)
  - ADM6286 INTERNATIONAL E-BUSINESS STRATEGIES FOR EBT (1.5cr.)
  - ADM6287 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS FOR EBT (1.5cr.)
  - ADM6277 E-BUSINESS ENERGY MANAGEMENT (1.5cr.)
  - EBC6130 WEB SERVICES (1.5cr.)
  - EBC6170 INTERNET SECURITY (1.5cr.)
  - EBC6220 DATA MINING FOR BUSINESS APPLICATIONS (1.5cr.)
  - EBC6260 INTEGRATED NETWORKS FOR THE ENTERPRISE (1.5cr.)
  - EBC7101 RESEARCH WORKSHOP IN ELECTRONIC BUSINESS TECHNOLOGIES (1.5cr.)
  - *ISI5310 ETHICS, VALUES AND INFORMATION DILEMMAS (3cr.)*

  *Under special circumstances, students may be allowed to substitute CMN5115 COMMUNICATION ETHICS for ISI5310 with approval of the EBT Director and the professor for CMN5115.

- Optional courses (9 credits) (see list below)
- Research project
  EBC6997 PROJET DE RECHERCHE / RESEARCH PROJECT (6cr.)

2. **Electronic Technologies stream**

- Compulsory courses (15 credits)
  - ADM6287 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS FOR EBT (1.5cr.)
  - ADM6277 E-BUSINESS ENERGY MANAGEMENT (1.5cr.)
  - EBC7101 RESEARCH WORKSHOP IN ELECTRONIC BUSINESS TECHNOLOGIES (1.5cr.)
  - *ISI5310 ETHICS, VALUES AND INFORMATION DILEMMAS (3cr.)*

  7.5 credits from:
  - EBC5175 MOBILE COMMERCE TECHNOLOGIES (3cr.)
  - EBC5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)
  - EBC5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)
  - EBC6130 WEB SERVICES (1.5cr.)
  - EBC6170 INTERNET SECURITY (1.5cr.)
  - EBC6220 DATA MINING FOR BUSINESS APPLICATIONS (1.5cr.)
  - EBC6260 INTEGRATED NETWORKS FOR THE ENTERPRISE (1.5cr.)

  *Under special circumstances with approval of the EBT Director and the professor for the course, students may be allowed to substitute CMN5115 COMMUNICATION ETHICS for ISI5310.

- Optional courses (9 credits) (see list below)
- Research project
  EBC6997 PROJET DE RECHERCHE / RESEARCH PROJECT (6cr.)

**OPTIONAL COURSES**

The following courses can be taken as optional courses in any of the programs above:

- ADM6276 ENTERPRISE RESOURCE PLANNING SYSTEMS MANAGEMENT (1.5cr.)
- ADM6279 SOCIO-TECHNICAL CHANGE (1.5cr.)
- ADM6286 INTERNATIONAL E-BUSINESS STRATEGIES FOR EBT (1.5cr.)
ADM6420 ELECTRONIC MARKETING (1.5cr.)
ADM6260 PROJECT MANAGEMENT I (1.5cr.)
ADM6261 PROJECT MANAGEMENT II (1.5cr.)
CMN5110 SOCIAL HISTORY OF COMMUNICATION TECHNOLOGIES (3cr.)
CMN5140 COMMUNICATION, GLOBALIZATION AND CHANGE (3cr.)
CMN5150 KNOWLEDGE MANAGEMENT (3cr.)
CS15105 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
CS15111 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)
CS15112 (COMP 5507) SOFTWARE ENGINEERING (3cr.)
CS15115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
CS15118 (COMP 5502) AUTOMATED VERIFICATION AND VALIDATION OF SOFTWARE (3cr.)
CS15122 (COMP 5501) SOFTWARE USABILITY (3cr.)
CS15180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)
CS15386 (COMP 5505) NATURAL LANGUAGE PROCESSING (3cr.)
CS15387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)
EBC5175 MOBILE COMMERCE TECHNOLOGIES (3cr.)
EBC5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)
EBC5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)
EBC5990 ÉTUDE DIRIGÉE / DIRECTED READING (1.5cr.)
EBC5991 ÉTUDE DIRIGÉE / DIRECTED READING (1.5cr.)
EBC6130 WEB SERVICES (1.5cr.)
EBC6170 INTERNET SECURITY (1.5cr.)
EBC6180 ELECTRONIC HUMAN RESOURCES MANAGEMENT (1.5cr.)
EBC6210 ELECTRONIC COMMERCE ARCHITECTURE (1.5cr.)
EBC6220 DATA MINING FOR BUSINESS APPLICATIONS (1.5cr.)
EBC6230 BUSINESS PROCESS MANAGEMENT TECHNOLOGIES AND APPLICATIONS (1.5cr.)
EBC6240 MOBILE COMMERCE (1.5cr.)
EBC6250 DOCUMENT ENGINEERING FOR E-BUSINESS (1.5cr.)
EBC6260 INTEGRATED NETWORKS FOR THE ENTERPRISE (1.5cr.)
ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS (3cr.)
ELG5373 (EACJ 5105) DATA ENCRYPTION (3cr.)
EMP5116 ISSUES IN MANAGEMENT AND OPERATION OF COMMUNICATION NETWORKS (3cr.)
GNG5120 TECHNOLOGY ENTREPRENEURSHIP FOR ENGINEERS AND COMPUTER SCIENTISTS (3cr.)
GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
IS16312 GLOBAL INFORMATION AND COMMUNICATIONS POLICY (3cr.)
IS16322 DIGITAL PRESERVATION (3cr.)
IS16332 METADATA AND TAXONOMIES (3cr.)
IS16342 WEB ARCHITECTURE AND TECHNOLOGIES (3cr.)
IS16343 DIGITAL ASSET MANAGEMENT TECHNOLOGIES (3cr.)
IS16351 SOCIAL MEDIA (3cr.)
IS16372 INFORMATION LITERACY (3cr.)
IS16381 KNOWLEDGE IN ORGANIZATIONS (3cr.)
MBA5270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
MBA6220 MANAGING CUSTOMER RELATIONS (1.5cr.)
MGT6111 VENTURE CAPITAL AND PRIVATE EQUITY (3cr.)
MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE (1.5cr.)
POP8950 THÈMES CHOISIS EN SANTÉ DES POPULATIONS / SPECIAL TOPICS IN POPULATION HEALTH (3cr.)

Co-op option

Co-op students must register full-time and complete two work terms: EBC6001 Co-op Work Term I and EBC6002 Co-op work term II. Each work term is graded P/F (pass/fail), based on the employer’s report and on the written report completed by the student (the student report should be 30 pages long, including annexes). The report is evaluated by the professor in charge of the graduate co-op option in Electronic Business Technologies. The credits awarded for co-op terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain enrolled in the co-op option, students must:

- Maintain full-time status.
- Maintain a 7.0 grade point average.
- Obtain a satisfactory grade (P) for each co-op work term.

Duration of the program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Residence

All full-time students must complete a minimum of three sessions of full-time registration. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the initial registration in the program.
Minimum standards

The passing grade in all courses is C+. Students who fail 4.5 credits, or the same course twice, must withdraw from the program.

Courses

ADM6260 PROJECT MANAGEMENT I (1.5cr.)
Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK®) of the Project Management Institute (PMI®); project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning, realization and close-out). Students will have hands-on experience using MS Project.

ADM6261 PROJECT MANAGEMENT II (1.5cr.)
Focus on projects that have incomplete and/or unstable requirements such as IT projects or software development projects. Topics covered include: portfolio management; risk management; determining requirements and solutions; quality management; communication management; design methods (Quality Function deployment, Value Analysis); iterative and adaptive project management; fast tracking and concurrent methods of project management.

ADM6276 ENTERPRISE RESOURCE PLANNING SYSTEMS MANAGEMENT (1.5cr.)

ADM6277 E-BUSINESS ENERGY MANAGEMENT (1.5cr.)
Reduction of e-business power requirements by locating data centres in areas with low cost electricity and where cold outside air can be used for cooling, e.g. British Columbia, Québec, Finland, Iceland and Sweden. Reduction of power requirements in other industries, e.g. using smart grid, smart buildings and smart cities. Calculation of energy requirements for specific e-business services, e.g. e-banking, e-newspapers, media download, media streaming and web-based advertising. Review of current international standardization work on sustainability for and by IT.

ADM6279 SOCIO-TECHNICAL CHANGE (1.5cr.)
This course explores the structural-, cultural- and process-based organizational change management challenges facing business strategists during new technology implementation initiatives. Toward this, the course draws upon management frameworks, support tools and best practices for the joint optimization of technology and social subsystems within organizations. Adopting a complex adaptive system viewpoint of the organization, the course will highlight issues of technological and social embeddedness, and illustrate the use of configuration modeling and analysis tools for enterprise engineering and strategy models to facilitate change sustainability and continuity.

ADM6286 INTERNATIONAL E-BUSINESS STRATEGIES FOR EBT (1.5cr.)
International trends in the global economy together with assessment of risks, and associated international e-business opportunities. Strategies for translating international opportunities into e-businesses, including localizing international web-based content, developing international supply networks, international crowdsourcing, international payments and international collaboration. How to address local laws on privacy, intellectual property and business contracts. Exclusion: ADM6274

ADM6287 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS FOR EBT (1.5cr.)
Business Intelligence (BI) as a concept; review of major BI tools and methods; identification of the right types of BI for different types of decision making environments; Introduction to Big Data; Business applications of Big Data; review of the supporting technologies such as data bases and data warehouses and Big Data Platforms for integrating structured and unstructured data including Hadoop, sandbox analytics; Streaming Analytics, and advances in data warehousing appliances that accelerate analytics. Exclusion: ADM6275

ADM6420 ELECTRONIC MARKETING (1.5cr.)

CMN5110 SOCIAL HISTORY OF COMMUNICATION TECHNOLOGIES (3cr.)
Exploration of the social, political, economic, cultural and ethical ramifications of communication technologies as they have evolved over time. Relationship between innovation in new communication technologies and social and cultural change.

CMN5115 COMMUNICATION ETHICS (3cr.)
Emphasis on the significance of ethical principles and responsibilities of public communicators, as well as sanctions faced when communicators fail to uphold these principles. Critique of self-regulation of the media. Analysis of argumentation. Study of legal precedents with respect to defamation.

CMN5140 COMMUNICATION, GLOBALIZATION AND CHANGE (3cr.)
Impact of information and communication technologies and political, cultural, and global dynamics on organizations. Theoretical and critical reflections on the strategic management of change in organizations, the transformation of organizational cultures, and intervention practices. Case studies of hybrid cultures.
CMN150 KNOWLEDGE MANAGEMENT (3cr.)
Research directions in organizational learning, collective intelligence and information architecture, situated in the technical context of the general digitization of communication and the socio-cultural context of knowledge societies and human development policies. Interdisciplinary perspectives. Case studies from the work place, education, health, and cultural industries.

CS12505 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks. Prerequisites: familiarity with basic concepts in networks, network security, and applied cryptography. For example, relevant background courses may include the following (or equivalents): CEG 4185 or COMP 3293 and/or CSI 4138 or CEG 4394 or COMP 4108, and/or CSI 4108 or ELG 5372 or COMP 4109.

CS12515 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
The dimensional and multidimensional data models for data warehousing. Data dependencies and decompostition. Structure and use of data definition and manipulation languages. Database economics, engineering, deployment and evolution. Issues in integrity, security, the Internet and distributed databases. Relationships to decision support systems. Prerequisite: CS12317 or equivalent

CS12528 (COMP 5403) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

CS12537 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)

CS12538 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

CS12599 STAGE EN COMMERCE ÉLECTRONIQUE / ELECTRONIC COMMERCE WORK TERM (3cr.)
Expérience en milieu de travail. Noté: S (satisfaisant)/ NS (non satisfaisant) selon les résultats du rapport écrit et l'évaluation de l'employeur. / Practical experience. S (satisfactory) / NS (not satisfactory) grade, to be based on the grades obtained for the written report as well as on the evaluations of the employer. Préalable : Être accepté au programme de certificat en commerce électronique (option technologie) et recevoir la permission du Comité du programme. / Prerequisites: Acceptance in the Graduate Certificate in e-Commerce (Technology Option) and permission of the Program Committee.

CS12594 PROJET DE RECHERCHE AVANCÉ EN COMMERCE ÉLECTRONIQUE / GRADUATE PROJECT IN ELECTRONIC COMMERCE (3cr.)
Projet sur un sujet précis en commerce électronique mené sous la direction d’un professeur. Ne peut être combiné pour crédits avec CSI 5903. / Project on a specific topic in electronic commerce under the supervision of a professor. Exclusion: CSI 5903.

DCL7302 REGULATION OF INTERNET COMMUNICATIONS (3cr.)
Seminar analyzing the legal challenges posed by the Internet to the rights of free speech and privacy. Topics include online obscenity, hate speech, defamation, as well as national and international approaches to data privacy protection.

DCL7303 ELECTRONIC COMMERCE PRACTICE WORKSHOP (3cr.)
Practice-oriented seminar analyzing the legal issues and implications of electronic commerce. Topics include licensing, privacy and acceptable use policies, Web development agreements, and regulatory issues.

DCL7501 RÉGLEMENTATION DU CYBERCOMMERCHE (3cr.)
Séminaire consacré à l’étude des défis juridiques que pose l’Internet en matière du droit commercial traditionnel. Les sujets à l’étude sont la propriété intellectuelle, les contrats en ligne, les signatures numériques, les impôts, la réglementation des valeurs mobilières et la prestation de services juridiques en ligne.

DCL7502 RÉGLEMENTATION DES CYBERCOMMUNICATIONS (3cr.)
Séminaire consacré à l’étude des défis juridiques que pose l’Internet en matière de liberté d’expression et du droit à la vie privée. Certains sujets à l’étude sont l’obscénité, le discours haineux, la diffamation, les mécanismes pour la protection des renseignements personnels, à l’échelle nationale et à l’échelle internationale.

DCL 7503 PRATIQUE DU COMMERCE ÉLECTRONIQUE (3cr.)
Séminaire pratique pour l’approfondissement de diverses questions et implications juridiques du commerce électronique. Certains sujets à l’étude sont l’attribution de licences, les politiques relatives à la protection des renseignements personnels et à la négligence, les ententes pour le développement du Web et les questions de réglementation.
EBC5175 MOBILE COMMERCE TECHNOLOGIES (3cr.)

EBC5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

EBC5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)
Introduction to business models and technologies. Search engines. Web services and agents. Secure electronic transactions. Value added e-commerce technologies. Advanced research questions. **Exclusion:** CSI5389

EBC5990 ÉTUDE DIRIGÉE / DIRECTED READING (1.5cr.)
Étude indépendante, sous la direction d’un professeur membre du programme. Le sujet et les exigences doivent être approuvés par le comité du programme. / Independent study under the supervision of a faculty member in the program. The topic and requirements must be approved by the program committee. **Préalable:** MPC d’au moins 7 et permission du comité du programme. / Prerequisite: CGPA of at least 7 and permission of the program committee.

**Exclusion:** ADM6275

EBC6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l’évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. **Préalable : être accepté dans l’option coop. / Prerequisite: acceptance into the co-op option.**

EBC6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l’évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. **Préalable : être accepté dans l’option coop. / Prerequisite: acceptance into the co-op option.**

EBC6130 WEB SERVICES (1.5cr.)
Web services business models and strategies. Enterprise Application Integration and Service Oriented Architectures. Web services technology standards. Consumer and enterprise adoption of web service technologies and platforms such as Mashups and Cloud Computing. **Prerequisites:** ADM6276, CSI5389

EBC6170 INTERNET SECURITY (1.5cr.)
User, data and network security principles. Information systems security standards. Security risk analysis frameworks. Fundamentals of Internet security mechanisms including authentication, access control, data encryption and integrity, and Public Key Infrastructure. Internet security including security in the wireless environment. Payment card industry security standards and compliance.

EBC6180 ELECTRONIC HUMAN RESOURCES MANAGEMENT (1.5cr.)
The human resource functions needed for technology. Recruitment and selection via the internet. Internet and intranet applications for training personnel and enabling self-management. Measurement and management of employee performance using web-based applications. Using the web to maximize knowledge acquisition and sharing among employees. Knowing when and when not to use technology to effectively manage human resources.

EBC6210 ELECTRONIC COMMERCE ARCHITECTURE (1.5cr.)

EBC6220 DATA MINING FOR BUSINESS APPLICATIONS (1.5cr.)
Introduction to business data collection, data pre-processing, data warehouses, data marts, and online analytical processing. Data mining tasks including classification, clustering and association rules. Data mining model building, tools and techniques including decision trees, neural networks, and regression analysis. Application of these techniques in business including CRM, target marketing, credit scoring, churn, survival analysis, and fraud detection.

EBC6230 BUSINESS PROCESS MANAGEMENT TECHNOLOGIES AND APPLICATIONS (1.5cr.)
Introduction to Business Process Management Technologies. Review of the latest concepts for using technology to improve performance of business processes. Analysis of advances in Internet-enabled B2B and enterprise business models with emphasis on service-oriented and event-driven architecture. Example applications from supply chain management, order processing, and health care process management will be studied.

EBC6240 MOBILE COMMERCE (1.5cr.)
Diffusion and adoption of M-Commerce technologies. Demand-side and supply-side enterprise applications of M-Commerce.

**EBC6250 DOCUMENT ENGINEERING FOR E-BUSINESS** (1.5cr.)

**EBC6260 INTEGRATED NETWORKS FOR THE ENTERPRISE** (1.5cr.)

**EBC6900 STAGE INTERNATIONAL / INTERNATIONAL WORK TERM** (3cr.)
Exemple pratique dans un milieu de travail international. Note S (satisfaisant) / NS (non satisfaisant) selon les résultats de rapport écrit et l'évaluation de l'employeur. Préalables : être accepté au programme de diplôme et recevoir la permission du comité du programme. Exclusions : CSI 5903, CSI 5904. Practical international experience. Grades S (satisfactory) / NS (not satisfactory), based on the written report as well as on the evaluations of the employer. Prerequisites: Acceptance in the Graduate Diploma and permission of the Program Committee. Exclusions: CSI 5903, CSI 5904. Préalable : être accepté au programme de certificat et recevoir la permission du comité du programme. Ne peut pas être combiné pour crédits avec CSI 5904. Prerequisite: Acceptance in the Graduate Certificate and permission of the Program Committee. Cannot be combined for credit with CSI5904.

**EBC6997 PROJET DE RECHERCHE / RESEARCH PROJECT** (6cr.)
Le sujet de recherche, ainsi que le professeur qui en dirigera, doivent être approuvés par la direction du programme avant l'inscription à la troisième session. Le sujet peut être de nature théorique (par exemple, une étude de la documentation ou une étude de la littérature scientifique) ou appliquée (par exemple, des études de cas). Un mémoire, d'une cinquantaine de pages, doit être rédigé et approuvé par le professeur qui en dirige. / The research topic and the professor who will direct it must be approved by the program director prior to registration in the third session. The topic can be theoretical (for instance, based on a documentation assessment or a review of the scientific literature) or applied (based on case studies). A research paper, about 50 pages long, must be written and approved by the project director and another professor.

**EBC7100 RESEARCH METHODS IN ELECTRONIC BUSINESS TECHNOLOGIES** (3cr.)

**EBC7101 RESEARCH WORKSHOP IN ELECTRONIC BUSINESS TECHNOLOGIES** (1.5cr.)
Writing a Research Project proposal including problem formulation and work plan. Essentials of graduate report writing, information management, literature search techniques and reference management. Research ethics in-cluding academic integrity and avoiding acade-mic fraud.

**EBC7102 INTERDISCIPLINARY RESEARCH METHODS IN E-BUSINESS** (1.5cr.)
Writing a Thesis Proposal. Research design. Introduction to positivist and interpretive approaches, behavioural and design science research, qualitative and quantitative research methods, and sampling strategies and techniques. Prerequisite: EBC7101

**EBC7990 PROPOSITION DE THÈSE / THESIS PROPOSAL**
Les étudiants du programme de M.Sc. doivent, avant la fin de leur deuxième session d'inscription à temps plein, soumettre à leur directeur de thèse/comité du programme une proposition de recherche qui définit la question à traiter, en la plaçant dans le contexte de la littérature savante et en indiquant les hypothèses, les objectifs, la méthodologie, les résultats préliminaires et l'approche choisie. Une fois la proposition approuvée, les étudiants s'inscrivent à la cote de thèse (EBC 7990). Si la proposition n'est pas approuvée la première fois, on pourra permettre à l'étudiant de la soumettre et de la présenter une deuxième fois à la session suivante. Si la proposition n'est pas approuvée lors de la deuxième soumission, l'étudiant recevra une note de NS pour la proposition et devra se retirer du programme de M.Sc. Noté S/NS. / Students in the MSc program must submit to their thesis supervisor/program committee, by the end of the second session of full-time registration, a research proposal that defines the problem to be addressed, relating it to the scholarly literature, and outlining the hypotheses, goals, research methodology, initial results and validation approach. Upon successfully defending their proposal, students register in the master’s thesis (EBC 7990). A student whose proposal is not approved on the first attempt may be permitted to submit and present it a second time in the following session. Failure to obtain approval on the second attempt leads to a grade of NS for the proposal and withdrawal from the MSc program. Graded S/NS.

**EBC7999 THÈSE DE MAÎTRISE / MASTER'S THESIS** (12cr.)

**ELG5211 (EACJ 5201) MULTIMEDIA COMMUNICATIONS** (3cr.)

**ELG5373 (EACJ 5103) DATA ENCRYPTION** (3cr.)
Prerequisite: ELG5119 or SYSC5503 or the equivalent

GNG5120 TECHNOLOGY ENTREPRENEURSHIP FOR ENGINEERS AND COMPUTER SCIENTISTS (3cr.)
Hands-on introduction to the many dimensions of starting and growing a technology company. How to evaluate market opportunities, develop a product that customers need, raise capital and build a winning team. Skills and tools to turn technical ideas into profitable sustainable businesses. Students will submit a report describing how their graduate studies work (e.g. Thesis or Project) could be commercialized using the approaches learned in class.

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

ISI5310 ETHICS, VALUES AND INFORMATION DILEMMAS (3cr.)
Exploration of major ethical concerns currently confronting our information society. The course examines the moral and ethical values involved in information and technology-related situations faced by today's information professionals and agencies, and provides an opportunity to apply ethical theories to situations involving issues such as freedom of expression, censorship, intellectual property rights, equitable access, and privacy. 
Exclusion: ISI6310

ISI6351 SOCIAL MEDIA (3cr.)
Exploration of social media technologies and how they are changing the way we learn, communicate, interact, and share information. The course assesses the implications of social media for individuals, organizations, social networks, and communities, and examines how social media can be used to develop innovative information services and applications. (Formerly: ISI6129) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

MBA6220 MANAGING CUSTOMER RELATIONS (1.5cr.)
Introduction to management of customer relations, special issues in a technology-driven global context. Building long-term relationships from pre-sales to repeat business. Gathering and analyzing information about the customer. Converting information to value-added product and service. Measuring the effect on corporate sales and profits. Demonstration and workshop with a software decision support tool.

MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE (1.5cr.)
Discusses research on the implementation of contemporary health information technologies (IT) and their role in improving, transforming and supporting the delivery of health services: computer-based patient records, computerized order entry and results reporting, clinical services applications (lab, pharmacy, radiology- PACS), clinical decision support systems, nursing information systems, telemedicine and telehealth applications, e-health applications, (including end-users involvement, implementation aspects, alignment with work practices), inherent risks associated with application of IT in healthcare, information security and privacy, IT impacts and challenges, issues related to IT assessment and evaluation in healthcare. Technology as an enabler of change supporting process standardization using Business Process Orchestration Technologies to create a foundation for optimization and active process management. Prerequisite: MHA 6370

MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
Overview of current developments, issues and challenges in the emerging field of health informatics. Historical development as well as basic foundations of health informatics including theoretical, methodological and ethical/legal underpinnings will be studied. Critical examination of information management principles and methods in Canadian health care organizations both public and private. Emerging applications in health informatics as well as approaches to understanding and evaluating these applications. Identification of the issues that CIO's face in their attempts to provide the right information to the right people, at the right time.

MHS6380 SYSTEMS ANALYSIS, MODELING, AND DECISION SUPPORT IN HEALTH (3cr.)
Review of Checkland's soft-systems modeling methodology and of other systems approaches. Study of systems analysis in the broader context of modeling complex systems and of techniques for providing decisional support at macro and micro levels, including support of clinical decisions. Oral and written reports required.

Engineering Management
The Engineering Management Program offers a Master of Engineering in Engineering Management and a Graduate Diploma in Information Technology Project Management.

The objective of the Master of Engineering in Engineering Management program is to develop the knowledge and skills of engineers and scientists in the management of people, projects, resources and organizations in technical environments. The program is supervised by a committee composed of representatives from the Telfer School of Management and of the Faculty of Engineering.

Professors in the program are engaged in research in many areas related to engineering management: production and operations management, robotics and manufacturing management, reliability and maintainability engineering, human resource management, industrial and technology marketing, technical project management and control, research and development and innovation management, operation research and forecasting.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

**Master of Engineering Engineering Management**

**Admission**

To be considered for the master’s program, applicants must hold a bachelor’s degree with a specialization or major in engineering or in science (or equivalent) with a minimum admission average of 70% (B).

NOTE: Admission to the program is very competitive and preference will be given to candidates who have a few years of full-time work experience in engineering or a related field.

**Language requirements**

Most of the requirements of these programs must be fulfilled in English. A very good knowledge of this language is therefore required.

Applicants whose first language is not English are required to provide evidence of proficiency in English.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

**Program Requirements**

The program is governed by the evaluation and promotion regulations of the Faculty of Graduate and Postdoctoral Studies. To receive the Master of Engineering in Engineering Management, a student enrolled in the program must successfully complete 30 credits of academic work: 18 credits of core courses, and 12 credits of optional courses, which can include a 6-credit research project. 50% of the core courses should come from engineering, and 50% from management.

Students who register in the Graduate Diploma in Technology Project Management can apply for admission to the master’s and complete the remaining required credits.

The core courses provide the background necessary for the administration of engineering operations in general. Optional courses allow students to develop knowledge and skills in a professional area of their choice. Some courses are offered both in English and in French. Optional courses are generally offered on a three-year cycle.

**Compulsory courses (18 credits from the following)**

- EMP5100 INTRODUCTION TO ENGINEERING MANAGEMENT (3cr.)
- EMP5101 INDUSTRIAL ORGANIZATION (3cr.)
- EMP5102 SYSTEMS ENGINEERING AND INTEGRATION (3cr.)
- EMP5103 RELIABILITY, QUALITY AND SAFETY ENGINEERING (3cr.)
- MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
- MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
- MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
- MBA5250 INTRODUCTION TO CORPORATE FINANCE (1.5cr.)
- ADM6260 PROJECT MANAGEMENT I (1.5cr.)
- ADM6261 PROJECT MANAGEMENT II (1.5cr.)
Optional courses (12 credits from the following)

Students can select their optional courses from the list provided below. They can also select other graduate courses offered by the Faculty of Engineering and the Telfer School of Management (with the ADM course code) with the approval of the EMP program director and of the academic unit concerned. Course descriptions may be found in the listing of the academic unit concerned. This broad selection of courses allows students to develop knowledge in various areas of interest.

Students can also meet the optional course requirements by completing the 6-credit Engineering Management Project (EMP6997) plus 6 credits of optional courses, provided they have found a faculty member willing to supervise the project and that the project topic has been approved by the Director of the EMP program.

- EMP5100 INTRODUCTION TO ENGINEERING MANAGEMENT (3cr.)
- EMP5101 INDUSTRIAL ORGANIZATION (3cr.)
- EMP5102 SYSTEMS ENGINEERING AND INTEGRATION (3cr.)
- EMP5103 RELIABILITY, QUALITY AND SAFETY ENGINEERING (3cr.)
- EMP5106 TOPICS IN ENGINEERING MANAGEMENT (3cr.)
- EMP5111 CREATIVITY AND INNOVATION (3cr.)
- EMP5112 TECHNOLOGY POLICY AND R & D MANAGEMENT (3cr.)
- EMP5116 ISSUES IN MANAGEMENT AND OPERATION OF COMMUNICATION NETWORKS (3cr.)
- EMP5117 FOUNDATIONS OF SOFTWARE ENGINEERING (3cr.)
- EMP5118 TECHNOLOGY PROJECT MANAGEMENT PRACTICE (3cr.)
- EMP5119 PROJECT INFORMATION MANAGEMENT (3cr.)
- EMP5120 PRODUCT DEVELOPMENT AND MANAGEMENT (3cr.)
- EMP5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
- EMP5169 ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)
- EMP5179 MANUFACTURING SYSTEMS ANALYSIS (3cr.)
- EMP5910 ÉTUDES DIRIGÉES / DIRECTED STUDIES (3cr.)
- EMP5999 PROJET EN GESTION DE LA TECHNOLOGIE / PROJECT IN MANAGEMENT OF TECHNOLOGY (3cr.)
- EMP6997 PROJET EN GESTION DE L’INGÉNIERIE / ENGINEERING MANAGEMENT PROJECT (6cr.)
- GNG5120 TECHNOLOGY ENTREPRENEURSHIP FOR ENGINEERS AND COMPUTER SCIENTISTS (3cr.)
- MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
- MBA5250 INTRODUCTION TO CORPORATE FINANCE (1.5cr.)
- MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
- MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
- MBA5270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
- MBA6226 ENTREPRENEURSHIP (1.5cr.)
- ADM6260 PROJECT MANAGEMENT I (1.5cr.)
- ADM6261 PROJECT MANAGEMENT II (1.5cr.)
- ADM6271 BUSINESS TELECOMMUNICATIONS SYSTEMS (1.5cr.)
- ADM6274 INTERNATIONAL E-BUSINESS STRATEGIES (1.5cr.)
- ADM6275 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS (1.5cr.)
- ADM6276 ENTERPRISE RESOURCE PLANNING SYSTEMS MANAGEMENT (1.5cr.)
- ADM6281 SUPPLY CHAIN MANAGEMENT (1.5cr.)

**Note on optional courses:** It is the student's responsibility to verify that they satisfy the prerequisites and language requirements for the elective courses that they wish to take and, after consultation with the academic advisor, to obtain permission from the professors teaching these courses.

**Duration of the Program**

Full-time students are expected to complete all requirements within two years. The maximum time allowed is four years.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

- **EMP5100 INTRODUCTION TO ENGINEERING MANAGEMENT** (3cr.)
  Introduction to management. The structure of engineering organizations. Planning and control in engineering management.

- **EMP5101 INDUSTRIAL ORGANIZATION** (3cr.)
EM5102 SYSTEMS ENGINEERING AND INTEGRATION (3cr.)

EM5103 RELIABILITY, QUALITY AND SAFETY ENGINEERING (3cr.)

EM5109 TOPICS IN ENGINEERING MANAGEMENT (3cr.)
Current topics in industrial practices.

EM5111 CREATIVITY AND INNOVATION (3cr.)

EM5112 TECHNOLOGY POLICY AND R & D MANAGEMENT (3cr.)
Relationship between R & D and economic progress. Elements of the Canadian policy on technology; R & D activities in the private and public sectors; government incentives and support programs; comparison with the policies of other industrial countries. Technology planning and R & D management in a Canadian setting; technology forecasting, staffing, structure, strategy and support for R and D. Not accessible to students who have taken ADM 6263 or ADM 6264. Prerequisite: MBA 5330

EM5116 ISSUES IN MANAGEMENT AND OPERATION OF COMMUNICATION NETWORKS (3cr.)
Selected topics and emerging issues in management and operation of public and corporate communication networks: real-time and distributed systems; multimedia communications; integrated services networks.

EM5117 FOUNDATIONS OF SOFTWARE ENGINEERING (3cr.)
Foundations of software engineering for non-software engineers; basic principles of software engineering; practical laboratories and programming examples using modern programming languages. Prerequisite: Experience with programming in at least one common language over the last decade. Cannot count for credit in CEG, CSI and SEG programs.

EM5119 PROJECT INFORMATION MANAGEMENT (3cr.)
Topics relating to the contractual relationship within the project team, including the different types of contracts and their application, the preparation of project documents, the evaluation of different types of project organization structures and associated project delivery systems, bidding strategies, network analysis using deterministic and stochastic methods for time and cost management.

EM5200 PRODUCT DEVELOPMENT AND MANAGEMENT (3cr.)
Product development and management, including engineering aspects of the process. The latest trends and practices, insight into processes which facilitate product management and development, understanding of product management and development practices via case studies, development of the leadership and management skills required to create, initiate, develop, bring to market and implement new technological products and services.

EM5211 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)

EM5215 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
2-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach. Case studies and application project.

EM5269 ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

EM5279 MANUFACTURING SYSTEMS ANALYSIS (3cr.)

EM5910 ÉTUDES DIRIGÉES / DIRECTED STUDIES (3cr.)
Étude approfondie dans un domaine de la gestion en ingénierie sous la direction d’un professeur et donnant lieu à rapport écrit. Préalable: Permission de la direction du programme. Exclusion: EMP 6997/ Advanced study in an area of engineering management under the supervision of a professor and leading to a written report. Prerequisite: Permission of program director. Exclusion: EMP 6997.

EM5999 PROJET EN GESTION DE LA TECHNOLOGIE / PROJECT IN MANAGEMENT TECHNOLOGY (3cr.)
Analyse d’un projet complété en gestion de la technologie : entrevues de départ, étude de la documentation accumulée, présentation d’un sommaire des leçons retenues, conférence sur les résultats de l’analyse. Le projet, à choisir par l’étudiant, doit être approuvé par un superviseur nommé par le directeur du programme. Le superviseur dirigera les travaux de l’étudiant et soumettra la note finale S (satisfaisant) ou NS (non
EMP6997 PROJET EN GESTION DE L’INGÉNIERIE / ENGINEERING MANAGEMENT PROJECT (6cr.)
Projet en gestion de l’ingénierie dirigé par un professeur et donnant lieu à la rédaction d’un rapport approfondi. Le choix d’un professeur doit être approuvé par la direction du programme. L’inscription à ce projet est également sujette à l’approbation par la direction d’une proposition de projet détaillée. Note S (satisfaisant) ou NS (non satisfaisant) par le directeur du projet et un autre professeur nommé par la direction du programme. Préalable: MPC de 8.0/A- ou l’équivalent dans les études antérieures. Exclusion: EMP 5910 / Project in engineering management supervised by a professor approved by the program director and leading to the writing of a major report. Registration in this project is subject to the approval of a detailed project proposal by the program director. Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the program director. Prerequisite: CGPS of 8.0/A- or equivalent in previous studies. Exclusion: EMP 5910.

ADM6260 PROJECT MANAGEMENT I (1.5cr.)
Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK®) of the Project Management Institute (PMI®); project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning, realization and close-out). Students will have hands-on experience using MS Project.

ADM6261 PROJECT MANAGEMENT II (1.5cr.)
Focus on projects that have incomplete and/or unstable requirements such as IT projects or software development projects. Topics covered include: portfolio management; risk management; determining requirements and solutions; quality management; communication management; design methods (Quality Function deployment, Value Analysis); iterative and adaptive project management; fast tracking and concurrent methods of project management.

ADM6271 BUSINESS TELECOMMUNICATIONS SYSTEMS (1.5cr.)
Concepts of voice, data, image and video communications and their integration into local and long distance networks. Business communication systems examples.

ADM6274 INTERNATIONAL E-BUSINESS STRATEGIES (1.5cr.)
International trends in the global economy together with assessment of risks, and associated international e-business opportunities. Strategies for translating international opportunities into e-businesses, including localizing international web-based content, developing international supply networks, international crowdsourcing, international payments and international collaboration. How to address local laws on privacy, intellectual property and business contracts. Prerequisite: MBA 5270 (for EMP, MBA and MHA students).

ADM6275 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS (1.5cr.)
Business Intelligence (BI) as a concept; review of major BI tools and methods; identification of the right types of BI for different types of decision making environments; Introduction to Big Data; Business applications of Big Data; review of the supporting technologies such as data bases and data warehouses and Big Data Platforms for integrating structured and unstructured data including Hadoop, sandbox analytics; Streaming Analytics, and advances in data warehousing appliances that accelerate analytics. Prerequisite: MBA 5270 (for EMP, MBA and MHA students).

ADM6276 ENTERPRISE RESOURCE PLANNING SYSTEMS MANAGEMENT (1.5cr.)

ADM6281 SUPPLY CHAIN MANAGEMENT (1.5cr.)
Introduction to supply chain management; overview of its role in the organization as an operational, a strategic, and a competitive tool; role of information systems and technology in supply chain management; managing the flow of materials, and inventory management across the supply chain; developing and maintaining supply chain relationships; future challenges including sharing risks in inter-organizational relationships, managing the global supply chain and design for supply chain management. Prerequisite: MBA 5380 or equivalent for MBA students or EMP 5101 for EMP students.

GNG5120 TECHNOLOGY ENTREPRENEURSHIP FOR ENGINEERS AND COMPUTER SCIENTISTS (3cr.)
Hands-on introduction to the many dimensions of starting and growing a technology company. How to evaluate market opportunities, develop a product that customers need, raise capital and build a winning team. Skills and tools to turn technical ideas into profitable sustainable businesses. Students will submit a report describing how their graduate studies work (e.g. Thesis or Project) could be commercialized using the approaches learned in class.

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection.DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

**MBA5421 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS** (1.5cr.)
This course focuses on the role of the accounting function internal to the organization. It takes a broad view of managerial accounting, introducing students to various costing systems, cost behaviour patterns and cost structures. It demonstrates the use of accounting for the evaluation of product, managerial and divisional performance thus helping students to understand what accounting can do for decision makers and how accounting choices affect decisions. Emphasis the strategic importance of aligning accounting systems with firm technologies and goals. Current issues in management accounting and internal reporting are discussed.

**MBA5250 INTRODUCTION TO CORPORATE FINANCE** (1.5cr.)

**MBA5270 KNOWLEDGE AND INFORMATION MANAGEMENT** (1.5cr.)
Role of information in organizations. Overview of systems used to capture, transform and disseminate information to managers. Linkages between information and knowledge management. The process of knowledge creation and application within and among organizations.

**MBA5320 STRATEGIC MARKETING MANAGEMENT** (3cr.)
Overview of the Marketing process: key concepts, tools and procedures, in the context of a technology-intensive global economy. Definition of Marketing, the Marketing Concept and Marketing Management, and the significance of operating in a technology-intensive global economy. Analyzing market opportunities, setting performance goals, formulating marketing and implementation plans to meet those goals. Introduction to e-marketing management and some of the e-marketing tools available. MBA5120 and MBA5125, together, are equivalent to MBA5320.

**MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT** (3cr.)
The strategic advantage of understanding and integrating organizational behaviour (OB) frameworks in designing and implementing effective human resource (HR) activities (namely attraction, development, maintenance and retention of employees), in measuring performance and in achieving high-performance outcomes in various global organizational contexts. OB topics covered include motivation, rewards, leadership, group dynamics, organizational politics, job and organization design, and culture. *Prerequisite: MBA 5235 for MBA students only. MBA5131 and MBA5132, together, are equivalent to MBA5330.*

**MBA6226 NEW PRODUCT DEVELOPMENT** (1.5cr.)
How to develop new products for high-tech applications in an environment of global competition and shrinking cycle times. Topics include creating the climate, generating ideas, screening ideas, product portfolio selection, team building, managing the formal gating process, testing, killing. New product launch. Product migration strategies. *Prerequisite: MBA 6225.*

**English**

The Department of English offers the degrees of Master of Arts (with or without thesis) and Doctor of Philosophy in English. Both programs equip students to pursue advanced studies in British, Canadian, or American literature informed by a broad knowledge of literary history and by recent developments in literary criticism and cultural theory. The department is well known for its annual Canadian Literature Symposium, and its faculty is distinguished and well-published. The Ontario Council on Graduate Studies (OCGS) has consistently awarded the department the council's highest rating.

The department participates in the collaborative programs in Women's Studies and in Medieval and Renaissance Studies at the master's level, and in the collaborative program in Canadian Studies at the PhD level. For more information on these programs, see "Program Requirements" below.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). Please note, however, that any course fulfilling a graduate degree requirement in English must be completed with a mark of B or higher. A student whose record shows any two grades lower than a mark of B will automatically be withdrawn from the program. Most graduate courses in the Department of English at the University of Ottawa carry three credits. Requirements are stated in number of credits.

**Programs**

Master of Arts English Literature

Master of Arts English Literature Specialization in Medieval and Renaissance Studies

Master of Arts English Literature Specialization in Women's Studies
Admission

- The MA program is intended to refine the critical and scholarly skills of high-achieving graduates from undergraduate honours programs. An honours BA in English literature with a minimum high second class standing of B+ is normally required. A 500-word statement of interest in the program is required with the application. Students applying for the MA with thesis option should submit a sample of their academic writing, such as an essay written for an undergraduate English course.
- Students who have completed a BA or equivalent degree with a minimum of six full courses in English with an average of 75 per cent (B+) may be admitted to a qualifying year which normally comprises 30 credits selected to ensure coverage of the major fields of English literature. These courses must be successfully completed in each case with a mark of B+ or higher. By special permission one or two graduate courses may be substituted for the equivalent number of undergraduate courses. After the requirements of the qualifying year have been satisfactorily fulfilled, students may apply for admission to the regular MA program. Such admission will depend on the quality of their overall record.

Collaborative programs
The Department of English is a participating unit in the collaborative programs in Women's Studies (master's level only) and in Medieval and Renaissance Studies (master's level only). Students should indicate in their initial application for admission to the master's program in English that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

Program Requirements

The Department offers three options for the MA:

- A two-year program in which students complete fifteen credits of course work, including ENG6302 and ENG6303, as well as ENG7997 (Thesis Proposal), and a thesis, of about ninety pages in length, defended in an oral examination.
- An one-year program in which students complete eighteen credits of course work, including ENG6302 and ENG6303, as well as ENG6999, a research paper of about 12,000 words.
- A one-year program in which students complete twenty-seven credits of course work, including ENG6302 and ENG6303.

The completion times above are for the full-time students. Part-time students may take up to four years to complete either MA program, but are not eligible for scholarship support. The residence requirement for students admitted on a full-time basis is three sessions.

In keeping with the bilingual character of the University, the program has a French language requirement. Student may satisfy this requirement by passing FLS 1000, the test administered by the Official Languages and Bilingualism Institute, or its equivalent as determined by the Department of English. A pass on the Department's test leads to an S on the transcript. Students may also satisfy the language requirement by passing six credits of second-year university-level language course(s). These courses are additional to the English courses required for the degree.

Collaborative program in Women's Studies
Students admitted to the Collaborative program in women's studies at the master's level must meet the requirements for a master's degree in their primary program as well as the requirements of the women's studies program. Normally, the women's studies courses are recognized as partial fulfillment of the requirements of the student's primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women's Studies requirements are:

- Two compulsory courses:
  FEM5300 FEMINIST THEORIES (3cr.)
  FEM5103 FEMINIST METHODOLOGIES (3cr.)
  Students must complete the two compulsory courses before their first registration for the major research paper or thesis.
- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women's Studies Graduate Committee as well as by the student's primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.
- The thesis supervisor must possess Women's Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women's Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.
- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women's Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women's studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women's Studies Graduate Committee.
- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the
Collaborative program in Medieval and Renaissance Studies

Students in the program must complete the requirements of their primary program and those of the collaborative program. One of the two 3-credit courses in medieval and Renaissance Studies (MDV 5100 or MDV 5500) will be counted towards the requirements of the primary program. Consequently, students in the specialization will have only one extra course to take.

The requirements of the collaborative program are as follows:

Two compulsory courses:

- MDV 5100 Medieval and Renaissance Studies Research Methods and Tools (3cr.)
- OR
- MDV 5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3cr.)
- AND
- MDV 5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3cr.)

Students must complete the two compulsory courses before they register to the major research paper or thesis.

A thesis or major research paper on a topic related to medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.

In both cases, the title of the degree will indicate the discipline of the participating unit with the specification "specialization in Medieval and Renaissance Studies."

Duration of program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Residence

Students admitted full-time must register full-time for at least three sessions.

Minimum standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

Every year the department usually offers at least three credits in each of the following areas: medieval, renaissance, restoration and 18th century, romanticism, victorian, modern British, American, Canadian, and theory.

The titles below refer to general subject areas, whereas the actual seminars will consist of specific studies in the subject areas. For a detailed description of the seminars available in any year, please consult the department webpage. Information is normally available early in the winter for the next academic year. All courses are three credits.

ENG6300 OLD ENGLISH I (3cr.)

ENG6301 OLD ENGLISH II (3cr.)

ENG6302 RESEARCH METHODOLOGY (1.5cr.)

Preparation of students for the professional study of English and for the application of graduate level research skills to non-academic careers. Review and analysis of electronic and print research tools and methods. Internet database searches, both in the discipline of English as well as in related fields (such as history, philosophy, and sociology), and evaluation of Internet sites. Short assignments developing skills in academic and non-academic research. Preparation of grant applications and of the thesis proposal (for students in the MA with thesis program). Graded S/NS. Offered in the fall session.

ENG6303 PROFESSIONAL DEVELOPMENT (1.5cr.)

Preparation of students for careers involving graduate level research and communication skills, including teaching, university research, and non-academic careers. Introduction to academic and non-academic professional activities: writing and publishing scholarly articles, and research reports, disseminating research results through academic and non-academic presentations, networking, participation in conferences and professional associations, and career planning for both academic and non-academic career paths for holders of graduate degrees. Sessions to be devoted to the practice of teaching, covering such topics as syllabus construction, teaching 'styles,' classroom management, teaching dossiers,
student evaluation, and the application of teaching skills to non-academic goals such as presentations and team-building. Graded S/NS. Offered in the winter session

**ENG6304 Doctoral Research Methods (3cr.)**
Overview of theoretical, methodological, and critical approaches to literary studies to enable students to situate their own research within the discipline.

**ENG6310 MIDDLE ENGLISH LITERATURE I (3cr.)**

**ENG6320 MIDDLE ENGLISH LITERATURE (3cr.)**

**ENG6321 MIDDLE ENGLISH LITERATURE III (3cr.)**

**ENG6322 MIDDLE ENGLISH LITERATURE IV (3cr.)**

**ENG6330 RENAISSANCE LITERATURE I (3cr.)**

**ENG6340 SHAKESPEARE I (3cr.)**

**ENG6342 SHAKESPEARE II (3cr.)**

**ENG6343 SHAKESPEARE III (3cr.)**

**ENG6344 SHAKESPEARE IV (3cr.)**

**ENG6350 RENAISSANCE LITERATURE II (3cr.)**

**ENG6351 RENAISSANCE LITERATURE III (3cr.)**

**ENG6352 RENAISSANCE LITERATURE IV (3cr.)**

**ENG6355 RESTORATION LITERATURE I (3cr.)**

**ENG6356 RESTORATION LITERATURE II (3cr.)**

**ENG6357 RESTORATION LITERATURE III (3cr.)**

**ENG6360 EIGHTEENTH CENTURY LITERATURE I (3cr.)**

**ENG6361 EIGHTEENTH CENTURY LITERATURE II (3cr.)**

**ENG6362 EIGHTEENTH-CENTURY LITERATURE III (3cr.)**

**ENG6363 EIGHTEENTH-CENTURY LITERATURE IV (3cr.)**

**ENG6370 ROMANTIC LITERATURE I (3cr.)**

**ENG6371 ROMANTIC LITERATURE II (3cr.)**

**ENG6372 ROMANTIC LITERATURE III (3cr.)**
ENG6373 ROMANTIC LITERATURE IV (3cr.)

ENG6380 VICTORIAN LITERATURE I (3cr.)

ENG6381 VICTORIAN LITERATURE II (3cr.)

ENG6382 VICTORIAN LITERATURE III (3cr.)

ENG6383 VICTORIAN LITERATURE IV (3cr.)

ENG6900 SECOND LANGUAGE REQUIREMENT
In keeping with the bilingual character of the University, the MA program has a French language requirement. Students may satisfy this requirement by passing the FLS1000, the test administered by the Official Languages and Bilingualism Institute, or the departmental language test. The departmental tests are one-hour examinations which require the candidate to translate, with the aid of a dictionary, a passage of literary criticism or another appropriate selection of similar difficulty approximately one page in length. Students may also satisfy the language requirement by passing six credits of second-year university-level language course(s). These courses are additional to the English courses required for the degree. In all cases, the minimum passing grade is 50% and leads to an "S" (Satisfactory) on the transcript for ENG6900.

ENG6999 MA RESEARCH PAPER
The research paper is prepared under the direction of the research paper supervisor and is approved by the graduate committee. The research paper must be successfully completed by the end of the third session of full-time registration in the master’s. In the event of failure, the student must register for an additional session. A second failure leads to a grade of NS on the transcript and to withdrawal from the program. 
Prerequisites: 15 credits.

ENG7000 MODERN LITERATURE I (3cr.)

ENG7001 MODERN LITERATURE II (3cr.)

ENG7002 MODERN LITERATURE III (3cr.)

ENG7003 MODERN LITERATURE IV (3cr.)

ENG7100 AMERICAN LITERATURE I (3cr.)

ENG7101 AMERICAN LITERATURE II (3cr.)

ENG7102 AMERICAN LITERATURE III (3cr.)

ENG7103 AMERICAN LITERATURE IV (3cr.)

ENG7104 CANADIAN LITERATURE I (3cr.)

ENG7105 CANADIAN LITERATURE II (3cr.)

ENG7106 CANADIAN LITERATURE III (3cr.)

ENG7107 CANADIAN LITERATURE IV (3cr.)

ENG7108 ANGLO IRISH LITERATURE I (3cr.)

ENG7109 ANGLO-IRISH LITERATURE II (3cr.)
ENG7332 ANGLO-IRISH LITERATURE III (3cr.)

ENG7370 HISTORY OF ENGLISH LANGUAGE (3cr.)

ENG7375 COMMONWEALTH LITERATURE (3cr.)

ENG7376 COMMONWEALTH LITERATURE II (3cr.)

ENG7377 COMMONWEALTH LITERATURE III (3cr.)

ENG7380 HISTORY OF CRITICISM I (3cr.)

ENG7381 THEORY OF CRITICISM I (3cr.)

ENG7382 HISTORY OF CRITICISM II (3cr.)

ENG7383 HISTORY OF CRITICISM III (3cr.)

ENG7384 THEORY OF CRITICISM II (3cr.)

ENG7385 THEORY OF CRITICISM III (3cr.)

ENG7900 SECOND LANGUAGE REQUIREMENT
In keeping with the bilingual character of the University, the PhD program has a French language requirement. Students may satisfy this requirement by passing FLS1000, the test administered by the Official Languages and Bilingualism Institute, or the departmental language test. The departmental tests are one-hour examinations which require the candidate to translate, with the aid of a dictionary, a passage of literary criticism or another appropriate selection of similar difficulty approximately one page in length. Language testing of languages other than French is normally administered by the Department. Students may also satisfy the language requirement by passing six credits of second-year university-level language course(s). These courses are additional to the 18 credits required for the degree. In all cases, the minimum passing grade is 66 percent and leads to an "S" (Satisfactory) on the transcript for ENG7900. NOTE: Students who achieve 65% or higher at the MA level will not be required to retake the test if they continue on to the PhD.

Readings and Research
ENG6111 DIRECTED READINGS I (3cr.)
Only in the most exceptional of circumstances and subject to the approval of the graduate committee will a directed reading course be accepted.

ENG6112 DIRECTED READINGS II (3cr.)
Only in the most exceptional of circumstances and subject to the approval of the graduate committee will a directed reading course be accepted.

ENG6313 DIRECTED READING (3cr.)

ENG7997 MA THESIS PROPOSAL
The thesis proposal is prepared under the direction of the thesis supervisor and is approved by the graduate committee. The proposal must normally be successfully completed by the end of the third session. In the event of failure, the proposal can be resubmitted the following session at the latest. A second failure leads to a grade of NS on the transcript and to withdrawal from the program. Graded: S (Satisfactory) / N/S (Not Satisfactory). Prerequisites: 7.5 credits.

ENG7999 MA THESIS RESEARCH

ENG9997 PhD Thesis Proposal
The thesis proposal is prepared under the direction of the thesis supervisor and is approved by the graduate committee after consultation with area experts. The proposal must normally be successfully completed by the end of the seventh session. In the event of failure, the proposal can be resubmitted the following session at the latest. A second failure leads to a grade of NS on the transcript and to withdrawal from the program. Graded: S (Satisfactory) / N/S (Not Satisfactory).
The objectives of the Department are to foster awareness of the field of Geography, and to add to the body of geographic knowledge and
Exploration of key issues relating to health policy within and outside Canada. Topics covered: rationale for public provision and funding of health care in
designs), case-only designs; candidate gene and
classical literature in epidemiology. Seminars on current topics.

Department, and will gain experience in the day-to-day management of the project, in data collection, in data analysis and report preparation.

EPI5243 GUIDED RESEARCH PROJECTS

Admission

Minimum Standards

Master's program with research paper:
registered in one of the participating master's programs to specialize in environmental sustainability.

guidelines. The work submitted for this course must be different from that submitted for other courses, including the research proposal, the thesis
Each work term is graded P/F (pass/fail), based on the employer's report and on the written report completed by the student (the student report
regulations of the University of Ottawa, examinations, assignments, and the research paper or thesis may be written in the official language of
register for

Programs

Master of Applied Science Environmental Engineering

Master of Engineering Environmental Engineering

Doctorate in Philosophy Environmental Engineering

Admission

Admission to the graduate programs in Environmental Engineering is governed by the general regulations of the Ottawa-Carleton Institute of
Environmental Engineering (OCIEE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold an honours bachelor's degree with specialization or a major in environmental engineering or in related engineering disciplines (civil, chemical, mechanical, etc.), or an honours bachelor's degree with specialization or a major in environmental science disciplines with a minimum average of 70% (B);
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other
documents demonstrating research skills;
- Provide at least two confidential letters of recommendation from professors who are familiar with the applicant's work;
- Provide a statement of purpose indicating their career goals and interests in the proposed research area;
- For admission to the MASc, identify at least one professor who is willing and available to act as thesis supervisor;
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities
can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her
research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

NOTE: All students entering the program are required to have courses in mathematics, probability and statistics equivalent to courses required in
undergraduate engineering programs. The Department may require students to take additional courses depending on their backgrounds.
All students entering the program are also required to have taken three undergraduate courses equivalent to the following University of Ottawa courses:

- CHG 3312 Fluid Flow or CVG 2116 Introduction to Fluid Mechanics
- CHG 2131 Fundamentals of Environmental Engineering
- CVG 3132 Physical/Chemical Unit Operations of Water and Wastewater Treatment

These courses are considered to provide the minimum background in fluid mechanics, and in physical, chemical, and biochemical treatment principles, necessary to adequately follow environmental engineering courses at the graduate level. Depending on their background, students may have been exposed to these principles through a different combination of courses in their undergraduate curriculum. Students entering the program without an equivalent background in these topics are expected to take these courses early in their studies and they are considered additional to those normally required for the degree. The undergraduate courses required are specified in the certificate of admission.

**Program Requirements**

**Master of applied science (MASc)**

The requirements of the program are as follows:

- Successful completion of 15 credits, with a minimum of 3 credits from each of at least three of the areas of study listed below;
- Presentation of a seminar EVG5800, which also involves the regular attendance to the departmental seminar series;
- Presentation and defense of a thesis (EVG7999) based on original research carried out under the direct supervision of a research faculty member in the Department.

**NOTE:** The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

**Specialization in Environmental Sustainability**

The specific requirements to be so as to qualify for the Specialization in Environmental Sustainability are as follows:

- Successful completion of the Environmental Sustainability Seminar (EVD5100 or EVD5500, 3 credits). These credits count towards the 18 credits required for the primary program. No additional credits are required.
- Presentation and successful defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability. At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

**Master of engineering (MEng)**

1. **Project option**

   The requirements of the program are as follows:

   - Completion of a minimum of 24 course credits, with a minimum of 3 credits from each of at least three of the areas of study listed below;
   - Presentation of a seminar EVG5800, which also involves the regular attendance to the departmental seminar series;
   - Completion of an environmental engineering project (EVG6001).

2. **Coursework option**

   The requirements of the program are as follows:

   - Completion of a minimum of 30 course credits, with a minimum of 3 credits from each of at least three of the areas of study listed below.

   **NOTE:** Candidates transferring from another university must take at least half their credits at the institute.

**Areas of research**

In keeping with the objective of ensuring a breadth of knowledge for graduates of the program, students in the master's program are expected to take at least one graduate level course from each of at least three of the following areas of study:

- Air pollution
- Water resources management, groundwater management and contaminant transport
- Water and waste water treatment
- Management of solid, hazardous, and radioactive waste and pollution prevention
- Environmental impact assessment

**Duration of the program**

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The requirements of the program are usually fulfilled within two years of full-time studies.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is B. Students who fail six credits, or the thesis proposal, or whose research progress report is deemed unsatisfactory are required to withdraw from the program.

**Courses**

Course selection is subject to the approval of the advisor or the advisory committee. Students may choose courses offered at either university from among those listed below.

The courses listed below are grouped by area of study. Students must complete at least one course in three of the five areas. The director will decide when a course offered under a special topics or directed studies heading can be considered to meet the requirements of a given area. Course descriptions may be found in the departmental sections of the calendars concerned.

Course codes in parentheses are for Carleton University. Only a selection of courses given in a particular academic year.

**Air Pollution**

CVG7161 (ENVE 5102) TRAFFIC RELATED AIR POLLUTION (3cr.)

CVG7162 (ENVE 5103) AMBIENT AIR QUALITY AND POLLUTION MODELLING (3cr.)

CHG8132 (ENVE 5105) ADSORPTION SEPARATION PROCESSES (3cr.)


EVG5101 (ENVE 5101) AIR POLLUTION CONTROL (3cr.)

EVG7104 (ENVE 5104) INDOOR AIR QUALITY (3cr.)

**Water Resources Management, Groundwater Management, and Contaminant Transport**

CVG5124 (CIVJ 5605) COASTAL ENGINEERING (3cr.)

Key concepts in coastal engineering. Wave mechanics and coastal hydrodynamics, (2) sediment transport and coastal morphodynamics and (3) coastal structures and coastal zone management. Wave mechanics and coastal hydrodynamics to include small-amplitude wave theory, finite amplitude wave theories (Stokes, Chioial and solitary wave), wave generation, wave transformations, development and prediction, hydrodynamics of coastal circulation. Sediment transport and coastal morphodynamics to include: wave and current-induced sediment transport, coastal sediment processes, longshore and cross-shore beach morphologic transformations, etc. Coastal structures and coastal zone management to include: beach erosion control, coastal structures (dikes, breakwaters, groins, seawalls), beach nourishment, coastal pollution and control, nearshore area development.

CVG5125 (CIVJ 5601) STATISTICAL METHODS IN HYDROLOGY (3cr.)

Concepts of probability and random variables applied to hydrology. Statistical distributions, their approximation and analysis. Statistical inference, including tests of significance and estimation theory. Linear and multivariate correlation and regression techniques. Data generation and simulation techniques for design of water-resource systems. Introduction to hydrologic and meteorologic time series.

CVG5126 (CIVJ 5602) STOCHASTIC HYDROLOGY


CVG5131 (CIVJ 5606) RIVER ENGINEERING

Introduction to fluvial processes and flow regimes: modes of sediment transportation; suspended and bedload transport theories; sediment measuring techniques and their limitations; secondary circulation and the meander process; hydraulics of bridge waterways and pipeline crossings; local scour at bridge piers; erosion protection.
CVG5154 (CIVJ 5308) RANDOM VIBRATION (3cr.)

CVG5160 (CIVJ 5503) SEDIMENT TRANSPORT (3cr.)
An introduction to particle transport, with special emphasis on river engineering applications, including natural channel design. Sediment properties, initiation of motion, bed load, suspended load, fluvial dunes, alluvial channels, bank erosion and protection, natural channel design. Special topics include contaminated sediments, local scour, morphodynamic modelling, fluvial habitat.

CVG5162 (CIVJ 5504) RIVER HYDRAULICS (3cr.)
Advanced concepts of river hydraulics, with an emphasis on field measurement techniques and application of numerical models. Navier-Stokes equations, turbulence, flow resistance, numerical modelling of simplified momentum and continuity equations, field-based measurement and statistical analysis of velocity fields. Special topics include contaminant transport, morphodynamic modelling.

CVG7108 (CIVE 5504) SEEPAGE AND WATER FLOW THROUGH SOILS (3cr.)

CVG7163 (ENVE 5302) CASE STUDIES IN HYDROGEOLOGY (3cr.)

CHG8158 (ENVJ 5304) POROUS MEDIA (3cr.)

GEO5143 (GEOI 5403) ENVIRONMENTAL ISOTOPES AND GROUNDWATER GEOCHEMISTRY (3cr.)
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radiocarbon, and exotic radioisotopes (e.g. 36Cl, 39Ar, 85Kr). Low temperature aqueous geochemistry and mineral solubility with emphasis on the carbonate system. Some applications to paleoclimatology will be discussed. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO 4342) or equivalent.

GEO5144 (ERTH 5404) GROUNDWATER RESOURCES
Advanced topics in the exploration and development of groundwater resources, including detailed aquifer response analysis. Examination of hydrogeology in arid and undeveloped regions will also be included. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO4341) or equivalent.

GEO5146 (ERTH 5406) TECHNIQUES OF GROUNDWATER RESOURCES EVALUATION (3cr.)
Governing groundwater flow equations, initial and boundary conditions; simple numerical solutions (spreadsheets); complex numerical solutions (commercial software); and analytical solutions. Applications: aquifer response test analysis, capture zone analysis, groundwater flow modeling, water budgeting, and aquifer vulnerability assessment. Prerequisite: undergraduate hydrogeology.

GEO5147 (ERTH 5407) GEOCHEMISTRY OF NATURAL WATERS (3cr.)
Aqueous speciation, solubility of metals, minerals and gas, reaction kinetics and equilibria. Chemistry and dynamics of groundwaters and hydrothermal fluids.

GEO5148 (ERTH 5408) THEORY OF FLOW AND CONTAMINANT TRANSPORT IN GEOLOGICAL MATERIALS (3cr.)
Development of governing groundwater flow equations and solute transport equations from first principles, and application of principles in case studies. Topics: Forces and potentials, fluids, geological materials, contaminants, case studies. Prerequisite: undergraduate hydrogeology.

EVD7301 (ENVE 5301) CONTAMINANT HYDROLOGY (3cr.)

EVD7303 (ENVE 5303) MULTIPHASE FLOW IN SOILS (3cr.)

Management of Solid, Hazardous, and Radioactive Waste and Pollution Prevention

CVG5133 (ENVY 5906) SOLID WASTE DISPOSAL (3cr.)
Collection and disposal of solid wastes. Sanitary landfill, composting, incineration and other methods of disposal. Material and energy recovery.

CVG5179 (ENVY 5908)ANAEROBIC DIGESTION (3cr.)
Advanced theoretical, biological, and practical aspects of anaerobic digestion processes. Principles to be applied to the design and application of conventional and advanced anaerobic processes used for treatment of municipal and industrial wastewaters. Topics to include microbiology and biochemistry fundamentals, techniques for monitoring anaerobic digestion performance, municipal sludge stabilization, anaerobic composting, anoxic/anaerobic bioremediation, Andrew's dynamic model. Design of the following: two-phase digestion; Downflow Stationary Fixed Film (DSFF) reactors; Upflow Anaerobic Sludge Blanket (UASB); Upflow Blanket Filter (UBF) reactors; and Anaerobic Sequencing Batch Reactors (ASBR).
CVG5331 (ENVJ 5902) SLUDGE UTILIZATION AND DISPOSAL (3cr.)
Introduction to sludge processing technology and procedures to be used in the planning and design of sludge treatment processes. Evaluate the economics and performance of sludge unit process operations. Selection of methods for final disposition of sludge.

EVG5203 (ENVE 5203) HAZARDOUS AND RADIOACTIVE WASTE MANAGEMENT (3cr.)

EVG7201 (ENVE 5201) GEO-ENVIRONMENTAL ENGINEERING (3cr.)

EVG7202 (ENVE 5202) CONTAMINANT FATE MECHANISMS (3cr.)

Water and Wastewater Treatment

CVG5130 (ENVJ 5900) WASTEWATER TREATMENT PROCESS DESIGN (3cr.)
The physical, chemical and biological processes involved in the treatment of domestic and industrial wastes. Waste characteristics, stream assimilation, biological oxidation, aeration, sedimentation, anaerobic digestion, sludge disposal.

CVG5132 (ENVJ 5901) UNIT OPERATIONS OF WATER TREATMENT (3cr.)
Unit operations and unit processes involved in the treatment of a water supply for various uses. Topics included are: water quality, water microbiology, sedimentation, chemical treatment, disinfection, water chemistry, flocculation.

CVG5134 (ENVJ 5907) CHEMICAL ANALYSIS FOR ENVIRONMENTAL ENGINEERING (3cr.)

CVG5135 (CIVJ 5608) WATER SUPPLY AND SANITATION IN DEVELOPING COUNTRIES (3cr.)

CVG5137 (ENVJ 5905) WATER AND WASTEWATER TREATMENT PROCESS ANALYSIS (3cr.)
Mass balancing in complex systems. Reaction kinetics and kinetic data analysis: classical and computer based methods. Reactor design: ideal reactors and real reactors. Analysis of tracer tests. Interfacial mass transfer: common theories. Mass transfer models. Prerequisite: CVG 3132 or equivalent. Students with a Chemical Engineering background may not take this course for credit.

CVG5138 (ENVJ 5902) ADVANCED WATER TREATMENT (3cr.)
Scope, limitations and design procedures for water treatment processes for the removal of toxic and non-standard contaminants. Current water treatment problems and regulations, activated carbon treatment, ion exchange, disinfection practices and oxidation via advanced oxidation processes (ozonation and UV oxidation), iron and manganese removal, recent developments in coagulation, membranes, air stripping. Prerequisite: CVG 3132 or equivalent.

CVG7160 (ENVE 5001) BIOFILM PROCESSES IN WASTEWATER TREATMENT (3cr.)

CVG5180 (ENVJ 5909) BIOLOGICAL NUTRIENT REMOVAL (3cr.)
Advanced theoretical, biological, and practical aspects of biological nutrient removal (BNR) (nitrification, denitrification and excess biological phosphorus) processes. Principles to be applied to the design and application of conventional and advanced BNR processes used for treatment of municipal and industrial wastewaters. Topics as follows: microbiology and biochemistry fundamentals of BNR, nitrification process design of suspended growth and fixed film growth systems, denitrification process design of suspended growth and fixed film growth systems, excess biological phosphorus removal design including prefermentation. Design of 2,3,4 and 5 stage BNR systems. General activated sludge model and Simworks for BNR systems. Retrofit of exiting plants and pilot plant testing for BNR.

CVG5232 (ENVJ 5911) UNIT OPERATIONS OF WATER TREATMENT LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for particular applications, and b) design a full-scale facility. Conventional analytical techniques used in water treatment (pH, alkalinity, hardness, turbidity, color, spectrophotometric analysis). Process analysis techniques for process evaluation and scale-up including: zone sedimentation, batch flux settling tests, coagulation with iron and aluminum salts, flocculent sedimentation, filtration and fluidization, flotation. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5132.

CVG5238 (ENVJ 5912) ADVANCED WATER TREATMENT PROCESSES LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for the removal of toxic and non-standard contaminants, and b) design a full-scale facility. tracer tests and none-ideal reactor behaviour, activated carbon adsorption equilibria and kinetics, aeration. Total organic carbon analysis, spectrophotometry. Process analysis, techniques for process evaluation and scale-up including: aeration, analysis of non-ideal flow conditions. tracer study of three basins, adsorption isotherm tests, activated carbon mini-column tests, oxidation kinetic tests. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5138.
CHG8181 (ENVJ5501) BIOCHEMICAL ENGINEERING (3cr.)

CHG8192 (ENVJ5502) MEMBRANE APPLICATIONS IN ENVIRONMENTAL ENGINEERING (3cr.)
Course emphasizing the applications of membrane separation processes in the resolution of various environmental problems. Applications of reverse osmosis, ultrafiltration and pervaporation to the treatment of industrial waste waters. Applications of membrane gas and vapor permeation to the removal of pollutants from air. Discussion of fundamentals underlying each separation process.

CHG8198 (ENVJ5503) REVERSE OSMOSIS (3cr.)

Environmental Impact Assessment
EVG7401 (ENVE 5401) ENVIRONMENTAL IMPACT ASSESSMENT OF MAJOR PROJECTS (3cr.)

CVG5139 (ENVJ 5700) ENVIRONMENTAL ASSESSMENT OF CIVIL ENGINEERING PROJECTS (3cr.)
Procedures and methods for systematic evaluation of the environmental impact of civil engineering projects including wastewater disposal systems, solid waste disposal systems, and water resource development systems.

Other Courses
To fulfill the requirements beyond the nine credits of area courses, students may choose from the following:

EVG7402 (ENVE 5402) FINITE ELEMENTS IN FIELD PROBLEMS (3cr.)

CHG8153 (ENVJ5500) STATISTICAL MODELLING AND CONTROL OF DYNAMIC PROCESSES (3cr.)

Dynamic Processes
CHG8186 (ENVJ5506) MODELLING OF STEADY-STATE PROCESSES (3cr.)
A comprehensive examination of techniques for building and analyzing process models is made. Topics include: linear least squares estimation, non-linear least squares estimation, multivariate parameter estimation, error in variables estimation, heteroscedasticity, design of experiments for precise parameter estimation and model discrimination.

CHG8194 (ENVJ5504) MEMBRANE SEPARATION PROCESSES (3cr.)
Advanced topics of membrane separations including reverse osmosis, ultrafiltration, gas separation, non-aqueous liquid separation, and membrane applications in biotechnology. The course involves problem solving in membrane transport, membrane design, and membrane process design.

CHG8195 (ENVJ5505) ADVANCED NUMERICAL METHODS IN TRANSPORT PHENOMENA (3cr.)
Survey course of numerical methods for solving linear and non-linear ordinary and partial differential equations. Techniques reviewed include Runge-Kutta and predictor-corrector methods, shooting techniques, control volume discretization methods and finite elements. Example problems from the field of transport phenomena.

Transport Phenomena
CHG8196 (ENVJ5507) INTERFACIAL PHENOMENA IN ENGINEERING (3cr.)
Interfacial tension and interfacial free energy; contact angles; spreading of liquids; wetting of surfaces; experimental techniques. Interfacial tension of mixtures; Gibbs equation; absorbed and insoluble monolayers; properties of monolayers and films. Electrical phenomena at interfaces; the electrical double layer; zeta-potential; electrokinetic phenomena (electrophoresis, electro-osmosis, streaming potential); surface conductance. Dispersed systems; formation and practical uses of emulsions; spontaneous emulsification; flocculation.

CVG5128 (ENVJ 5604) WATER RESOURCES PLANNING AND POLICY
Examination of engineering and non-engineering aspects of arrangements which affect Federal and Provincial water resources policy. Application of basic concepts of engineering hydrology, economic projections and water law to current problems of water resources planning and policy.

CVG7140 (CIVE 5601) STATISTICS, PROBABILITIES AND DECISION-MAKING (3cr.)

CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)

CVG7151 (CIVE 5305) TRAFFIC ENGINEERING (3cr.)
Students may also, subject to approval, select courses from the graduate programs in mechanical engineering, biology, chemistry, earth sciences, computer sciences, geography and public administration at both universities.

Seminars, Directed Studies and Special Topics

EPI5800 (ENVE 5800) SEMINAR FOR MASTER'S CANDIDATES IN ENVIRONMENTAL ENGINEERING (1cr.)

EPI5801 (ENVE 7800) SEMINAR FOR DOCTORAL CANDIDATES IN ENVIRONMENTAL ENGINEERING (3cr.)

EPI6108 (ENVE 5906) DIRECTED STUDIES I (3cr.)

EPI6109 (ENVE 5907) DIRECTED STUDIES II (3cr.)

EPI6300 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING I (3cr.)

EPI6301 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING II (3cr.)

EPI6302 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING III (3cr.)

Project and Theses

EPI6001 PROJET EN GÉNIE DE L'ENVIRONNEMENT / ENVIRONMENTAL ENGINEERING PROJECT (6cr.)

EPI7999 THÈSE DE M.Sc.A. / MAsc THESIS

EPI9998 EXAMEN DE SYNTHÈSE/ COMPREHENSIVE EXAMINATION

EPI9999 THÈSE DE DOCTORAT / PhD THESIS

(ENVE 5900) ENVIRONMENTAL ENGINEERING PROJECT

(ENVE 5909) MASTER'S THESIS

(ENVE 6909) PhD THESIS

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)

Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)

Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)

Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Environmental Sustainability
The Institute of the Environment offers a master’s level Collaborative Program in Environmental Sustainability and an interdisciplinary Master of Science (MSc) in Environmental Sustainability. The MSc is aimed at providing future professionals and scholars with the skills and capacities needed to develop effective regulatory and policy solutions to today’s complex, multi-dimensional environmental problems. Students will gain foundational knowledge relevant to environmental sustainability from science, law, economics and policy; learn a set of methodological skills for synthesizing and integrating knowledge from these disciplines; and, apply this knowledge and these integration skills to today’s most pressing environmental challenges.

Two options are available: the M.Sc. with thesis and the M.Sc. with research paper. Both options can be taken full-time or part-time (except that all students will have to complete the first session full-time). The MSc with research paper option can be completed in 12 months of full-time study, and the MSc with thesis option can be completed in 24 months of full-time study. Students in the MSc with research paper option may register for an additional session of full-time study if needed to fulfill the program requirements.

The Institute of the Environment, in collaboration with the University of Ottawa’s Co-op office, offers a co-op option to a limited number of students. Students must request this option in their admission file. The co-op option provides the opportunity to acquire practical work experience by completing two one-session paid work placements.

The compulsory courses for the program are currently offered in English. They will be offered in French in the future. In accordance with the regulations of the University of Ottawa, examinations, assignments, and the research paper or thesis may be written in the official language of the student’s choice (either English or French).

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS), which can be accessed on the FGPS Website.

### Programs

**Master of Science Environmental Sustainability**

### Admission

Admission is limited to the number of places available in the program in a given year, and is on a competitive basis. The basic admission requirement is an honours bachelor’s degree or equivalent from a relevant discipline with a minimum average of B (70%), calculated in accordance with FGPS guidelines. Examples of relevant disciplines include environmental studies, geography, economics, environmental science, political science, international development, environmental engineering, and law. Candidates with honours bachelor’s degrees from disciplines other than these may also be considered. The program is rigorous and requires strong academic skills, discipline and a professional work-ethic.

### Co-op Option

To be admitted into the coop option, students must be registered full-time in the EVD program. Applications for the coop option must be received by the end of the first month of the student’s registration in the EVD program. Acceptance into the coop option is on a competitive basis and is managed by the coop office. Enquiries should be directed to that office.

### Language Requirements

The compulsory courses in the program are currently offered in English. Candidates whose mother tongue is not English must submit evidence of proficiency in English by providing one or more of the documents in the following list (test scores cannot be more than two years old as of September 1 of the year of potential entry into the program):

- proof of having studied for at least three years (full time) in a high school, college or university in Canada or elsewhere where the language of instruction was exclusively English or French;
- a minimum TOEFL score of 600 on the paper-based test (or 250 on the computer-based test) with a minimum writing score of 4.5; IBT 100 (writing: 24);
- an IELTS (International English Language Testing System) score of 7 (writing: 6.5);
- an average score of 4.5 in listening/reading, and a score of 4.0 in writing on the CanTEST administered by the University of Ottawa.

### Program Requirements

**MSc with research paper (30 credits):**

- 21 compulsory credits:
EVD5106 FOUNDATIONS OF ENVIRONMENTAL LAW (1.5cr.)  
EVD5109 APPLIED ENVIRONMENTAL SUSTAINABILITY (3cr.)  
EVD5111 CAPSTONE SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)  
EVD5113 FOUNDATIONS OF ENVIRONMENTAL POLICY (3cr.)  
EVD5114 PROFESSIONAL SKILLS FOR ENVIRONMENTAL SUSTAINABILITY (1.5cr.)  
EVD5121 FOUNDATIONS OF ENVIRONMENTAL SCIENCE (3cr.)  
EVD5122 FOUNDATIONS OF ENVIRONMENTAL ECONOMICS (3cr.)  
EVD5123 EVIDENCE SYNTHESIS AND EVALUATION (3cr.)

- 1 elective course (3cr.)

It is possible to take the elective course credits outside of the EVD program (for instance, in geography, political studies, science, globalization and international development, business administration, or management), subject to the approval of the director of the Environmental Sustainability program.

- Participation in IE Research Seminars

- EVD6999 MÉMOIRE/RESEARCH PAPER (6cr.)

Students must begin the process of selecting their research paper topic and supervisor at the beginning of the program. The supervisor must be an affiliate of the Institute of the Environment and a member of the Faculty of Graduate and Postdoctoral Studies (FGPS), and be approved by the Program Director.

**MSc with thesis (18 credits):**

- 15 compulsory credits:
  EVD5106 FOUNDATIONS OF ENVIRONMENTAL LAW (1.5cr.)  
  EVD5113 FOUNDATIONS OF ENVIRONMENTAL POLICY (3cr.)  
  EVD5114 PROFESSIONAL SKILLS FOR ENVIRONMENTAL SUSTAINABILITY (1.5cr.)  
  EVD5121 FOUNDATIONS OF ENVIRONMENTAL SCIENCE (3cr.)  
  EVD5122 FOUNDATIONS OF ENVIRONMENTAL ECONOMICS (3cr.)  

  Plus:
  EVD5109 APPLIED ENVIRONMENTAL SUSTAINABILITY (3cr.)

  and/or
  EVD5123 EVIDENCE SYNTHESIS AND EVALUATION (3cr.)

- 3 elective credits

**NOTE:** Students who choose to complete both EVD5109 and EVD5123 do not need to complete 3 elective credits.

A student may take the elective course credits in other disciplines (e.g. geography, political science, science, international development, business, management etc.), subject to the approval of the program director in Environmental Sustainability.

- Participation in IE Research Seminars

- EVD7997 PROJET DE THÈSE/THESIS PROPOSAL

- EVD7999 THÈSE DE MAÎTRISE/MASTER’S THESIS

Candidates must begin the process of selecting a thesis topic and a supervisor at the beginning of their program. The supervisor must be an affiliate of the Institute of the Environment and a member of the Faculty of Graduate and Postdoctoral Studies (FGPS), and be approved by the Program Director. The choice of thesis topic and supervisor must be registered with the FGPS no later than the end of the second session.

**Co-op option requirements**

Co-op students must register full time and complete two work terms: EVD6001 Co-op work term I, EVD6002 Co-op work term II.

Each work term is graded P/F (pass/fail), based on the employer’s report and on the written report completed by the student (the student report should be 30 pages in length, including appendices.) The report is evaluated by the professor in charge of the graduate co-op option in Environmental Sustainability.

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain in the co-op option, students must:

- maintain full-time status;
- maintain a 7.0 cumulative grade point average;
- obtain a satisfactory grade (P) for each co-op work term.
Minimum standards

The passing grade in all courses is C+. Students who fail two courses or the same course twice, or the thesis research proposal, or whose research progress is deemed unsatisfactory, must withdraw from the program.

Residence

Students admitted full-time must register full-time for at least three sessions.

Duration of the program

Full-time students are expected to fulfill all requirements of the thesis option within two years and the research paper option within one year. Students in the research paper option may take an additional term to complete their research paper, if needed. The maximum time permitted for all students is four years from the date of initial registration in the program.

Courses

EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)
Overview of environmental sustainability issues using climate change as an example. Application of integrated analyses based on concepts in science, law, economics and policy to devise policy solutions. The debate about the scientific evidence for climate change and international efforts to negotiate an agreement. The economic, political and social dimensions of climate change and measures taken both nationally and internationally to mitigate its effects.

EVD5106 FOUNDATIONS OF ENVIRONMENTAL LAW (1.5cr.)
Foundations of environmental law, including theory of sustainability, constitutional division of powers, approaches to regulation of environmental issues, including examples of legal frameworks for different environmental problems, and access to justice.

EVD5109 APPLIED ENVIRONMENTAL SUSTAINABILITY (3cr.)
Uses an environmental sustainability case study, such as climate change, to learn how to synthesize information about a problem from multiple disciplinary perspectives, to critically evaluate such information using rigorous methodological approaches, and to design and evaluate policy or regulatory solutions. Prerequisites: EVD5106, EVD5107, EVD5121, EVD5122.

EVD5111 CAPSTONE SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)
Involves partnering with organization(s) working on a sustainability issue. Students work in interdisciplinary teams to identify the scientific, economic, legal and social dimensions of a particular environmental problem, evaluate a set of candidate solutions, and recommend an approach.

EVD5113 FOUNDATIONS OF ENVIRONMENTAL POLICY (3cr.)
Study of the key political and administrative factors affecting the formulation and implementation of environmental policy, including democratic institutions, various methods for citizen and stakeholder engagement and their influence on the decision-making process in government, public opinion and the framing of policy problems, values and the use of scientific evidence in policy-making, lobbying and the role of interest representation, federalism and multi-level environmental governance, and the international governance of environmental problems. Case studies will place Canada in a comparative context and explore the importance of political factors across areas of environmental policy.

EVD5114 PROFESSIONAL SKILLS FOR ENVIRONMENTAL SUSTAINABILITY (1.5cr.)
Oral and written communications skills, including presenting to parliamentary committees, preparing memos to cabinet, writing editorials, doing media interviews, and producing interdisciplinary public policy reports. Project and process management skills, including multi-stakeholder processes.

EVD5121 FOUNDATIONS OF ENVIRONMENTAL SCIENCE (3cr.)
Provides students with a thematic understanding of the current state of environmental science. Major themes include: the set of environmental issues that are currently of major concern in Canada and abroad; the range of scientific approaches currently employed to understand and predict the effects of human activities on ecosystems; the nature of environmental science evidence; and how environmental sustainability is characterized from the perspective of environmental science.

EVD5122 FOUNDATIONS OF ENVIRONMENTAL ECONOMICS (3cr.)
Key elements of economics including formal models and their underlying assumptions as they relate to the development of sustainability policy. Covers concepts such as public goods, market failure, non-market valuation, incentives, welfare economics, regulation, the equity-efficiency trade-off and market-based instruments. The course explains how fundamental economic concepts, particularly their advantages and limitations, are used to analyze issues at the interface of the economy and the environment. Examines renewable (e.g., fisheries, forests) and non-renewable (e.g., oil, gas, minerals) resource management and other topics (e.g., climate change, ozone depletion, cap and trade) in applied environmental economics. Explores the institutions and trade-offs that individuals and governments face in the context of sustainability policy.

EVD5123 EVIDENCE SYNTHESIS AND EVALUATION (3cr.)
Reviews different understandings of what constitutes research, both as it pertains to the production of evidence and to the evaluation of existing evidence relating to policy, to regulatory and statutory interventions and to identifying evidence gaps. Students learn research methodologies to design research so as to maximize its evidentiary value (given existing constraints); they will also learn to synthesize and assess the evidentiary...
value of existing research.

EVD6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)
Exérience en milieu de travail. Évalué P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Evaluated P (Pass) / F (Fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

EVD6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)
Exérience en milieu de travail. Évalué P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Evaluated P (Pass) / F (Fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

EVD6112 SELECTED TOPICS IN ENVIRONMENTAL SUSTAINABILITY (3cr.)
In-depth examination of a question or topic linked to new trends or research areas in environmental sustainability.

EVD6912 THEMES CHOISIS EN DURABILITÉ DE L’ENVIRONNEMENT / SELECTED TOPICS IN ENVIRONMENTAL SUSTAINABILITY (3cr.)
Analyse approfondie d’une problématique ou d’une question liée aux nouvelles tendances en recherche ou aux nouveaux thèmes de recherche en durabilité de l’environnement. / In-depth examination of a question or topic linked to new trends or research areas in environmental sustainability. Préalable : connaissance passive de l'anglais / Prerequisite: passive knowledge of French

EVD6932 LECTURES DIRIGÉES EN DURABILITÉ DE L’ENVIRONNEMENT / DIRECTED READINGS IN ENVIRONMENTAL SUSTAINABILITY (3cr.)
Cours individuel ayant pour objectif d’approfondir les connaissances de l’étudiant dans un domaine particulier ou de lui permettre de se familiariser avec un nouveau domaine. Le sujet est déterminé et développé en consultation avec le professeur responsable et en conformité avec les directives de l’Institut de l’environnement. Le travail remis dans ce cours doit être différent de ce qui a pu être soumis dans d’autres cours, y compris le projet de recherche, la thèse ou le mémoire. On permet un maximum d’un cours de lectures dirigées par étudiant et la permission n’est accordée que dans des circonstances exceptionnelles. / Individual course aimed at deepening a student’s knowledge of a particular area or at gaining knowledge of a new area. The topic is selected and developed in consultation with the supervising professor in accordance with institute guidelines. The work submitted for this course must be different from that submitted for other courses, including the research proposal, the thesis or the research paper. Maximum of one directed readings course per student, and permission granted only under exceptional circumstances. Préalables : permission du responsable des études supérieures de l’Institut de l’environnement et connaissance passive de l'anglais. / Prerequisites: Permission of the Director of graduate studies at the Institute of the Environment and passive knowledge of French.

EVD6999 MÉMOIRE/RESEARCH PAPER (6cr.)

EVD7997 PROJET DE THÈSE/THESIS PROPOSAL

EVD7999 THÈSE DE MAÎTRISE/MASTER’S THESIS
Préalable : EVD7997 / Prerequisite: EVD7997

API6319 SPECIAL TOPICS IN PUBLIC POLICY (3cr.)

DCL5340 SUSTAINABILITY AND LAW (3cr.)
This course provides theoretical perspectives on alternative approaches to environmental policy, emphasizing ethical and economic perspectives.

GEG5305 SELECTED TOPICS IN HUMAN GEOGRAPHY (3cr.)
In-depth examination of a question or topic linked to new trends or research areas in human geography.

GEG5309 PLACE AND SOCIAL TRANSFORMATIONS (3cr.)
Interplay between social and spatial transformations and its implications for meanings and representations from global to local scales.

MBA6296 SEMINAR IN MANAGEMENT II (1.5cr.)
The seminars focus on current issues and topics in management. The focus of these seminars may change from year to year.

Environmental Sustainability (Collaborative)

The Institute of the Environment offers a master’s level Collaborative Program in Environmental Sustainability and an interdisciplinary Master of Science (MSc) in Environmental Sustainability. The master’s level Collaborative Program in Environmental Sustainability allows students registered in one of the participating master’s programs to specialize in environmental sustainability.

The guiding objective of the Collaborative Program is to provide graduate students with the knowledge and skills needed to identify and analyze the economic, legal, policy and scientific dimensions of environmental problems, and to employ an evidence-based approach to develop rational policy options for addressing those problems.

The degree awarded specifies the primary program and indicates “Specialization in Environmental Sustainability.”
The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

See the list of the participating programs below.
Programs

Master of Arts Geography Specialization in Environmental Sustainability
Master of Arts Globalization and International Development Specialization in Environmental Sustainability
Master of Arts Political Science Specialization in Environmental Sustainability
Master of Arts Public Administration Specialization in Environmental Sustainability
Master of Arts Public and International Affairs Specialization in Environmental Sustainability
Master of Science Biology Specialization in Environmental Sustainability
Master of Science Earth Sciences Specialization in Environmental Sustainability
Master of Science Health Systems Specialization in Environmental Sustainability
Master of Science in Geography Specialization in Environmental Sustainability
Master of Science Management Specialization in Environmental Sustainability
Master of Science Systems Science Specialization in Environmental Sustainability

Admission

Admission to the Collaborative Program in Environmental Sustainability is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Applications for admission to the collaborative program in environmental sustainability at the master's level are normally submitted at the same time as the application for admission to the relevant participating master's program. In exceptional cases, students could commence their specialization in environmental sustainability at the beginning of the second session of registration.

To be accepted into the Collaborative Program candidates must:

- Be admitted to one of the programs participating in the Collaborative Program;
- Submit the collaborative program registration form;
- Provide, in the case of thesis-based programs, a letter of recommendation from a professor confirming that he or she is willing to act as thesis supervisor;
- Submit a cover letter along with the application form indicating what research topic or area the student would like to pursue, and why the student wishes to do so as part of the Collaborative Program.

Co-op option

To be admitted into the co-op option, students must be registered full-time in the EVD program. Applications for the co-op option must be received by the end of the first month of the student’s registration in the EVD program. Acceptance into the co-op option is on a competitive basis and is managed by the co-op office. Enquiries should be directed to that office.

Co-op option requirements

Co-op students must register full-time and complete two work terms: EVD6001 Co-op work term I, EVD6002 Co-op work term II.

Each work term is graded P/F (pass/fail), based on the employer's report and on the written report completed by the student (the student report should be 30 pages in length, including appendices). The report is evaluated by the professor in charge of the graduate co-op option in Environmental Sustainability.

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain in the co-op option, students must:

- maintain full-time status;
- maintain a 7.0 cumulative grade point average; and
- obtain a satisfactory grade (P) for each co-op work term.

Program Requirements
The requirements of both the primary program and of the collaborative program must be met.
The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

**Master’s program with thesis:**

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

**Master’s program with research paper:**

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar course (EVD5100 or EVD5500, 3 credits).
- Satisfactory completion of one course (3 credits) selected from a list of optional courses for the Collaborative Program in Environmental Sustainability.
- Satisfactory completion of the research paper, which must be on a topic in the area of environmental sustainability, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the research paper is appropriate for the designation “Specialization in Environmental Sustainability.” The research paper is evaluated by two professors, one of whom is selected by the primary program, and the other by the Collaborative Program Director, on the advice of the Collaborative Program Committee.

**Minimum Standards**

The passing grade in all courses is the same as that of the student’s primary program.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described. Please verify with the Environment Institute.

**Compulsory courses**

**EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)**
Overview of environmental sustainability issues using climate change as an example. Application of integrated analyses based on concepts in science, law, economics and policy to devise policy solutions. The debate about the scientific evidence for climate change and international efforts to negotiate an agreement. The economic, political and social dimensions of climate change and measures taken both nationally and internationally to mitigate its effects.

**Optional courses**

**DCL5340 SUSTAINABILITY AND LAW (3cr.)**
This course provides theoretical perspectives on alternative approaches to environmental policy, emphasizing ethical and economic perspectives.

**EVD5101 ECONOMICS OF ENVIRONMENTAL LAW AND POLICY (3cr.)**
Environmental issues and the environmental policy framework from an economics perspective. Review of the underlying theory in relation to economic concepts such as efficiency, market failure, externalities, cost-benefit, and valuation. Overview of macroeconomic topics such as economic growth and green accounting, and their relation to law and policy. Application of these theoretical concepts to various environmental challenges, from climate change and energy regulation to managing ecosystem services and conserving biodiversity. Policy options for managing environmental challenges, from traditional “command and control” regulation to economic instruments such as environmental taxation, and cap and trade programs. Evaluation of the environmental, social, and economic effectiveness of the various policy options, and integration of economic theory into environmental policy development.

**GEG5105 SELECTED TOPICS IN HUMAN GEOGRAPHY (3cr.)**
In-depth examination of a question or topic linked to new trends or research areas in human geography.

**Epidemiology**

*Use of the masculine gender in the generic sense should be taken to include women as well as men in this publication.*
The Department of Epidemiology and Community Medicine, located in the Faculty of Medicine, offers graduate programs leading to the Master of Science (MSc) degree and the Doctor of Philosophy (PhD) degree in Epidemiology.

The purpose of the programs is to provide a scholarly environment for the health sciences community that will stimulate and enhance learning and expand knowledge by conducting research. Graduates are professional experts or consultants who can advise persons and agencies in other fields.

The faculty members of the Department come from a wide variety of academic backgrounds and interests. The Department has an active research program, involving extensive collaborations with other groups, which includes three broad areas:

- Etiological Epidemiology
- Social Epidemiology
- Clinical Epidemiology & Health Services Research

The Department is a participating unit in the biostatistics program (at the master's level).

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Most of the requirements of these programs must be fulfilled in English. A very good knowledge of this language is therefore required.

**Programs**

Master of Science Epidemiology

Master of Science Epidemiology Specialization in Biostatistics

Doctorate in Philosophy Epidemiology

**Admission**

Admission to the graduate program in epidemiology is governed by the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Hold an honours Bachelor of Science with specialization or major in a discipline relevant to epidemiology (life science or behavioural science) or a four-year degree in a health profession (medicine, nursing, rehabilitation therapy etc.) with a minimum average of B+.
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide a statement of purpose demonstrating ability to write reports, and indicating the career goals and the interests in the proposed research area.
- Possess competence in a defined list of statistical topics (a self-assessment tool and a non credit self-study course will be available for those who need it, prior to the beginning of courses).

**Collaborative Program in Biostatistics at the Master's Level**

The Department of Epidemiology and Community Medicine is one of the participating academic units in the collaborative program in biostatistics at the master's level. For further details, please consult the Biostatistics program.

The Department is also involved in other graduate interdisciplinary programs in medicine and health.

**Language Requirements**

All applicants must be able to understand speak and write proficiently in either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the Admission section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

**Program Requirements**

**MSc in Epidemiology with thesis**
This two-year program requires a minimum of 21 course credits (9 compulsory, 6 optional, and 6 elective) and a thesis, according to the following rules:

- **MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS**
- 9 credits are compulsory:
  - EPI5240 EPIDEMIOLOGY I - INTRODUCTORY EPIDEMIOLOGY (3cr.)
  - EPI5242 BIOSTATISTICS I (3cr.)
  - EPI6178 INTERVENTION STUDIES IN HEALTH RESEARCH (3cr.)
- 6 optional credits must be selected among the following:
  - EPI5340 EPIDEMIOLOGICAL METHODS (1.5cr.)
  - EPI5341 EPIDEMIOLOGICAL APPLICATIONS (1.5cr.)
  - EPI5342 GENETIC EPIDEMIOLOGY (1.5cr.)
  - EPI5343 OUTCOME MEASURES IN HEALTH RESEARCH (1.5cr.)
  - EPI5344 SURVIVAL ANALYSIS IN THE HEALTH SCIENCES (1.5cr.)
  - EPI5345 APPLIED LOGISTIC REGRESSION (1.5cr.)
  - EPI5346 APPLIED LONGITUDINAL AND CLUSTERED DATA ANALYSIS (1.5cr.)
  - EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
  - EP16188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
  - EP16189 CLINICAL DECISION MAKING (3cr.)
  - EP16276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
  - EP16278 ADVANCED CLINICAL TRIALS (3cr.)
  - EP1784 HEALTH POLICY (3cr.)
- 6 elective graduate credits to be selected from the list of EPI courses, or from graduate courses offered by other departments with the approval of the epidemiology graduate studies committee.
- Students completing a thesis in global health are encouraged to take two of the following global health courses as electives:
  - EPI5180 INTERNATIONAL HEALTH AND DEVELOPMENT (3cr.)
  - EPI5144 GLOBAL HEALTH EPIDEMIOLOGY AND PRACTICE (3cr.)
  - EPI5145 GLOBALIZATION AND HEALTH EQUITY (3cr.)
- EPI5997 MSc. SEMINAR
- EPI7999 THÈSE DE MAÎTRISE EN ÉPIDÉMIologie / MSc. THESIS IN EPIDEMIOLOGY
- Participation in approved departmental seminars (bi-weekly community medicine rounds, weekly clinical epidemiology rounds or other approved seminars organized by the department) is compulsory.

**MSc with research paper**

The MSc with research paper requires two years of study and successful completion of a minimum of 33 credits (9 compulsory, 9 optional, 9 elective and a 6-credit research paper) as follows:

- **MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS**
- 9 compulsory credits:
  - EPI5240 EPIDEMIOLOGY I - INTRODUCTORY EPIDEMIOLOGY (3cr.)
  - EPI5242 BIOSTATISTICS I (3cr.)
  - EPI6178 INTERVENTION STUDIES IN HEALTH RESEARCH (3cr.)
- 9 optional credits selected among the following:
  - EPI5340 EPIDEMIOLOGICAL METHODS (1.5cr.)
  - EPI5341 EPIDEMIOLOGICAL APPLICATIONS (1.5cr.)
  - EPI5342 GENETIC EPIDEMIOLOGY (1.5cr.)
  - EPI5343 OUTCOME MEASURES IN HEALTH RESEARCH (1.5cr.)
  - EPI5344 SURVIVAL ANALYSIS IN THE HEALTH SCIENCES (1.5cr.)
  - EPI5345 APPLIED LOGISTIC REGRESSION (1.5cr.)
  - EPI5346 APPLIED LONGITUDINAL AND CLUSTERED DATA ANALYSIS (1.5cr.)
  - EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
  - EP16188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
  - EP16189 CLINICAL DECISION MAKING (3cr.)
  - EP16276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
  - EP16278 ADVANCED CLINICAL TRIALS (3cr.)
  - EP1784 HEALTH POLICY (3cr.)
- 9 elective graduate credits to be selected from the list of EPI courses, or from graduate courses offered by other departments with the approval of the epidemiology graduate studies committee
- EPI7998 Mémoire / Research Paper (6cr.)
- Residency (full-time registration) for at least three sessions
- Compulsory participation in departmental seminars

**Collaborative program**

**MSc in Epidemiology with specialization in Biostatistics**

This two-year program requires a minimum of 21 course credits (9 compulsory, 6 optional, and 6 elective) and a thesis, according to the following rules:

- 9 credits are compulsory:
  - EPI5240 EPIDEMIOLOGY I - INTRODUCTORY EPIDEMIOLOGY (3cr.)
- EPI5242 BIOSTATISTICS I (3cr.)
- EPI6178 INTERVENTION STUDIES IN HEALTH RESEARCH (3cr.)
- 6 optional credits must be selected among the following:
  - EPI5340 EPIDEMIOLOGICAL METHODS (1.5cr.)
  - EPI5341 EPIDEMIOLOGICAL APPLICATIONS (1.5cr.)
  - EPI5342 GENETIC EPIDEMIOLOGY (1.5cr.)
  - EPI5343 OUTCOME MEASURES IN HEALTH RESEARCH (1.5cr.)
  - EPI5344 SURVIVAL ANALYSIS IN THE HEALTH SCIENCES (1.5cr.)
  - EPI5345 APPLIED LOGISTIC REGRESSION (1.5cr.)
  - EPI5346 APPLIED LONGITUDINAL AND CLUSTERED DATA ANALYSIS (1.5cr.)
  - EPI5347 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
  - EPI6188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
  - EPI6189 CLINICAL DECISION MAKING (3cr.)
  - EPI6276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
  - EPI6278 ADVANCED CLINICAL TRIALS (3cr.)
- EPI7184 HEALTH POLICY (3cr.)
- The 6 elective credits must be taken from graduate courses offered by the Department of Mathematics and Statistics.
- EPI7999 THÈSE DE MAÎTRISE EN ÉPIDÉMIologie / MSc THESIS IN EPIDEMIOLOGY
- Participation in approved departmental seminars (bi-weekly community medicine rounds, weekly clinical epidemiology rounds or other approved seminars organized by the department) is compulsory.

**Duration of the program**

Students are expected to fulfill all requirements, including the submission of the thesis, within a maximum time of two years from the date of initial registration in the program.

**Residence**

All full-time students must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is C+. Students who fail 6 credits, the thesis proposal, or whose research progress is deemed unsatisfactory will be withdrawn from the program.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE** (3cr.)

Exploration of principles of effective program evaluation methods; planning; instrument development; data collection, processing and analysis; reporting and follow-up; survey of diverse models of evaluation. **Prerequisite: EDU5290**

**EPI5126 INTRODUCTION TO HEALTHCARE EPIDEMIOLOGY** (3cr.)

Applications of epidemiologic and statistical methods within the healthcare setting; issues specific to infection control; roles and administration of infection control, risk management and quality assurance within healthcare facilities; surveillance mechanisms for nosocomial infections; outbreak investigation methods; infection risks in special populations and settings; prevention and risk management of adverse outcomes; regulatory guidelines and accreditation; emerging issues in infection control.

**EPI5142 HEALTH SERVICES EVALUATION** (3cr.)

The theory and practice of health services evaluation, including specification of objectives, research designs, measures of process and outcome, and practical problems in conducting evaluations. The focus is on scientific (research) evaluation, but other evaluation strategies and techniques are discussed. Lectures and student presentations. **Prerequisite: EPI 5240 or equivalent and permission of the program director.**

**EPI5143 EPIDEMIOLOGICAL RESEARCH USING LARGE DATABASES** (3cr.)

A practical approach to using administrative and other large databases for epidemiological research. Basic and advanced statistical techniques to manipulate, link, and examine datasets; large health surveys; coding systems; data warehouses; data mining; birth and death registries; use of census data; linking postal codes to geographical files; geographical information systems. Extensive use of SAS as the primary application package. **Prerequisite: Permission of the program director.**

**EPI5144 GLOBAL HEALTH EPIDEMIOLOGY AND PRACTICE** (3cr.)

Global burden of illness; epidemiology of major infectious and non-communicable diseases; global environmental health; maternal and child health, global nutrition, one health. Global health practice, research methods, systematic reviews, knowledge translation, communication, ethics, collaboration, funding, sustainability, publication, evaluation, and evidence for global health action.

**EPI5145 GLOBALIZATION AND HEALTH EQUITY** (3cr.)

Keys to understanding how globalization processes are affecting health. Policy options for creating a fairer and more health equitable globalization. Review of relevant theories from sociology, political science (international relations) and political economy; and of evidence
program in Canadian Studies at the PhD level. For more information on this program, see "Admission Requirements."

EPI5181 POPULATION HEALTH RISK ASSESSMENT I (3cr.)
National and international policy frameworks for health risk assessment and management, including determinants of population health; epidemiological, clinical, and toxicological methods for identifying health hazards; population health surveillance; methods of population health risk assessment; regulatory, economic, advisory, and technological approaches to population health risk management; community action and social marketing; selection of risk management strategies; risk perception and risk communication. Lectures and case studies. Preparation of term paper on a current issue in population health risk assessment. Co-requisites: EPI 5240 and EPI 5242 or equivalents. Exclusion: PHR 5181. Prerequisite: Permission of the program director.

EPI5182 SAMPLE SURVEY RESEARCH METHODS (3cr.)

EPI5183 APPROACHES TO COMMUNITY/PUBLIC HEALTH PROGRAM EVALUATION (3cr.)
Critical review and practical application, in collaboration with a health care community partner, of approaches to community and public health program evaluation. Community partners include representatives of the community agencies whose mandate or remit includes evaluation of their community/public health program(s). Evaluation based on student’s ability to (a) identify most appropriate approaches to evaluation, (b) critically review strengths and limitations of chosen approaches, (c) apply the selected approach appropriately to examine and quantify impact of the program(s).

EPI5188 HEALTH TECHNOLOGY ASSESSMENT (3cr.)
Definition and scope of health technology assessment; needs assessment; practice variations; use of administrative databases; evaluation of diagnostic tests; development and use of practice guidelines and clinical prediction rules; health technology assessment in the developing world. Lectures, seminars and case studies. Prerequisite: Permission of the program director.

EPI5189 HEALTH ECONOMIC EVALUATION (3cr.)
Brief overview of economics and health economics; examination of analyses used in epidemiologic and clinical research; cost-effectiveness analysis, cost-minimization analysis, cost-utility analysis (including determination of utilities), cost-benefit analysis, cost of illness studies and use of economic methods in priority-setting. Lectures and seminars. Written report required, presenting an economic evaluation or a detailed review of the economic literature in a particular area. Prerequisite: Permission of the program director.

EPI5210 PUBLIC HEALTH ADMINISTRATION (3cr.)
Introduction to practical aspects of managing a health unit from the viewpoint of a Medical Officer of Health. The organization of public health services, relationships with the Board, leadership and management, budgeting and human resource issues including labour relations. Problem-based approach in a seminar format. Prerequisite: Permission of the program director.

EPI5212 COMMUNICABLE DISEASE EPIDEMIOLOGY (3cr.)
Consideration of the specialized methods used in the investigation and control of communicable disease. Detailed review of the epidemiology of the major communicable diseases. Lectures, presentations by invited experts, and student presentations. Prerequisite: A basic knowledge of epidemiologic methods and permission of the program director.

EPI5213 CHRONIC DISEASE EPIDEMIOLOGY (3cr.)
Review of the descriptive epidemiology (distribution, trends, risk factors) of the major chronic diseases, with emphasis on circulatory diseases, cancer, injuries, and mental health problems. Approaches to primary and secondary prevention. Lectures, presentations by invited experts, and student presentations. Prerequisite: Permission of the program director.

EPI5240 EPIDEMIOLOGY I - INTRODUCTORY EPIDEMIOLOGY (3cr.)
An overview of epidemiology - uses, methods, and data sources. Descriptive and analytical epidemiology. Lectures and assignments in which students will work with data and will gain experience in critically reviewing epidemiologic literature. Prerequisites: EPI 5242 (Biostatistics I) or equivalent; may be taken concurrently with the permission of the program director. Prerequisites: EPI5242 (Biostatistics I) or equivalent; may be taken concurrently. Permission of instructor.

EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
This second level epidemiology course covers major principles of design, analysis, and interpretation of epidemiologic research. Material presented in a quantitative manner. Prerequisites: EPI 5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology); EPI 6276 may be taken concurrently with the permission of the program director. Prerequisites: EPI5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology).

EPI5242 BIOSTATISTICS I (3cr.)
Building on the students' prior background in statistics, this course explores the use of mathematical models in statistical data analysis. Topics include analysis of categorical data, choice of linear vs non-linear models, estimation of parameters, testing of hypotheses by parametric and non-parametric methods, analysis of variance, linear and logistic regression models, introduction to survival analysis. This course may also be
EPI5243 GUIDED RESEARCH PROJECTS (3cr.)
Practical experience of the application of epidemiologic methods. The student will participate in one or more research projects underway in the Department, and will gain experience in the day-to-day management of the project, in data collection, in data analysis and report preparation.

EPI5244 SPECIAL TOPICS IN EPIDEMIOLOGY (3cr.)
The content of this seminar course is flexible, covering issues of current debate in communicable and non-communicable disease epidemiology: Presentations by participants and invited experts and seminar discussion. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5240 and EPI5242 and permission of instructor.

EPI5251 MEASUREMENT IN HEALTH (3cr.)
An overview of measurement theory as applied to health measurement; a review of existing measurements of health status in clinical and research applications, plus practical experience of how to develop and test new measurement methods. Prerequisite: Permission of the program director.

EPI5271 HEALTH PROMOTION (3cr.)
Origins, theories and techniques of health promotion at the individual and community levels. Examination of current health promotion activities in Canada and elsewhere. Prerequisite: Permission of the program director.

EPI5281 DEVELOPMENTS IN EPIDEMIOLOGY (3cr.)
Major new developments in epidemiology, conceptualization of research topics and objectives for the thesis. Critical appraisal of current and classical literature in epidemiology. Seminars on current topics. Prerequisite: Permission of the program director.

EPI5330 VITAL AND HEALTH STATISTICS AND DEMOGRAPHY (3cr.)
Techniques of demography, health and vital statistics with particular reference to health care and epidemiologic research. The Canadian demographic structure and trends, vital registration procedures, calculation and interpretation of vital rates, life table analysis and record linkage. Lectures and exercises. Prerequisite: Permission of the program director.

EPI5340 EPIDEMIOLOGICAL METHODS (1.5cr.)
Major principles of study design and analysis: validity in epidemiologic studies; precision and statistics in epidemiology studies; confounding; additive and multiplicative interaction; stratified analysis; regression models; regression modeling; bias analysis; analytical strategy. Prerequisites: EPI 5240 and EPI 5242

EPI5341 EPIDEMIOLOGICAL APPLICATIONS (1.5cr.)
Interpretation of epidemiologic research and some specific topics: complex survey data analysis; attributable risk, odds ratio and relative risk estimation in multivariate analysis; combined effect of multiple exposures and interaction measures; chronic disease screening and surveillance; environmental epidemiology. Prerequisite: EPI 5340

EPI5342 GENETIC EPIDEMIOLOGY (1.5cr.)
Scope of genetic epidemiology, including an overview of types of human genetic variation, approaches to gene discovery vs. gene characterization. Specific issues include: assessment of effect of family history on disease risk; measurement of genetic variation, genotyping errors and factors affecting them; study designs specially adapted to genetic epidemiology – family based designs (e.g. case-parent trio, case-sib designs), case-only designs; candidate gene and genome-wide association approaches to genetic association; gene-environment and gene-gene interaction; integration of evidence; evaluation of potential value of genetic information in screening (e.g. newborn screening), family history tools and genetic testing. Prerequisite: EPI 5340

EPI5343 OUTCOME MEASURES IN HEALTH RESEARCH (1.5cr.)
Technical review of the design requirements for outcome measures in health research and clinical trials; a historical review of the evolution of such measures and a survey of the quality of existing instruments in various fields of health research (disability, quality of life, mental health, pain, etc.). This course is designed for students who will need to use and interpret health measures in their research. Prerequisite: EPI 5340

EPI5344 SURVIVAL ANALYSIS IN THE HEALTH SCIENCES (1.5cr.)
Exploration of the analysis for the analysis of data which includes information about the time when an event occurred. Non-regression methods of analyzing survival data, including actuarial life tables, the Kaplan-Meier method, the log-rank test, and person-time. The hazard curve and its links to incidence rate/density. Proportional hazards regression modeling (Cox modelling) including interpretation of model parameters, model building strategies and assessing the fit of the model. Methods to handle time varying covariates and non-proportional hazards will be discussed. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EPI 5340

EPI5345 APPLIED LOGISTIC REGRESSION (1.5cr.)
Foundation of model estimation: maximum likelihood; modeling dichotomous outcome (dependent) variables: logistic regression; logistic models with several independent variables; interpretation of model parameters; model-building strategies; assessing the fit of the model; regression diagnostics. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EPI 5340

EPI5346 APPLIED LONGITUDINAL AND CLUSTERED DATA ANALYSIS (1.5cr.)
Introduction to longitudinal (repeated measures) and clustered data and overview of regression models for correlated data; linear mixed effects models: modelling the mean; modelling the covariance structure; generalized estimating equations and generalized linear mixed effects models; regression diagnostics; missing data and drop-out; case studies. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EPI 5340

EPI5366 MSc SEMINAR

offered in French: EPI 5642. Prerequisite: Basic course in Statistics and permission of the program director.
Seminars on topics in Epidemiology delivered by program faculty, visiting speakers and/or students. Compulsory attendance and participation during at least the first year of registration in the program. Graded S/NS (Satisfactory/Not satisfactory).

**EPI1626 ADVANCED HEALTHCARE EPIDEMIOLOGY** (3cr.)
Exploration of advanced healthcare epidemiology topics including pandemic planning, emergency preparedness, environmental considerations, healthcare surveillance techniques, quality improvement and patient safety initiatives, antimicrobial control programs, blood safety, developing and delivering educational programs, healthcare organization and administration, healthcare epidemiology research design. Lectures, presentations by invited experts, workshops and student presentations. Pre-requisites: EPI 5240, EPI 5126.

**EPI1678 INTERVENTION STUDIES IN HEALTH RESEARCH** (3cr.)
Practical introduction to intervention studies in the health field, including experimental and quasi-experimental studies and clinical and community trials. Question formulation; conduct of literature reviews; design issues (choice of research design and study population, implications for validity of results); ethical issues; instrument development; data collection and management; approach to data analysis; report writing and presentation. Examples drawn from both population and clinical research. Development and presentation of proposal for an intervention study. **Prerequisite:** Permission of the program director.

**EPI1679 COMPUTER APPLICATIONS IN MEDICINE** (3cr.)
A laboratory course introducing health researchers to packaged computer programs for data analysis. Applications of these programs to the participants' own research, the organization of large data files and the choice between different types of computers. **Prerequisite:** Permission of the program director.

**EPI1681 SOCIAL ASPECTS OF EPIDEMIOLOGY** (3cr.)
This course will analyze the way in which behavioural, social and emotional forces influence patterns of disease. The links between these processes and physiological changes; inferences on how best to intervene to modify "lifestyle" risk factors; recent prevention and health promotion trials will be reviewed. May also be offered in French: EPI 6581. **Prerequisite:** Permission of the program director.

**EPI1682 POPULATION HEALTH RISK ASSESSMENT II** (3cr.)
Scientific methods for population health risk assessment; characterization of population health risks, and attendant uncertainties; risk modeling; combining risk information from different sources; risk acceptability; principles of risk management decision making; evidence-based risk management policy development; audit and evaluation of risk interventions; priority setting; case studies on current population health risk assessment issues. Term paper on a current methodological issue in population health risk assessment required **Exclusion:** PHR 6182. **Prerequisites:** EPI 5240, EPI 5242, and EPI 5181, or equivalents and permission of the program director.

**EPI1688 SYSTEMATIC REVIEWS AND META-ANALYSIS** (3cr.)
Approaches to the systematic review of evidence in the health sciences. Searching for the evidence, selection of studies, quality and validity of included studies, heterogeneity, statistical analysis and other quantitative and qualitative methods. Students will be required to do a meta-analysis on a topic of their own interest. **Prerequisites:** EPI 5240 and EPI 5242 and permission of the program director. **Prerequisites:** EPI 5240 and permission of instructor.

**EPI1689 CLINICAL DECISION MAKING** (3cr.)
Theories of decision making and their validity in health care applications. Comparison of decision support methods: decision analysis, utility assessment techniques, patient aids, practice guidelines, care maps. Methods for developing, evaluating, and disseminating decision support tools in clinical practice. **Prerequisites:** EPI 5240 and EPI 5242 and permission of the program director. **Prerequisites:** EPI 5240 and EPI 5242 and permission of instructor.

**EPI1676 QUANTITATIVE METHODS IN EPIDEMIOLOGY** (3cr.)
Application of advanced topics in statistical methods for epidemiological data analysis: logistic regression and discriminant analysis, Poisson regression, contingency table analysis (including log-linear modelling), time series, survival analysis, Cox regression with and without time-dependent covariates, principle components and factor analysis. **Prerequisites:** EPI 5240 and EPI 5242 and permission of the program director. **Prerequisites:** EPI 5242 or equivalent, and EPI 5241 (may be done concurrently), or permission of the professor.

**EPI1677 BIOSTATISTICS II** (3cr.)
Focus on the statistical analysis of more than one variable and/or more than two groups. Topics covered include the analysis of variance, multiple linear regression and multivariate analysis topics such as the linear discriminant analysis. Statistical analysis relevant to clinical medicine will be discussed in detail with relevant examples from clinical research papers. **Prerequisite:** EPI 5242 or equivalent and permission of the program director.

**EPI1678 ADVANCED CLINICAL TRIALS** (3cr.)
Lectures and laboratories on the detailed principles, design, methodology and statistical techniques associated with clinical trials. Emphasis on emerging topics and procedures. **Prerequisites:** EPI 5242 and EPI 6178 and permission of the program director. **Prerequisites:** EPI 5242 and EPI 6178 and permission of instructor.

**EPI1682 SPECIAL TOPICS IN COMMUNITY MEDICINE** (3cr.)
Current Community Health topics will be reviewed. Weekly seminars, written assignments, discussions, research meetings and presentations by students and invited speakers. Each student must present two seminars. **Prerequisite:** Permission of the program director.

**EPI1683 PHARMACOEPIDEMIOLOGY** (3cr.)
Issues in and methodology of pharmacoepidemiology. Discussion on the biases and confounders possible at every stage of a pharmacoepidemiological study, in drug utilization review, drug effectiveness, risk/benefit assessment and other topics. This course will normally be given every second year. **Prerequisites:** EPI 5240 or equivalent and permission of the program director. **Prerequisite:** EPI 5240 or equivalent and permission of instructor.
EPI6344 CURRENT ISSUES IN EPIDEMIOLOGY (1.5cr.)
Topics will be selected based on student and faculty interests. Depending on the topics, the course may be given as formal lectures or in seminar format with presentations by participants and invited experts followed by in-class discussion. Prerequisites: EPI 5240 and EPI 5242 or permission of the program director.

PhD Courses
EPI7101 GENETIC EPIDEMIOLOGY (3cr.)
Application of genetic biological methods to epidemiological research. Covers the development of research hypotheses; genetic determinants and gene-environment interactions; biomarkers for exposure and outcome as well as for predicting prognosis. Students will undertake a course project to design a genetic epidemiological study. Prerequisite: EPI5240 or equivalent.

EPI7102 DATA ANALYSIS METHODS IN GENETIC EPIDEMIOLOGY (3cr.)
Data analysis methods in genetic epidemiology and gene identification. Topics include the relationship between design and analysis; genetic models; methods for case-unrelated control studies, case-familial control studies and other familial designs; introduction to frequentist multiple testing and empirical Bayes methods, focus on applications to genome-wide association studies. Basic approaches in bioinformatics; insights into gene function based on the characterization of three major categories of cellular components (genome, transcriptome and proteome) and their interactions; public molecular databases. Practical lab sessions, both on statistical analysis and integration of discovery with information on gene function (commonly used algorithms; hands-on practice with data retrieval, manipulation and analysis). Prerequisite: EPI5242 or equivalent.

EPI7103 GENETIC ASSOCIATION STUDIES (3cr.)
Population-based family studies, case-control and case-familial control designs and analysis. Topics include population-based family studies; case-unrelated control design and variants; case-familial control designs (including case-parent trios, e.g. maternal versus paternal versus fetal genetic effects; mitochondrial DNA; imprinting; genome-wide association; linkage disequilibrium; genotyping error; imputation; population stratification and methods for its control; genotyping errors; modeling haplotype variation; Hardy-Weinberg equilibrium; replication; selection of participants, rationale for choice of genes and variants; treatment effects in studying quantitative traits; relatedness of participants; reporting of descriptive and outcome data; issues of data volume; joint effects of genes and environmental factors; epistasis; bioinformatics; causal inference. Prerequisite: EPI5242 or equivalent.

EPI7104 ADVANCED METHODS IN BIOSTATISTICS: ANALYSIS OF VARIANCE (3cr.)
Exploration of the theoretical foundations of the advanced methods in biostatistics as well as of the practical application and interpretation of these methods. Topics include repeated measures ANOVA; multivariate analysis of variance (MANOVA); split-plot ANOVA (SPANOVA); expected mean squares; randomization theory; estimation of variance using regression; tests of hypotheses for balanced and unbalanced data sets. Prerequisite: EPI5242 or equivalent.

EPI7105 ADVANCED METHODS IN BIOSTATISTICS: STATISTICAL INFERENCE (3cr.)
Advanced methods in biostatistics and probability modeling. Sample topics include: Bayesian parameter estimation; construction and use of likelihoods; hypothesis testing; comparison of inference methods using jackknife, bootstrap and normal approximations. Prerequisite: EPI5242 or equivalent.

EPI7106 QUALITATIVE RESEARCH METHODS IN EPIDEMIOLOGY (3cr.)
Theoretical frameworks and corresponding methods of qualitative research applied to epidemiological research. Topics will include: theoretical paradigms of qualitative research; matching qualitative research to types of research questions; sampling objectives and procedures; methods of data collection; analysis and interpretation; quality criteria for evaluating qualitative research studies; ethical issues and responsibilities of qualitative researchers. Relationship between qualitative and quantitative research will be explored. Prerequisite: EPI5240 or equivalent.

EPI7107 DESCRIPTIVE EPIDEMIOLOGY (3cr.)
Issues of current debate in Descriptive Epidemiology and epidemiological methods. Topics will include methods for studying the distribution of health conditions and their predictors in populations; current issues and principles of disease classification and surveillance, surveillance of prognostic factors, applying principles of demography in epidemiologic research. Prerequisite: EPI5240 or equivalent.

EPI7108 ANALYTIC EPIDEMIOLOGY (3cr.)
Issues of current debate in Analytic Epidemiology and epidemiological methods. Topics will include theory and methods in the study of the etiology of health conditions and prognostic factors, current theories of disease causation, application of causal models to epidemiologic questions, implications for study design and analysis, measurement error. Prerequisite: EPI5240 or equivalent.

EPI7109 CLINICAL AND APPLIED EPIDEMIOLOGY (3cr.)
Issues of current debate in Clinical and Applied Epidemiology and epidemiological methods. Topics will include clinical health interventions related to individual patient care; research related to the design and delivery of broader health systems and services; current analytical methods and population-based studies; decision rules; randomized clinical trials; diagnostic tests; interventions that are relevant to public health practice. Prerequisite: EPI5240 or equivalent.

EPI7111 BIOSTATISTICS III (3cr.)
Advanced methods in biostatistics, with emphasis on one or two major methods. Examination of the theoretical foundations of the methods as well as of their practical application and interpretation. Topics include multivariate statistics, longitudinal data analysis, multi-level models, and statistical genetics. Pre-requisite: EPI5242 or equivalent.
EPI7113 SPECIAL TOPICS IN EPIDEMIOLOGY II (3cr.)
Variable topics depending on the interests of students and faculty.

EPI7184 HEALTH POLICY (3cr.)
Exploration of key issues relating to health policy within and outside Canada. Topics covered: rationale for public provision and funding of health care in Canada; historical and current perspectives regarding structure and process of the Canadian health care system; specific micro and macro policy issues relating to health and health care provision (Canadian and international).

EPI7302 OBSERVATIONAL DESIGNS (1.5cr.)
Examination of the case-control method from conceptual, practical and analytical perspectives. Potential biases of different approaches. Role of nested case-control studies. Case-cohort, case-based, case-only and case-crossover designs. Implications of sampling methods for analytical approaches. Analysis of sample data sets, using SAS or STATA. The relationship between quantitative and qualitative research. Prerequisite: EPI5242 or equivalent.

EPI7303 TRANSLATION OF GENETIC DISCOVERIES FROM THE RESEARCH LABORATORY TO THE HEALTH CARE SYSTEM (1.5cr.)
Overview of the process of transferring genetic discoveries into medicine and public health, focusing primarily on chronic diseases. Topics include basic concepts and existing knowledge translational pathways and frameworks. Interdisciplinary approaches to knowledge translation, including clinical trials, guideline development, dissemination research, outcomes research, and health policy research. Using chronic disease examples to illustrate the process, students will learn which elements need to be considered at each step in the translation process. Prerequisite: EPI5240 or equivalent.

EPI7910 ÉTUDES DIRIGÉES EN ÉPIDÉMIÉLOGIE / DIRECTED STUDIES IN EPIDEMIOLOGY (3cr.)
Étude approfondie d’un sujet d’intérêt particulier pour l’étudiant, sous la direction d’un professeur membre du programme. Préalables: EPI5240 ou l’équivalent et approbation du Comité des études doctorales/Directed Studies on a topic of individual interest to the student under the direction of a faculty supervisor. Students planning to take this course must have the proposed content, learning activities and evaluation methods approved by the Doctoral Studies Committee. Prerequisite: EPI5240 or equivalent.

EPI7912 ÉTUDES DIRIGÉES EN BIOSTATISTIQUE / DIRECTED STUDIES IN BIOSTATISTICS (3cr.)
Étude approfondie d’un sujet en biostatistique d’intérêt particulier pour l’étudiant, sous la direction d’un professeur membre du programme. Préalables: EPI5242 ou l’équivalent et approbation du Comité des études doctorales. / In-depth study on a topic in biostatistics of individual interest to the student under the direction of a faculty member in the program. Prerequisites: EPI5242 or equivalent and permission of the Doctoral Studies Committee.

EPI7913 THÈMES SPÉCIAUX EN ÉPIDÉMIÉLOGIE / SPECIAL TOPICS IN EPIDEMIOLOGY (3cr.)
Sujets variables selon les intérêts des étudiants et du corps professoral. / Variable topics depending on the interests of students and faculty.

EPI7980 STAGE / INTERNSHIP
Expérience pratique et exécution d'un projet ayant trait à l'évaluation des technologies de la santé dans un organisme de recherche ou une agence d'évaluation des technologies de la santé, sous la supervision d'un membre du corps professoral. Noté S/NS à partir d'un rapport de stage écrit et des résultats du stage. / Practical experience and completion of a project related to HTA in a research organization or an HTA agency, under the supervision of a faculty member. Graded S/NS based on a written report on the project, and on performance during the internship.

EPI7998 Mémoire / Research Paper (6cr.)
Mémoire préparé sous la direction d’un ou deux membres du corps professoral choisis en accord avec la personne responsable des études supérieures. Le mémoire est évalué par le ou les personnes qui l’ont dirigé et un autre membre du corps professoral. Noté : S (satisfaisant) / NS (non satisfaisant). / Research paper prepared under the direction of one or two professors chosen in consultation with the director of graduate studies. The paper is evaluated by the (co-)advisors and another professor. Graded: S (Satisfactory)/NS (Not satisfactory).

EPI7999 THÈSE DE MAÎTRISE EN ÉPIDÉMIÉLOGIE / MSc THESIS IN EPIDEMIOLOGY

EPI8166 PhD SEMINAR (3cr.)
Presentation of one seminar as well as regular attendance at the departmental seminar series. Offered over two consecutive sessions. Compulsory for all students enrolled in the doctoral program in Epidemiology. Graded S/NS (Satisfactory/Not satisfactory).

MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

MED8167 PROFESSIONAL SKILLS (3cr.)
Professional skills related to teaching, research ethics, field work, writing, and information technology. Offered over two consecutive sessions. Compulsory for all students enrolled in the doctoral program in Epidemiology. Graded S/NS (Satisfactory/Not satisfactory). Note: Students in other Faculty of Medicine graduate programs may take this course as an additional course (above and beyond their minimum degree requirements). Graded S/NS (Satisfactory/Not satisfactory). Corequisite: MED8166 Professionalism and Professional Skills.
EPI9997 PROJET DE THÈSE / THESIS PROPOSAL

EPI9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

EPI9999 THÈSE DE DOCTORAT / PhD THESIS

HMG8106 CLINICAL CYTOGENOMICS (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

Geography

The objectives of the Department are to foster awareness of the field of Geography, and to add to the body of geographic knowledge and methodology through teaching and research. The Department also endeavors to prepare specialized teachers and researchers to meet the demands of the teaching profession and of various public and private agencies. The Department of Geography offers a master of arts (with thesis), a master of science (with thesis), and a PhD in geography. In certain cases, students may be admitted to the master's in geography on a part-time basis.**

The MA in Geography and MSc in Geography are two programs participating in the collaborative program in environmental sustainability as well as in the collaborative program in Science, Society and Policy (at the master's level only). The department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission Requirements.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Part-time students must normally complete course requirements, except the thesis, within a period of not more than 24 months. For more information consult the department.

Programs

Master of Arts Geography
Master of Arts Geography Specialization in Environmental Sustainability
Master of Arts Geography Specialization in Science, Society and Policy
Master of Geography
Master of Science Geography
Master of Science Geography Specialization in Science, Society and Policy
Master of Science in Geography Specialization in Environmental Sustainability
Doctorate in Philosophy Geography
Doctorate in Philosophy Geography Specialization in Canadian Studies

Admission

To be admissible to the master's program, the student must hold an BA with honours in geography or in a related discipline with an academic record indicating at least (B+) or the equivalent. Candidates whose bachelor's degree with honours (or the equivalent) is in an area other than
geography may be admitted for a qualifying period, during which they must take selected courses required in the department’s BA with honours program.

**Additional Coursework**

The Admissions Committee may, depending on the candidates’ background, require them to successfully complete additional courses, including language courses, beyond the basic MA degree requirements.

**Collaborative programs**

The Department of Geography is one of the units participating in the collaborative programs in Canadian Studies (PhD level only) and in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

**Additional information**

For additional information refer to the following website:

http://www.geography.uottawa.ca/PDF/Form_geography.pdf

**Program Requirements**

**MA in Geography**

- Nine credits from the following lists: 5105/5505, 5109, 5510, 6101/6501, 6102/6502, 6103/6503 and 7910. Three credits can be replaced by three other credits approved by the Department of Geography and the FGPS.
- GEG7998 MA Thesis Project. Preparation and presentation of the MA thesis proposal (3 cr.).
- GEG7999 - Master’s Thesis.
- Second Language Proficiency Test.

In the course of their studies, students are required to demonstrate at least a passive knowledge of the second official language of Canada. Students must write the second language proficiency test in the fall or winter session of their first year of graduate studies. Passing this test satisfies the language requirement for the master’s and PhD degrees. This test consists of translating a text (600-1000 words) chosen by the supervisor, in the research field of the candidate. The text chosen will not be made known in advance to the candidate. A French-English dictionary will be permitted. This test should precede the MA Thesis Proposal Presentation of the PhD Comprehensive Examination. A candidate who fails the test will have to successfully complete a course at the Official Languages and Bilingualism Institute approved by the department. This requirement applies only to students whose mother tongue is either English or French.

**MSc in Geography**

- Nine credits from the following: 5310/5710, 5311, 5707, 6101/6501, 6102/6502, 6103/6503 and 7910. Three credits may be replaced by three other credits approved by the Department of Geography and the FGPS. Recommended courses from other departments include GEO5132, 5133, 5139, 5140, 5141, 5142 and 5143.
- GEG7996 MSc Thesis Project. Preparation and presentation of the MSc thesis proposal (3 cr.).
- GEG7999 - Master’s thesis.
- Second Language Proficiency Test

The requirements for the second official language of Canada are the same as those specified for the Master of Arts (see Degree Requirements - Master of Arts).

**Collaborative program in Environmental Sustainability**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

**Collaborative program in Science, Society and Policy**

The requirements of both the program in Geography (MA or MSc) and the collaborative program must be met. The credits completed for the specialization count also towards the degree in Geography.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
Satisfactory completion of the thesis (GEG7999).

For further information, please consult the web page for the Science, Society and Policy program.

**Fast-track from master’s to PhD**

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

**Duration of program**

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

**Minimum standards**

The passing grade in all courses is C+. A student who has incurred two failures is withdrawn from the program.

**Courses**

Courses with 51XX and 55XX codes are reserved for students enrolled in the MA or PhD programs.

Courses with 53XX and 57XX codes are reserved for students enrolled in the MSc or PhD programs.

Courses at the 6000-level are available for all graduate students in geography.

Courses at the 7000-level are reserved for students enrolled in the MA and MSc programs.

Courses at the 8000- or 9000-levels are reserved for students enrolled in the PhD program.

**GEG5105 SELECTED TOPICS IN HUMAN GEOGRAPHY** (3cr.)

In-depth examination of a question or topic linked to new trends or research areas in human geography.

**GEG5109 PLACE AND SOCIAL TRANSFORMATIONS** (3cr.)

Interplay between social and spatial transformations and its implications for meanings and representations from global to local scales.

**GEG5310 SELECTED TOPICS IN PHYSICAL GEOGRAPHY** (3cr.)

**GEG5311 ENVIRONMENTAL CHANGE IN COLD REGIONS** (3cr.)

Dynamics of cold environments with particular emphasis on their sensitivity to climate variability and climate change, natural and anthropogenically induced.

**GEG5510 ESPACES ET LIEUX ENTRE SOCIÉTÉ ET CULTURE** (3cr.)

Espaces de référence, lieux d’appartenance et territoire dans le contexte des mutations sociales contemporaines et de la fragmentation des identités culturelles.

**GEG5707 MILIEUX NORDIQUES** (3cr.)

Les milieux glaciaires ou périglaciaires, anciens ou actuels. Approches géomorphologique, hydrologique et paléobotanique.

**GEG6101 DATA ANALYSIS AND MODELLING** (3cr.)

Techniques of analysis of empirical data: quantitative, semi-quantitative and qualitative. Multivariate and time-series data analysis.

**GEG6102 ADVANCED GEOMATICS** (3cr.)

Concepts and themes in advanced geomatics: geographical information systems, computer cartography and remote sensing.

**GEG6103 SPATIAL DATA ANALYSIS** (3cr.)

Visualisation and analysis of spatial data: point-pattern analysis, spatial interpolation and estimation, spatial autocorrelation. Analysis of spatial interaction and spatio-temporal dynamics.

**GEG7906 RECHERCHE DIRIGÉE / DIRECTED RESEARCH** (6cr.)

Recherche dirigée pendant une session, évaluée par trois membres de la Faculté des études supérieures et postdoctorales. L’inscription à temps plein est obligatoire. La note donnée sera (S) satisfaisant ou (NS) non satisfaisant. N.B. Inscription limitée aux étudiants désirant transférer de la maîtrise au doctorat. / One session of directed research, evaluated by three members of the Faculty of Graduate and Postdoctoral Studies. The student must be enrolled full-time for this session. The course will be graded (S) satisfactory or (NS) not satisfactory. NOTE: Restricted to students intending to transfer from master’s to PhD.

**GEG7910 LECTURES DIRIGÉES / DIRECTED READINGS** (3cr.)
The requirements of both the primary program and of the collaborative program must be met.

**ECS5119 MEDIATION AND NEGOTIATION: THEORY AND RESEARCH (3cr.)**

**NSG6133 DECISION MAKING IN CLINICAL PRACTICE (3cr.)**

**MHA6361 LEADING STRATEGY AND CHANGE IN HEALTH CARE ORGANIZATIONS (3cr.)**

**MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)**

courses other than those posted on the program website may be selected with the approval of the Thesis Supervisor and Program Director. It is

Students in consultation with their thesis supervisor will select elective courses in areas related to their research topics. All courses offered in the

**Globalization and International Development**

The School of International Development and Global Studies (SIDGS) offers interdisciplinary programs leading to a Master of Arts (MA) in Globalization and International Development and a Doctor of Philosophy (PhD) in International Development.

**Master's program**

The master's program is offered in collaboration with the Faculty of Arts, the Faculty of Law (common law and droit civil), and the Faculty of
Social Sciences and includes a Co-op option.

The program draws on the expertise of professors in economics, geography, history, law, political science, religious studies, sociology and anthropology and it benefits from the strength of numerous advanced research institutes and centres. Students are provided with the training needed to address complex, multifaceted problems that may simultaneously encompass economic, political, social, cultural, religious, legal, ethical and environmental elements. The program is administered by a program committee, composed of representatives from the participating academic units and chaired by the program director.

The core courses of the program are offered each year in both English and French. The elective courses may be offered in either language; students are advised to check with the academic unit offering the course.

The Department offers a collaborative program in Women’s Studies (at the MA level) and in environmental sustainability (at the MA level). For more information on this program, see Admission.

**Doctoral program**

The doctoral program caters to students from both academic and professional backgrounds, and is offered in both English and French. Two fields are offered in the PhD program:

- Development Theory and Critique
- Development Policy and Practice

Further information on the fields and research interests of the professors is posted on the program website.

The programs are offered in both English and French. In accordance with the University of Ottawa regulation, students have the right to produce their work, their thesis, and to answer examination questions in French or in English. The program is offered on a full-time basis.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Globalization and International Development

Master of Arts Globalization and International Development Specialization in Environmental Sustainability

Master of Arts Globalization and International Development Specialization in Women’s Studies

**Admission**

To be considered for direct admission, candidates must hold:

a) An honour's bachelor’s degree in international development and globalization or a related field (e.g., international studies and modern languages, environmental studies, religious studies, economics, geography, history, sociology, political science)

**OR**

b) An undergraduate law degree (LLB/LLL or equivalent).

An overall undergraduate average of 75% (B+) (calculated in accordance with FGPS guidelines) is required.

The admissions committee may also recommend candidates who do not fully meet the above requirements but who do meet the minimum requirements of the FGPS (an honours bachelor's degree with 70% (B) standing) and who have demonstrated knowledge of the field through relevant training and/or work experience.

A letter of intent outlining the candidate's interest in the program and relevant academic and practical experience must be submitted along with the application. Candidates should also indicate their preferred field (among four defined by the program).

Candidates who meet the basic admission requirements but who need to complete prerequisites for graduate courses or who need essential background knowledge in one or more fields may be admitted to a qualifying program.

**Collaborative Program in Women’s Studies at the Master’s Level**

The interdisciplinary MA program in Globalization and International Development is a participating unit in the collaborative program in Women’s Studies at the master’s level. This program has been established for students wishing to enrich their training in globalization and international development by including an interdisciplinary component in Women’s Studies.

Students must apply for admission to the Women’s Studies collaborative program at the same time as they apply for admission to the master’s
program in Globalization and International Development.

For further details, please consult the Women’s Studies program on the FGPS website.

**Collaborative program in Environmental Sustainability at the master’s level**

The interdisciplinary MA program in Globalization and International Development is a participating unit in the collaborative program in Environmental Sustainability at the master’s level. This program has been established for students wishing to enrich their training in globalization and international development by including an interdisciplinary component in environmental sustainability.

Students must apply for admission to the Environmental Sustainability collaborative program at the same time as they apply for admission to the master’s program in Globalization and International Development.

For further details, please consult the Environmental Sustainability program on the FGPS website.

**Co-op program**

To be admitted into the co-op option, students must commence the MA program in the fall session and be registered full time. Applications for the co-op option must be received by the end of the first month of the student’s registration in the MA program. Acceptance into the co-op option is offered on a competitive basis and is managed by the Co-op Office. Enquiries should be directed to that office.

**Language requirements**

Candidates must be able to understand, speak and write either English or French fluently. Applicants whose mother tongue is neither English nor French are required, at the time of application, to provide evidence of proficiency in one of these languages. Proof of having achieved a score of at least 280 in the computer-based Test of English as a Foreign Language (TOEFL) or in an equivalent test must be provided. For French proficiency, proof of having achieved a CarTest score of 5.0 in Listening, Reading, and Writing must be provided.

In addition, students admitted to the program without evidence of proficiency in the second official language must demonstrate their reading competence in this language at the earliest opportunity by passing the language requirements (DVM5999) administered by the program. A candidate who fails the test will have to successfully complete a course at the Official Languages and Bilingualism Institute approved by the program.

In accordance with University of Ottawa regulations, examinations, assignments, and the research paper or thesis may be written in either one of the two official languages (English or French).

**Mentoring system**

Applications are reviewed by the program admissions committee. The committee assigns each student a professor who acts as a mentor and assists in developing an individualized study plan that takes account of interdisciplinary requirements and of the student’s needs, interests, and preferred field.

**Lecture series**

All students are required, during the first year, to attend a lecture series where faculty and students from participating academic units, from other academic units or from outside organizations address important themes in globalization and international development.

**Program Requirements**

The program requirements consist of 24 credits of courses and a Major Research Paper. For students writing a thesis, the requirements consist of 18 credits of courses and a thesis. There is also a co-op option (see below).

The program has four fields: political economy of globalization and development; development policy and practice; conflict, security, and territoriality in a globalizing world; globalization, culture and identity.

**MA with major research paper**

- 24 course credits as follows:
  - Two core courses (6 credits): DVM5100, DVM5101;
  - At least two courses (6 credits) from the following list: DVM6101, DVM6102, DVM6103, DVM6104, DVM6105;
  - Four elective courses (12 credits) chosen from the list of DVM graduate courses.
    - Two of the four electives (6 credits) may be selected from graduate courses offered by other programs, upon approval by the program director or a delegate.
  - DVM6998 - Research Paper (6 credits).

**MA with thesis**

- 18 course credits as follows:
  - Two core courses (6 credits): DVM5100, DVM5101;
- At least two courses (6 credits) from the following list: DVM6101, DVM6102, DVM6103, DVM6104, DVM6105.
- Two elective courses (6 credits) chosen from the list of DVM graduate courses.
  - One of the two electives (3 credits) may be selected from graduate courses offered by other programs, upon approval by the program director or a delegate.
- DVM6999 - Thesis

**Collaborative program in Environmental Sustainability (with thesis)**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

**Collaborative program in Environmental Sustainability (with research paper)**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar course (EVD5100 or EVD5500, 3 credits).
- Satisfactory completion of one course (3 credits) selected from a list of optional courses for the Collaborative Program in Environmental Sustainability.
- Satisfactory completion of the research paper, which must be on a topic in the area of environmental sustainability, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the research paper is appropriate for the designation “Specialization in Environmental Sustainability.” The research paper is evaluated by two professors, one of whom is selected by the primary program, and the other by the Collaborative Program Director, on the advice of the Collaborative Program Committee.

**Collaborative program in Women’s Studies**

Students admitted to the Collaborative program in Women’s Studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the Women’s Studies program. Normally, the Women’s Studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5103 FEMINIST METHODOLOGIES (3cr.)

In addition, FEM5103/FEM5503 (Feminist Methodologies/Méthodologies féministes) may be taken in lieu of the required methodology course in the Globalization and International Development program, i.e., DVM5101/DVM5501 (Research Methods/Méthodes de recherche). However, students are encouraged to take both methodology courses, i.e., FEM5103/FEM5503 and DVM5101/DVM5501.

Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.
- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.
- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to Women’s Studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.
- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

**Co-op option**

The requirements of the co-op option are as follows:

- Co-op students must register full-time and complete two work terms: DVM6001 Co-op Work Term I and DVM6002 Co-op Work Term II.
Each work term is graded P/F (pass/fail), based on the employer's report and on the written report completed by the student. (The report must be 30 pages, including appendices.) The report is evaluated by the professor in charge of the graduate co-op option in DVM.

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain in the co-op option, students must:

- Be registered full-time.
- Maintain a 7.0 cumulative grade point average.
- Obtain a satisfactory grade (P) for each co-op work term.

**Second language requirement**

Students admitted to the program without evidence of proficiency in the second official language must demonstrate their reading competence in this language at the earliest opportunity by passing the language requirements (DVM5999) administered by the program. A candidate who fails the test will have to successfully complete a course at the Official Language and Bilingualism Institute (OLBI) approved by the program.

**Duration of the program**

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

**DVM5100 UNDERSTANDING INTERNATIONAL DEVELOPMENT AND GLOBALIZATION (3cr.)**
Study of leading theories and debates on the meaning, challenges and possibilities of development and globalization. Analysis and discussion of the different aspects of development and globalization, including its cultural, political economic, security, legal and territorial implications. Interdisciplinary approach, with a focus on discussion and evaluation of key texts.

**DVM5101 RESEARCH METHODS (3cr.)**
Research methods in international development and global studies. Analysis of epistemological foundations as well as ethical and practical issues associated with qualitative, quantitative and mixed research methodologies. Discussions of key aspects of research proposal development (stages, formulating sharp research questions, nature of a literature review).

**DVM5910 STAGE EN MONDIALISATION/DÉVELOPPEMENT INTERNATIONAL // INTERNSHIP IN GLOBALIZATION/INTERNATIONAL DEVELOPMENT (3cr.)**
Stage au Canada ou à l'étranger en milieu de travail. Noté S/NS (satisfaisant/non satisfaisant) par un professeur du programme en fonction du rapport écrit et de l'évaluation du superviseur de stage. / Workplace internship in Canada or abroad. Graded S/NS (satisfactory/not satisfactory) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable: réussite des 12 crédits obligatoires du programme. Approbation du responsable des études supérieures et du superviseur de l'étudiant. Exclusion : étudiants inscrits dans l'option coop. / Prerequisite: Successful completion of the 12 compulsory credits in the program; permission of the Graduate Studies Coordinator and the student's own supervisor. Exclusion: Students registered in the co-op option.

**DVM5999 EXIGENCE DE LANGUE / LANGUAGE REQUIREMENT (3cr.)**
Noté (S) satisfaisant ou (NS) non satisfaisant / Graded (S) Satisfactory or (NS) Not satisfactory.

**DVM6001 STAGE COOP I / CO-OP WORK TERM I (3cr.)**
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

**DVM6002 STAGE COOP II / CO-OP WORK TERM II (3cr.)**
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

**DVM6101 ECONOMIC GROWTH, PRIVATE SECTOR, SOCIAL INCLUSION (3cr.)**
Understanding economic development, including the roles of the private sector and public policy, particularly in terms of their impact on economic growth, living standards, social inclusion, poverty and inequality, and human development.

**DVM6102 LIVELIHOODS, RESOURCES AND SUSTAINABILITY (3cr.)**
Interaction between society and nature. Consideration of how power shapes the use of resources such as land, water, food, or energy, and on how livelihoods adapt to environmental change in various rural and urban contexts. Theoretical lenses include commons theory, social ecological resilience, political ecology, and political economy.

**DVM6103 CONFLICT, TRANSITIONS AND PEACE** (3cr.)
Relationships between insecurity, transitions, peace and development. Key debates on links between development and security or, conversely, between insecurity, conflict and development. Different critical perspectives on the security-development nexus. Issues surrounding human (in)security, as well as key debates on transitions and peace.

**DVM6104 SOCIAL MOVEMENTS, EQUITY AND HUMAN RIGHTS** (3cr.)
Social movements, civil society, and informal networks, their roles, actions and impacts in the struggle against the vicious cycles of inequality and vulnerability in developing countries. Themes include class, gender, ethnicity, citizenship and migration.

**DVM6105 INTERNATIONAL DEVELOPMENT PROGRAMMING: RESULTS-BASED APPROACHES** (3cr.)
The evolving international policy context for development effectiveness; results-based management for different actors and modalities (national strategies, program-based approaches, projects); how to practice RBM through the programming cycle (design, budgeting, implementation, monitoring & evaluation, etc.); RBM in different contexts (e.g. in middle-income countries versus fragile and conflict-affected states); limits of RBM-based approaches.

**DVM6110 DIRECTED STUDIES IN GLOBALIZATION AND INTERNATIONAL DEVELOPMENT** (3cr.)

**DVM6111 SPECIAL TOPICS IN ECONOMIC GROWTH, PRIVATE SECTOR AND SOCIAL INCLUSION** (3cr.)
Prerequisite: DVM6101

**DVM6112 SPECIAL TOPICS IN ENVIRONMENT, NATURAL RESOURCES AND SUSTAINABILITY** (3cr.)
Prerequisite: DVM6102

**DVM6113 SPECIAL TOPICS IN CONFLICT, TRANSITIONS AND PEACE** (3cr.)
Prerequisite: DVM6103

**DVM6114 SPECIAL TOPICS IN RIGHTS, SOCIAL MOVEMENTS AND POWER** (3cr.)
Prerequisite: DVM6104

**DVM6115 SPECIAL TOPICS IN PROFESSIONAL SKILLS FOR INTERNATIONAL DEVELOPMENT AND GLOBALIZATION** (3cr.)
Prerequisites: DVM6105

**DVM6998 MÉMOIRE / RESEARCH PAPER** (6cr.)

**DVM6999 THÈSE DE MAÎTRISE / MASTER'S THESIS**

**Electives**
The following list of electives is not exhaustive, and is provided as a guideline for students and their advisors. Each year a list of elective courses approved and offered for students in the program will be posted on the program’s website. Graduate courses other than those posted on the program website may be selected with the approval of the program committee.

It is the students’ responsibility to verify that they have the prerequisites for the elective courses they wish to take and to obtain the permission of the academic unit if required.

**DCL5508 DROIT COMPARÉ** (3cr.)
Définition et méthode du droit comparé. Étude sommaire des grands systèmes de droit contemporains, et comparaison de leurs fondements. Étude de certaines institutions juridiques dans le contexte de ces divers systèmes.

**DCL5730 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE** (3cr.)

**DCL6120 ADVANCED INTERNATIONAL LAW** (3cr.)

**DCL6121 STUDIES IN INTERNATIONAL LAW I** (3cr.)

**DCL6122 STUDIES IN INTERNATIONAL LAW II** (3cr.)
The requirements specific to the collaborative program are as follows:

Committee based on: (i) the Health Systems Research Seminars presentation and (ii) the written internship report to the Thesis Committee. The appropriate software applications. Data collection methodologies will include the gathering of secondary data from published or archived sources, thesis supervisor (and co-supervisor, if desired), a researcher from one of the collaborating institutions who may also act as co-supervisor, and

MBA5280 OPERATIONS MANAGEMENT (1.5cr.)

Students are required to attend the regular seminars throughout their program of study; students are expected to present their proposal and decisions. The course will cover the following topics: decision analysis; mathematical model formulation; linear programming and optimization; forecasting; delivery of health services: computer-based patient records, computerized order entry and results reporting, clinical services applications (lab, pharmacy, guidelines or coding standards may be introduced.

MHA6266 INTERNATIONAL PERSPECTIVES IN HEALTH CARE (1.5cr.)

Financial structure of the health care system. Introduction to managerial accounting with special emphasis on the management of health care agencies.

MHA6213 DIRECTED READINGS IN HEALTH CARE MANAGEMENT (1.5cr.)

This course will apply concepts from the literature to analyze and understand quality management and patient safety issues, and discuss these concepts in relation

MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)

The strategic advantage of understanding and integrating organizational behaviour (OB) frameworks in designing and implementing effective human resource

MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)

Introduction to statistical data analysis. Basic concepts important to management: problem-solving and decision-making using data. Application of univariate and

Block 2

YEAR 2

MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)

YEAR 3

MHA6990 HEALTH CARE ADMINISTRATIVE RESIDENCY AND FIELD PROJECT (7.5cr.)

YEAR 4

PRESENTATION OF PhD THESIS PROJECT

Additional Coursework

Doctorate in Philosophy Geography Specialization in Canadian Studies

Master of Arts Geography Specialization in Science, Society and Policy

Master of Geography

Master of Science in Geography

Two core courses (6 credits): DVM5100, DVM5101;

All students are required, during the first year, to attend a lecture series where faculty and students from participating academic units, from other

and biology of foraminifera and other microfossil groups, as well as their application to biostratigraphy and paleo-oceanography.

PRESENTATION OF MA THESIS PROJECT

PRESENTATION OF PhD THESIS PROJECT

Additional Coursework

Doctorate in Philosophy Geography Specialization in Canadian Studies

Master of Arts Geography Specialization in Science, Society and Policy

Master of Geography

Master of Science in Geography

Two core courses (6 credits): DVM5100, DVM5101;

Prerequisite: At least 12 credits of MBA courses and 18 credits of

A candidate

Prerequisite: ECO2143.

Prerequisites: ECO2143, ECO2145. (Previously: ECO3117.)

Prerequisites: ECO2143, ECO2145. (Previously: ECO3117.)
Balance of payments. Fixed and flexible exchange rates. The functioning of the international monetary system. The International Monetary Fund and problems of international liquidity. **Prerequisite:** ECO2143. (Previously: ECO3123.)

**ECO5106 COMPARATIVE ECONOMIC SYSTEMS** (3cr.)
Analysis of the socialist economic system, collective appropriation of the means of production, fundamental economic role of the State: firms and socialist profit. Planning, capital accumulation and growth; measure of investment efficiency; price determination and the Marxist theory of value; income distribution; money and State banks. International economic relations of the socialist countries within the Comecon, with the other socialist economies, the Third World and the Western countries. Study of selected issues on the Soviet, Chinese or East-European economies. Achievements and future prospects. **Prerequisite:** ECO3152, ECO3153

**ECO6160 (ECON 5601) INTERNATIONAL TRADE: THEORY AND POLICY** (3cr.)
International trade theory and its implications for economic policy, with emphasis on topics such as determinants of trade and specialization, gains from trade and commercial policy, international factor mobility, growth, and development.

**ECO6161 (ECON 5602) INTERNATIONAL MONETARY THEORY AND POLICY** (3cr.)
International monetary theory and its implications for economic policy, with emphasis on topics such as sources of equilibrium and disequilibrium in the balance of payments, balance-of-payments adjustment under fixed versus flexible exchange rates, international capital movements, and recent issues in the international monetary system.

**ECO6162 (ECON 5603) TOPICS IN INTERNATIONAL ECONOMICS** (3cr.)
Selected topics in international economics, including theoretical analysis, quantitative methods and policy formulation, implementation and evaluation.

**ECO6170 (ECON 5500) THEORY OF ECONOMIC DEVELOPMENT** (3cr.)
Theoretical approaches in the economic development literature in relation to the historical, economic, environmental, social and political dimensions of the development process.

**ECO6172 (ECON 5505) ECONOMIC DEVELOPMENT: INTERNATIONAL ASPECTS** (3cr.)
Key problems of international economic development such as trade in primary commodities and manufactures, financial flow and debt, the role of multinational corporations, the transfer of technology, and the international dimensions of environmental issues as they relate to the developing countries.

**ECO6173 (ECON 5507) ENVIRONMENTAL ASPECTS OF ECONOMIC DEVELOPMENT** (3cr.)
Policy aspects of sustainable economic development and environmental quality in developing countries. Topics to include energy use, deforestation, drought and desertification, depletion of natural resources, debt, environment and poverty, sustainable industrial and agricultural development, conservation policies, pollution control and global environmental issues.

**GEG5105 SELECTED TOPICS IN HUMAN GEOGRAPHY** (3cr.)
In-depth examination of a question or topic linked to new trends or research areas in human geography.

**HIS5103 SEMINAR IN CANADIAN HISTORY** (3cr.)

**HIS6103 SEMINAR ON AMERICAN HISTORY** (3cr.)

**HIS6332 SEMINAR ON THE HISTORY OF TECHNOLOGY** (3cr.)

**HIS6336 SEMINAR ON IMMIGRANTS AND ETHNIC GROUPS IN NORTH AMERICA** (3cr.)

**HIS6532 SÉMINAIRE EN HISTOIRE DE LA TECHNOLOGIE** (3cr.)

**HIS7103 SEMINAR IN EUROPEAN HISTORY** (3cr.)

**HIS7330 SEMINAR ON COMPARATIVE HISTORY** (3cr.)

**HIS7331 SEMINAR ON THE HISTORY OF WOMEN AND GENDER** (3cr.)

**HIS7333 SEMINAR ON INTERNATIONAL RELATIONS** (3cr.)
HIS7335 SEMINAR ON WAR AND SOCIETY (3cr.)

HIS7336 SLOVAKS IN EUROPE, CANADA AND THE UNITED STATES SINCE 1870 (3cr.)

HIS7337 SEMINAR ON HISTORY OF MEDICINE (3cr.)

HIS7530 SÉMINAIRE EN HISTOIRE COMPARÉE (3cr.)

HIS7535 SÉMINAIRE SUR LA GUERRE ET LA SOCIÉTÉ (3cr.)

HIS7705 MÉTHODES DE RECHERCHE EN HISTOIRE (3cr.)

POL6100 SEMINAR IN INTERNATIONAL RELATIONS (3cr.)

POL7102 SELECTED TOPICS IN INTERNATIONAL RELATIONS (3cr.)

POL7109 GOVERNANCE AND GLOBALIZATION (3cr.)
Analysis of institutions and practices of regulation at the international level in the context of globalization. Study of major trends in national and international governance, including forces of resistance. Case studies.

POL7110 INTERNATIONAL POLITICAL ECONOMY (3cr.)
Analysis of the political aspects of the international economy and how economic issues affect societies and international politics. Case studies. Examination of historical and contemporary theoretical approaches.

POL7111 SPACE AND TERRITORIALITY (3cr.)
Analysis of issues relating to the production, control and use of space in world order. Study of diverse contemporary theories concerning space and territoriality.

POL7112 SECURITY AND CONFLICT: CONTEMPORARY ISSUES (3cr.)
Analysis of the causes, mechanisms and consequences of inter-state conflicts (wars, crises) and/or intra-state conflicts (civil war, secession). Examination of relevant theoretical literature.

SOC7160 DEVELOPMENT: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)

SOC7161 RESEARCH SEMINAR IN DEVELOPMENT (3cr.)
Evaluation of research in the area.

SOC7562 PROBLÈMES CHOISIS EN DÉVELOPPEMENT (3cr.)
Analyse approfondie d'une question de sociologie du développement.

SOC7166 DEVELOPMENT AND GENDER RELATIONS (3cr.)
Deconstruction of the concepts of gender and development. International power relations and gender. Women in the global South and their theorizing of gender relations.

SRS5100 SPECIAL QUESTIONS IN THE HISTORY AND METHODS OF THE HISTORY OF RELIGIONS (3cr.)

SRS5106 GODDESSES AND WOMEN IN MYTH AND SYMBOL (3cr.)

SRS5305 RELIGION AND SOCIETY IN CROSS-CULTURAL ANALYSIS (3cr.)
Comparative sociological analysis of the relations between religion and society in different cultures and regions.

SRS5520 RELIGION ET ANTHROPOLOGIE - THÈMES CHOISIS (3cr.)
Health Administration

The Telfer School of Management provides an outstanding environment for students pursuing graduate studies in health care management both from an academic and a professional point of view. In addition to the Master in Health Administration (MHA), the Telfer School of Management offers at the graduate level a master of business administration (MBA), a master of science in management and a master of science in health systems, as well as a number of joint programs with the faculties of Law and of Engineering.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

The MHA program has close links to other faculties including the Faculty of Health Sciences and the Faculty of Medicine to assure relevance to clinical practice for health service administration.

The MHA program also has close links with hospitals, long-term care institutions, community health agencies, psychiatric institutions, federal and provincial governments, and international, national, and provincial health organizations to assure curricular relevance and excellence.

Moreover, the program maintains close ties with the Canadian College of Health Service Executives, the American College of Health Service Executives, and other professional bodies across North America. The emphasis in this program is on proactive management with a vision of humanistic leadership and public service in a period of intense change in health-care systems around the world.

The MHA is closely allied to, and aligned with, the MBA program. MHA students take their core management courses with MBA students. The MHA aims to prepare students for the managerial and leadership responsibilities faced in rapidly changing health-care environments.

The MHA program allows for full-time or part-time study, with the common core management courses (of the MBA) available in either English or French. The MHA health specialization courses are available only in English. The MHA requires an administrative residency of at least 16 weeks that expands the students’ experience in health care or health policy and awareness of the applicability of the material covered in the academic portion of the program to the practical world of management of health care. Students can do their administrative residency, in English or in French, at any recognized and approved health agency.

Mission

The mission of the MHA program is to prepare ethical and socially responsible professionals to assume management and leadership positions in the changing health service system, primarily in Canada but also internationally, and to strive for excellence in professional education, scholarly research and community service in health systems management. The program focuses on the quality of student experience and education and is engaged in continuous curriculum development through excellence in research and strong links with the community of health care practitioners in the field.

Goals and Objectives

Given its mission statement, the MHA program will pursue the following goals:

- Provide comprehensive education in health services and systems management.
- Conduct relevant health management research.
- Make continuous improvements to the program by proactively responding to market needs.
- Create opportunities to effectively link students with the health community to enhance the student’s learning experience.
- Assist students in the development of meaningful career plans.
- Foster strong, ongoing, lasting and mutually beneficial relationships with the MHA Alumni Association, the local Chapter of CCHSE and its members as well as all residency sites and preceptors.
- Provide patient-centered inter-professional learning opportunities.
History of the Program

The master's in health administration (MHA) program began as the School of Hospital Administration in 1964. It changed its name in 1970 to include the notion of health in order to broaden its focus. In 1979, a reorganization of the Faculty of Administration program changed the school's name to the MHA program. Since 1997, the core management disciplines of the MHA program are covered through MBA courses offered to both MBA and MHA students.

Accreditation

One of only three business schools in Canada accredited by the Association to Advance Collegiate Schools of Business (AACSB), the European Quality Improvement System (EQUIS) and the Association of MBAs (AMBA), the Telfer School is recognized by The Princeton Review as one of the world's best 290 business schools and has been ranked by the Financial Times as a top 150 business school for the last three years.

Computer facilities

The Telfer School of Management offers students well-equipped computer facilities. Hardware and software common in business are available. Computers are also used as a main teaching tool in the many multimedia classrooms available on campus.

The MHA program fosters the development of its students' computer skills by providing them with continuous access to the most current suite software, to financial databases, to specialized business software, as well as to the Internet and electronic mail. Computer and multimedia equipment are also available to prepare assignments and class presentations.

In addition to those tools and services provided by the Telfer School of Management, students can access computer, communication and multimedia services provided to all University students.

Libraries

The Morisset and health sciences libraries of the University house extensive collections of books, periodicals and documents relevant to the arts and sciences, including health administration, general administration and medicine. Students also have access to the National Library and the Canadian Institute for Scientific and Technical Information (formerly the National Research Council Library), as well as dozens of other specialized collections in Ottawa.

Programs

Master of Health Administration (M.H.A.)

Admission

Admission to the master’s of health administration program is open to candidates holding a Canadian baccalaureate degree or its equivalent. A minimum standing of B or 70% overall average is required. The Faculty of Graduate and Postdoctoral Studies will determine the equivalency of qualifications for applicants from non-Canadian institutions. In addition, a limited number of candidates may be considered for admission on the basis of substantial managerial or professional training and experience (normally 10 years or more) even if they do not hold a university degree or do not meet the minimum academic requirements.

Entry into the Master in Health Administration (MHA) program takes place in the fall session (full-time and part-time students) of each year. Classes start mid-August. In order to be considered for admission, completed applications must be received no later than April 1 of the year of potential entry.

Due to immigration requirements, all applications other than those from Canada, the United States and Europe must be received no later than February 1. Later applications will only be considered at the discretion of the Telfer School of Management.

In its evaluation of applicants, the admissions committee will identify those who lack mathematical background and will strongly recommend that they complete four Quantitative Analysis for Business Modules (namely “Basic Mathematics”, “Spreadsheet for Statistics”, “Mathematics for Finance”, and “Calculus for Microeconomics”) offered in an hybrid delivery mode (on-line with some one-on-one tutorials with a professor; the modules can be done completely on-line for students who can not attend live tutorials). Furthermore, all students admitted will be invited to complete these four modules to refresh their quantitative analysis skills.

Requirements and Documents

Admission to the program is competitive and the number of candidates that can be accommodated is limited. Admission will be granted only to those who clearly demonstrate high promise of success in the MHA program. In applying to the program, candidates should provide the following documentation:

- a duly completed application form
- a non-refundable application fee
- past academic performance: original transcripts from all post-secondary institutions attended, as well as any additional evidence of academic excellence such as grade point average, class rank, awards, publications, professional designations
- related work experience: a current curriculum vitae that details managerial or professional experience.
- A minimum of 3 years of full time work experience is required. In general, preference is given to those applicants who have greater work experience, particularly when there is evidence of career progression. In exceptional circumstances, volunteer work, internships and other demonstrated leadership roles can be considered as part of this criterion
- two confidential letters of recommendation that comment on the applicant's suitability for graduate study
- a narrative statement that indicates the applicant's personal motivation for entering the MHA program, and how they would contribute to the learning environment
- standardized test: The Graduate Management Admission Test (GMAT) is compulsory for all candidates planning to take the MHA (both anglophones and francophones, since the MHA specialization courses are offered only in English). A score of at least 50 percentile is required for the GMAT, and each individual component being within the 45 percentile. A score of 4.5 is also required on the essay writing. Applications for the GMAT can be obtained from Educational Testing Service P.O. Box 6103 Princeton, New Jersey USA, 08541-6103
- personal interview: in some cases, applicants may be required to attend a personal interview with a representative of the MHA program.

Candidates whose mother tongue is neither English nor French are required to provide evidence of proficiency in one of Canada's official languages. These candidates must submit one of the following to the Faculty of Graduate and Postdoctoral Studies to confirm their proficiency:

- A score of at least 250 on the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, New Jersey, USA, 08540; see also wv.web1.toefl.org.
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council; www.ielts.org.
- A score of at least 14 on the CANTEST, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years over the last six years).

All applications, supporting documents, and inquiries from candidates for the MHA program should be sent to the Telfer School of Management.

**N.B.** The selection committee will not consider applications unless all the required documents are submitted.

**Language of Instruction**

In the application to the MHA program, students must elect to take the common core components either in English or in French and are placed, once admitted, in a cohort/study group accordingly. The health administration modules are taught only in English; therefore a good command of English is necessary. However, students may submit assignments, research papers, directed readings or examination papers either in English or in French. Administrative residencies can be arranged in French-language institutions.

**Recognition of Courses**

**Advanced Standing**

At the time of admission, a student may receive advanced standing for graduate courses in management completed previously as a regular student either in a Canadian MBA program or a similar program accredited by the AACSB International or an equivalent.

Credits may also be granted for graduate courses completed previously in a University of Ottawa interdisciplinary program in which the Telfer School of Management is involved.

The maximum number of credits allowed is 27. No credits will be granted for courses completed more than five years ago or for which the grade was lower than B or 70 %. Advanced standing is usually granted only for core courses.

**Orientation**

The program begins the last two weeks of August with a period dedicated to skills development and program orientation / information for all students (MBA 5235 or MBA 5260).

**Computer skills**

Students must be familiar with the use of computers and basic applications related to administration such as word processing, spreadsheets and presentation software.

**Program Requirements**

**MHA Program**

The MHA curriculum is composed of 54 credits as follows:
○ Management Core (MBA and ADM course codes): 16.5 credits
○ Health Management (MHA) courses: 30 credits
○ Administrative residency and field project: 7.5 credits.

Courses
Many of the program requirements consist of 3-credit courses, normally offered on the basis of three hours per week over twelve weeks during a university session. Each session has been divided into two blocks, allowing the program to also offer 1.5-credit courses, also known as modules. The 18-hour modules, normally offered over a six-week period, provide more variety in course offerings and allow flexibility in course delivery, as some modules may be offered in an intensive format such as over a 3-day weekend. Any given course is normally offered only once a year in a specific academic session or block. Multiple sections (day and evening) of each course may be scheduled in the same session or block, given the program structure and based on enrollment figures; some courses are offered only in the evenings. The Telfer School of Management may choose not to offer a course for which the demand is too low.

* Throughout this text, the term "courses" refers both to the three-credit courses and to 1.5 credit modules.

Management Skills
The MHA program begins with a period dedicated to skills development (leadership, communications, negotiation, group work, and other related management tools necessary for a solid grounding in business, MBA 5235). This skills development course is offered during the last two weeks of August for full-time students and during the last week-end of August for working professionals.

Common Core in Management
The MHA program starts with a common core in management with the MBA program. The common core provides groundwork in basic management disciplines and skills.

Health Management Specialization
The MHA program offers a large number of health management specialization courses that prepare its students for the challenges that managers in the health system must face. All these courses are required.

Health Care Administrative Residency and Field Project (MHA 6990)
The residency is an integral part of the program and takes place in the last academic session (fourth session in the full-time program). During this period, the students are assigned to a specific preceptor but remain under the supervision of the program. The residency may be spent in a variety of health agencies and institutions. All students must register full-time for this activity.

The administrative residency has three major learning goals: to integrate course knowledge in health care management; to develop cognitive skills; to enhance leadership skills.

The Field Project is an integral part of the successful completion of the administrative residency requirement. It integrates curricular content with practical experience and is undertaken under joint supervision by the faculty member and the preceptor in whose organization the administrative residency takes place.

The project describes a particular area of the student’s residency experience and contribution to the residency site and is structured according to a standard format accepted in medical research. Successful Field Project papers should combine the student’s knowledge of theory with the practical experience gained during the administrative residency. In order to pass this course, the student must successfully complete the administrative residency component (evaluated as S/NS) and receive a passing grade in the field project component.

Students will be given a kick off orientation by the Residency Coordinator(s) followed by individual meetings to help guide the development of career goals and residency objectives leading to the selection of site options. Once residency sites have been finalized, a second orientation will target preparation for the actual residency experience. Prerequisite: At least 12 credits of MBA courses and 18 credits of MHA courses.

Evaluation and Promotion
The term "courses" refers both to 3-credit courses and to 1.5-credit modules.

Grades are awarded according to the following scale:

A+ 90 - 100 % 10 points Exceptional
A 85 - 89 % 9 points Excellent
A- 80 - 84 % 8 points Excellent
B+ 75 - 79 % 7 points Very Good
B 70 - 74 % 6 points Very Good
C+ 65 - 69 % 5 points Good
C 60 - 64 % 4 points
D+ 55 - 59 % 3 points
D 50 - 54 % 2 points
E 40 - 49 % 1 point
F 0 - 39 % 0 point

ABS-EIN*

* ABS - (absent, no work submitted) Awarded to a student who has not attended the course and has not informed the academic unit and the Faculty of Graduate and Postdoctoral Studies in writing, within two weeks of the start of the course. This symbol is equivalent to a failing grade (F).
* EIN - (incomplete) Awarded when at least one of the compulsory elements of evaluation have not been provided. This symbol is equivalent to a failing grade (F).

**Dropping Courses**

Given the integrative nature of the program delivery, full-time and part-time students are not allowed to drop 5000-level courses: however, they may drop 6000-level courses, but only during the first two weeks of classes.

**Minimum Standards and Failures**

Students must meet the following requirements throughout their program.

1. Requested Cumulative Grade Point Average and Probation Period

   1.1. General Standard: Students must maintain a cumulative grade point average (CGPA) of 6.0 throughout the program and their overall CGPA upon completion of all requirements must be 6.0 in order to qualify for graduation. Those who fail to maintain an average of 6.0 at the time of the periodic review are placed on probation. All courses are included in the calculation of the CGPA.

   The CGPA of full-time students initially will be reviewed at the end of Block 2, and subsequently at the end of each block, provided they have completed 12 credits since the last CGPA review. The academic performance of working professionals will be reviewed at the end of Block 6 for the first two years of the program. Thereafter, their performance will be evaluated upon completion of each additional 12 credits. Students who fail to qualify for removal from probation on the next review must withdraw from the program.

2. Failures

   The general regulation of the FGPS (Regulation E.7) applies.

**Duration of the Program**

All students, whatever option they choose, must complete all degree requirements within five years.

**Change of Grade on the Record**

**Revision**

Students wishing to request a review of any marked assignments returned while the course is in progress must do so within one week of receipt of the marked assignment from the professor. Students wishing to request a review of final examinations and term work returned after the end of a course must do so within one week following the posting of grades by the graduate programs secretariat.

The request must be made in writing to the graduate programs secretariat using the special form available for this purpose. A copy of the student’s request will be forwarded to the professor, who will submit his decision to the director of the MHA program, using the Change of Grade Report. The graduate programs secretariat will inform the student of the decision: if applicable, the revised grade will be forwarded to the Faculty of Graduate and Postdoctoral Studies.

**Appeal process**

A student who is not satisfied with the professor’s decision, and who wishes to proceed with a formal review, must submit a written request to the graduate programs secretariat within one week of communication of the professor’s decision. The Director of the MHA program will proceed with a reevaluation according to the procedure approved by the Senate of the University, a copy of which can be found at the graduate programs secretariat or at the Faculty of Graduate and Postdoctoral Studies (FGPS). One or two professors qualified in the discipline and appointed by the director of the MHA program will re-assess the assignment, test or examination in question and will submit their decision to the Director of the MHA program, who will communicate the decision to the student.

A student who disagrees with this decision may, within a week of communication of the Telfer School of Management decision, submit a written appeal to the dean of the FGPS, who will refer the appeal to the Executive Committee of the FGPS.

**FULL-TIME MHA PROGRAM**

A full-time student is expected to complete the program in 15 months.

The schedule of the full-time MHA follows. Note that the MHA modules are normally offered after 4 p.m., while the MBA common core is offered between 8:30 a.m. and 4 p.m., or (on an exceptional basis) after 4 p.m. if a student is assigned to a cohort intended primarily for part-time students.

Core modules taken in the full-time MBA program (MBA/ADM) and health administration modules (MHA):

**YEAR 1**

**Fall Session**

Block 1
MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
MBA5300 DATA ANALYSIS (3cr.)
MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)
MHA6360 HEALTH CARE IN CANADA - OVERVIEW (3cr.)

Block 2
MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
MBA5300 DATA ANALYSIS (3cr.)
MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)
MHA6360 HEALTH CARE IN CANADA - OVERVIEW (3cr.)

Winter Session

Block 3
ADM6260 PROJECT MANAGEMENT I (1.5cr.)
MHA6266 INTERNATIONAL PERSPECTIVES IN HEALTH CARE (1.5cr.)
MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
MHA6380 QUANTITATIVE METHODS AND THEIR APPLICATIONS TO HEALTH CARE DECISION MAKING (3cr.)

Block 4
MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
MHA6250 HEALTH CARE ACCOUNTING AND FINANCE (1.5cr.)
MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
MHA6380 QUANTITATIVE METHODS AND THEIR APPLICATIONS TO HEALTH CARE DECISION MAKING (3cr.)

Spring / Summer Session

Block 5 and intensive courses
MHA6215 MANAGEMENT AND EVALUATION OF QUALITY OF PATIENT CARE (1.5cr.)
MHA6216 RISK MANAGEMENT IN HEALTH CARE (1.5cr.)
MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE (1.5cr.)
MHA6351 HEALTH ECONOMICS (3cr.)
MHA6361 LEADING STRATEGY AND CHANGE IN HEALTH CARE ORGANIZATIONS (3cr.)

Block 6 and intensive courses
MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)
MHA6230 HUMAN RESOURCE MANAGEMENT IN HEALTH CARE (1.5cr.)
MHA6351 HEALTH ECONOMICS (3cr.)

YEAR 2

Fall Session

Blocks 1 & 2
MHA6203 PROGRAM EVALUATION FOR HEALTH CARE MANAGERS (1.5cr.)
MHA6990 HEALTH CARE ADMINISTRATIVE RESIDENCY AND FIELD PROJECT (7.5cr.)

ACCELERATED PROGRAM OPTION

Individuals in full-time employment may choose the accelerated option for working professionals and complete their degree in 28 months. Students must register full-time during the spring sessions of Year 1 and Year 2. Some courses are offered on an irregular and sometimes intensive schedule to assist students in balancing their university workload with their employment. Students are informed in advance of these irregular schedules. Most management core and specialization courses are offered after 4 p.m. for working professionals.

All students must register full-time while completing their compulsory residency (MHA6990 7.5 cr.).

MHA 28-MONTH PROGRAM STRUCTURE

We present below the 28-month program structure.

YEAR 1

Fall Session

Block 1
MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
MBA5300 DATA ANALYSIS (3cr.)
MHA6360 HEALTH CARE IN CANADA - OVERVIEW (3cr.)

Block 2
MBA5300 DATA ANALYSIS (3cr.)
MHA6360 HEALTH CARE IN CANADA - OVERVIEW (3cr.)

Winter Session
Blocks 3 & 4
MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)

Spring / Summer Session (full-time session)

Block 5 and intensive courses
MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
MHA6215 MANAGEMENT AND EVALUATION OF QUALITY OF PATIENT CARE (1.5cr.)
MHA6351 HEALTH ECONOMICS (3cr.)

Block 6 and intensive courses
MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
MHA6230 HUMAN RESOURCE MANAGEMENT IN HEALTH CARE (1.5cr.)
MHA6351 HEALTH ECONOMICS (3cr.)

YEAR 2

Fall Session

Block 1
MBA5260 THE WORLD OF THE GENERAL MANAGER AND STRATEGIC MANAGEMENT (1.5cr.)
MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)

Block 2
MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)

Winter Session

Block 3
ADM6260 PROJECT MANAGEMENT I (1.5cr.)
MHA6266 INTERNATIONAL PERSPECTIVES IN HEALTH CARE (1.5cr.)
MHA6380 QUANTITATIVE METHODS AND THEIR APPLICATIONS TO HEALTH CARE DECISION MAKING (3cr.)

Block 4
MHA6250 HEALTH CARE ACCOUNTING AND FINANCE (1.5cr.)
MHA6380 QUANTITATIVE METHODS AND THEIR APPLICATIONS TO HEALTH CARE DECISION MAKING (3cr.)

Spring / Summer Session (full-time session)

Block 5 and intensive courses
MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
MHA6216 RISK MANAGEMENT IN HEALTH CARE (1.5cr.)
MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE (1.5cr.)
MHA6361 LEADING STRATEGY AND CHANGE IN HEALTH CARE ORGANIZATIONS (3cr.)

Block 6 and intensive courses
MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)

YEAR 3

Fall Session (full-time session)

Blocks 1 & 2
MHA6203 PROGRAM EVALUATION FOR HEALTH CARE MANAGERS (1.5cr.)
MHA6990 HEALTH CARE ADMINISTRATIVE RESIDENCY AND FIELD PROJECT (7.5cr.)

Regardless of the option chosen (full-time or accelerated), students have a maximum of 5 years from the date of initial registration in which to complete the degree requirements.

Transfer of Credits

Under certain circumstances it is permissible for students registered in the program to take courses at another faculty or another university and to have the credits for these courses transferred towards the requirements of the degree. Arrangements for registration in such courses must be approved in advance by the Telfer School of Management and completed by the closing date for registration of the MHA program in the session concerned.

Students who intend to take courses at Ontario universities must complete in advance the form entitled Ontario Visiting Graduate Student Application available at the secretariat of the School or at the Faculty of Graduate and Postdoctoral Studies. Students who intend to take courses at a university outside of Ontario must obtain in advance a Letter of Permission at the school or at the Faculty of Graduate and Postdoctoral Studies.

The maximum number of credits that can be granted in advanced standing or in transferred credits is 27. The regular rules of evaluation and promotion apply to all courses taken by transfer of credit.
Graduate Diploma in Business Administration

The Graduate Diploma is awarded only to students already registered in the MBA or MHA programs who are not continuing in these programs.

In order to receive the Graduate Diploma, candidates must:

- be admitted and registered in either the MBA or the MHA program;
- have completed at least 27 credits of MBA or MHA or ADM courses with satisfactory performance (normally with a 6.0 cumulative grade point average), including at least 15 credits of MBA 5000-level courses from the following list:

MBA5211 CORPORATE GOVERNANCE AND ETHICS (1.5cr.)
MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
MBA5237 CHANGE MANAGEMENT (1.5cr.)
MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
MBA5266 PERFORMANCE MANAGEMENT: BUSINESS PROCESS MODELLING (1.5cr.)
MBA5270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
MBA5300 DATA ANALYSIS (3cr.)
MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS (3cr.)
MBA5350 CORPORATE FINANCIAL MANAGEMENT (3cr.)
MBA5355 ECONOMICS FOR THE GLOBAL MANAGER (3cr.)
MBA5360 STRATEGY FORMULATION AND IMPLEMENTATION (3cr.)

Courses

Explanation of Course Codes

1st digit:

5000 level: common core

6000 level: Health Administration specialization

2nd digit:

2, 4 courses offered in English
6, 8 courses offered in French
9 bilingual courses

3rd digit:

0 Data Analysis, Statistics
1 Public Policy, Public Sector Management, Health Care Systems
2 Marketing
3 Organizational Behaviour, Human Resources
4 Accounting
5 Finance, Economics
6 Health or Business Policy, International Management, High Technology
7 Information Systems
8 Management Decision Models, Operations Management
9 Seminars, Projects, Residency

Core Courses

MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
Development of increased skills and understanding of participant preferences for the management of interpersonal and team-based issues and processes in a work environment. Special focus on diversity and ethics in a team environment. Effective business communications, including skills for delivery of high quality business presentations; exposure to common business software for inclusion in the student's professional toolbox.

**MBA5236 LEADERSHIP AND MANAGEMENT** (1.5cr.)
Leadership versus management; participatory leadership; transactional leadership; transformational leadership; reciprocity and mutual influence between leaders and followers; leading up (followership); situational determinants of effective leadership; cross-cultural leadership; virtual leadership. Course delivery involves class discussions, experiential exercises, guest speakers and case studies. Prerequisite: MBA 5330 or permission of the MBA program director.

**MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT** (1.5cr.)
Understanding the role of the general manager in setting direction, creating competitive advantage, allocating resources, integrating operations and projects, framing the organizational infrastructure and context and managing change. Introduction to the concept of strategy and alternative models of strategic making.

**MBA5265 PERFORMANCE MANAGEMENT** (1.5cr.)
The focus will be on learning about business intelligence and performance management approaches at operational levels in the organization. Frameworks such as the Balanced Score Card and Quality Management will be covered, as well as the use of business intelligence to explore performance problems.

**MBA5300 DATA ANALYSIS** (3cr.)
Introduction to statistical data analysis. Basic concepts important to management: problem-solving and decision-making using data. Application of univariate and bivariate methods to various datasets. Use of software and interpretation of statistical output. Models and tools to assist students in collecting, organizing, understanding, analyzing, presenting and communicating data. MBA5100 and MBA5101, together, are equivalent to MBA5300.

**MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT** (3cr.)
The strategic advantage of understanding and integrating organizational behavior (OB) frameworks in designing and implementing effective human resource (HR) activities (namely attraction, development, maintenance and retention of employees), in measuring performance and in achieving high-performance outcomes in various global organizational contexts. OB topics covered include motivation, rewards, leadership, group dynamics, organizational politics, job and organization design, and culture. Prerequisite: MBA 5235 for MBA students only. MBA5131 and MBA5132, together, are equivalent to MBA5330.

**MBA5340 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS** (3cr.)
This course focuses on the role of the accounting function external to the organization. It takes a broad view of financial accounting, encompassing a wide range of external financial and economic information, both national and international. The orientation will help students to understand what accounting can do for decision makers and how accounting and ethical choices affect decisions. Current issues in financial accounting and reporting are discussed. MBA5140 and MBA5141, together, are equivalent to MBA5340.

**ADM6260 PROJECT MANAGEMENT I** (1.5cr.)
Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK®) of the Project Management Institute (PMI®); project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning, realization and close-out). Students will have hands-on experience using MS Project.

**MHA Specialization Modules**
(Ces cours ne sont offerts qu'en anglais) / (Courses offered in English only).

**MHA6203 PROGRAM EVALUATION FOR HEALTH CARE MANAGERS** (1.5cr.)
This course is intended for future health care managers who will contract out or procure program evaluations within their organizations. It covers the development of evaluation questions and standards of effectiveness, program evaluation designs, sampling, collecting information (primary and secondary), evaluation measures, managing evaluation data, analyzing evaluation data, evaluation reports, and development of “Requests for Proposals (RFPs)” that form the basis for these evaluations. Students prepare an evaluation proposal similar to the kind of proposal that is submitted by consulting firms and/or academic groups in response to RFPs from health care managers. At the conclusion of this course, students will be able to develop RFPs and to adequately assess evaluation proposals, i.e., be able to ask right questions, and to know which disciplines should be represented on the proposal review team.

**MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS** (1.5cr.)
Governance models for health care organizations. Definition, resolution and handling of ethical problems of administrators, professionals and researchers in health organizations. Reconciliation of conflicting interests of the stakeholders according to ethical principles.

**MHA6213 DIRECTED READINGS IN HEALTH CARE MANAGEMENT** (3cr.)
Personal definition, investigation and synthesis of broadly based literature on a topic from a list prepared in advance by the MHA faculty. Bi-weekly progress reports submitted by e-mail or in person. Presentation of the report at a seminar organized by a supervisor. Prerequisites: must have completed the common core and at least 10.5 MHA credits.

**MHA6215 MANAGEMENT AND EVALUATION OF QUALITY OF PATIENT CARE** (1.5cr.)
This course will apply concepts from the literature to analyze and understand quality management and patient safety issues, and discuss these concepts in relation to accountability. It will prepare students for the health care workplace by exposing them to practices and aspects related to patient safety and quality in health care, and by identifying contemporary approaches to address them. Various models and approaches for assessing and improving quality will be discussed,
including evidence-based medicine and management, systematic reviews, clinical practice guidelines, and quality improvement approaches. Various quality initiatives and quality improvement tools will be discussed and evaluated.

**MHA6216 RISK MANAGEMENT IN HEALTH CARE** (1.5cr.)
Applies the tools of decision analysis (e.g., decision trees, and uncertainty analysis) to risk management problems in health care. The general purpose of these tools will be highlighted. Early lectures will focus on medical decision-making applications (e.g., choosing a diagnostic cut-point, choosing between different health technologies, and aiding a patient with her choice of course of action). Later lectures will demonstrate how the decision analysis tools can enlighten broader risk management deliberations (such as whether to invoke a quarantine, whether to issue health-alerts, whether to support new vaccines, etc.). Case studies will be used to exemplify lessons learned from the risk assessment, the risk communication, the risk perception and the risk management literatures. **Prerequisite:** MBA 5300, MHA 6380

**MHA6230 HUMAN RESOURCE MANAGEMENT IN HEALTH CARE** (1.5cr.)
Focus on the major issues unique to effective health human resources management. Topics covered include measuring needs and planning for the current and future supply of human resources. Recruitment, retention and development strategies to meet changing workforce conditions. Understanding the unique regulatory environments where many professions are regulated by provincial laws and professional colleges while others are not. Labor relation issues and approaches in this highly unionized environment. Funding, team work and inter-professional practice, scope of practice issues and organizational design. Interactions of organizational and professional accreditation mechanisms (such as professional colleges and associations, and accreditation bodies).

**MHA6250 HEALTH CARE ACCOUNTING AND FINANCE** (1.5cr.)
Financial structure of the health care system. Introduction to managerial accounting with special emphasis on the management of health care agencies. Principles of costing. Multi-product and case mix measures. Resource use decisions, budgeting and control, and pricing analysis for health care organizations. Fundamentals of capital financing, financial planning and financial policy formulation within the health care context in Canada. Relevant healthcare financial guidelines or coding standards may be introduced. **Prerequisite:** MBA 5340

**MHA6266 INTERNATIONAL PERSPECTIVES IN HEALTH CARE** (1.5cr.)
Geopolitics of world health: health inequities between countries and within countries. Health systems as a determinant of health: Canada and the USA. OECD/WHO countries: France, No. 1? Germany (Bismarck model) and the UK (Beveridge model) – major reforms. Sweden (Beveridge) - a very decentralized system. International actors: WHO (PAHO), private foundations, NGOs, pressure groups.

**MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE** (1.5cr.)
Discusses research on the implementation of contemporary health information technologies (IT) and their role in improving, transforming and supporting the delivery of health services: computer-based patient records, computerized order entry and results reporting, clinical services applications (lab, pharmacy, radiology- PACS), clinical decision support systems, nursing information systems, telemedicine and telehealth applications, e-health applications, (including end-users involvement, implementation aspects, alignment with work practices), inherent risks associated with application of IT in healthcare, information security and privacy, IT impacts and challenges, issues related to IT assessment and evaluation in healthcare. Technology as an enabler of change supporting process standardization using Business Process Orchestration Technologies to create a foundation for optimization and active process management. **Prerequisite:** MHA 6370

**MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY** (3cr.)
Provides a survey of epidemiology; viewed through a “population health” lens. Course will provide a survey of: measures of health status (including measures of mortality and morbidity); and measures of association. The basic epidemiological designs (observational, case-control, cohort, time series, and randomized control studies) will be reviewed. The factors affecting the precision and validity of these studies (e.g. statistical power, confounding, effect modification, and causality criterion) will be reviewed. Emphasis will be placed on equipping students with an ability to critically evaluate clinical, epidemiological, and health administration evidence in support of decisions. Guidance will also be provided to help select appropriate outcome indicators and critically evaluate interventions/programs. Students will get hands on experience computing effect measures (e.g. odds, ratios) from study results, as well as with assessing the precision and validity of results. **Prerequisite:** MBA 5300

**MHA6351 HEALTH ECONOMICS** (3cr.)
The course provides a macro-economic perspective on the demand and supply of healthcare, highlighting the market failures that are archetypical within the health domain. It contrasts Welfarist and Extra-Welfarist perspectives on resource allocation (contrasting technical versus allocative efficiency). The course will also review cost-benefit, cost-effectiveness, and cost-utility approaches of evaluating health interventions; and in so doing the course will provide students an opportunity for hands-on computation (workshops). The course will also consider the issue of equity and methods for incorporating equity into health economic evaluations.

**MHA6360 HEALTH CARE IN CANADA - OVERVIEW** (3cr.)

**MHA6361 LEADING STRATEGY AND CHANGE IN HEALTH CARE ORGANIZATIONS** (3cr.)
performance. Strategic change simulation in a health care context. Managing change in health care settings. Understanding individual, organizational and institutional level changes. Diffusion of change and innovation in health care. Prerequisite: MBA 5260

MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
Overview of current developments, issues and challenges in the emerging field of health informatics. Historical development as well as basic foundations of health informatics including theoretical, methodological and ethical/legal underpinnings will be studied. Critical examination of information management principles and methods in Canadian health care organizations both public and private. Emerging applications in health informatics as well as approaches to understanding and evaluating these applications. Identification of the issues that CIO’s face in their attempts to provide the right information to the right people, at the right time.

MHA6380 QUANTITATIVE METHODS AND THEIR APPLICATIONS TO HEALTH CARE DECISION MAKING (3cr.)
The use of these methods has recently become an active and growing area of practice and research in contexts including wait list management, patient flow, population demand estimates, health human resource management and the coordination of resources for elective and emergency services. This course is designed to provide health care decision makers with an overview of several useful quantitative methods that can provide insight and support for complex decisions. The course will cover the following topics: decision analysis; mathematical model formulation; linear programming and optimization; forecasting; queuing theory and simulation modeling; dynamic programming. This class is not intended for students who have a background in operations research. Rather it is intended for future or current managers who need to have a grasp of the potential of the mathematical tools available to help optimally utilize the resources under their control.

MHA6990 HEALTH CARE ADMINISTRATIVE RESIDENCY AND FIELD PROJECT (7.5cr.)
Prérequis : Un minimum de 12 crédits de cours MBA et 18 crédits de cours MHA. / Prerequisite: At least 12 credits of MBA courses and 18 credits of MHA courses.

Electives Outside the School
Students may take courses outside of the Telfer School of Management as electives. To do so, they must receive permission of the School. Normally this would involve providing a description of the proposed course along with a rationale for the relevance of this course to the student’s program of study. The School reserves the right to refuse such requests when a student is on academic probation.

Students may take graduate level courses in any discipline recognized by the Faculty of Graduate and Postdoctoral Studies. For more information on these courses, please consult the relevant program calendars that are available at the graduate programs secretariat.

Health Systems

The Telfer School of Management (TSsM) offers a graduate program leading to the degree of Master of Science in Health Systems (MSc in HS). This research-based program is designed to train researchers and academic leaders in the expanding field of health systems. These systems are studied using the scientific problem solving methods of management science and systems science. Students follow a process of scientific discovery applying abstract modeling or empirical discovery paradigms.

The MSc in Health Systems is one of the participating programs in the collaborative program in environmental sustainability. The MSc in Health Systems is acceptable as a basis for admission to the PhD in management.

The program builds on the expertise of professors and researchers in health systems research from the Telfer School of Management and from the Faculties of Health Sciences, Medicine, Social Sciences, Engineering and the Institute of Population Health.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). It is offered in both English and French, primarily on a full-time basis.

Programs

Master of Science Health Systems

Admission

Applicants must hold a four-year bachelor’s (honours) degree in management (B. Com.), health sciences, life sciences, medicine, nursing, computer science, economics, social sciences, engineering, mathematics or a related field with at least a 75% (B+) cumulative grade point average (CGPA) calculated in accordance with FGPS guidelines.

The academic profile of applicants must contain a background in analysis including the equivalent of at least 6 credits of analysis courses. Analysis courses include undergraduate level courses in quantitative and qualitative research methods, micro and macro economics, calculus, probability and statistics, linear algebra, and information technology. These courses represent excellent preparatory material for the core courses of the MSc in HS program. Students lacking background in the quantitative analysis material may be required to complete prerequisite course
work as a condition of admission. The specific requirements of the qualifying program will be determined by the admissions committee based on the academic and professional profile of the applicant.

Applicants to the program must have achieved at least a 50th percentile score on either the GMAT (General Management Admission Test) or GRE (Graduate Record Examinations), or TAGE-MAGE (Test d’ Aptitude aux Etudes en Gestion), and submit at least two letters of recommendation and a statement of research interest of between 800-1000 words. The research statement is a letter of intent stating the applicant’s motivation for studying in the MSc in HS program, their commitment to conducting research, their preferred areas of research interest as well as identifying a possible research supervisor.

Applicants who have successfully completed compulsory credits or their equivalents prior to admission will be granted an exemption, that is, they will be permitted, on the advice of their supervisor, to replace those credits with elective credits in the program. To be eligible for exemption, the credits must have been completed with a grade of 70 per cent (B) or better no more than five years prior to admission to the MSc. The maximum number of credits for which an exemption can be granted is six. The general regulations of the FGPS, section B 2.7, apply for transfer of credits.

Students are normally admitted to the program on a full-time basis and are required to register full-time for three sessions. Applicants applying to be admitted on a part-time basis may be considered, provided they have demonstrated a clear commitment and plan for completing their degree requirements in a timely way.

Language Requirements

Applicants must be able to understand, speak and write either English or French fluently and they must indicate in their application the language in which they intend to take their courses. Those whose mother tongue is neither English nor French are required, at the time of application, to provide evidence of proficiency in one of these languages. Applicants whose mother tongue is not English and who intend to study in English are required to provide one of the following as evidence of proficiency in English (the test scores cannot be more than two years old as of September 1 of the year of potential entry into the program):

- A score of at least 250 on the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, New Jersey, USA, 08540; see also www.web1.toefl.org
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: www.ielts.org
- A score of at least 14 on the CANTEST, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years of last six years).

Candidates applying to study in French must submit one of the following to confirm their French proficiency:

- A score of at least 14 on the TESTCAN, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in a French language university.
- Proof of recent prolonged residence and exercise of a profession in a French-speaking country (normally at least four years of the last six years).

Considering the significant amount of health systems research that is published in English, all applicants need the ability to read and understand written English; proof of this ability may be required.

Language of Instruction

All core courses and some of the electives are offered in both French and English. Some of the seminars in the Health Systems Research Seminar will be delivered in English and some in French so that the requirement may be completed fully in either language. There are sufficient elective courses in both languages for students to complete the elective requirements in either French or English. As per University of Ottawa policy, students can complete major assignments, examinations and their thesis in either English or French. This also applies to the oral presentations given by the students in the Health Systems Research Seminar. Opportunities exist for students to use French or English as a primary language of communication as they conduct their research.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Program Requirements

The MSc in health systems requires successful completion of 30 credits consisting of 12 course credits, a 6-credit Health Systems Research Internship and 12 credits for the thesis.

Compulsory courses (7.5 credits)

MHS6301 RESEARCH DESIGN METHODOLOGIES AND THE CONDUCT OF RESEARCH (3cr.)
MHS6380 SYSTEMS ANALYSIS, MODELING, AND DECISION SUPPORT IN HEALTH (3cr.)
Students are required to attend the regular seminars throughout their program of study; students are expected to present their proposal and preliminary research results normally in the winter (session II) or Spring (session III) session of the Health Systems Research Seminars.

At least 1.5 credits of MHA courses; the complete list of courses is available in the MHA calendar.

**Electives (4.5 credits)**

Students in consultation with their thesis supervisor will select elective courses in areas related to their research topics. All courses offered in the MHA program are open to the MSc students. Registration to courses offered in the MBA, the MSc in Management and other graduate programs will normally require permission from the respective Program Directors.

The following list of electives, regrouped under possible themes of study, is not exhaustive, and is provided as a guideline for students and their advisors. Each year a list of elective courses approved and offered for students in the program will be posted on the program’s website. Graduate courses other than those posted on the program website may be selected with the approval of the Thesis Supervisor and Program Director. It is the students’ responsibility to verify that they have the prerequisites for the elective courses they wish to take and to obtain the permission of the academic unit if required. Students are advised that enrolment in out of faculty courses may be limited at the discretion of the faculty offering the course. Unless otherwise indicated, all courses are worth 3 credits.

1. **Health Services and Policy**

   MHA6203 PROGRAM EVALUATION FOR HEALTH CARE MANAGERS (1.5cr.)
   MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)
   MHA6216 RISK MANAGEMENT IN HEALTH CARE (1.5cr.)
   MHA6250 HEALTH CARE ACCOUNTING AND FINANCE (1.5cr.)
   MHA6351 HEALTH ECONOMICS (3cr.)
   MHA6360 HEALTH CARE IN CANADA - OVERVIEW (3cr.)
   [[ADM6609]] NSG6160 POLICY, POLITICAL ACTION AND CHANGE IN HEALTH CARE (3cr.)
   NSG6160 POLICY, POLITICAL ACTION AND CHANGE IN HEALTH CARE (3cr.)
   [[[EP7181]]]

2. **Public Health and Health Promotion**

   MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
   MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
   MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
   EPI5181 POPULATION HEALTH RISK ASSESSMENT I (3cr.)
   EPI5210 PUBLIC HEALTH ADMINISTRATION (3cr.)
   EPI5271 IMAGE PROMOTION (3cr.)

3. **Health Care Organizations**

   MHA6230 HUMAN RESOURCE MANAGEMENT IN HEALTH CARE (1.5cr.)
   MHA6361 LEADING STRATEGY AND CHANGE IN HEALTH CARE ORGANIZATIONS (3cr.)
   MHA6250 HEALTH CARE ACCOUNTING AND FINANCE (1.5cr.)
   MBA5237 CHANGE MANAGEMENT (1.5cr.)
   MBA5237 CHANGE MANAGEMENT (1.5cr.)
   MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
   MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
   [[AD6610]] MBA6266 PRINCIPLES OF NEGOTIATION FOR THE GLOBAL MANAGER (1.5cr.)
   MBA6266 PRINCIPLES OF NEGOTIATION FOR THE GLOBAL MANAGER (1.5cr.)

4. **Health Systems Analysis and Optimization**

   MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE (1.5cr.)
   MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
   MHA6380 QUANTITATIVE METHODS AND THEIR APPLICATIONS TO HEALTH CARE DECISION MAKING (3cr.)
   MBA5280 OPERATIONS MANAGEMENT (1.5cr.)
   MBA5280 OPERATIONS MANAGEMENT (1.5cr.)
   ADM6275 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS (1.5cr.)
   SYS5130 SYSTEMS OPTIMIZATION AND MANAGEMENT (3cr.)
   SYS5140 ECONOMIC SYSTEM DESIGN (3cr.)
   EPI5242 BIOSTATISTICS I (3cr.)
   EPI5242 BIOSTATISTICS I (3cr.)
   EPI6188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
   MAT5307 (MATH 5307) TOPICS IN OPERATIONS RESEARCH (3cr.)

5. **Health Informatics and Technology**

   MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE (1.5cr.)
   MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
   EPI6179 COMPUTER APPLICATIONS IN MEDICINE (3cr.)
   EPI5188 HEALTH TECHNOLOGY ASSESSMENT (3cr.)
   CSI5115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
   [[CSI5387]] CSI5387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)

6. **Quality of Care**
MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
MHA6216 RISK MANAGEMENT IN HEALTH CARE (1.5cr.)
MBA6260 MANAGING CUSTOMER RELATIONS (1.5cr.)
MBA6220 MANAGING CUSTOMER RELATIONS (1.5cr.)
MHA6361 LEADING STRATEGY AND CHANGE IN HEALTH CARE ORGANIZATIONS (3cr.)
MHA6360 HEALTH CARE IN CANADA - OVERVIEW (3cr.)
MHA6215 MANAGEMENT AND EVALUATION OF QUALITY OF PATIENT CARE (1.5cr.)

7. Clinical Decision Making and Support
MHA6203 PROGRAM EVALUATION FOR HEALTH CARE MANAGERS (1.5cr.)
MHA6216 RISK MANAGEMENT IN HEALTH CARE (1.5cr.)
MHA6380 QUANTITATIVE METHODS AND THEIR APPLICATIONS TO HEALTH CARE DECISION MAKING (3cr.)
MBA5280 OPERATIONS MANAGEMENT (1.5cr.)
MBA5280 OPERATIONS MANAGEMENT (1.5cr.)
NSG5133 DECISION MAKING IN CLINICAL PRACTICE (3cr.)
NSG5133 DECISION MAKING IN CLINICAL PRACTICE (3cr.)
EP1581 POPULATION HEALTH RISK ASSESSMENT I (3cr.)
EP16276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
PHR6101 RISK MANAGEMENT IN GOVERNMENT (3cr.)
CSJ5307 EXPERT SYSTEMS
ECS5119 MEDIATION AND NEGOTIATION: THEORY AND RESEARCH (3cr.)

Master's Thesis and Health Systems Research Internship (18 credits)

The research deliverables of the program are comprised of the Master's thesis and the research internship for a total of 18 credits.

MHS7999 THÈSE DE MAÎTRISE / MSc THESIS (12cr.)

Students registered for the MSc in HS must submit to their Thesis Committee, before the end of the second session of registration in the program, a clearly defined research proposal. The Thesis Committee will be formed prior to the thesis proposal submission. The Committee will include the thesis supervisor (and co-supervisor, if desired), a researcher from one of the collaborating institutions who may also act as co-supervisor, and another faculty member. Approval of the proposal by the Thesis Committee will normally be obtained by the end of the second session and no later than the end of the third. A student must register in the Masters thesis in the session immediately following the approval of the proposal. A student whose proposal is not approved on the first attempt may be permitted to submit a second proposal and present it in the Health Systems Research Seminars. Failure to obtain approval following the second submission will lead to an NS grade and to withdrawal from the program.

The master’s thesis should reveal that the candidate is able to work independently in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. Insofar as possible, the thesis should be an original contribution. Theses will comprise theoretical and/or empirical research contributions applying a wide range of data collection methodologies, and modeling and analysis techniques based on appropriate software applications. Data collection methodologies will include the gathering of secondary data from published or archived sources, and/or primary data through interviews, surveys, and ethnographic studies. For example, topics for thesis research may address the issues of improving efficiencies of a health system and providing quality health services, the role of information and communication technologies in delivery of health services and the development of decision support tools.

Once the thesis proposal is accepted, students will be eligible to begin their Health Systems Research Internship with one of the collaborating organizations (see MHS7991).

The completed thesis will be evaluated by a Thesis Examining Board composed of at least two professors who are members of the FGPS and involved in the MSc in Health Systems. For information regarding the thesis, consult section G of the General Regulations of the FGPS and the guide Preparing a thesis or a Research Paper, which are both accessible through the FGPS website at www.gradstud.uottawa.ca.

MHS7991 INTERNAT DE RECHERCHE EN SYSTÈMES DE SANTÉ / HEALTH SYSTEMS RESEARCH INTERNSHIP (6cr.)

All MSc students will be required to undertake a one-semester Research Internship that takes place in one of the collaborating Research Institutes. Students will work under the direction of their thesis supervisor and of a research mentor in the Institute. The Institute mentor is one of the members of the Thesis Committee. The Internship will allow the student to conduct thesis research and at the same time learn about and be involved in one or several of the cutting-edge research projects conducted in the Institute. It is expected that the student while doing the Health Systems Research Internship will participate in research seminars offered at the Institute as per the advice of the Internship supervisor as well as in the Health Systems Research Seminars. At the end of the session of the internship, students will be required to present a report to their Thesis Committee summarizing the research activities completed during the internship. The internship will be evaluated by the members of the Thesis Committee based on: (i) the Health Systems Research Seminars presentation and (ii) the written internship report to the Thesis Committee. The internship is graded on a (S) Satisfactory / (NS) Non-Satisfactory basis.

Collaborative program in Environmental Sustainability (with thesis)

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At
least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

Collaborative program in Environmental Sustainability (with research paper)

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar course (EVD5100 or EVD5500, 3 credits).
- Satisfactory completion of one course (3 credits) selected from a list of optional courses for the Collaborative Program in Environmental Sustainability.
- Satisfactory completion of the research paper, which must be on a topic in the area of environmental sustainability, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the research paper is appropriate for the designation “Specialization in Environmental Sustainability.” The research paper is evaluated by two professors, one of whom is selected by the primary program, and the other by the Collaborative Program Director, on the advice of the Collaborative Program Committee.

Duration of program

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

Minimum standards

The minimum passing grade in all courses taken as part of the program is 65% (C+). Students who have incurred failures in two courses or a practicum, or whose thesis proposal is rejected twice (NS grade in MHS7991) is withdrawn from the program.

Courses

MHS5301 RESEARCH DESIGN METHODOLOGIES AND THE CONDUCT OF RESEARCH (3cr.)
Introduction to research and scientific inquiry in order to foster a better understanding of the research discovery process. The process of planning, designing, and conducting a research study focusing on the research process, detailed discussions of the research methods and techniques available for use at each stage in the process, and linking the choice of research methods and techniques to the nature of the problem and the objectives of the study. Exposure to various research methodologies including paradigms of social phenomena modeling, qualitative research, mathematical modeling methods, and experimental design approaches including randomized control trials (RCT) design principles.

MHS6380 SYSTEMS ANALYSIS, MODELING, AND DECISION SUPPORT IN HEALTH (3cr.)
Review of Checkland’s soft-systems modeling methodology and of other systems approaches. Study of systems analysis in the broader context of modeling complex systems and of techniques for providing decisional support at macro and micro levels, including support of clinical decisions. Oral and written reports required.

MHS6930 RESEARCH TOPICS IN HEALTH SYSTEMS (3cr.)
Seminar course focusing on current research issues and topics in health systems. Topics may change from year to year.

MHS6991 SÉMINAIRES SUR LA RECHERCHE EN SYSTÈMES DE SANTÉ / HEALTH SYSTEMS RESEARCH SEMINARS
Série de séminaires de recherche de deux types : ceux donnés par des conférenciers invités et ceux animés par des étudiants qui présenteront leurs projets de thèse. Les étudiants doivent assister à au moins six des séminaires donnés par des conférenciers invités pendant toute la durée du programme d'études. Les projets de thèse et résultats préliminaires des recherches des étudiants sont présentés lors de la session d'hiver (session II) ou celle du printemps (session III). Noté S (satisfaisant) ou NS (non satisfaisant). / Research seminar series with some seminars given by invited speakers and others consisting of student presentations of their thesis proposals. Students are expected to attend at least six of the invited speakers’ seminars over the duration of their program. Students are expected to present their proposal and preliminary research results in the winter (session II) or spring (session III). Evaluated S (Satisfactory) or NS (Not Satisfactory).

MHS6998 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)
Études avancées dans un domaine de systèmes de santé sous la direction d’un professeur et aboutissant à un rapport écrit. L’étudiant peut proposer un sujet de recherche. Préalable : approbation du directeur du programme sur recommandation du directeur de thèse de l’étudiant. Les étudiants peuvent s’inscrire à un maximum de 6 crédits de cours de lectures dirigées. / Advanced study in an area of health systems under the supervision of a professor and leading to a major written report. Students may propose research topics. Prerequisite: approval by the program director on the recommendation of the student’s thesis supervisor. Students can register to at most 6 credits of directed readings.

MHS6999 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)
Études avancées dans un domaine de systèmes de santé sous la direction d’un professeur et aboutissant à un rapport écrit. L’étudiant peut proposer un sujet de recherche. Préalable : approbation du directeur du programme sur recommandation du directeur de thèse de l’étudiant. Les étudiants peuvent s’inscrire à un maximum de 6 crédits de cours de lectures dirigées. / Advanced study in an area of health systems under the supervision of a professor and leading to a major written report. Students may propose research topics. Prerequisite: approval by the program director on the recommendation of the student’s thesis supervisor. Students can register to at most 6 credits of directed readings.
MHS7991 INTERNAT DE RECHERCHE EN SYSTÈMES DE SANTÉ / HEALTH SYSTEMS RESEARCH INTERNSHIP (6cr.)

Tous les candidats à la M.Sc. devront effectuer un internat de recherche d’une durée d’une session qui aura lieu à l’un des instituts partenaires de l’Université. Ils travailleront sous la supervision directe de leur directeur de thèse et d’un mentor membre de l’institut. Le mentor fait partie de leur comité de thèse. Pendant son internat, l’étudiant effectuera sa recherche de thèse tout en prenant part à l’un ou plusieurs des projets de recherche d’avant-garde de l’institut. On s’attend à ce qu’il participe, sur la recommandation de son mentor, à des séminaires de recherche offerts par l’institut ainsi qu’au Séminaire sur la recherche en systèmes de santé (MHS6991). À la fin de l’internat, l’étudiant devra présenter à son comité de thèse un rapport sommaire sur ses activités de recherche. Les membres du comité de thèse évalueront l’internat selon les critères suivants : (i) la présentation que l’étudiant aura faite lors du Séminaire sur la recherche en systèmes de santé; (ii) le rapport d’internat écrit que l’étudiant aura présenté à son comité de thèse. L’internat sera noté (S) satisfaisant ou (NS) non satisfaisant. / All MSc students will be required to undertake a one-session Research Internship that takes place in one of the collaborating Research Institutes. Students will work under the direction of their thesis supervisor and of a research mentor in the Institute. The Institute mentor is one of the members of the Thesis Committee. The Internship will allow the student to conduct thesis research and at the same time learn about and be involved in one or several of the cutting-edge research projects conducted in the Institute. It is expected that the student while doing the Health Systems Research Internship (MHS6991) will participate in research seminars offered at the Institute as per the advice of the Internship supervisor as well as in the Health Systems Research Seminars. At the end of the session of the Internship, students will be required to present a report to their Thesis Committee summarizing the research activities completed during the Internship. The Internship will be evaluated by the members of the Thesis Committee based on: (i) the Health Systems Research Seminars presentation and (ii) the written Internship report to the Thesis Committee. The Internship is graded on a (S) Satisfactory 1 (NS) Non-Satisfactory basis.

MHS7999 THÈSE DE MAÎTRISE / MSc THESIS (12cr.)

History

The Department of History offers the degrees of Master of arts (with or without thesis) and doctor of philosophy in history. Within the limits imposed by the availability of qualified staff, students may pursue their studies in English or in French.

At the master’s level students undertake research in diverse areas corresponding to the expertise and interests of faculty members. The program includes a co-op option at the master’s.

The Department participates in the collaborative programs in Women’s Studies and in Medieval and Renaissance Studies at the master’s level, allowing students to specialize in one of these areas. For further details, please consult the “Admission” section of the master program.

At the doctoral level, the department has five areas of strength:

- Canada and North America
- Europe
- Women, Gender and the Family
- Empire, Colonization and Decolonization
- War, Conflict and Diplomacy.

Candidates may be accepted in other areas depending upon the availability of qualified supervisors.

The department participates in the collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission Requirements.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts History

Master of Arts History Specialization in Medieval and Renaissance Studies

Master of Arts History Specialization in Women’s Studies

Doctorate in Philosophy History

Doctorate in Philosophy History Specialization in Canadian Studies

Admission
Students must have an honours BA in history (or the equivalent) with a minimum average of 70 per cent (B) before they can be considered for admission. The department may require a written or oral entrance examination.

**Collaborative programs**

The Department of History is a participating unit in the collaborative programs in Women’s Studies (master’s level only) and in Medieval and Renaissance Studies (master’s level only).

- The program in Women’s Studies has been established for students wishing to enrich their training in history by including an interdisciplinary component in Women’s Studies. The specific requirements of this collaborative program include two core courses and a thesis or major research paper on a topic related to Women’s studies. Only one of the core “FEM” courses will be counted for credit towards the requirements of the master’s with thesis option.
- The program in Medieval and Renaissance Studies has been established for students wishing to enrich their training in History by including an interdisciplinary component in Medieval and Renaissance Studies. The specific requirements of this collaborative program include two core courses in medieval studies and a thesis on a topic related to Medieval and Renaissance Studies.

Students should indicate in their initial application for admission to the master’s program in History that they wish to be accepted into one of the collaborative programs. For further details, see the description of these collaborative programs posted on the FGPS website.

**Co-op option**

To be admissible to the co-op option, students must commence the Master of History Program in the fall session and be registered full time. Applications for the co-op option must be received by the end of the first month of the student’s registration in the MA program. Acceptance into the co-op option is offered on a competitive basis and is managed by the Co-op Office. Enquiries should be directed to that office.

**Language requirements**

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Program Requirements**

Students may prepare for a master’s degree in one of two ways:

- The successful completion of 12 credits at the graduate level and the preparation and effective defence of a thesis (HIS7999) before a board of at least two examiners, members of the Faculty of Graduate and Postdoctoral Studies, and presided over by the Chairperson of the Department or his representative. The master’s thesis should be between 125 and 150 pages in length.
- The successful completion of 18 credits at the graduate level plus a research paper (HIS6999). The research paper must receive the approval of the supervisor and a passing grade from the reader. The research paper should be about 50 pages in length.

**Language requirements**

Students in both the master’s and doctoral programs must understand, speak and write either English or French fluently. In addition, students in both programs must demonstrate their reading competence in Canada’s other official language, French or English, at the earliest opportunity, by passing a language examination administered by the department in the fall or winter session. To this end, registration in HIS 5590 is compulsory. Students who take a graduate course in history in the other language may be exempted from this examination, given a favourable report from the professor concerned. Students working in a field of history where a language other than English or French is necessary may also be required to demonstrate their grasp of that language.

**Collaborative program in Women’s Studies**

Students admitted to the Collaborative program in women’s studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5103 FEMINIST METHODOLOGIES (3cr.)
  - Students must complete the two compulsory courses before their first registration for the major research paper or thesis.
- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.
- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor...
should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.

- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women’s studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.
- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

**Collaborative program in Medieval and Renaissance Studies**

Students in the program must complete the requirements of their primary program and those of the collaborative program. One of the two 3-credit courses in Medieval and Renaissance Studies (MDV5100 or MDV5500) will be counted towards the requirements of the primary program. Consequently, students in the specialization will have only one extra course to take.

The requirements of the collaborative program are as follows:

- Two compulsory courses:
  - MDV5100 Medieval and Renaissance Studies Research Methods and Tools (3cr.)
  - MDV5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3cr.)
  - MDV5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3cr.)

  Students must complete the two compulsory courses before they register to the major research paper or thesis.

- A thesis or major research paper on a topic related to Medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.
- In both cases, the title of the degree will indicate the discipline of the participating unit with the specification "specialization in Medieval and Renaissance Studies."

**Co-op option**

The requirements for the co-op option are as follows:

- Co-op students must register full-time and complete two work terms: HIS6001 and HIS6002. The co-op work terms are each worth six credits.

Each work term is graded P/F (Pass or Fail), based on the employer’s report and on a written report completed by the student. (The report must be 30 pages, including appendices.) The report is evaluated by the professor in charge of the graduate co-op option in History.

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain in the co-op option, students must:

- Be registered full-time.
- Maintain a 7.0 cumulative grade point average.
- Obtain a satisfactory grade (P) for each co-op work term.

**Duration of program**

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

**Residence**

Students admitted on a full-time basis must register full-time for at least three sessions.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

Up to six credits in 9000-level fields may be counted towards the master's program course requirements. HIS 5122 or HIS 5522 is obligatory.
Students in the master's program may take, at the discretion of the departmental graduate studies committee, one three-credit directed studies course (either HIS 7399 Directed Studies in History or HIS 7799 Études dirigées en histoire).

Master's students may also take, with the approval of the departmental graduate studies committee, three credits from among fourth-year seminars.

All of the 5000-, 6000- and 7000-level courses listed below are for three credits each (except for HIS 5199, 5599, 6999 and 7999). They are not necessarily offered every year.

Students should check with the Department or the departmental Web site for annual course offerings.

**HIS5103 SEMINAR IN CANADIAN HISTORY** (3cr.)

**HIS5111 SEMINAR IN NEW FRANCE** (3cr.)

**HIS5122 RESEARCH SEMINAR** (3cr.)

**HIS5123 SEMINAR ON HISTORY OF QUEBEC** (3cr.)

**HIS5129 SEMINAR ON BRITISH NORTH AMERICA** (3cr.)

**HIS5199 ENGLISH LANGUAGE REQUIREMENT IN HISTORY**

**HIS6001 STAGE COOP I / CO-OP WORK TERM I** (6cr.)
Expérience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l'évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l'étudiant. Préalable : permission du Bureau coop. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student's work term report. Prerequisite: Permission of the co-op office.

**HIS6002 STAGE COOP II / CO-OP WORK TERM II** (6cr.)
Expérience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l'évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l'étudiant. Préalable : HIS6001. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student's work term report. Prerequisite: HIS6001.

**HIS6103 SEMINAR ON AMERICAN HISTORY** (3cr.)

**HIS6332 SEMINAR ON THE HISTORY OF TECHNOLOGY** (3cr.)

**HIS6334 HISTORY OF FRANCOPHONES IN NORTH AMERICA, OUTSIDE OF QUEBEC** (3cr.)

**HIS6336 SEMINAR ON IMMIGRANTS AND ETHNIC GROUPS IN NORTH AMERICA** (3cr.)

**HIS6536 SÉMINAIRE EN HISTOIRE DES IMMIGRANTS ET DES COMMUNAUTÉS ETHNO-CULTURELLES EN AMÉRIQUE DU NORD** (3cr.)

**HIS6999 MÉMOIRE DE MAÎTRISE / MA RESEARCH PAPER**

**HIS7103 SEMINAR IN EUROPEAN HISTORY** (3cr.)

**HIS7304 SEMINAR ON MEDIEVAL HISTORY** (3cr.)

**HIS7330 SEMINAR ON COMPARATIVE HISTORY** (3cr.)

**HIS7331 SEMINAR ON THE HISTORY OF WOMEN AND GENDER** (3cr.)
HIS7333 SEMINAR ON INTERNATIONAL RELATIONS (3cr.)

HIS7335 SEMINAR ON WAR AND SOCIETY (3cr.)

HIS7336 SLOVAKS IN EUROPE, CANADA AND THE UNITED STATES SINCE 1870 (3cr.)

HIS7337 SEMINAR ON HISTORY OF MEDICINE (3cr.)

HIS7338 SEMINAR ON THE HISTORY OF COLONIALISM AND POSTCOLONIALISM (3cr.)
In-depth examination of issues relating to the history of colonialism and postcolonialism.

HIS7399 DIRECTED STUDIES IN HISTORY (3cr.)

HIS7504 SÉMINAIRE EN HISTOIRE MÉDIÉVALE (3cr.)

HIS7530 SÉMINAIRE EN HISTOIRE COMPARÉE (3cr.)

HIS7535 SÉMINAIRE SUR LA GUERRE ET LA SOCIÉTÉ (3cr.)

HIS7705 MÉTHODES DE RECHERCHE EN HISTOIRE (3cr.)

HIS7999 THÈSE DE MAÎTRISE / MA THESIS

HIS8900 SÉMINAIRE DE RECHERCHE DOCTORALE/ DOCTORAL RESEARCH SEMINAR (3cr.)
Séminaire sur des sujets se rapportant aux débats historiographiques et aux méthodologies de recherche en histoire. / Seminar on topics relating to the historiographical debates and research methodologies in history.

All the 9900-level doctoral fields listed below are for three credits (except HIS 9998 and 9999). Subject to availability of professors, students are responsible for determining their fields and field directors. The language of instruction is decided on mutually between the student and the professor.

HIS9901 LE CANADA FRANÇAIS / FRENCH CANADA (3cr.)

HIS9902 L’AMÉRIQUE COLONIALE / COLONIAL AMERICA (3cr.)

HIS9903 L’AMÉRIQUE BRITANNIQUE DU NORD JUSQU’À 1873 / BRITISH NORTH AMERICA TO 1873 (3cr.)

HIS9904 LE CANADA APRÈS LA CONFÉDÉRATION / POST-CONFEDERATION CANADA (3cr.)

HIS9905 LA NOUVELLE-FRANCE / NEW FRANCE (3cr.)

HIS9910 QUÉBEC / QUEBEC (3cr.)

HIS9920 L’AMÉRIQUE LATINE / LATIN AMERICA (3cr.)

HIS9930 HISTOIRE DE L’ASIE / ASIAN HISTORY (3cr.)

HIS9940 HISTOIRE DU MOYEN-ORIENT ET DE L’AFRIQUE DU NORD / MIDDLE EASTERN AND NORTH AFRICAN HISTORY (3cr.)

HIS9950 HISTOIRE DE L’AFRIQUE / HISTORY OF AFRICA (3cr.)
Human and Molecular Genetics (Collaborative)

The Faculty of Medicine offers a collaborative program in Human and Molecular Genetics at the master's and doctoral levels. The primary graduate programs in Biochemistry (BCH), Cellular and Molecular Medicine (CMM) and Neuroscience (NSC) collaborate in offering the specialization. The degree awarded specifies the primary program and indicates "specialization in Human and Molecular Genetics."

Students must meet the admission and curriculum requirements of their primary program as well as the specific requirements of the collaborative program.
Members of the program include scientists with interest and expertise in the following areas: developmental genetics, neuromuscular disease, microbial genetics, host resistance, cancer biology, aging, development of novel molecular therapeutics, gene therapy, growth and development, auto-immune diseases, molecular biology of viruses, bacteria and parasites, genetic epidemiology, retinal development and disease, animal models of human disease, molecular aspects of signal transduction.

The doctoral-level program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in their primary program with a specialization in Human and Molecular Genetics and an MD. For more information please see the website of the Faculty of Medicine.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Biochemistry Specialization in Human and Molecular Genetics
Master of Science Cellular and Molecular Medicine Specialization in Human and Molecular Genetics
Master of Science Neuroscience Specialization in Human and Molecular Genetics
Doctorate in Philosophy Biochemistry Specialization in Human and Molecular Genetics
Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Human and Molecular Genetics
Doctorate in Philosophy Neuroscience Specialization in Human and Molecular Genetics

Admission

Candidates are admitted through the master’s or doctoral program either in biochemistry (BCH) or cellular and molecular medicine (CMM) or neuroscience (NSC) and must therefore meet the admission requirements of those programs. Transfer from master’s to doctoral level without completing a master’s thesis is permitted in the collaborative program under the same conditions as in the primary programs. Proficiency in English is required.

Candidates should indicate in their initial application for admission into the primary program that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students will normally be informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Program Requirements

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

- Six credits of courses, three credits of which must be from the student’s primary program and three of which must be HMG credits.
- Enrolment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Presentation and successful defence of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Master’s candidates intending to transfer directly to the doctoral program must meet the conditions set by their primary program.

Course selection is subject to the approval of the HMG program director.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses
HMG8103 ADVANCED TOPICS IN THE MOLECULAR BIOLOGY OF HUMAN DISEASES I (3cr.)
Topics will be selected and representative of current developments in the field. The course consists of a repeated series of a 3 hour lecture by an expert in the field one week, followed by student presentations, discussions and critique of assigned papers on that topic the following week. Topics on selected diseases will focus on various aspects of cancer, apoptosis, disease gene identification and gene therapy. In the past these topics have included the molecular aspects of various cancers, spinal muscular atrophy, tissue regeneration, the discovery of disease genes, infectious disease (HIV) and gene therapy. Students will write a grant proposal and participate in mock grant review panels. Depending on enrolment, the course may be limited to HMG students only. Prerequisite: Permission of the HMG program director.

HMG8105 ADVANCED TOPICS IN THE MOLECULAR BIOLOGY OF HUMAN DISEASES II (3cr.)
Topics will be selected and representative of current developments in the field. The course consists of a repeated series of a 3 hour lecture by an expert in the field one week, followed by student presentations, discussions and critique of assigned papers on that topic the following week. Topics on selected diseases will focus on various aspects of cancer, apoptosis, disease gene identification and gene therapy. In the past these topics have included the molecular aspects of various cancers, spinal muscular atrophy, tissue regeneration, the discovery of disease genes, infectious disease (HIV) and gene therapy. Students will write a grant proposal and participate in mock grant review panels. Depending on enrolment, the course may be limited to HMG students only. Prerequisite: Permission of the HMG program director.

HMG8106 CLINICAL CYTOGENOMICS (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8600 SPECIAL TOPICS IN HUMAN AND MOLECULAR GENETICS (3cr.)
Current topics in molecular genetics, developmental genetics, cancer genetics, neurogenetics, population genetics, clinical genetics and other areas depending on available expertise and interest expressed. Offered alternate years subject to sufficient demand. Prerequisite: Permission of the course coordinator.

Human Kinetics

The School of Human Kinetics (SHK), located within the Faculty of Health Sciences, offers a Master of Arts degree (MA), a Master of Science degree (MSc), a Master of Human Kinetics (MHK) and a Doctor of Philosophy degree (PhD) in human kinetics. The MSc program and the MA program both require a thesis. The Master of Human Kinetics is a course based program, offering two concentrations, one in sport management and the other in intervention and consultation. An integrated approach to the study of sport, physical activity and health allows students and professors to share research interests and professional expertise, and to contribute to the broad field of human kinetics.

The programs are offered on a full-time or on a part-time basis in French and in English. In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English. The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Master’s program

The MA and MSc programs pursue three major objectives:

- To contribute to the accumulation of facts and scientific data related to sport, physical activity and health, as well as to foster the development of critical thinking skills and problem solving abilities.
- To facilitate the acquisition of quantitative and qualitative knowledge in the field of biophysical sciences of sport, physical activity and health.
- To prepare human kinetics specialists so that they are better able to play a determinant role in Canadian society.

Theses may pertain to either of two general areas of specialization:

- MA: the focus is on sociocultural, psychosocial and administrative sciences (e.g., psychology, sociology, administration, intervention) as they relate to sport, physical activity and health.
- MSc: the focus is on biophysical sciences (e.g., biomechanics, physiology, psychomotor) as they relate to sport, physical activity and health.

The MHK program is an applied studies program that prepares students either in Sport Management or in Intervention and consultation. The program is course-based with an emphasis on a supervised internship that seeks to enhance the personal, academic and career development of students. Academic goals include developing such cognitive skills as problem solving, critical thinking, analysis and synthesis and, most importantly, relating theory to practice.
The department participates in a collaborative program in Women’s Studies at the MA level. For more information on this program, see the collaborative program in Women’s Studies.

**Doctoral program**

The PhD program involves two fields of research:

- Psychosocial sciences of sport, physical activity and health: This field involves studying sport, physical activity, and health from psychological, pedagogical, administrative, and/or socio-cultural perspectives.
- Biophysical sciences of sport, physical activity and health: This field includes biomechanics, physiology and metabolism, and neuro-psychomotor sciences as they relate to sport, physical activity, and health.

The department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission Requirements.”

**Programs**

**Master of Arts Human Kinetics**

**Master of Arts Human Kinetics Specialization in Women’s Studies**

**Master of Human Kinetics Concentration in Intervention and Consultation**

**Master of Human Kinetics Concentration in Sport Management**

**Master of Science Human Kinetics**

**Doctorate in Philosophy Human Kinetics**

**Doctorate in Philosophy Human Kinetics Specialization in Canadian Studies**

**Admission**

Applicants for any of the master's programs must meet the general requirements of the FGPS. They must hold an honours bachelor's degree (or equivalent) in human kinetics or a related field, with a minimum average of 70% (B).

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

**Collaborative programs**

The School of Human Kinetics participates in the collaborative program in Women’s Studies at the master’s level. This program has been established for MA students wishing to enrich their training in human kinetics by including an interdisciplinary component in women’s studies. The specific requirements of the collaborative program include two core “FEM” courses and a thesis on a topic related to women’s studies. Students in the collaborative program must complete three credits additional to those required in the regular program.

Students should indicate in their initial application for admission to the master’s program in human kinetics that they wish to be accepted into the collaborative program. For further details, see the description of the program posted on the FGPS website.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

**Program Requirements**

**Master of Arts in Human Kinetics (MA)**

The MA program requires 15 credits of courses and a thesis.

- **Compulsory courses (15 credits)**
  - One of the following two courses:
    - APA6100 QUALITATIVE DATA ANALYSIS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
    - APA6101 QUANTITATIVE DATA ANALYSIS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
  - One of the following two courses:
APA6902 QUALITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
APA6903 QUANTITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)

One of the following four courses:
APA6904 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ: ÉTUDES SOCIOCulturelles / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: SOCIOCULTURAL STUDIES (3cr.)
APA6905 THÈMES CHOISIS / SELECTED TOPICS (3cr.)
APA6910 THEMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : GESTION / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: MANAGEMENT (3cr.)
APA6911 THEMES CHOISIS EN SCIENCES DU LOISIR / SELECTED TOPICS IN LEISURE STUDIES (3cr.)
APA6907 EXAMEN DES ÉCRITS PSYCHOSOCIAUX EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / EXAMINATION OF PSYCHOSOCIAL LITERATURE IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
APA6923 SEMINaire / SEMINAR (1.5cr.)
APA6924 SEMINaire / SEMINAR (1.5cr.)

Thesis
APA6999 RECHERCHE ET THÈSE DE MAÎTRISE / MASTER’S RESEARCH AND THESIS

Master of Science in Human Kinetics (MSc)

The MSc program requires 15 credits of courses and a thesis.

Compulsory courses (12 credits)

One of the following two courses:
APA6902 QUALITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
APA6903 QUANTITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)

APA69101 QUANTITATIVE DATA ANALYSIS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
APA6908 EXAMEN DES ÉCRITS BIOPHYSIQUES EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / EXAMINATION OF BIOPHYSICAL LITERATURE IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
APA6923 SEMINaire / SEMINAR (1.5cr.)
APA6924 SEMINaire / SEMINAR (1.5cr.)

Optional courses (3 credits)

One of the following three courses:
APA6901 THEMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ: ÉTUDES Physiologiques / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: PHYSIOLOGICAL STUDIES (3cr.)
APA6903 THEMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : BIOMÉcanique / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: BIOMECHANICS (3cr.)
APA6909 THÈMES CHOISIS : CONTRÔLE MOTEUR ET APPRENTISSAGE / SELECTED TOPICS: MOTOR CONTROL AND LEARNING (3cr.)

Thesis
APA6999 RECHERCHE ET THÈSE DE MAÎTRISE / MASTER’S RESEARCH AND THESIS

Master of Human Kinetics (MHK)

The MHK program requires 30 credits.

Concentration in Sport Management

Compulsory courses (24 credits)

APA5105 ORGANIZATIONAL THEORY IN SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5111 SPORT EVENT MANAGEMENT (3cr.)
APA5303 MARKETING AND SPONSORSHIP OF SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5308 ORGANIZATIONAL BEHAVIOUR IN SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5318 FINANCIAL MANAGEMENT OF SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5916 STAGE EN ADMINISTRATION DU SPORT ET DE L’ACTIVITÉ PHYSIQUE / INTERNSHIP IN ADMINISTRATION OF SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5921 ANALYSE ET RÉflexion CRITIQUES DE LA THÉorIE ET PRATIQue EN GESTION DU SPORT / CRITICAL ANALYSIS OF AND REFLECTION ON THEORY AND PRACTICE IN SPORT MANAGEMENT (3cr.)
APA6912 CONSULTATION EN GESTION DU SPORT / SPORT BUSINESS CONSULTING (3cr.)

Optional courses (6 credits)

The choice of optional courses must be approved by the Director of Graduate Studies. The following is a list of suggested optional courses.

APA5104 SPORT AND PHYSICAL ACTIVITY IN CANADIAN LIFE (3cr.)
APA5142 INTERNATIONAL SPORT MANAGEMENT (3cr.)
APA5303 MARKETING AND SPONSORSHIP OF SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5305 POLICY ANALYSIS OF SPORT AND PHYSICAL ACTIVITY IN CANADA (3cr.)
APA5306 ETHICS AND VALUES IN SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5307 LEGAL ISSUES AND RISK MANAGEMENT IN SPORT (3cr.)
APA5308 ORGANIZATIONAL BEHAVIOUR IN SPORT AND PHYSICAL ACTIVITY (3cr.)
APA5997 ÉTUDES DIRIGÉES EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : DIRECTED STUDIES IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
APA6902 QUALITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
APA6910 THEMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : GESTION / SELECTED TOPICS IN SPORT,
PHYSICAL ACTIVITY AND HEALTH: MANAGEMENT (3cr.)

Concentration in Intervention and Consultation

- Compulsory courses (27 credits)
  - APA5107 COUNSELLING THEORIES AND SKILLS (3cr.)
  - APA5109 MENTAL TRAINING AND QUALITY LIVING I (3cr.)
  - APA5110 MENTAL TRAINING AND QUALITY LIVING II (3cr.)
  - APA5306 ETHICS AND VALUES IN SPORT AND PHYSICAL ACTIVITY (3cr.)
  - APA5311 ANALYSIS AND ENHANCEMENT OF INTERVENTIONS IN SPORT, PHYSICAL ACTIVITY AND HEALTH SETTINGS (3cr.)
  - APA5319 SEMINAR: INTERVENTION AND CONSULTATION (3cr.)
  - APA5926 STAGE EN INTERVENTION ET CONSULTATION / INTERNSHIP IN INTERVENTION AND CONSULTATION (3cr.)
  - APA5931 ANALYSE ET REFLEXION CRITIQUES DE LA THÉORIE ET PRATIQUE: INTERVENTION ET CONSULTATION / CRITICAL ANALYSIS AND REFLECTION OF THEORY AND PRACTICE: INTERVENTION AND CONSULTATION (3cr.)
  - APA6905 THEMES CHOISIS / SELECTED TOPICS (3cr.)
- Optional courses (3 credits)

The choice of optional courses must be approved by the Director of Graduate Studies.

Collaborative program in Women’s Studies

Students admitted to the Collaborative program in women’s studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5103 FEMINIST METHODOLOGIES (3cr.)
  - Students must complete the two compulsory courses before their first registration for the major research paper or thesis.
- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.
- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.
- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women’s studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.
- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

Duration of programs

The requirements of the MA or MSc program are usually fulfilled within two years of full-time study and within one year and four months for the MHK. The maximum time permitted whether full-time or part-time is four years from the date of initial registration.

Residence

All students admitted full-time must complete a minimum of three sessions of full-time registration, regardless of which program is chosen.

Minimum standards

The passing grade in all courses is C+. A student who incurs failures in two courses or a practicum is withdrawn from the program.

Courses

APA5303 MARKETING AND SPONSORSHIP OF SPORT AND PHYSICAL ACTIVITY (3cr.)
- Study of the literature and research pertaining to the marketing and sponsorship of sport and physical activity programs and events. Strategic planning, fundraising, and event management for various types of organizations.

APA5305 POLICY ANALYSIS OF SPORT AND PHYSICAL ACTIVITY IN CANADA (3cr.)
- Critical examination of the role of government in policy development. An analysis of sport and physical activity policies as related to amateur and professional sport organizations in Canada as well other organizations involved in sport and physical activity in the public and private sectors.
APA5306 ETHICS AND VALUES IN SPORT AND PHYSICAL ACTIVITY (3cr.)
Critical examination of professionals' and volunteers' decision-making in the context of sport and physical activity. Discussion of concepts and theories to encourage and cultivate critical, reflective, and ethically-based thinking about the cases examined.

APA5307 LEGAL ISSUES AND RISK MANAGEMENT IN SPORT (3cr.)
Study of legal aspects of sport including an introduction to law and the Canadian constitution (e.g. legislation relating to criminal and civil liability for injuries and the duties of managers, civil rights of athletes in selection and disciplinary procedures, human rights issues). Contractual obligations, responsibilities and principles of risk management in sport.

APA5308 ORGANIZATIONAL BEHAVIOUR IN SPORT AND PHYSICAL ACTIVITY (3cr.)
Study of organizational behavior in sport and physical activity organizations. Discussion of topics such as effective interpersonal communication, goal setting, group dynamics, team building, diversity, leadership, group renewal processes, gender differences in the workplace, power dynamics, and conflict management.

APA5311 ANALYSIS AND ENHANCEMENT OF INTERVENTIONS IN SPORT, PHYSICAL ACTIVITY AND HEALTH SETTINGS (3cr.)
Critical behaviour analysis of practitioners and clients in various sport, physical activity, and health contexts. Presentation of plans to enhance learning situations. Discussion of concepts of clinical supervision, self-supervision and peer-supervision. Experimentation with various observational tools. Prerequisite: APA5307, APA5926, APA66903.

APA5318 FINANCIAL MANAGEMENT OF SPORT AND PHYSICAL ACTIVITY (3cr.)
Financial management concepts and tools applied to sport and physical activity programs. Topics include: public and private sector funding, accounting and budgeting, economic impact studies, feasibility studies, resource acquisition strategies, public private partnerships, forms of ownership and event management.

APA5319 SEMINAR: INTERVENTION AND CONSULTATION (3cr.)
Critical analysis of current interventions and related issues in sport, physical activity, and health. Discussion of applied consultations. Preparation for the internship. Graded (S) satisfactory / (NS) not satisfactory.

APA5304 SPORT AND PHYSICAL ACTIVITY IN CANADIAN LIFE (3cr.)
Sociological analysis of sport and physical activity. Socio-historical determinants of sport and physical activity. Emphasis on the organizational structure of sport and physical activity, ideologies, and current practices. Different themes may also be examined: sociology of sport organizations, social movements, and social problems.

APA5305 ORGANIZATIONAL THEORY IN SPORT AND PHYSICAL ACTIVITY (3cr.)
Interpretation of organizational theory in the context of sport and physical activity environments. Focus on the study of Canadian amateur and professional sport organizations as well as other organizations associated to sport and physical activity in the public and private sectors.

APA5307 COUNSELLING THEORIES AND SKILLS (3cr.)
Critical examination of counselling approaches and theories. Discussion and application of fundamental counselling skills in the contexts of sport, physical activity, and health.

APA5309 MENTAL TRAINING AND QUALITY LIVING I (3cr.)
Presentation of current material in applied sport psychology, mental training consulting, and performance and life enhancement. Discussion of mental skills used at developmental and high performance levels. Application of mental skills related to personal excellence.

APA5310 MENTAL TRAINING AND QUALITY LIVING II (3cr.)
Critical examination of mental skills used to enhance performance in diverse sport, exercise, and health settings. Discussion of various ways to assess mental skills. Experimentation with teaching different mental training techniques and creating effective mental skills training programs. Prerequisite: APA5109.

APA5311 SPORT EVENT MANAGEMENT (3cr.)
Theories and principles related to planning, organizing, leading, and evaluating sporting events (e.g., Olympic Games, Jeux de la Francophonie, National Championships). Critical analysis of the academic literature related to sport event management.

APA5312 INTERNATIONAL SPORT MANAGEMENT (3cr.)
Study of cultural, economic and political roles of sport within the broader context of globalization. Interdisciplinary approach examining the impact of sport on local and global cultures as well as on development.

APA5316 STAGE EN ADMINISTRATION DU SPORT ET DE L’ACTIVITÉ PHYSIQUE / INTERNSHIP IN ADMINISTRATION OF SPORT AND PHYSICAL ACTIVITY (3cr.)
Entraînement pratique d’une durée de 360 heures sous la direction d’un membre du corps professsoral et d’un spécialiste travaillant au sein d’un organisme œuvrant dans le domaine du sport et/ou de l’activité physique. / A 360-hour practical internship under the supervision of a faculty member and of a specialist in a selected organization in the field of sport and/or physical activity. Préalables : APA5305, APA5703, APA5708 et permission écrite du directeur des études supérieures à l’ÉSAP / Prerequisite: APA5105, APA5303 APA5308, and written permission of the director of graduate studies at the SHK

APA5321 ANALYSE ET RÉFLEXION CRITIQUES DE LA THÉORIE ET PRATIQUE EN GESTION DU SPORT / CRITICAL ANALYSIS OF AND REFLECTION ON THEORY AND PRACTICE IN SPORT MANAGEMENT (3cr.)
Rapport écrit analysant le stage pratique en administration du sport et de l’activité physique à la lumière des connaissances théoriques acquises dans les cours du programme. / Major paper analyzing the internship in administration of sport and physical activity in light of the theoretical
APAr926 STAGE EN INTERVENTION ET CONSULTATION / INTERNSHIP IN INTERVENTION AND CONSULTATION
(3cr.)
Entraînement pratique d'une durée de 400 heures sous la direction d'un membre du corps professoral et d'un spécialiste travaillant au sein d'un organisme dans le domaine du sport, de l'activité physique, et/ou de la santé. A 400-hour practical internship under the supervision of a faculty member and a specialist in a selected organization in the field of sport, physical activity, and/or health. Préalables : APA5507, APA5509, APA5510, APA5706, APA5719 et APA6905. / Prerequisites: APA5107, APA5109, APA5306, APA5319 and APA6905.

APAr934 ANALYSE ET RÉFLEXION CRITIQUES DE LA THÉORIE ET PRATIQUE: INTERVENTION ET CONSULTATION /
CRITICAL ANALYSIS AND REFLECTION OF THEORY AND PRACTICE: INTERVENTION AND CONSULTATION
(3cr.)
Rapport écrit analysant le stage pratique en intervention et consultation à la lumière des connaissances théoriques acquises dans les cours du programme. / Major paper analyzing the internship in intervention and consultation in light of the theoretical knowledge gained in program courses. Préalable : APA5926. / Prerequisite: APA5926.

APAr997 ÉTUDES DIRIGÉES EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / DIRECTED STUDIES IN SPORT, PHYSICAL
ACTIVITY AND HEALTH (3cr.)
Recherche individuelle sur un problème relié au sport, à l'activité physique et/ou à la santé. Le sujet, sa portée et le plan de travail doivent être approuvés par le directeur adjoint des études supérieures. Un résumé écrit, signé par le professeur(e) est exigé. / Individual research investigation of a problem related to sport, physical activity and/or health. The subject and the work plan must be approved by the Assistant Director of Graduate Studies. A written abstract, signed by the Professor is also required.

APAr6100 QUALITATIVE DATA ANALYSIS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Study of the major methods (observation, interviews, textual analysis) used to collect qualitative data in sport, physical activity and health. Emphasis on developing the skills needed in the management, analysis and interpretation of qualitative data.

APAr6101 QUANTITATIVE DATA ANALYSIS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Advanced statistical analysis and interpretation of data derived from experimental and quasi-experimental research. Application of analysis of variance, analysis of covariance, MANOVA and techniques of linear regression, multivariate analysis and factor analysis. Prerequisite: undergraduate statistics course is strongly recommended.

APAr6302 QUANTITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Discussion of theoretical foundations of qualitative research methods. Detailed examination of a research proposal. Critical evaluation of methodology and analysis of research related to sport, physical activity and health.

APAr6303 QUANTITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Discussion of theoretical foundations of quantitative research methods. Detailed examination of a research proposal. Critical evaluation of methodology and analysis of research related to sport, physical activity and health.

APAr6901 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : ÉTUDES PHYSIOLOGIQUES / SELECTED
TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: PHYSIOLOGICAL STUDIES (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine de la physiologie de l’exercice et de la santé. / Critical analysis and discussion of recent theoretical and empirical papers presented and published in the physiology of exercise and health.

APAr6903 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : BIOMÉCANIQUE / SELECTED TOPICS IN
SPORT, PHYSICAL ACTIVITY AND HEALTH: BIOMECHANICS (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine du développement de la biomécanique. / Critical analysis and discussion of recent theoretical and empirical papers presented and published in biomechanics.

APAr6904 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : ÉTUDES SOCIOCULTURELLES / SELECTED
TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: SOCIOCULTURAL STUDIES (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine de la sociologie des organisations sportives ainsi que dans le domaine de la sociologie du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers presented and published in the sociology of sport organizations as well as in the sociology of sport, physical activity and health.

APAr6905 THÈMES CHOISIS / SELECTED TOPICS (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine de l’intervention et de la psychologie du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers presented and published in intervention as well as in psychology of sport, physical activity and health.

APAr6907 EXAMEN DES ÉCRITS PSYCHOSOCIAUX EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / EXAMINATION OF
PSYCHOSOCIAL LITERATURE IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Analyse critique et discussion des études théoriques et empiriques récemment publiées en études psychosociales dans le domaine du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers published in the psychosocial area of sport, physical activity and health.

APAr6908 EXAMEN DES ÉCRITS BIOPHYSIQUES EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / EXAMINATION OF
BIOPHYSICAL LITERATURE IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Analyse critique et discussion des études théoriques et empiriques récemment publiées en études biophysiques dans le domaine du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers published in the biophysical area of sport, physical activity and health.
APA6909 THÈMES CHOISIS : CONTRÔLE MOTEUR ET APPRENTISSAGE / SELECTED TOPICS: MOTOR CONTROL AND LEARNING (3cr.)
Concepts and principles important of contrôle et d'apprentissage moteurs, analyse des facteurs sensoriels, cognitifs, neuronaux et environnementaux qui affectent le contrôle et l'apprentissage moteurs. Étude de populations spéciales et de certains modèles numériques à l'aide de techniques contemporaines de laboratoire. / Major concepts and principles of motor control and learning. Analysis of sensory, cognitive, neural and environmental factors that affect motor control and learning. Study of special populations and computational models using contemporary laboratory techniques.

APA6910 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : GESTION / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: MANAGEMENT (3cr.)
Analyse critique et discussion des articles théoriques et empiriques publiés récemment dans le domaine de la gestion du sport / Critical analysis and discussion of recent theoretical and empirical papaers published in the area of sport management.

APA6911 THÈMES CHOISIS EN SCIENCES DU LOISIR / SELECTED TOPICS IN LEISURE STUDIES (3cr.)
Analyse critique et discussion des recherches récentes publiées en sciences du loisir / Critical analysis and discussion of recent research publications in leisure studies.

APA6912 CONSULTATION EN GESTION DU SPORT / SPORT BUSINESS CONSULTING (3cr.)
Cours de synthèse de la concentration en gestion du sport. Expérience pratique de l'approche entrepreneuriale et commerciale en contexte sportif. Mise en œuvre des connaissances acquises lors des cours et du stage pratique dans des projets de consultation avec des organisations sportives. / Capstone course of the sport management concentration. Business and entrepreneurship experience in the context of sport. Implementation of knowledge acquired during courses and the internship in real-life consulting projects with sport organizations. Préalable : APA5916 / Prerequisite: APA5916

APA6923 SÉMINAIRE / SEMINAR (1,5cr.)
Discussion et critique des écrits scientifiques récents dans le domaine du sport, de l'activité physique et de la santé. Écriture scientifique et étapes menant au dépôt d'une proposition de thèse. Noté (S) satisfaisant ou (NS) non satisfaisant. / Lectures, discussions and critiques on current research in the field of sport, physical activity and health. Scientific writing and steps toward the submission of a thesis proposal. Graded on a (S) satisfactory / (NS) not satisfactory basis.

APA6924 SÉMINAIRE / SEMINAR (1,5cr.)
Discussion et critique des écrits scientifiques récents dans le domaine du sport, de l'activité physique et de la santé. Écriture scientifique et étapes menant à la publication d'un manuscrit. Noté (S) satisfaisant ou (NS) non satisfaisant. / Lectures, discussions and critiques on current research in the field of sport, physical activity and health. Scientific writing and steps toward the publication of a manuscript. Graded on a (S) satisfactory / (NS) not satisfactory basis.

APA6999 RECHERCHE ET THÈSE DE MAÎTRISE / MASTER'S RESEARCH AND THESIS

APA7120 SELECTED TOPICS (3cr.)
Selected aspects of biophysical and/or psychosocial sciences, not covered by other graduate courses. Topics vary from year to year. Students at the Master's level must obtain permission from the Assistant Director of Graduate Studies.

APA7301 CRITICAL SOCIO-CULTURAL PERSPECTIVES ON SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Critical analysis of sport, physical activity and health issues and concepts through contemporary socio-cultural theories. Application of theoretical models most relevant to the students’ areas of research to assist them as they move forward in their doctoral thesis.

APA7302 CONTEMPORARY PSYCHOLOGICAL THEORIES IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Application of the most recent theories in psychology to issues in sport, physical activity and health. Seminar course to encourage active dialogue around the application of theory to contemporary issues in the field.

APA7304 ADVANCED EXERCISE METABOLISM AND PHYSIOLOGY (3cr.)
Principles of exercise metabolism and physiology. Topics include: regulation of energy and substrate metabolism, neuroendocrine systems, adipose tissue, environmental influences, nutrition, weight control, and the impact of exercise on health and disease.

APA7305 ADVANCED TOPICS IN BIOMECHANICS AND MOTOR/CONTROL LEARNING (3cr.)
Examination of current topics in biomechanics and motor/control research, including advanced motion analysis, biomedical imaging techniques, muscle mechanics, musculoskeletal injury mechanisms, musculoskeletal modeling, neuromuscular control of movement, and/or clinical biomechanics.

APA9997 PROJET DE THÈSE / THESIS PROPOSAL
Les étudiants, encadrés par leur directeur de thèse, rédigent leur projet de thèse. Ils le présentent et le défendent oralement devant le CCT. Il est possible d'obtenir des renseignements complémentaires dans le guide des études supérieures pour étudiants et superviseurs, publié sur le site Web de notre programme. Après avoir réussi la soutenance orale du projet de thèse, l'étudiant doit ensuite obtenir l'approbation du comité d'éthique (si nécessaire) avant d'entamer la collecte de données. Règle générale, le projet de thèse est défendu vers le milieu de la deuxième année, au plus tard à la fin de cette année. Un étudiant qui échoue à la première tentative peut se voir accorder la permission de la répéter une seule fois. L'échec de la deuxième tentative mène à une note NS (non satisfaisant) et au retrait de l’étudiant du programme. Préalable : APA 9998. / Students write their thesis proposal under the guidance of their thesis supervisor and present and defend it orally before the TAC. Details are available in the Graduate Handbook for Students and Supervisors posted on our program website. After successfully defending the oral thesis proposal, the student must obtain ethics approval (if required) before proceeding to data collection. The proposal will normally have been defended towards
the middle of the second year and, at the latest, by the end of that year. A student who is unsuccessful on the first attempt may be allowed to repeat it once. Failure on the second attempt leads to a grade of NS and withdrawal from the program. Prerequisite: APA 9998.

APA9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION

L'examen de synthèse a lieu une fois tous les cours réussis (habituellement à la fin de la première année pour les étudiants admis après l'obtention de la maîtrise). Il doit être terminé, au plus tard, avant la fin de la sixième session suivant l'inscription initiale. L'examen comporte une partie écrite et une partie orale. Le CCT en assure l'évaluation. Il est possible d'obtenir sur le site Web du programme plus de renseignements sur l'examen. La réussite de l'examen de synthèse sert de condition préalable à la présentation et à la soutenance du projet de thèse. Un étudiant qui échoue à la première tentative à l'examen peut se voir accorder la permission de le répéter une seule fois. L'échec de la deuxième tentative mène à une note NS (non satisfaisant) et au retrait de l'étudiant du programme. / The comprehensive examination takes place after successful completion of coursework (typically by the end of the first year for students admitted with a completed master’s degree). It must be completed at the latest within two years of initial registration. It is a two-part examination (written and oral) that is overseen by the TAC. Details on the examination are available on the program website. Successful completion of the comprehensive examination is a prerequisite for the presentation and defence of the PhD thesis proposal. A student who is unsuccessful on the first attempt at the comprehensive exam may be allowed to repeat it once. Failure on the second attempt leads to a grade of NS and withdrawal from the program.

APA9999 THÈSE DE DOCTORAT / PhD THESIS

La thèse sera fondée sur de la recherche originale effectuée dans le cadre du programme, de même que sur l'expertise et les intérêts majeurs de l'étudiant. La thèse mènera à la création de nouvelles connaissances dans les domaines psychosocial ou biophysique des sciences de l'activité physique. La qualité de la thèse doit être telle qu'elle mérite d'être publiée. Elle devra aussi démontrer la parfaite connaissance du champ par l'étudiant ainsi que sa capacité à appliquer cette connaissance de façon autonome, à un problème précis. / The thesis will be based on original research carried out while in the program and will build on the expertise and substantive interests of the student. The thesis will involve the generation of new knowledge within the psychosocial or biophysical disciplinary areas of human kinetics and is expected to be of publishable quality. The thesis must demonstrate a detailed understanding and knowledge of the field and the ability to apply that knowledge independently to a specific problem.

Information Studies

The School of Information Studies, located in the Faculty of Arts, offers a graduate diploma in Information Studies and a Master of Information Studies (MIS).

Full-time or part-time students in the Master of Information Studies (MIS) degree complete 7 compulsory core courses in their first year of study plus a capstone experience course in their final semester.

The master’s program offers three options to complete the 48 credits required for the MIS degree. The three options include a course-based option, a thesis option, and a co-op option. Please note that the co-op option is available to full time students only, and that there are a limited number of work placement spots available to SIS students each year. In all cases, a minimum of 25% of the courses must be completed in the second language.

Graduates of the MIS program are prepared to take on many exciting career opportunities as controlled vocabulary specialists, digital curators, information architects, knowledge management analysts, library directors, metadata managers, privacy analysts, records managers and web content managers, to name just a few.

This program is open to graduates in all disciplines, and is offered on a full-time and part-time basis. The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Graduate Diploma Information Studies

Master of Information Studies (Bilingual)

Master of Information Studies (Bilingual) Specialization in Science, Society and Policy

Admission

Admission to the graduate programs in Information Studies is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). Applicants must have a four year bachelor’s degree with a minimum cumulative average of 70% (B) calculated in accordance with FGPS guidelines.

All applicants must be able to understand, speak and write proficiently in either English or French and have a passive knowledge (ability to understand the spoken and written word) of the other language. Proof of knowledge of the second language is required. Applicants whose first language is neither English nor French must provide proof of their abilities in both languages. The list of acceptable proofs is indicated in the
"Admission" section of the general regulations of the FGPS.

In accordance with University of Ottawa policy, students have a right to produce their written work and to answer examination questions in French or in English.

On the recommendation of the Admissions Committee, applicants who have successfully completed information studies credits or electives at the master’s or doctoral level prior to admission may receive equivalencies or exemptions for courses in the Information Studies master’s program. Equivalencies may be granted for courses completed as a special student or as part of an incomplete or completed graduate program. To be eligible, the courses must have been completed with a minimum grade of 70% (B), no more than five years prior to admission. A maximum of 25% of the credits required for the program can be granted in equivalencies or exemptions.

Applications are evaluated based on the criteria listed in the online application form.

**Co-op option**

To be admitted into the co-op option, students must commence the MIS program in the fall session and be registered full time. Applications for the co-op option must be received by the end of the first month of the student’s registration in the MIS program. Acceptance into the co-op option is offered on a competitive basis and is managed by the Co-op Office. Enquiries should be directed to that office.

**Transfer from graduate diploma to master’s**

Students registered in the graduate diploma program can request to transfer to Master of Information Studies (MIS) in accordance with section A.7.1 of the “General regulations” of the FGPS.

**Collaborative programs**

The School of Information Studies is one of the participating units in the collaborative program in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of the program posted on the FGPS website.

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**Program Requirements**

The Master of Information Studies requires 48 credits to be completed by following one of three options:

**Option A: course-based**

- 21 credits of compulsory core courses
- 24 credits of electives
- 3-credit capstone experience (ISI6995)

At least 25% of courses must be completed in the second language.

**Option B: thesis**

- 21 credits of compulsory core courses
- 12 credits of electives
- 3-credit advanced research methods course (ISI6961)
- thesis proposal (ISI6998)
- 12-credit thesis (ISI6999)

At least 25% of courses must be completed in the second language.

**Option C: co-op**

- 21 credits of compulsory core courses
- 12 credits of electives
- 3-credit capstone experience (ISI6995)
- 12-credits of work placement (ISI6001, ISI6002, ISI6011, ISI6012)

At least 25% of courses must be completed in the second language.

**Compulsory core courses (21 credits)**

ISI5301 INFORMATION AND SOCIETY (3cr.)
ISI5302 KNOWLEDGE ORGANIZATION (3cr.)
ISI5303 INFORMATION RESOURCE MANAGEMENT (3cr.)
ISI5304 INFORMATION RESOURCE DISCOVERY (3cr.)
ISI5305 MANAGEMENT FOUNDATIONS FOR THE INFORMATION PROFESSIONAL (3cr.)
ISI5306 INFORMATION PROFESSIONALS AS LEADERS (3cr.)
Capstone experience (3 credits)

Students in the course-based and co-op options receive 3 credits for the compulsory capstone course (ISI6995).

For students in the thesis option, the thesis satisfies the capstone requirement.

Elective courses

Electives are chosen in consultation with the student’s program advisor. Students in the master’s program may complete a maximum of 6 credits of directed readings or special topics courses to fulfill the electives requirement. In addition, relevant courses from other graduate programs at the University of Ottawa, or at another university, may be taken with the approval of the School of Information Studies Programs Committee and of the unit responsible for the course or courses in question. Students must make sure to have completed any prerequisites for the selected courses.

Students must complete at least four compulsory core courses before enrolling for any elective courses, or receive permission of the School for an exception.

- Course-based Option (24 credits)
  Students in the course-based option must complete 8 three-credit elective courses.
- Thesis Option (12 credits)
  Students in the thesis option must complete 4 three-credit elective courses.
- Co-op Option (12 credits)
  Students in the co-op option must complete 4 three-credit elective courses.

Thesis option (12 credits)

Students in the thesis option receive 12 credits for their thesis proposal (ISI6998) and thesis (ISI6999).

Students must submit to their thesis committee, prior to completing their third session of registration in the program, a clearly defined research proposal that has been approved by their thesis supervisor. The proposal must be defended in the context of ISI6998. Students unsuccessful on the first attempt are allowed a second attempt. A second unsuccessful attempt leads to withdrawal from the program.

The master’s thesis should reveal that the candidate is able to work independently in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. Insofar as possible, the thesis should be an original contribution.

Upon submission, the completed thesis is examined by a committee comprised of the thesis supervisor and at least two other professors who are members of the FGPS. For information regarding the thesis, consult section G of the general regulations of the FGPS and the guide ”Preparing a thesis or a Research Paper”, which are both accessible through the FGPS website at www.grad.uottawa.ca.

Co-op option (12 credits)

Co-op students must register full-time and complete two work terms and two applied research projects: ISI6001 Co-op Work Term I and ISI6002 Co-op Work Term II, and ISI6011 Applied Research Project I and ISI6012 Applied Research Project II.

Each work term is graded P/F (pass/fail), based on the employer’s report and on the written applied research project completed by the student. (The applied research project must be 30 pages, including appendices.) The applied research project is evaluated by the professor in charge of the graduate co-op option in MIS program.

To remain in the co-op option, students must:

- Be registered full-time.
- Maintain a 7.0 cumulative grade point average.
- Obtain a satisfactory grade (P) for each co-op work term.

Duration of the program

Students admitted on a full-time basis are expected to complete all the requirements of the master’s program within two years. Students in the thesis option may require more time.

The maximum time permitted to complete the master’s program, whether full- or part-time, is five years from the date of initial registration in the program.

Minimum standards

The minimum passing grade in all courses taken as part of the Information Studies programs is C+. A student who has incurred two failures is withdrawn from the program. A student who fails a co-op placement is withdrawn from the co-op option and returned to the course-based option.

Collaborative program in Science, Society and Policy

The requirements of both the Information Studies program and the collaborative program must be met. The credits completed for the
specialization count also towards the degree in Information Studies.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the Information Studies program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation of “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

Courses

Not all of the listed courses are given each year.

The course description appears in the language of instruction.

**ISI5301 INFORMATION AND SOCIETY (3cr.)**
Critical examination of roles, values, ethics, and policies associated with the creation, communication, and use of information in today's society. The course examines from both an historical and a contemporary perspective the socio-cultural, economic, legal, and technological dimensions of the information environment, and the role of the information professions with respect to promoting and safeguarding principles such as those that form the foundation of intellectual freedom and equitable access to information. (Formerly: ISI5105)

**ISI5302 KNOWLEDGE ORGANIZATION (3cr.)**
Theories, principles, and models underlying the organization of knowledge and the representation of information resources. The course examines various approaches to knowledge organization, drawing on theories based in philosophy, cognitive sciences, linguistics, and other related fields, and explores their application in ontologies, taxonomies, classification systems, indexing languages, folksonomies, and resource description schema. (Formerly: ISI5102)

**ISI5303 INFORMATION RESOURCE MANAGEMENT (3cr.)**
Concepts and practices related to the management of information resources evaluation, selection, acquisition, storage, conservation, and preservation. The course examines organizational and technological models and standards for the management of a variety of analog, digital, and networked resources. (Formerly: ISI6126)

**ISI5304 INFORMATION RESOURCE DISCOVERY (3cr.)**
Theories and models relating to information seeking and use within both individual and institutional contexts. The course addresses the identification and representation of information needs, search strategies and techniques, ethical issues, and evaluation methods all within a variety of user communities and technological settings. The course also examines the information mediation process and services that facilitate information access. (Formerly: ISI5104)

**ISI5305 MANAGEMENT FOUNDATIONS FOR THE INFORMATION PROFESSIONAL (3cr.)**
Core management theories, principles, and methods used to effectively plan, deliver, and control the provision of information services. The course addresses strategic planning, project management, human and financial management, collaboration and team building, communications and marketing, and the evaluation of programs and services. (Formerly: ISI5103)

**ISI5306 INFORMATION PROFESSIONALS AS LEADERS (3cr.)**
Exploration of the multi-dimensional concept of leadership. The course provides an overview of theories and practices related to the various forms that leadership can take both within an organization and in the context of partnerships, collaborations, networks, and engagement with stakeholders and explores the dynamics of transformational leadership, entrepreneurship, and mentorship as they impact organizational change, innovation, advocacy, professional development, and advancement of the field of information studies. (Formerly: ISI5106)

**ISI5307 RESEARCH AND EVALUATION IN INFORMATION STUDIES (3cr.)**
Analysis of the research process from qualitative, quantitative, and evaluative perspectives. The course addresses each specific element of the research and evaluation process articulation of a research problem or evaluation goal, data collection and analysis, and dissemination of findings through a combination of critical analysis of existing research and in-class experimentation. (Formerly: ISI5101)

**ISI6001 STAGE COOP / CO-OP WORK TERM (6cr.)**
Expérience en milieu de travail comprenant une application pratique de recherche. Le stage est évalué Réussite / Echec (P/F) par un professeur de l’Ecole des sciences de l’information basé sur l’évaluation fournie par le superviseur de la partie pratique du stage et sur le rapport de stage rédigé par l’étudiant. Préalable : Permission de l’Ecole des sciences de l’information et du bureau du programme coop.) / Experience in a workplace setting including practical application of research. Graded P (pass) / (F) fail by a professor from the School of Information Studies based on the work performance evaluation provided by the workplace supervisor and the student’s work term written report. (Prerequisite: Permission of the School of Information Studies and the CO-OP office.)

**ISI6002 STAGE COOP / CO-OP WORK TERM (6cr.)**
Expérience en milieu de travail comprenant une application pratique de recherche. Le stage est évalué Réussite / Echec (P/F) par un professeur de l’Ecole des sciences de l’information basé sur l’évaluation fournie par le superviseur de la partie pratique du stage et sur le rapport de stage rédigé par l’étudiant. Préalable : 6001 et permission de l’Ecole des sciences de l’information et du bureau du programme coop.) / Experience in a workplace setting including practical application of research. Graded P (pass) / (F) fail by a professor from the School of Information Studies
based on the work performance evaluation provided by the workplace supervisor and the student's work term written report. (Prerequisite: 6001 and permission of the School of Information Studies and the CO-OP office.)

**ISI6011 PROJET DE RECHERCHE APPLIQUÉE I / APPLIED RESEARCH PROJECT I**
Projjet en bibliothéconomie, gestion de l'information ou pratique archivistique, permettant à l'étudiant d'acquérir de l'expérience en recherche appliquée, en intégrant connaissances et pratique. Le projet est préparé sous la direction d'un professeur du programme avec l'apport du superviseur de stage. L'étudiant doit soumettre un rapport écrit où il démontre qu'il a acquis des connaissances théoriques et pratiques pertinentes. Noté S/NS. Préalable : être accepté dans l'option coop OU au moins 24 crédits de cours d'études supérieures, incluant 12 crédits de cours ISI et permission de l'École des sciences de l'information. / A project in librarianship, information management or archival practice, allowing students to acquire experience in the application of research, integrating knowledge and practice. The project is conducted under the direction of a professor in the program with input from the workplace supervisor. Students must submit a written report that describes the project and demonstrates that they have acquired relevant theoretical and methodological knowledge. Graded S/NS. Prerequisites: Acceptance into the co-op option OR at least 24 credits at the graduate level, including 12 credits of ISI courses, and the permission of the School of Information Studies.

**ISI6012 PROJET DE RECHERCHE APPLIQUÉE II / APPLIED RESEARCH PROJECT II**
Projjet en bibliothéconomie, gestion de l'information ou pratique archivistique, permettant à l'étudiant d'acquérir de l'expérience en recherche appliquée, en intégrant connaissances et pratique. Le projet est préparé sous la direction d'un professeur du programme avec l'apport du superviseur de stage. L'étudiant doit soumettre un rapport écrit où il démontre qu'il a acquis des connaissances théoriques et pratiques pertinentes. Noté S/NS. Préalable : être accepté dans l'option coop. Co-requis : ISI6002. / A project in librarianship, information management or archival practice, allowing students to acquire experience in the application of research, integrating knowledge and practice. The project is conducted under the direction of a professor in the program with input from the workplace supervisor. Students must submit a written report that describes the project and demonstrates that they have acquired relevant theoretical and methodological knowledge. Graded S/NS. Prerequisite: Acceptance into the co-op option. Co-requisite: ISI6002.

**ISI6300 SPECIAL TOPICS IN INFORMATION STUDIES** (3cr.)
Particular subjects in information studies not included or covered to the same extent in other Information Studies courses. May be repeated with distinct topics. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6100)

**ISI6310 ETHICS, VALUES AND INFORMATION DILEMMAS** (3cr.)
Exploration of major ethical concerns currently confronting our information society. The course examines the moral and ethical values involved in information and technology-related situations faced by today's information professionals and agencies, and provides an opportunity to apply ethical theories to situations involving issues such as freedom of expression, censorship, intellectual property rights, equitable access, and privacy. (Formerly: ISI5160) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

**ISI6311 INFORMATION AND THE LAW** (3cr.)
Survey of the legal framework relevant to the formulation and implementation of information policies in libraries, archives, and other cultural, educational, and governmental organizations. The course focuses on Canadian legislation regulating copyright, access to information, and privacy; examines models for licensing intellectual property; and assesses the impact of digital technologies on regulations governing the management and dissemination of information. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5161)

**ISI6312 GLOBAL INFORMATION AND COMMUNICATIONS POLICY** (3cr.)
Contemporary policy issues relating to information and communication systems and institutions worldwide. The course examines how the interests of various actors and their differing abilities to advance these interests influence the intended and unintended outcomes of information and communications policy, and provides an opportunity to use the tools and techniques of policy analysis. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5162)

**ISI6313 GOVERNMENT INFORMATION POLICY AND PRACTICE** (3cr.)
Exploration of the role of government policy in the provision of information services, in its social, economic, and technological dimensions. The course examines policies and practices relating to publishing, distributing, and providing online access to government information at the federal, provincial, and municipal levels; assesses the role and expectations of government in the information ecosystem today; and compares Canadian information policies and trends with those of foreign and intergovernmental agencies. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5163)

**ISI6314 THE PUBLISHING BUSINESS: TRANSFORMATIONS AND OPPORTUNITIES** (3cr.)
Overview of publishing and its role in today's information landscape. The course examines various types of publishers, their role in the communications ecosystem, their business models, use of formats and standards, strategic planning, and intellectual property issues. The challenges addressed include the multiplicity of communication technologies and supply/distribution channels, publishers' efforts to transform their operations for the digital age, open access, and the dynamics of global partnerships, collaboration, and competition. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6130)

**ISI6321 ARCHIVES AND RECORDS MANAGEMENT** (3cr.)
Principles and challenges of organizing, archiving, and providing access to the records of an organization. The course examines methods, standards, and best practices for establishing information inventories, evaluating information policies, and managing the information life cycle, through an exploration of a multiplicity of media formats and a variety of records storage, retrieval, and management technologies. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6121)

**ISI6322 DIGITAL PRESERVATION** (3cr.)
Critical examination of the organizational, technological, regulatory, and cultural factors associated with the preservation of digital information
over time to ensure its long-term accessibility and authenticity. The course focuses on the set of processes, initiatives, and standards used to identify, control, and manage digital information, whether this information is born-digital with no analog counterpart or has been digitally reformatted from an analog source. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6122)

**ISI6323 LIBRARY COLLECTIONS MANAGEMENT (3cr.)**
Exploration of the concepts, theories, and practices involved in library collection development and management. The course examines policies and issues related to the evaluation, selection, acquisition, and disposition of resources, budgeting, pricing models, and the impact of communication systems, in a variety of library settings. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6148)

**ISI6330 RESOURCE DESCRIPTION (3cr.)**
Critical examination of concepts and principles underlying the design and application of standards for the description of information resources. The course examines current standards for resource description and their relationship to the resource discovery context within which they operate. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5120)

**ISI6331 CONCEPT ANALYSIS AND REPRESENTATION (3cr.)**
Critical examination of theories, principles, and practices relating to the analysis of concepts reflected in information resources, and the representation of those concepts by means of indexing terms and class notation. The course focuses on the design and application of controlled vocabularies and classification systems used currently to support resource discovery in a variety of domains. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5121)

**ISI6332 METADATA AND TAXONOMIES (3cr.)**
Critical examination of the development and application of metadata standards and taxonomies designed to support resource discovery, resource management, and resource use. The course examines standards and taxonomies drawn from a variety of domains (e.g., cultural heritage, education, government, e-commerce) covering a broad range of resources (texts, images, geospatial data, multimedia); and explores issues relating to the planning and management of metadata projects and interoperability in a distributed environment. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6125)

**ISI6341 INFORMATION REPRESENTATION AND RETRIEVAL TECHNOLOGIES (3cr.)**
Survey of digital technologies for representing and retrieving information. The course focuses on XML and database methods for representing, querying, and transforming structured data, including entity relationship diagrams, XML schema and XML style sheets. The course also examines technologies that underlie search engines, such as natural language processing, full-text indexing, document classification, semantic search, and recommender systems, situating each of these technologies in the context of document repositories and digital libraries. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5141)

**ISI6342 WEB ARCHITECTURE AND TECHNOLOGIES (3cr.)**
Design and management of websites information architecture as it pertains to website design and the web environment. The course examines methodologies applied in information organization, website design, and evaluation of the user experience, as well as state of the art software tools supporting website design and management. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6127)

**ISI6343 DIGITAL ASSET MANAGEMENT TECHNOLOGIES (3cr.)**
Structure and function of digital asset management technologies designed to meet a variety of individual and organizational needs. The course examines client-server architectures, database-driven web applications, and the selection and deployment of digital asset management systems to meet end-user and organizational requirements. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6131)

**ISI6351 SOCIAL MEDIA (3cr.)**
Exploration of social media technologies and how they are changing the way we learn, communicate, interact, and share information. The course assesses the implications of social media for individuals, organizations, social networks, and communities, and examines how social media can be used to develop innovative information services and applications. (Formerly: ISI6129) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

**ISI6352 MARKETING AND ADVOCACY FOR INFORMATION ORGANIZATIONS (3cr.)**
Examination of how marketing concepts and techniques can be applied to promote the products and services offered by information organizations, and to raise public awareness around issues relating to information access and services. The course introduces theoretical concepts and marketing tools, and examines how they can be applied in the context of non-profit organizations. The course also examines the advocacy process, and provides an opportunity to apply advocacy techniques to selected issues. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.) (Formerly: ISI6142)

**ISI6353 ACCESS AND SERVICES TO DIVERSE POPULATIONS (3cr.)**
Critical examination of the social, cultural, political, and economic information contexts experienced by minority and underserved populations in Canada and in the global society. The course examines barriers, enablers, and issues related to various forms of literacy, ethno-cultural practices, organizational structures, and user-centered knowledge and information preferences, with the goal of improving the information professional's cross-cultural skills and practices related to information access, service design, delivery, and evaluation. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies)

**ISI6354 CULTURAL HERITAGE RESOURCES (3cr.)**
Examination of policies, practices, and issues relating to cultural heritage collections. The course examines the role of cultural heritage organizations, their policies and practices with respect to developing, preserving, and facilitating access to collections of cultural significance, and
issues relating to interpretation, stewardship, advocacy, and cultural engagement. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5112)

**ISI6361 ADVANCED RESEARCH METHODS IN INFORMATION STUDIES** (3cr.)
Advanced study of quantitative and qualitative research paradigms for the investigation of both practical and theoretical problems in information studies and the critical assessment of published research. The course addresses online data collection and analysis, ethics of Internet research and relevant data analysis software, and established and emerging research methods for large data sets. (Prerequisites: ISI5307 and 9 credits among compulsory core courses.)

**ISI6371 LEARNING AND INSTRUCTION** (3cr.)
Survey of theories and practices related to learning and instructional design from the perspective of skills development and lifelong learning on a personal, organizational, and societal level. The course addresses the roles of information professionals in providing instruction in the use of information services, in enabling users to conduct independent research, and in staff training, and examines approaches and issues related to technology-enhanced learning. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6145)

**ISI6372 INFORMATION LITERACY** (3cr.)
Survey of information literacy perspectives, concepts, and principles, including past and current trends. The course provides an in-depth examination of practical and theoretical issues relating to the development and evaluation of information literacy modules and programs, using case studies of information literacy programs and services in libraries, community agencies, business, education, and other information settings. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.)

**ISI6381 KNOWLEDGE IN ORGANIZATIONS** (3cr.)
Exploration of the institutional structures, agencies, and practices of contemporary knowledge organizations. The course examines organizational culture, decision-making, socio-technical practices, and approaches to assessing and communicating organizational value within a knowledge and information management framework. (Formerly: ISI6140) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

**ISI6382 HUMAN RESOURCE MANAGEMENT** (3cr.)
Examination of various perspectives on organizations, their infrastructure, their human resources, and their political and symbolic realities. The course uses case studies extensively, providing examples from special, academic, and public libraries as well as archival repositories, and addressing a number of issues associated with change management, including those related to recruitment, retention, collective bargaining, team building, mentoring, and professional development. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.) (Formerly: ISI6144)

**ISI6995 PROJET DE FIN D’ÉTUDES / CAPSTONE EXPERIENCE** (3cr.)
Ce cours synthèse vise à offrir une perspective intégrée des expériences d’apprentissage vécues par l’étudiant durant son programme de M.S.I. dans le cadre de ses cours, du travail de terrain, et des activités d’implication dans la communauté auxquelles il a participé. Le cours permet de faire une évaluation globale des réalisations de l’étudiant en fonction de ses compétences professionnelles et de ses résultats d’apprentissage. Évalué S/NS Préalable : réussite de 36 crédits, dont 30 crédits ISI, ou la permission de l’École des sciences de l’information.) / The capstone course is designed to provide an integrated perspective on the student’s learning experiences in the MIS program gained through courses, field work, and community engagement. The course enables an overall assessment of the student’s achievements in the context of professional competencies and student learning outcomes. Evaluated S/NS. (Prerequisite: completion of 36 credits, including 30 ISI credits or permission of the School of Information Studies.)

**ISI6996 APPRENTISSAGE EXPÉRIENTIEL / EXPERIENTIAL LEARNING** (3cr.)
Application des principes des sciences de l’information au cours d’un stage supervisé effectué dans un service de l’information. Rédaction d’un rapport de stage. Préalable : Permission de l’École des sciences de l’information.) / Supervised practicum designed to allow students to put their knowledge of information studies into practice in an organization that offers information services. Students are required to submit a written report. (Prerequisite: Permission of the School of Information Studies.)

**ISI6997 LECTURES DIRIGÉES EN SCIENCES DE L’INFORMATION / DIRECTED READINGS IN INFORMATION STUDIES** (3cr.)
Études personnelles supervisées sur des sujets qui n’ont pas été traités, ou l’ont été de façon sommaire, dans les autres cours du programme. Peut être répété si les sujets diffèrent. Préalable : Permission de l’École des sciences de l’information.) / Supervised specialized study of subjects not included or covered to the same extent in available Information Studies courses. May be repeated with distinct subjects. (Prerequisite: Permission of the School of Information Studies)

**ISI6998 PROPOSITION DE THÈSE DE MAÎTRISE / MASTER’S THESIS PROPOSAL**

**ISI6999 THÈSE DE MAÎTRISE / MASTER’S THESIS** (12cr.)
La thèse de maîtrise doit révéler que le candidat possède une méthode de travail scientifique et est au courant des principaux ouvrages sur le sujet de sa thèse. Autant que possible, la thèse doit être une contribution originale. Pour de plus amples renseignements, veuillez consulter la Section G des Règlements Généraux de la FESP et le guide « Préparer sa thèse ou son mémoire », qui se trouvent sur le site internet de la FESP (www.etudesup.uottawa.ca). Évaluer S/NS./ The master’s thesis should reveal that the candidate is able to work in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. Insofar as it is possible, the thesis should be an original contribution. For additional information, please consult section G of the General Regulations of the FGPS and the guide “Preparing a Thesis or a Research Paper”, which can be found in the website of the FGPS (www.grad.uottawa.ca). Evaluated S/NS.
Interdisciplinary Health Sciences

The MSc program in Interdisciplinary Health Sciences is offered by the Interdisciplinary School of Health Sciences. The program is offered on a full-time basis only. All courses in the program are bilingual.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Interdisciplinary Health Sciences

Admission

To be considered for admission, candidates must hold a four-year bachelor's degree. A minimum overall GPA of 6.0 out of 10, or 70%, calculated in accordance with FGPS guidelines, is required.

The candidates' previous studies must include a university-level statistics course.

Candidates must have an active knowledge of one of the official languages (French or English) and at least a passive knowledge of the other.

Documents to be included with the application include the following:

- A letter indicating agreement by a core faculty member within the program to supervise the proposed thesis area;
- A two-page statement of interest describing the candidate's training, their career plan and how this graduate degree fits with their plan;
- A curriculum vitae;
- Official transcripts of all post-secondary studies;
- Evidence of language proficiency (e.g., proof of passing a test administered by the Institute for Official Languages and Bilingualism) and a signed letter by the candidate that s/he can understand a lecture and read material in both French and English.

At the time of admission, the Admissions committee will determine, in consultation with the potential thesis supervisor, whether the candidate needs to complete any additional courses (maximum of three) beyond the basic program requirements in order to strengthen his or her knowledge of their thesis area.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Program Requirements

Compulsory courses (12 credits):

HSSS901 PERSPECTIVES INTERDISCIPLAIRES EN SCIENCES DE LA SANTÉ / INTERDISCIPLINARY PERSPECTIVES IN HEALTH SCIENCES (3cr.)
HSSS902 MÉTHODES DE RECHERCHE INTERDISCIPLAIRES ET STATISTIQUES EN SCIENCES DE LA SANTÉ / INTERDISCIPLINARY RESEARCH METHODS AND STATISTICS IN HEALTH SCIENCES (3cr.)
HSSS903 SÉMINAIRE DE MAÎTRISE I / MASTER’S SEMINAR I (1.5cr.)
HSSS904 SÉMINAIRE DE MAÎTRISE II / MASTER’S SEMINAR II (1.5cr.)
HSSS995 ÉTUDES DIRIGÉES EN SCIENCES INTERDISCIPLAIRES DE LA SANTÉ / DIRECTED STUDIES IN INTERDISCIPLINARY HEALTH SCIENCES (3cr.)
HSS6997 PROJET DE THÈSE / THESIS PROPOSAL
HSS7999 THÈSE DE MAÎTRISE / MASTER’S THESIS

*Students may replace HSSS995 with HSS6912 or an out-of-program graduate course chosen in consultation with their thesis supervisor and approved by the director of the MSc program.

Duration of the Program

Students are expected to complete all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.
Residence

Students must register full-time for the normal duration of the program, i.e. two years.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Thesis Advisory Committee (TAC)

During their first session in the program, a thesis advisory committee (TAC) is formed for each student. The TAC is made up of the thesis supervisor, a faculty member from within the Interdisciplinary School of Health Sciences, and a third committee member who can be from within or outside the Faculty of Health Sciences. At least one member of the committee must be at arms-length from the thesis research and resulting manuscript(s).

Courses

HSS5901 PERSPECTIVES INTERDISCIPLINAIRES EN SCIENCES DE LA SANTÉ / INTERDISCIPLINARY PERSPECTIVES IN HEALTH SCIENCES (3cr.)
Perspectives théoriques et empiriques sur les processus biologiques, comportementaux et sociaux qui opèrent de façon indépendante, cumulative et interactive au cours de la vie pour influencer le développement de la santé, de la maladie, du handicap et du bien-être. Étude des théories actuelles et évaluation critique des évidences empiriques supportant chacune de celles-ci dans différents domaines de la santé. Préalable : connaissance passive de l'anglais. Concomitant : HSS 5902. / Theoretical and empirical perspectives on the biological, behavioural and social processes that operate from conception to death independently, cumulatively and interactively to influence the development of health, disease, disability and well being. Examination of current theories and critical appraisal of the empirical evidence supporting each of these theories in different areas of health. (Prerequisite: passive knowledge of French. Co-requisite: HSS 5902).

HSS5902 MÉTHODES DE RECHERCHE INTERDISCIPLINAIRES ET STATISTIQUES EN SCIENCES DE LA SANTÉ / INTERDISCIPLINARY RESEARCH METHODS AND STATISTICS IN HEALTH SCIENCES (3cr.)
Étude des différentes méthodes de recherche (qualitatives, quantitatives et de laboratoire) et des modèles statistiques qui peuvent servir à identifier, définir, mesurer et résoudre des problèmes de santé complexes. Il s’agira de démontrer comment certains modèles/méthodes permettent de mettre en évidence la contribution des processus biologiques, comportementaux et sociaux dans le développement de la santé. Préalable : connaissance passive de l'anglais. Concomitant : HSS 5901. / Study of the different research methods (qualitative, quantitative and laboratory) and statistical models used for identifying, defining, measuring, evaluating and mitigating complex health problems. Involves demonstrating how certain methods/models can be used to highlight the contribution of biological, behavioural and social processes to the development of health. (Prerequisite: passive knowledge of French. Co-requisite: HSS 5901).

HSS5903 SÉMINAIRE DE MAÎTRISE I / MASTER’S SEMINAR I (1.5cr.)
Discussion concernant la manière dont les approches interdisciplinaires à la recherche et aux pratiques peuvent être utilisées dans l'application des connaissances aux problèmes de santé complexes. L’étudiant doit assister à six séminaires au cours de l’année et préparer un bref rapport sur les dits séminaires où il présente une vue d’ensemble de tous les séminaires. Noté S/NS. Préalable : connaissance passive de l’anglais. / Discussion as to how interdisciplinary approaches to research and practice can be applied to complex health problems. Students must attend six seminars and prepare a summary report providing an overview of all the seminars attended. Graded S/NS. Prerequisite: passive knowledge of French.

HSS5904 SÉMINAIRE DE MAÎTRISE II / MASTER’S SEMINAR II (1.5cr.)
Discussion concernant la manière dont les approches interdisciplinaires à la recherche et aux pratiques peuvent être utilisées dans l'application des connaissances aux problèmes de santé complexes. En plus de présenter ses propres recherches dans un séminaire, l’étudiant doit assister à cinq autres séminaires au cours de l’année. Il doit préparer un bref rapport où il présente une vue d’ensemble de tous les séminaires. Noté S/NS. Préalable : connaissance passive de l’anglais. / Discussion as to how interdisciplinary approaches to research and practice can be applied to complex health problems. Students must present their research ideas at one seminar, attend five other seminars, and prepare a summary report providing an overview of all the seminars attended. Graded S/NS. Prerequisite: passive knowledge of French.

HSS5995 ÉTUDES DIRIGÉES EN SCIENCES INTERDISCIPLINAIRES DE LA SANTÉ / DIRECTED STUDIES IN INTERDISCIPLINARY HEALTH SCIENCES (3cr.)
Études individuelles conçues pour parfaire la formation de l’étudiant dans son champ de recherche. Préalable : Approbation de l’unité scolaire / Individual study designed to complement the student’s knowledge related to his or her research area. Prerequisite: Approval of Academic Unit.

HSS6918 THÈMES CHOISIS EN SCIENCES INTERDISCIPLINAIRES DE LA SANTÉ (3cr.) / SELECTED TOPICS IN INTERDISCIPLINARY HEALTH SCIENCES (3cr.)
Analyse approfondie d’une problématique ou d’une question liée aux nouvelles tendances en recherche ou aux nouveaux thèmes de recherche en sciences interdisciplinaires de la santé. Préalable : connaissance passive de l’anglais. / In-depth examination of a question or topic linked to new trends or research areas in interdisciplinary health sciences. Prerequisite: passive knowledge of French.

HSS6997 PROJET DE THÈSE / THESIS PROPOSAL

HSS7999 THÈSE DE MAÎTRISE / MASTER’S THESIS
Law

Reflecting Canada’s bilingual and trijuridical legal system (civil law, common law, aboriginal law), as well as its location in Canada’s Capital, the Faculty of Law offers graduate programs leading to a master’s degree and a doctoral degree in Law.

The graduate studies in law are a joint endeavour of the Common Law and Civil Law Sections. We welcome law graduates from both legal systems and from countries around the world. Courses are offered in English or in French, and occasionally in both languages. Students may readily complete their graduate studies while learning something of Canada’s other legal and linguistic traditions.

The programs are offered in English and in French, and sometimes in a combination of both. In accordance with University of Ottawa Policy, examinations, assignments and the research paper or thesis may be written in either English or French. The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS)

Master's Program

For the Master of Laws degree (LLM), we offer both a thesis option and a research paper option. While students can pursue these options in any subject, we particularly emphasize the following two fields as well as the fields associated with our six concentrations described below:

- International law; and
- Human rights law.

In the context of the master’s with research paper, students have a choice of six concentrations:

- International Humanitarian and Security Law;
- Global Sustainability and Environmental Law;
- Law and Social Justice;
- Law and Technology;
- Notarial Law; and
- International Trade and Investment Law.

LLM students can also participate in a collaborative program in Women’s Studies at the Master's level (LLM with Specialization in Women’s Studies). For more information on this program, see “Degree Requirements”.

International Reciprocity Agreements

Are you interested in obtaining two LL.M. degrees and studying abroad? The Faculty of Law at the University of Ottawa has international reciprocity agreements:

- with Washington College of Law (American University),
- l’Université Paris Ouest Nanterre La défense,
- l’Université Paul-Cézanne (Aix-Marseille III),
- the University of Haifa (Israel)
- and the Université de Rennes 1.

Doctoral Program

The aim of the doctoral program is to develop autonomous academics and lawyers who are highly qualified to contribute to the advancement of knowledge in their particular discipline through theoretical, practical and empirical research in various fields of law. The program focuses on the development and mastery of a research approach, of social and critical legal reasoning for the purpose of making original contributions in the field of law.

The doctoral program comprises the following elements: a legal research methodology and theory course, an elective course, a comprehensive examination, a thesis proposal examination, the writing of a thesis and its defence before an examining board.

Please see the Graduate Studies in Law website for further information: [http://llmphd.uottawa.ca/](http://llmphd.uottawa.ca/)

Programs

Master of Laws (LL.M.)

Master of Laws (LL.M.) Concentration in Global Sustainability and Environmental Law

Master of Laws (LL.M.) Concentration in International Humanitarian and Security Law

Master of Laws (LL.M.) Concentration in International Trade and Foreign Investment
Master of Laws (LL.M.) Concentration in Law and Technology
Master of Laws (LL.M.) Concentration in Notarial Law
Master of Laws (LL.M.) Concentration Law and Social Justice
Doctorate in Philosophy Law

Admission

To be considered for admission to the master of laws (LLM) program, applicants must have an undergraduate law degree from a Canadian university or an equivalent foreign law degree or, exceptionally, a degree deemed equivalent by the program Admissions Committee. Candidates must have completed their undergraduate law degree with an average of at least 70% (B), calculated in accordance with the Faculty of Graduate and Postdoctoral Studies (FGPS) guidelines. Particular attention is paid to relevant legal experience, prior research and letters of reference. Please review the graduate studies in Law website.

Language of Instruction

Courses are offered in English or in French, and occasionally in both languages.

Financial Support

Internal Scholarships

The Faculty of Graduate and Postdoctoral Studies in conjunction with the Faculty of Law provides a number of admission scholarships per year to LLM and PhD students. Please note that students do not need to apply for these scholarships. Recommendations are made to the Faculty of Graduate and Postdoctoral Studies by the admissions committee in law.

Several other scholarships are available to LLM and PhD students thanks to generous donors. These scholarships require a separate application. Further details are available through the graduate studies in Law website.

External Scholarships

For a comprehensive list of scholarships and awards offered by outside agencies, and details regarding application, please visit the Scholarships and financial support website or go directly to:

Awards Office
Faculty of Graduate and Postdoctoral Studies
University of Ottawa
115 Séraphin Marion, Room 107
Ottawa ON K1N 6N5

Applicants are encouraged to seek scholarships and financial assistance from other sources in Canada and, abroad if applicable.

Program Requirements

Master's with Thesis

Title of degree: Master of Laws

Degree Requirements:

a) Three compulsory courses:

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)

One legal theory course (3cr.) (chosen from a selection of courses varying from year to year)
DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)

b) DCL7999 Thesis (100 to 130 pages)

The master's thesis should show that the candidate is able to work in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. It must be of publishable quality and make a significant and original contribution to legal scholarship. The thesis has to satisfy a jury of at least two members proposed by the Assistant Dean of Graduate Studies and approved by the FGPS.

Residence
The residence requirement for students admitted to the master’s program is three sessions.

**Time limit**
Full-time: 5 sessions

**Status**
Full-time only

**Master’s with Research Paper**

**A. Master of Laws without concentration**

Title of degree: Master of Laws

**Degree Requirements:**

a) Three compulsory courses:

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)

One legal theory course (3cr.) (chosen from a selection of courses varying from year to year)
DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)

b) Two elective courses (3 credits each)

c) DCL7066 Research paper (50 to 60 pages)

**Residence**
The residence requirement for students admitted full-time to the master’s program is three sessions.

**Time limit**
Full-time: 4 sessions
Part-time: 8 sessions

**Status**
Full-time or part-time

**B. Master of Laws with concentration**

1. **Master of Laws with Concentration in International Humanitarian and Security Law**

Title of degree: Master of Laws with Concentration in International Humanitarian and Security Law

**Degree Requirements:**

a) Three compulsory courses (3 credits each):

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
DCL5303 STUDIES IN LEGAL THEORY I (3cr.)
DCL6126 INTERNATIONAL HUMANITARIAN LAW: CONTEMPORARY CHALLENGES (3cr.)

b) Two optional courses of three credits each from the following list (the selection of courses varies from year to year):

DCL5106 INDIGENOUS LEGAL THEORY: WORLDVIEW, LANGUAGE, AND LEGAL CONCEPTS (3cr.)
DCL5120 ADVANCED HUMAN RIGHTS (3cr.)
DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)
DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)
DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)
DCL5143 INDIGENOUS LAW CLINIC (3cr.)
DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
DCL5327 COMPARATIVE INDIGENOUS RIGHTS / LEGAL REGIMES (3cr.)
DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)
DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)
DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)
DCL6127 LAW AND DEVELOPING COUNTRIES (3cr.)
DCL6128 LAW, POLITICS AND ECONOMICS IN INTERNATIONAL AFFAIRS (3cr.)
DCL6130 NATIONAL SECURITY LAW (3cr.)
DCL6150 INTERNATIONAL HUMANITARIAN AND SECURITY LAW INTERNSHIP (3cr.)

c) DCL7066 Research Paper (50 to 60 pages)

**Residence**
The residence requirement for students admitted full-time to the master’s program is three sessions.
2. Master of Laws with Concentration in Global Sustainability and Environmental Law

Title of degree: Masters of Laws with Concentration in Global Sustainability and Environmental Law

Degree Requirements:

a) Three compulsory courses (3 credits each):

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
DCL5340 SUSTAINABILITY AND LAW (3cr.)

One of the following courses:

DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)
or
EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)

b) Two optional courses of three credits each from the following list (the selection of courses varies from year to year):

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
DCL5341 COMPARATIVE ENVIRONMENTAL LAW (3cr.)
DCL5342 GLOBAL ENVIRONMENTAL GOVERNANCE (3cr.)
DCL5343 ENVIRONMENTAL LAW INTERNSHIP (3cr.)
DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

c) DCL7066 Research Paper (50 to 60 pages)

Residence

The residence requirement for students admitted full-time to the master’s program is three sessions.

Time limit
Full-time: 4 sessions
Part-time: 8 sessions

Status
Full-time or part-time

3. Master of Laws with Concentration in Law and Social Justice

Title of degree: Master of Laws with Concentration in Law and Social Justice

Degree Requirements:

a) Three compulsory courses (3 credits each):

DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)
DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)

One legal theory course (chosen from the following):

DCL5303 STUDIES IN LEGAL THEORY I (3cr.)
or
DCL5337 CRITICAL LEGAL THEORIES (3cr.)

b) Two optional courses (3 credits each) from the following list (the courses offered vary from year to year):

DCL5106 INDIGENOUS LEGAL THEORY: WORLDVIEW, LANGUAGE, AND LEGAL CONCEPTS (3cr.)
DCL5120 ADVANCED HUMAN RIGHTS (3cr.)
DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)
DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)
DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)
DCL5143 INDIGENOUS LAW CLINIC (3cr.)
DCL5304 STUDIES IN LEGAL THEORY II (3cr.)
DCL3305 FEMINIST ANALYSIS OF LAW (3cr.)
DCL3309 LEGAL THEORY SEMINAR (3cr.)
DCL3326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
DCL3327 COMPARATIVE INDIGENOUS RIGHTS / LEGAL REGIMES (3cr.)
DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)
DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)
DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)
DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)
c) DCL7066 Research Paper (50 to 60 pages)

Residence
The residence requirement for students admitted full-time to the master's program is three sessions.

Time limit
Full-time: 4 sessions
Part-time: 8 sessions

Status
Full-time or part-time

4. Master of Laws with Concentration in Law and Technology

Title of degree: Master of Laws with Concentration in Law and Technology

Degree Requirements

a) Two compulsory courses (3 credits each):

DCL7300 TECHNOPRUDENCE : LEGAL THEORY IN THE INFORMATION AGE (3cr.)
DCL7310 TECHNOPOLICY : INTERPLAY BETWEEN TECHNOLOGIES AND EXISTING LEGAL RULES (3cr.)

b) Two elective, three credit courses from the list of Law and Technology courses.

Students may seek authorization to take an additional or alternative elective. They may also elect to supplement their legal research skills by enrolling in Legal Research Methodology / Méthodologie de la recherche juridique (DCL5301/DCL5501). DCL5301/DCL5501 does not count towards the fulfillment of the requirement to complete two elective courses.

c) DCL7304 Technology Law Internship
d) DCL7066 Research Paper (50 to 60 pages)  
or
DCL7366 Technology Law Project

Residence
The residence requirement for students admitted full-time to the master's program is three sessions.

Time limit
Full-time: 4 sessions
Part-time: 8 sessions

Status
Full-time or part-time

5. Master of Laws with Concentration in Notarial Law (offered in French only)

Title of degree: Master of Laws with Concentration in Notarial Law

Exigences du grade

Session automne

DCL5301 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)
DCL5321 INITIATION À LA RÉDACTION D’ACTES ET À LA PROFESSION NOTARIALE (3cr.)
DCL5322 STAGE DE DROIT NOTARIAL (3cr.)
DCL5323 PUBLICITÉ DES DROITS ET PROPRIÉTÉ (3cr.)
DCL5324 RELATIONS FAMILIALES (3cr.)
DCL5325 NÉGOCIATION ET TRANSFERTS DE PROPRIÉTÉ (3cr.)

Session hiver

DCL5526 ENGAGEMENTS FINANCIERS (3cr.)
DCL5527 DÉCÈS ET TRANSMISSION DES BIENS (3cr.)
DCL5528 EXAMEN DES TITRES IMMOBILIERS (3cr.)
DCL5529 DROIT DES SOCIÉTÉS (3cr.)
Deux cours optionnels (3 crédits chaque) ou mémoire (6 crédits)

**Session printemps**
- DCL5332 DROIT NOTARIAL APPROFONDI I (3cr.)
- DCL5333 DROIT NOTARIAL APPROFONDI II (3cr.)

**Session automne**
- DCL5821 STAGE EN MILIEU PROFESSIONNEL (12cr.)

**Résidence**
L'exigence de résidence à la maîtrise pour les étudiants admis à temps plein est de quatre sessions.

**Limite de temps**
Temps plein : 5 sessions

**Statut**
Temps plein seulement

### 6. LLM with concentration in International Trade and Investment Law

**Title of degree:** LLM with concentration in International Trade and Investment Law

**Degree Requirements:**

a) Five compulsory courses (3 credits each):
- DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
- DCL6125 INTERNATIONAL TRADE REGULATION (3cr.)
- DCL6300 INTERNATIONAL INVESTMENT LAW (3cr.)
- DCL6319 ADVANCED INTERNATIONAL ECONOMIC LAW (3cr.)
- DCL6350 INTERNATIONAL ECONOMIC LAW CASE STUDIES (3cr.)

b) DCL7066 Research Paper (50 to 60 pages)

**Residence**
The residence requirement for students admitted full-time to the master's program is three sessions.

**Time limit**
- Full-time: 4 sessions
- Part-time: 8 sessions

**Status**
Full-time or part-time

### Master of Laws with Specialization in Women's Studies

**Title of degree:** Master of Laws with Specialization in Women's Studies.

The Faculty of Law is a participating unit in the collaborative master’s program in women's studies. This program has been established for students wishing to enrich their training in Law by including an interdisciplinary component in Women’s Studies.

Students should normally apply for acceptance in the Women's Studies collaborative program at the same time as they apply for admission to the master’s program in Law. For further details, please consult the Women's Studies program description below or our website.

**1. Degree Requirements (with Research Paper)**

a) Two compulsory law courses:
- DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
- DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)

b) Two compulsory courses in Women’s Studies:
- FEM5300 FEMINIST THEORIES (3cr.)
- FEM5103 FEMINIST METHODOLOGIES (3cr.)

c) One elective law course

d) DCL7066 Research Paper (50 to 60 pages)

The research paper must focus on a legal issue related to Women's Studies. Written under the supervision of a faculty member or other suitable
expert appointed by the Assistant Dean of Graduate Studies in Law, it should advance a research question, propose a solution to a problem, or present a critical analysis of an area of law related to women's studies. The paper is evaluated on a "satisfactory" or "not satisfactory" basis by the supervisor and one other expert selected by the Director of the Women's Studies Graduate Committee.

**Residence**
The residence requirement for students admitted full-time to the master's program is three sessions.

**Time limit**
Full-time: 4 sessions
Part-time: 8 sessions

**Status**
Full-time or part-time

2. **Degree requirements (with thesis)**

a) Two compulsory law courses:

DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)
DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)

b) Two compulsory courses in Women's Studies:

FEM5300 FEMINIST THEORIES (3cr.)
FEM5103 FEMINIST METHODOLOGIES (3cr.)

c) DCL7999 Thesis (100 to 130 pages).
The thesis must focus on a legal issue related to Women's Studies. It must show that the candidate is able to work in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. It must make a significant and original contribution to the combined fields of studies and should be of such quality as to merit publication without the need for major revision. The thesis has to satisfy a three-member jury approved by the Faculty of Graduate and Postdoctoral Studies. At least one jury member is selected by the Women's Studies Graduate Committee. The other members are selected by the Assistant Dean of Graduate Studies in Law.

**Residence**
The residence requirement is three sessions.

**Time limit**
Full-time: 5 sessions

**Status**
Full-time only

**Particular Regulations**

These particular regulations supplement the General Regulations of the FGPS.

**Part-time Registration**
A part-time student may not take more than one activity in a given session.

**Courses in Other Faculties**

With the approval of the Assistant Dean of Graduate Studies in Law, a candidate may be allowed to take a limited number of graduate courses in other faculties.

**Language of Instruction**

Courses are offered in English or in French, and occasionally in both languages. Students may complete the course requirements of their program in either English or French or a combination of both, subject to the availability of the courses required for the program in question.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), or the research proposal, or the thesis proposal, or whose research progress is deemed unsatisfactory, must withdraw from the program.

**Courses**

Not all of the courses listed are given each year. The course is offered in the language in which it is described.

**DCL5135 CONTEMPORARY ISSUES IN LAW** (3cr.)
This seminar will focus on a general overarching theme (i.e. equality, security, rights, access to justice, public interest lawyering, etc.) that will be
discussed in relation to different areas of law.

**DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)**
Review of basic legal research techniques, legal resource materials and legal citation.

**DCL5336 LEGAL RESEARCH SEMINAR (3cr.)**
This seminar explores alternative teaching styles for legal education. Students will be presenting their research projects.

**DCL5401 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)**
Réalisation des techniques de recherche, des sources du droit et des méthodes d’analyse.

**DCL5403 CONTEMPORARY ISSUES IN LAW (3cr.)**
This seminar will focus on a general overarching theme (i.e. equality, security, rights, access to justice, public interest lawyering, etc.) that will be discussed in relation to different areas of law.

**DCL6339 SPECIAL TOPICS IN LAW (3cr.)**
In-depth examination of a question or topic linked to emerging trends or research areas in law.

**DCL6939 THÈMES CHOISIS EN DROIT / SPECIAL TOPICS IN LAW (3cr.)**
Etude approfondie d’une problématique ou d’un sujet lié aux tendances émergentes en droit. Préalable : connaissance active soit de l’anglais, soit du français et connaissance passive de l’autre langue. In-depth examination of a question or topic linked to emerging trends or research areas in law. Prerequisite: Active knowledge of English or French and passive knowledge of the other language.

**DCL7022 STAGE DE CLÉRICATURE / JUDICIAL CLERKSHIP (6cr.)**

**DCL8330 LEGAL RESEARCH METHODOLOGY AND THEORY (3cr.)**
The course will examine epistemology and methodology issues arising in the field of legal research.

**Théorie juridique**

**DCL5302 PHILOSOPHY OF LAW (3cr.)**
Examination of topics, theories, writers in philosophy of law. May include comparative or critical materials.

**DCL5303 STUDIES IN LEGAL THEORY I (3cr.)**
Survey of current theories of law. May be organized around a particular problem or writer or perspective. May include interdisciplinary materials.

**DCL5304 STUDIES IN LEGAL THEORY II (3cr.)**
Exploration of a particular theme or problem from a theoretical point of view, e.g. legal education, professional responsibility, law and sociology. May include interdisciplinary materials.

**DCL5305 FEMINIST ANALYSIS OF LAW (3cr.)**
Exploration of feminist perspectives, theories and themes and the application of these to particular problems or issues. Development of techniques for analyzing social meaning of law.

**DCL5307 INTRODUCTION TO CIVIL LAW (3cr.)**
Survey of basic concepts of Civil Law, including codification, law of the person, obligations, property. Exploration of legal reasoning in civilian context.

**DCL5308 COMPARATIVE LAW (3cr.)**
Exploration of issues, legal institutions, legal rules in context of different jurisdictions. May include theory of comparative law.

**DCL5309 LEGAL THEORY SEMINAR (3cr.)**
Examination of current legal issues in their legal, historical and social context.

**DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)**
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

**DCL5337 CRITICAL LEGAL THEORIES (3cr.)**
This course examines contemporary approaches to and debates in critical legal theory, law and society, feminist jurisprudence, critical race theory, and post-colonial theory, including critiques of essentialist theory and models of interdisciplinary analysis.

**DCL5340 SUSTAINABILITY AND LAW (3cr.)**
This course provides theoretical perspectives on alternative approaches to environmental policy, emphasizing ethical and economic perspectives.
DCL5502 PHILOSOPHIE DU DROIT (3cr.)
Définition du droit et de la philosophie du droit; les buts du droit; les concepts juridiques; le raisonnement du droit; le language du droit; les philosophies et les théories du droit.

DCL5503 THÉORIES CONTEMPORAINES DU DROIT (3cr.)
Introduction à l'étude des différentes théories contemporaines du droit, telles la théorie marxiste, l'analyse économique, l'approche féministe, le positivisme, le droit naturel, etc.

DCL5504 SOCIOLOGIE DU DROIT (3cr.)

DCL5505 ANALYSE FÉMINISTE DU DROIT (3cr.)
Statut juridique, droits et obligations des femmes dans les domaines de la santé, de la famille, du travail, de la criminalité, de la fiscalité, du commerce, etc. Analyse critique du droit à partir d'une perspective féministe. Étude des différentes théories féministes du droit.

DCL5508 DROIT COMPARÉ (3cr.)
Définition et méthode du droit comparé. Étude sommaire des grands système de droit contemporains, et comparaison de leurs fondements. Étude de certaines institutions juridiques dans le contexte de ces divers systèmes.

DCL5509 PROBLÈMES THÉORIQUES CHOISIS DE DROIT PUBLIC (3cr.)
Étude critique, d'ordre fondamental ou méthodologique, de notions, de mécanismes ou d'institutions de droit public.

DCL5510 PROBLÈMES THÉORIQUES CHOISIS DE DROIT PRIVÉ (3cr.)
Étude critique, d'ordre fondamental ou méthodologique, de notions, de mécanismes ou d'institutions de droit privé.

DCL5610 INTERPRÉTATION DES LOIS (3cr.)

DCL5337 CRITICAL LEGAL THEORIES (3cr.)
This course examines contemporary approaches to and debates in critical legal theory, law and society, feminist jurisprudence, critical race theory, and post-colonial theory, including critiques of essentialist theory and models of interdisciplinary analysis.

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)

DCL6126 INTERNATIONAL HUMANITARIAN LAW: CONTEMPORARY CHALLENGES (3cr.)
The philosophy, principles and practical application of International Humanitarian Law (IHL) in both historic and contemporary contexts.

DCL6319 ADVANCED INTERNATIONAL ECONOMIC LAW (3cr.)
This seminar explores theoretical and systemic issues of international economic law.

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)

DCL7300 TECHNOPRUDENCE : LEGAL THEORY IN THE INFORMATION AGE (3cr.)
Seminar examining the impact that cyberspace and other technologies utilized in the so-called information revolution might have on traditional legal theory and doctrine.

DCL7313 STATUTORY INTERPRETATION (3cr.)

DCL7500 TECHNO-THÉORIE : THÉORIE DU DROIT À L'ÈRE DE L'INFORMATION (3cr.)
Séminaire consacré à l’étude des incidences du cyberspace et des autres technologies de la soi-disant révolution de l’information sur la théorie et la doctrine traditionnelles.

Electives

International Law

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)
DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)

DCL6124 INTERNATIONAL BUSINESS TRANSACTIONS (3cr.)

DCL6125 INTERNATIONAL TRADE REGULATION (3cr.)

DCL6126 INTERNATIONAL HUMANITARIAN LAW: CONTEMPORARY CHALLENGES (3cr.)
The philosophy, principles and practical application of International Humanitarian Law (IHL) in both historic and contemporary contexts.

DCL6127 LAW AND DEVELOPING COUNTRIES (3cr.)
The role of domestic and international law in developing countries including historical, economic and critical (feminist and post-colonial) perspectives on law in the process of development; assessing the impact of law on developments regarding the environment, international trade, democratic and human rights, markets and investment, ethnic conflict, governance and corruption, technology development, and aid to developing countries.

DCL6128 LAW, POLITICS AND ECONOMICS IN INTERNATIONAL AFFAIRS (3cr.)
The linkages and differences between the disciplines of law, political science and economics as they relate to international affairs, including an in-depth exploration of the underlying assumptions of each discipline and how they interact in international affairs.

DCL6300 INTERNATIONAL INVESTMENT LAW (3cr.)
Study of the international law applicable to the promotion and protection of foreign investment. Origins, evolution and sources; treatment and protection principles; settlement of investment disputes.

DCL6319 ADVANCED INTERNATIONAL ECONOMIC LAW (3cr.)
This seminar explores theoretical and systemic issues of international economic law.

DCL6350 INTERNATIONAL ECONOMIC LAW CASE STUDIES (3cr.)
This seminar uses case studies to explore theoretical issues of international economic law in the context of actual disputes.

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)

DCL6728 DROIT INTERNATIONAL PRIVÉ (3cr.)

DCL6730 ASPECTS INTERNATIONAUX DE LA PROPRIÉTÉ INTELLECTUELLE (3cr.)

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

DCL6733 DROIT COMMERCIAL INTERNATIONAL (3cr.)

DCL6734 ORGANISATION INTERNATIONALE DU COMMERCE (3cr.)

DCL6735 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL III (3cr.)
Étude approfondie de problèmes d'actualité en droit international.

DCL6736 DROIT INTERNATIONAL HUMANITAIRE (3cr.)
Le droit international humanitaire est la branche du droit international public qui régit les conséquences humanitaires de conflits armés. Le cours a pour but de familiariser les étudiants et étudiantes avec les sources du droit international humanitaire, ses principes et ses règles fondamentaux.

DCL6737 JUSTICE ET VIOLENCES POLITIQUES EXTRÊMES : LA RÉPONSE DU DROIT INTERNATIONAL (3cr.)
La multiplication, dans le monde contemporain, de situations de violences politiques extrêmes, oblige le droit et la justice à s’adapter et à trouver de nouvelles réponses à ces types de violations systématiques et radicales. Il s’agira, dans le cadre de ce cours, de réfléchir sur la nature, le rôle, la place, le fonctionnement, les forces et les limites de la justice, ainsi que les attentes qu’elle suscite et les défis qu’il lui faut relever dans des contextes de sortie de périodes de génocides et/ou crimes contre l’humanité.

DCL6738 RÉPRESSEION PÉNALE INTERNATIONALE (3cr.)
Les origines de la responsabilité pénale individuelle, les tribunaux pénaux internationaux, mixtes et autres mécanismes alternatifs de justice seront étudiés notamment le Tribunal pénal international pour l’ex-Yougoslavie, le Tribunal pénal international pour le Rwanda, la Cour spéciale pour la Sierra Leone et la Cour pénale internationale. Le fondement juridique de la création de ces tribunaux, leurs compétences, leurs structures, ainsi que l’apport de la jurisprudence au droit international humanitaire et au droit international des droits de la personne seront examinés.

Human Rights
DCL5120 ADVANCED HUMAN RIGHTS (3cr.)

DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)

DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)

DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)

DCL5127 CONSTITUTIONAL EQUALITY LAW AND THEORY (3cr.)
Examination of different models of equality rights and of rights adjudication that shape Canadian constitutional jurisprudence with the goal of developing a critical understanding of the social, political and legal possibilities, risks and limitations of attempting to advance equality claims through constitutional rights litigation.

DCL5131 CHILDREN’S RIGHTS: AN INTERDISCIPLINARY APPROACH (3cr.)
Study of specific questions related to various aspects of the life of a child, as well as the different realities of children: the child as a person and his/her identity, filial relations and family life, the child in the community, marginalized children, education and participation. A multidisciplinary perspective built around the United Nations’ Convention of the Rights of the Child, which allows the student to delve deeper into the issue of children’s rights by bringing together points of view from law, social sciences, education and health.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5721 PERSPECTIVES FÉMINISTES DU DROIT (3cr.)

DCL5730 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE (3cr.)

DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I (3cr.)

DCL5732 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE II (3cr.)

DCL5733 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE III (3cr.)

DCL5734 PERSPECTIVES AUTOCHTONES DU DROIT (3cr.)

DCL5735 PROBLÈMES CHOISIS DE DROITS DE LA PERSONNE IV (3cr.)
Étude approfondie de problèmes d’actualité dans le domaine des droits de la personne.
Concentrations
International Humanitarian and Security Law

DCL5106 INDIGENOUS LEGAL THEORY: WORLDVIEW, LANGUAGE, AND LEGAL CONCEPTS (3cr.)
Students will explore indigenous legal concepts as they are constructed within a particular Indigenous language and worldview. The specific language and people will vary depending on the instructor.

DCL5120 ADVANCED HUMAN RIGHTS (3cr.)

DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)

DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)

DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)

DCL5143 INDIGENOUS LAW CLINIC (3cr.)
The goal of the Clinic is to help create Indigenous law research materials for Indigenous communities, academic institutions and practitioners. In partnership with Indigenous communities and working under supervision, students will be placed in an Indigenous community to investigate questions pertaining to Indigenous law and the sui generis nature of Aboriginal law. The Clinic aims to promote a more in-depth understanding of Indigenous legal orders by providing hands-on experience to build on students' classroom learning. There will be a lecture component designed to enhance the hands-on clinic experience. Grading for the internship will be on an S (Satisfactory) / NS (Non-Satisfactory) basis.

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
Review of basic legal research techniques, legal resource materials and legal citation.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5327 COMPARATIVE INDIGENOUS RIGHTS / LEGAL REGIMES (3cr.)
Critical issues affecting indigenous people arising within Canada, the United States, Australia, New Zealand and other countries in which the similarities and differences in domestic law, indigenous legal orders and sui generis or hybrid law are explored in detail from a comparative perspective of legal pluralism.

DCL5501 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)
Révision des techniques de recherche, des sources du droit et des méthodes d'analyse.

DCL5730 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE (3cr.)

DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I (3cr.)

DCL5732 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE II (3cr.)

DCL5733 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE III (3cr.)

DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)

DCL6126 INTERNATIONAL HUMANITARIAN LAW: CONTEMPORARY CHALLENGES (3cr.)
The philosophy, principles and practical application of International Humanitarian Law (IHL) in both historic and contemporary contexts.

DCL6127 LAW AND DEVELOPING COUNTRIES (3cr.)
The role of domestic and international law in developing countries including historical, economic and critical (feminist and post-colonial) perspectives on law in the process of development; assessing the impact of law on developments regarding the environment, international trade, democratic and human rights, markets and investment, ethnic conflict, governance and corruption, technology development, and aid to developing countries.

DCL6128 LAW, POLITICS AND ECONOMICS IN INTERNATIONAL AFFAIRS (3cr.)
The linkages and differences between the disciplines of law, political science and economics as they relate to international affairs, including an in-depth exploration of the underlying assumptions of each discipline and how they interact in international affairs.

DCL6130 NATIONAL SECURITY LAW (3cr.)
This course examines international, Canadian and comparative laws governing efforts to preserve "national security." "National security" has been defined as the protection and preservation of a state's values, institutions and the well-being of its citizens - it is an expansive concept that, in colloquial terms, has a strong association with military preparedness and law enforcement and that sometimes co-exists uncomfortably with the "rule of law."

DCL6150 INTERNATIONAL HUMANITARIAN AND SECURITY LAW INTERNSHIP (3cr.)
Internship with a governmental or non-governmental organization in order to enhance the student's practical experience in international humanitarian and security law issues. Students will be required to submit a written report relating to the work accomplished during the internship. The internship assessment, which will be based on this written report, will be conducted by the internship Faculty supervisor on a "satisfactory" or "not-satisfactory" (S/NS) basis.

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

DCL6737 JUSTICE ET VIOLENCES POLITIQUES EXTRÊMES : LA RÉPONSE DU DROIT INTERNATIONAL (3cr.)
La multiplication, dans le monde contemporain, de situations de violences politiques extrêmes, oblige le droit et le justice à s'adapter et à trouver de nouvelles réponses à ces types de violations systématiques et radicales. Il s’agira, dans le cadre de ce cours, de réfléchir sur la nature, le rôle, la place, le fonctionnement, les forces et les limites de la justice, ainsi que les attentes qu’elle suscite et les défis qu’il lui faut relever dans des contextes de sorte de périodes de génocides et/ou crimes contre l’humanité.

DCL6738 RÉPRESSION PÉNALE INTERNATIONALE (3cr.)
Les origines de la responsabilité pénale individuelle, les tribunaux pénals internationaux, mixtes et autres mécanismes alternatifs de justice seront étudiés notamment le Tribunal pénal international pour l’ex-Yougoslavie, le Tribunal pénal international pour le Rwanda, la Cour spéciale pour la Sierra Leone et la Cour pénale internationale. Le fondement juridique de la création de ces tribunaux, leurs compétences, leurs structures, ainsi que l’apport de la jurisprudence au droit international humanitaire et au droit international des droits de la personne seront examinés.

Global Sustainability and Environmental Law

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
Review of basic legal research techniques, legal resource materials and legal citation.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5340 SUSTAINABILITY AND LAW (3cr.)
This course provides theoretical perspectives on alternative approaches to environmental policy, emphasizing ethical and economic perspectives.

DCL5341 COMPARATIVE ENVIRONMENTAL LAW (3cr.)
This course offers comparative analysis of legal approaches to environmental law from civil, common, Islamic, socialist, and aboriginal law perspectives.

DCL5342 GLOBAL ENVIRONMENTAL GOVERNANCE (3cr.)
This course examines the responsibilities and operation of a number of organizations with significant environmental responsibilities operating at the global level. The development of international environmental law and the implementation of international development goals will also be studied.

DCL5343 ENVIRONMENTAL LAW INTERNSHIP (3cr.)
Internship with a governmental or non-governmental organization or research institution in order to enhance the student's practical experience in applied research or environmental law practice. Students will be required to submit a written report relating to the work accomplished during the internship. The internship assessment, which will be based on this written report, will be conducted by the internship Faculty supervisor on a "satisfactory" or "not-satisfactory" (S/NS) basis.
DCL5501 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)
Révision des techniques de recherche, des sources du droit et des méthodes d'analyse.

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

**Law and Social Justice**

DCL5106 INDIGENOUS LEGAL THEORY: WORLDVIEW, LANGUAGE, AND LEGAL CONCEPTS (3cr.)
Students will explore indigenous legal concepts as they are constructed within a particular Indigenous language and worldview. The specific language and people will vary depending on the instructor.

DCL5120 ADVANCED HUMAN RIGHTS (3cr.)

DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)

DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)

DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)

DCL5143 INDIGENOUS LAW CLINIC (3cr.)
The goal of the Clinic is to help create Indigenous law research materials for Indigenous communities, academic institutions and practitioners. In partnership with Indigenous communities and working under supervision, students will be placed in an Indigenous community to investigate questions pertaining to Indigenous law and the sui generis nature of Aboriginal law. The Clinic aims to promote a more in-depth understanding of Indigenous legal orders by providing hands-on experience to build on students' classroom learning. There will be a lecture component designed to enhance the hands-on clinic experience. Grading for the internship will be on an S (Satisfactory) / NS (Non-Satisfactory) basis.

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
Review of basic legal research techniques, legal resource materials and legal citation.

DCL5303 STUDIES IN LEGAL THEORY I (3cr.)
Survey of current theories of law. May be organized around a particular problem or writer or perspective. May include interdisciplinary materials.

DCL5304 STUDIES IN LEGAL THEORY II (3cr.)
Exploration of a particular theme or problem from a theoretical point of view, eg. legal education, professional responsibility, law and sociology. May include interdisciplinary materials.

DCL5305 FEMINIST ANALYSIS OF LAW (3cr.)
Exploration of feminist perspectives, theories and themes and the application of these to particular problems or issues. Development of techniques for analyzing social meaning of law.

DCL5309 LEGAL THEORY SEMINAR (3cr.)
Examination of current legal issues in their legal, historical and social context.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5327 COMPARATIVE INDIGENOUS RIGHTS / LEGAL REGIMES (3cr.)
Critical issues affecting indigenous peoples arising within Canada, the United States, Australia, New Zealand and other countries in which the similarities and differences in domestic law, indigenous legal orders and sui generis or hybrid law are explored in detail from a comparative perspective of legal pluralism.

DCL5337 CRITICAL LEGAL THEORIES (3cr.)
This course examines contemporary approaches to and debates in critical legal theory, law and society, feminist jurisprudence, critical race theory, and post-colonial theory, including critiques of essentialist theory and models of interdisciplinary analysis.
DCL5338 ACTION RESEARCH METHODOLOGY IN LAW (3cr.)
This course addresses issues of research ethics, accountability and partiality. It is also an introduction to research tools and methods of particular importance to studies related to social justice research and law.

DCL5501 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)
Révision des techniques de recherche, des sources du droit et des méthodes d'analyse.

DCL5503 THÉORIES CONTEMPORAINES DU DROIT (3cr.)
Introduction à l'étude des différentes théories contemporaines du droit, telles la théorie marxiste, l'analyse économique, l'approche féministe, le positivisme, le droit naturel, etc.

DCL5504 SOCIOLOGIE DU DROIT (3cr.)

DCL5505 ANALYSE FÉMINISTE DU DROIT (3cr.)
Statut juridique, droits et obligations des femmes dans les domaines de la santé, de la famille, du travail, de la criminalité, de la fiscalité, du commerce, etc. Analyse critique du droit à partir d'une perspective féministe. Étude des différentes théories féministes du droit.

DCL5721 PERSPECTIVES FÉMINISTES DU DROIT (3cr.)

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5730 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE (3cr.)

DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I (3cr.)

DCL5732 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE II (3cr.)

DCL5733 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE III (3cr.)

DCL5734 PERSPECTIVES AUTOCHTONES DU DROIT (3cr.)

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)

DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

Law and Technology
DCL.5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL.7300 TECHNOPRUDENCE: LEGAL THEORY IN THE INFORMATION AGE (3cr.)
Seminar examining the impact that cyberspace and other technologies utilized in the so-called information revolution might have on traditional legal theory and doctrine.

DCL.7301 REGULATION OF INTERNET COMMERCE (3cr.)
Seminar analyzing the legal challenges posed by the Internet to the traditional commercial law framework. Topics include intellectual property issues, on-line contracts, digital signatures, taxation, securities regulation, and the provision of online legal services.

DCL.7302 REGULATION OF INTERNET COMMUNICATIONS (3cr.)
Seminar analyzing the legal challenges posed by the Internet to the rights of free speech and privacy. Topics include online obscenity, hate speech, defamation, as well as national and international approaches to data privacy protection.

DCL.7303 ELECTRONIC COMMERCE PRACTICE WORKSHOP (3cr.)
Practice-oriented seminar analyzing the legal issues and implications of electronic commerce. Topics include licensing, privacy and acceptable use policies, Web development agreements, and regulatory issues.

DCL.7304 TECHNOLOGY LAW INTERNSHIP (3cr.)
Co-operative and clinical work study program in technology law. Student placement at a technology-focused government department or a technology corporation’s in-house legal department. Pass/Fail grade, to be based on the grades obtained for the written report as well as on the evaluations of the employer. Prerequisite: At least one Intellectual Property or Internet Law course.

DCL.7305 STUDIES IN INTERNET LAW (3cr.)
Selected problems in the emerging intersection of law and technology.

DCL.7306 LEGAL PERSPECTIVES ON CYBERFEMINISM (3cr.)
This course analyzes issues relating to application of feminist principles to the legal regulation of communication technologies. Topics covered include the gendered dynamics of networked capitalist society; women’s relationships with communication technologies; technology’s potential impact on equality for women; and questions surrounding whether and how to legally regulate communication technologies.

DCL.7307 DIGITAL MUSIC LAW (3cr.)
This course addresses legal, cultural, economic and technological aspects of digital music around the world. Topics include the music industry; copyright protection; infringement and limitation issues; and new business strategies.

DCL.7310 TECHNOPOLICY: INTERPLAY BETWEEN TECHNOLOGIES AND EXISTING LEGAL RULES (3cr.)
Seminar examining the application of traditional legal analysis to difficult policy questions arising from the advent of information technologies.

DCL.7311 STUDIES IN INTELLECTUAL AND INDUSTRIAL PROPERTY (3cr.)
Trademarks, registration, the torts of passing off and misappropriation of personality; trade names; copyright, the protection of computer software, arts and entertainment industries; trade secrets, confidential information; patents; industrial designs, related competitive torts. Canadian and international perspectives.

DCL.7312 COMPETITION LAW (3cr.)
Restrictive trade practices and competition policy.

DCL.7315 PATENT LAW (3cr.)
Law of patents, both national and international. Procurement, licensing and enforcement of patents.

DCL.7316 STUDIES IN BUSINESS LAW: COPYRIGHT LAW (3cr.)
Law and policy relating to copyright law.

DCL.7317 COMMUNICATIONS LAW (3cr.)
Examination of the regulatory framework governing communications in Canada. Three industry sectors (telecommunications, broadcasting and cable television) be examined with particular attention to the legal, policy, administrative and practical constraints which affect their activities.

DCL.7366 TECHNOLOGY LAW PROJECT
Technology-based project which will integrate legal content, usually within a piece of software, machine code or a web-based application. The project must incorporate a substantive legal dimension in order to satisfy the research requirement. A project that does not have a built-in substantive legal dimension must be accompanied by a written report outlining the legal significance of the project. Technology law projects will be evaluated on a Pass/Fail basis by the supervisor and one other person appointed by the Co-Director of Graduate Studies in Law.
DCL7500 TECHNO-THÉORIE : THÉORIE DU DROIT À L'ÈRE DE L'INFORMATION (3cr.)
Séminaire consacré à l’étude des incidences du cyberspace et des autres technologies de la soi-disant révolution de l’information sur la théorie et la doctrine traditionnelles.

DCL7501 RÉGLEMENTATION DU CYBERCOMMERCE (3cr.)
Séminaire consacré à l’étude des défis juridiques que pose l’Internet en matière du droit commercial traditionnel. Les sujets à l’étude sont la propriété intellectuelle, les contrats en ligne, les signatures numériques, les impôts, la réglementation des valeurs mobilières et la prestation de services juridiques en ligne.

DCL7502 RÉGLEMENTATION DES CYBERCOMMUNICATIONS (3cr.)
Séminaire consacré à l’étude des défis juridiques que pose l’Internet en matière de liberté d’expression et du droit à la vie privée. Certains sujets à l’étude sont l’obscénité, le discours haineux, la defamation, les mécanismes pour la protection des renseignements personnels, à l’échelle nationale et à l’échelle internationale.

DCL7503 PRATIQUE DU COMMERCE ÉLECTRONIQUE (3cr.)
Séminaire pratique pour l’approfondissement de diverses questions et implications juridiques du commerce électronique. Certains sujets à l’étude sont l’attribution de licences, les politiques relatives à la protection des renseignements personnels et à la négligence, les ententes pour le développement du Web et les questions de réglementation.

DCL7504 STAGE EN DROIT DE LA HAUTE TECHNOLOGIE (3cr.)
Stage professionnel auprès d’un ministère gouvernemental ou d’un service du contentieux d’une entreprise se spécialisant en droit de la haute technologie. Noté S (satisfaisant) ou N/S (non satisfaisant) selon les résultats du rapport écrit et de l’évaluation de l’employeur. Préalable : au moins un cours dans le domaine de la propriété intellectuelle ou du droit d’Internet.

DCL7505 ÉTUDES EN DROIT D’INTERNET (3cr.)
Études de problèmes d'actualité pour l'approfondissement des interactions croissantes entre le droit et la technologie.

DCL7506 DROIT DE LA COMMUNICATION DANS LE CYBERESPACE (3cr.)
Dans un contexte de droit civil, étude des problèmes juridiques liés à la réglementation du contenu d’Internet et à la protection de la vie privée des Internautes, envisagés dans divers domaines du droit, tels les communications, la pornographie, la criminalité, la protection des renseignements personnels et les libertés publiques.

DCL7507 DROIT INTERNATIONAL D’INTERNET : L’INTÉGRATION DES DIFFÉRENTS SYSTÈMES JURIDIQUES (3cr.)
Dans un contexte de droit civil, étude des solutions proposées par les différents intervenants du cyberspace, tels les gouvernements, les organismes non-gouvernementaux, l’industrie et les utilisateurs pour la résolution des divers problèmes juridiques, à caractère international, reliés à l’utilisation d’Internet, notamment dans les domaines de droit suivants : la réglementation, la propriété intellectuelle, les noms de domaines, la compétence des tribunaux et la résolution des conflits.

DCL7508 PROBLÈMES CHOISIS DE PROPRIÉTÉ INTELECTUELLE ET INDUSTRIELLE (3cr.)
Dans un contexte de droit civil, étude approfondie de certains problèmes contemporains en droit de la propriété intellectuelle et industrielle.

DCL7509 ÉTUDES APPROFONDIES DU DROIT DE LA CONCURRENCE (3cr.)
Dans un contexte de droit civil, étude des législations en droit de la concurrence; structure administrative; étude des règles portant sur les ententes restreignant la concurrence, les fusions, l’abus de position dominante, les pratiques restrictives, etc.; aspects internationaux du droit de la concurrence.

DCL7510 TECHNO-RÉGULATION : INTERACTION ENTRE LES TECHNOLOGIES ET L’ÉTAT ACTUEL DU DROIT (3cr.)
Séminaire consacré à l’application des règles traditionnelles de l’analyse juridique aux difficiles questions de politiques soulevées par les nouvelles technologies de l’information.

DCL7511 ÉTUDES EN PROPRIÉTÉ INTELECTUELLE ET INDUSTRIELLE (3cr.)
Dans un contexte de common law, études des sujets suivants : marques de commerce; système d’enregistrement; délits de commercialisation trompeuse et d’usurpation d’identité; noms commerciaux; droit d’auteur; protection des logiciels; domaine des arts et de l’industrie du spectacle; droit des secrets commerciaux et des renseignements confidentiels; droit des brevets; dessin industriel et tout délit en matière de concurrence. Perspective canadienne et internationale.

DCL7566 PROJET EN DROIT DE LA TECHNOLOGIE
Projet à contenu juridique qui peut prendre la forme d’un logiciel, d’un code machine ou d’une application sur l’Internet. Pour satisfaire aux exigences de recherche de la maîtrise, le contenu juridique doit être substantiel; à défaut d’un tel contenu, un rapport écrit décrivant la portée juridique du projet doit accompagner ce dernier. L’évaluation du projet est faite par la personne qui l’a dirigée et une autre personne désignée par la Direction des études supérieures en droit. Cette évaluation est sanctionnée uniquement par la mention « Réussite » ou « Échec ».

Droit notarial
DCL5321 INTRODUCTION TO LEGAL DRAFTING AND THE PROFESSION OF NOTARY (3cr.)
Introduction to preventive legal drafting (legal opinions, notarized writings and non-litigious proceedings). Introduction to the profession of notary throughout the
DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5521 INITIATION À LA RÉDACTION D’ACTES ET À LA PROFESSION NOTARIALE (3cr.)
Introduction à la profession notariale et au droit préventif (le rôle, les devoirs et la responsabilité du notaire; les actes notariés, leur communication et leur conservation). Règles et techniques de rédaction d’une opinion juridique, d’un acte notarié et d’un acte de procédure non contentieuse. Introduction à la rédaction préventive et aux conventions de règlement de conflits. Exercices d’analyse, d’interprétation et de rédaction des actes concernés.

DCL5522 STAGE DE DROIT NOTARIAL (3cr.)
Travail à la clinique de droit notarial, en pratique privée ou au gouvernement sous la supervision d’un notaire. Rapport de stage supervisé par un membre de la Faculté de droit.

DCL5523 PUBLICITÉ DES DROITS ET PROPRIÉTÉ (3cr.)
Règles régissant la publicité des droits (domaine, modalités et effets de la publicité des droits, immatriculation des immeubles, radiation des droits). Initiation aux modes d’accès aux registres et aux documents à distance. Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : modalités du droit de propriété (copropriété et propriété superficielle); démembrements du droit de propriété (emphytéose, usufruit, usage et servitudes) et publicité des droits.

DCL5524 RELATIONS FAMILIALES (3cr.)
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : régimes matrimoniaux; conventions matrimoniales; union civile; union de fait; dissolution et liquidation du régime matrimonial et conséquences fiscales; projets d’accord en matière de séparation et de divorce; droit international privé; adoption; régimes de protection des personnes inaptes ou absentes (tutelle, curatelle, conseiller, mandat d’inaptitude) et administration du bien d’autrui. Initiation à la médiation familiale.

DCL5525 NÉGOCIAISON ET TRANSFERTS DE PROPRIÉTÉ (3cr.)
Initiation aux règles de la négociation. Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : avant-contrats; contrats translatifs de propriété (promesse de vente, vente, vente d’un immeuble à usage d’habitation, vente d’entreprise, vente de créance, échange, dation de paiement, donation, etc.); patrimoines d’affectation; reconnaissance judiciaire du droit de propriété; publicité des droits; lois fiscales applicables et conséquences fiscales; restrictions ou autorisations résultants de lois particulières (Loi sur la protection du territoire agricole, Loi sur l’acquisition de terres agricoles par des non-résidents, Loi sur les biens culturels, Loi sur la Régie du logement.

DCL5526 ENGAGEMENTS FINANCIERS (3cr.)
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : obligations; reconnaissance de dette; sûretés (priorités, hypothèques, garantie bancaire, cautionnement); garanties particulières (vente à température, faculté de rachat, clause résolutoire, fiducie); publicité des droits; procédure particulière à la vente du bien d’autrui; ordre de collocation; droit international privé; droit comparé (garanties mobilières de common law) et faillite et insolvabilité.

DCL5527 DÉCÈS ET TRANSMISSION DES BIENS (3cr.)
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : testaments; donation à cause de mort; assurance de personnes; substitution et fiducie testamentaire; jugement déclaratif de décès; règlement des successions; conséquences fiscales; devoirs, pouvoirs et responsabilité du liquidateur; administration du bien d’autrui; gestion fiduciaire; planification successoriale; droit international privé et droit comparé (testament étranger, biens situés à l’étranger, etc.).

DCL5528 EXAMEN DES TITRES IMMOBILIERS (3cr.)

DCL5529 DROIT DES SOCIÉTÉS (3cr.)
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : constitution, fonctionnement, financement, réorganisation, fusion et liquidation des sociétés par actions; distribution et attribution de bénéfices, surplus, biens ou avantages aux actionnaires; sociétés de personnes; lois fiscales et lois connexes; planifications financières, corporatives et fiscales.

DCL5530 DROIT DES ENTREPRISES RÉGLEMENTÉES (3cr.)

DCL5532 DROIT NOTARIAL APPROFONDI I (3cr.)
Étude approfondie par dossier maître de sujets spécifiques et d’actualité liés au droit notarial.
International Trade and Foreign Investment

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Métis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)

DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6124 INTERNATIONAL BUSINESS TRANSACTIONS (3cr.)

DCL6125 INTERNATIONAL TRADE REGULATION (3cr.)

DCL6128 LAW, POLITICS AND ECONOMICS IN INTERNATIONAL AFFAIRS (3cr.)
The linkages and differences between the disciplines of law, political science and economics as they relate to international affairs, including an in-depth exploration of the underlying assumptions of each discipline and how they interact in international affairs.

DCL6300 INTERNATIONAL INVESTMENT LAW (3cr.)
Study of the international law applicable to the promotion and protection of foreign investment. Origins, evolution and sources; treatment and protection principles; settlement of investment disputes.

DCL6319 ADVANCED INTERNATIONAL ECONOMIC LAW (3cr.)
This seminar explores theoretical and systemic issues of international economic law.

DCL6350 INTERNATIONAL ECONOMIC LAW CASE STUDIES (3cr.)
This seminar uses case studies to explore theoretical issues of international economic law in the context of actual disputes.

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)

DCL6728 DROIT INTERNATIONAL PRIVÉ (3cr.)

DCL6730 ASPECTS INTERNATIONAUX DE LA PROPRIÉTÉ INTELLECTUELLE (3cr.)

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

DCL6733 DROIT COMMERCIAL INTERNATIONAL (3cr.)

DCL6734 ORGANISATION INTERNATIONALE DU COMMERCE (3cr.)
DCL6735 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL III (3cr.)
Étude approfondie de problèmes d'actualité en droit international.

Research
DCL7033 RECHERCHE DIRIGÉE / DIRECTED RESEARCH (3cr.)

DCL7066 MÉMOIRE DE RECHERCHE / RESEARCH PAPER

DCL7999 RECHERCHE ET THÈSE DE MAÎTRISE / RESEARCH AND MASTER'S THESIS

DCL8330 LEGAL RESEARCH METHODOLOGY AND THEORY (3cr.)
The course will examine epistemology and methodology issues arising in the field of legal research.

DCL9997 PROJET DE THÈSE / THESIS PROPOSAL
Examen au cours duquel l’étudiant expose, par écrit et oralement, son projet de thèse. L’étudiant doit soumettre une proposition de recherche, un plan détaillé ainsi qu’une bibliographie exhaustive. / The student presents, in writing and orally, his or her thesis proposal. The student must submit a research proposal, a detailed plan and a comprehensive bibliography.

DCL9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAM
Examen au cours duquel l’étudiant est évalué oralement sur ses connaissances des fondements dans son domaine de recherche. / During this examination the student will be assessed orally on his or her knowledge of legal foundations in his or her field of research.

DCL9999 THÈSE DE DOCTORAT / PhD THESIS

**Lettres françaises**

Le Département de français offre des programmes d’études supérieures menant aux grades de maîtrise ès arts (M.A.) en lettres françaises (avec mémoire ou avec thèse) et de docteur en philosophie (Ph.D.) en lettres françaises. Les champs de recherche sont les suivants :

- Création littéraire
- Littératures de langue française : littérature de la France, du Québec et du Canada français ainsi que du reste de la francophonie (Afrique, Antilles, Belgique, etc.)
- Langue et discours : étude diachronique de la langue française, grammaire et rédaction, analyse du discours, rhétorique et stylistique.

Le Département participe aussi à plusieurs programmes pluridisciplinaires : études des femmes (au niveau de la maîtrise), études médiévales et de la Renaissance (au niveau de la maîtrise), et études canadiennes (au niveau de doctorat), ce qui permet aux étudiants d’acquérir une spécialisation dans l’un de ces domaines.

Pour de plus amples renseignements, consultez le site Internet du Département de français.

Le programme de maîtrise est offert à temps plein ou à temps partiel ; le programme de doctorat est offert uniquement à temps plein.

Les programmes sont régis par les **règlements généraux** de la Faculté des études supérieures et postdoctorales (FÉSP).

**Programs**

Maîtrise ès arts Lettres françaises

Maîtrise ès arts Lettres françaises Spécialisation en études des femmes

Maîtrise ès arts Lettres françaises Spécialisation en études médiévales et de la renaissance

Doctorat en philosophie Lettres françaises

Doctorat en philosophie Lettres françaises Spécialisation en études canadiennes

**Admission**
Tout candidat doit détenir un baccalauréat spécialisé approfondi, ou spécialisé avec majeure, soit en lettres françaises soit en French Studies ou bien l'équivalent obtenu dans une université accréditée, avec une moyenne d'au moins 70 % (B).

Le candidat à l'admission au champ en création littéraire doit en outre présenter un dossier de textes représentatifs de son écriture.

Dans certains cas, un candidat sera plutôt admis à un programme de propédeutique. Ce programme visera à donner la formation requise pour poursuivre des études de maîtrise en Lettres françaises. Ayant réussi ce programme en obtenant une moyenne de 70 % (B) ou plus, le candidat pourra demander son admission à la maîtrise.

Programmes pluridisciplinaires

Le Département de français est l'une des unités scolaires participant aux programmes pluridisciplinaires en études des femmes (niveau maîtrise seulement) et en études médiévales et de la Renaissance (niveau maîtrise seulement).

- Le programme en études des femmes a été créé pour les étudiants et étudiantes qui souhaitent enrichir leur formation en lettres françaises en y ajoutant la dimension interdisciplinaire des études des femmes. Le programme comprend deux cours obligatoires ainsi que la rédaction d'une thèse ou d'un mémoire portant sur un sujet relié aux études des femmes.
- Le programme en études médiévales et de la Renaissance comprend, en plus de la rédaction d'une thèse ou d'un mémoire portant sur un sujet relié à l'histoire du Moyen Âge ou de la Renaissance, deux cours obligatoires, dont l'un sera compté comme exigence partielle de la maîtrise en lettres françaises.

Il faut indiquer dans la demande d'admission initiale au programme de maîtrise en lettres française qu'on veut être accepté dans l'un des programmes pluridisciplinaires. Pour de plus amples renseignements, voir la description de ces programmes affichée sur le site Web de la FESP.

### Program Requirements

#### Les exigences du grade sont les suivantes :

**Scolarité**

FRA5590 Atelier de méthodologie (3 crédits) : L'atelier vous permettra de mieux vous préparer à la recherche et, en particulier, à l'élaboration de votre sujet de thèse et à la rédaction de celle-ci. Il comporte deux volets. D’une part, vous ferez une réflexion critique sur les principes de base de toute recherche (définition d’un objet d’étude, d’une problématique, d’une méthode d’analyse, etc.); d’autre part, vous aborderez des problèmes concrets de la recherche (bibliographie, ressources électroniques, etc.). Une note, satisfaisant ou non satisfaisant, est attribuée à la fin de l’atelier.

**M.A. option thèse**

La scolarité de la maîtrise avec thèse comprend 15 crédits : quatre séminaires et un atelier de méthodologie (FRA5590), chaque séminaire équivalent à trois crédits.

FRA7998 Projet de thèse :

Préparé sous la supervision du directeur de thèse, le projet de thèse doit être soumis, avant la fin de la deuxième session d’inscription, au Comité des études supérieures, qui l’approuve ou non (note « satisfaisant » ou « non satisfaisant »). En cas d’échec, l’étudiant a droit, dans un délai de deux mois, à une reprise. S’il échoue une seconde fois, il doit se retirer du programme.

Comptant de 5 à 6 pages, le projet de thèse doit comporter l’énoncé de la problématique, l’état de la question, les objectifs et hypothèses de recherche, l’approche critique ou la méthodologie envisagée, la présentation du corpus envisagé et une bibliographie.

FRA7999 Thèse :

La thèse peut être de type traditionnel : travail de recherche selon des méthodes d’analyse et de synthèse critiques. Elle peut également être en création littéraire.

Dans le cas d’une thèse en création littéraire, celle-ci doit être le lieu d’une réflexion sur une pratique personnelle de la création littéraire. La thèse se compose donc de deux parties qui peuvent prendre des formes variées; ces parties sont d’égaIe importance mais non nécessairement de même longueur :

- Un texte de création littéraire inédit : poèmes, contes, nouvelles , roman, pièce de théâtre, essai.
- Une réflexion sur cette création : analyse personnelle des justifications théoriques, considérations esthétiques, problèmes techniques, formes et genres impliqués, etc.; cette analyse doit s’appuyer sur une bonne connaissance théorique de la question (étude des auteurs ayant traité de la création, de la théorie des genres, etc.)

Dans tous les cas, la thèse doit correspondre aux critères habituels: originalité, traitement adéquat du sujet, rigueur de la méthode ou de la technique, etc. La thèse de maîtrise sera d’une centaine de pages.

**M.A. option mémoire**

La scolarité de la maîtrise avec mémoire comprend 21 crédits : six séminaires et un atelier de méthodologie (FRA5590), chaque séminaire
équivalent à 3 crédits.

FRA7997 Mémoire :
Il faut faire approuver le nom de son directeur ainsi que son sujet avant de se réinscrire à son troisième trimestre d'études. Le mémoire, d'une cinquantaine de pages, se prépare sous la responsabilité d'un professeur. Terminé, le mémoire sera approuvé par le professeur responsable, et noté par deux autres professeurs.

Programme pluridisciplinaire en études des femmes
Les étudiantes et les étudiants inscrits au programme pluridisciplinaire en études des femmes au niveau de la maîtrise devront satisfaire aux exigences du programme primaire de maîtrise et à celles du programme en études des femmes. Les cours en études des femmes sont normalement comptés comme exigences partielles du programme primaire de l'étudiante ou l'étudiant. La note de passage pour le ou les cours FEM qui comptent pour le programme primaire est la même que celle en vigueur dans ce dernier.

Les exigences des études des femmes sont :
- Deux cours obligatoires :
  FEM5700 THÉORIES FÉMINISTES (3cr.)
  FEM5303 MÉTHODOLOGIES FÉMINISTES (3cr.)
Les étudiantes et les étudiants doivent réussir les deux cours obligatoires FEM avant leur première inscription au mémoire ou à la thèse.
- Une thèse ou un mémoire sur un sujet relié aux femmes, aux rapports sociaux de sexe, au genre, au féminisme ou aux sexualités : le sujet proposé doit être approuvé par le programme primaire et par le Comité des études supérieures en études des femmes. Une thèse ou un mémoire en études des femmes doit démontrer une connaissance des savoirs féministes dans le ou les domaines touchant la question à l'étude, de même que des méthodologies féministes s'il y a lieu.
- La directrice ou le directeur d'une thèse doit posséder une expertise adéquate en études des femmes ou études féministes. Dans le cas d'un mémoire, la directrice ou le directeur doit posséder idéalement une expertise adéquate en études des femmes ou études féministes. Autrement, l'une des lectrices ou un des lecteurs doit posséder cette expertise. Il pourra y avoir une codirection par un membre de l'unité participante et par une personne choisie par le Comité des études supérieures en études des femmes.
- Un projet de thèse ou de mémoire doit être approuvé par le Comité des études supérieures en études des femmes ainsi que par le programme primaire. Habituellement le projet de thèse ou de mémoire doit être soumis à la fin de la troisième session durant la première année d'études. Même dans les programmes primaires qui ne demandent pas de projet de thèse ou de mémoire, les étudiantes et étudiants doivent soumettre un projet au Comité d'études supérieures en études des femmes.
- Examinateur-examinatrice ou lectrice-lecteur : Une des examinaterices ou un des examinateurs (pour une thèse) ou une des lectrices ou un des lecteurs (pour le mémoire) doit être une personne approuvée par le Comité des études supérieures en études des femmes.

Programme pluridisciplinaire en études médiévales et de la Renaissance
Les étudiants devront satisfaire aux exigences du programme principal et à celles du programme pluridisciplinaire. Un des deux cours de trois crédits en études médiévales et de la Renaissance (MDV5100 ou MDV5500) sera compté comme une exigence partielle du programme principal. Par conséquent, les étudiants dans la spécialisation auront un seul cours supplémentaire à suivre.

Les exigences du programme pluridisciplinaire sont :
- Deux cours obligatoires :
  MDV5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3 cr.)
  OU
  MDV5100 Medieval and Renaissance Studies Research Methods and Tools (3 cr.)
  ET
  MDV5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3 cr.)
Les étudiants doivent réussir les deux cours obligatoires MDV avant de s'inscrire au mémoire ou à la thèse.
- Une thèse ou un mémoire sur un sujet relié aux études médiévales et de la Renaissance; le sujet proposé doit être approuvé par le Comité de programme de l'unité participante et par le Comité du programme pluridisciplinaire. La direction du mémoire ou de la thèse doit être effectuée par un professeur approuvé par le Comité des programmes pluridisciplinaires. Au moins un des deux examinateurs de la thèse (ou un examinateur du mémoire) doit être membre du programme pluridisciplinaire.
- Dans chacun des cas, le titre du diplôme indiquera la discipline de l'unité participante avec la mention de la spécialisation en études médiévales et de la Renaissance.

Passage accéléré de la maîtrise au doctorat
Les étudiants qui, au cours de leur baccalauréat, ont obtenu d'excellents résultats (M.P.C. 8,5) et qui, dans chacun des quatre séminaires de maîtrise, ont mérité la note de 85 % (A) ou plus peuvent demander la permission d'accéder directement au programme de doctorat.

L'adoption de cette voie d'accélération exige la recommandation expresse du Comité des études supérieures du département. Le passage doit avoir lieu avant la fin du quatrième trimestre d'inscription au programme.

Exigences minimales
La note de passage dans tous les cours est de C+. Les étudiants qui échouent deux cours (équivalent à 6 crédits) doivent se retirer du programme.

Durée du programme
On s'attend à ce que les étudiants à temps plein remplissent toutes les exigences dans une période de deux ans. Le délai maximum permis est de
quatre ans à partir de la date initiale d'inscription au programme.

**Courses**

Tous les cours, à l'exception de FRA 7997, 7998, 7999, 9997, 9998, 9999, valent trois crédits.
Certains cours ne sont pas offerts chaque année. Pour connaître les cours offerts, [Cliquez ici](#).

**Approches critiques**

FRA5501 POÉTIQUE ET INTERTEXTUALITÉ (3cr.)

FRA5502 LECTURES FÉMINISTES (3cr.)

FRA5503 SOCIOCRITIQUE ET SOCIOLOGIE DE LA LITTÉRATURE (3cr.)

FRA5505 LITTÉRATURE ET PHILOSOPHIE (3cr.)

FRA5507 ENJEUX DE LA LITTÉRATURE (3cr.)

FRA5508 APPROCHES PHILOLOGIQUES DES TEXTES (3cr.)

FRA5560 ANALYSE DU DISCOURS (3cr.)

FRA5570 RHÉTORIQUE ET PRAGMATIQUE (3cr.)

FRA5590 ATELIER DE MÉTHODOLOGIE (3cr.)

FRA5760 TEXTOLOGIE ET CRITIQUE GÉNÉTIQUE (3cr.)

FRA5770 LITTÉRATURE COMPAREÉE (3cr.)

FRA6755 LECTURES POSTCOLoniaLES (3cr.)

**Siècles**

FRA6701 LITTÉRATURE DU MOYEN ÂGE (3cr.)

FRA6702 LITTÉRATURE DE LA RENAISSANCE (3cr.)

FRA6703 LITTÉRATURE DU XVIIe SIÈCLE (3cr.)

FRA6704 LITTÉRATURE DU XVIIIe SIÈCLE (3cr.)

FRA6741 LITTÉRATURE DU XIXe SIÈCLE (3cr.)
Linguistics

Linguistics is a discipline that explores the structure of language, its role in human activity, and its relationship to the biological and psychological human organism. It is considered one of the humanities because it focuses on the relationship between human beings and language, but it is also an exact science because of its systematic explanation of the facts of language and its use of experimental methodology.

The Department of Linguistics offers graduate programs leading to the degrees of MA and PhD in linguistics. It is possible, through the selection of relevant courses, to specialize in a variety of areas of linguistic research. These include the following: theoretical linguistics (phonetics, phonology, morphology, syntax, semantics), first and second language acquisition, psycholinguistics, neurolinguistics and sociolinguistics. Detailed information about the programs, for instance, the research areas of professors, course descriptions, and student advising arrangements is provided in the department's student handbook.
The Department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission Requirements.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Linguistics
Doctorate in Philosophy Linguistics
Doctorate in Philosophy Linguistics Specialization in Canadian Studies

Admission

The BA with honours in linguistics (or the equivalent) is required for admission to the master's program.

Applicants to the master's program whose BA with honours is in an area other than linguistics may be admitted to a qualifying program which will be established for each student, taking previous preparation into account. This program will comprise up to 30 credits to ensure coverage of all the major areas of linguistics. After the requirements of the qualifying program have been satisfactorily fulfilled, students may apply for admission to the regular master’s program.

Language requirements

Candidates must have an adequate knowledge of English. Most of the courses are offered in English. Under the regulations of the University of Ottawa, examinations and assignments may be written in French or in English.

Program Requirements

Eighteen credits (six courses) at the graduate level to be chosen as follows:

- Three compulsory courses (9 credits): LIN5315 Phonology I, LIN5317 Syntax I, LIN5318 Semantics I
- Three courses encompassing at least two of the following sub-areas: bilingualism, experimental phonetics, first language acquisition, historical linguistics, neurolinguistics, psycholinguistics, second language acquisition and sociolinguistics

Research paper

Students must successfully complete a research paper of approximately 50 pages in length. Students will normally register for the research paper (LIN 7997) upon completion of all courses. The research paper must be approved by two faculty members, one of whom also serves as the supervisor. The paper is graded S (satisfactory) or NS (not satisfactory).

Transfer from master's to PhD

Outstanding students enrolled in the master’s program may be allowed to transfer to the PhD program without being required to write a master's thesis. For additional information, please consult the “Admission” section of the PhD program.

Duration of program

Full-time students will normally complete the program in three sessions. The maximum time allowed is four years.

Residence

Students admitted full-time must register full-time for a minimum of three sessions.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses
LIN5302 LABORATORY TECHNIQUES: SOFTWARE, SIGNALS AND STIMULI (3cr.)
Current laboratory techniques in empirical linguistics.

LIN5303 SOCIOLINGUISTICS I (3cr.)
Survey of recent and classical literature on variationist sociolinguistics, and the development of skills to locate, extract and interpret variable
phenomena in spontaneous speech.

LIN5304 PSYCHOLINGUISTICS (3cr.)
Introduction to the psychological factors governing the acquisition and use of language.

LIN5308 BILINGUALISM (3cr.)
Variationist perspectives on the linguistic consequences of language contact in stable bilingual communities.

LIN5310 DIALECTOLOGY (3cr.)
Seminar on methods in dialectology, with reference to modern languages.

LIN5315 PHONOLOGY (3cr.)
Basic phonological concepts; current problems in phonological research; the goals of phonological theory; fundamentals of theoretical and
experimental phonology.

LIN5317 SYNTAX I (3cr.)
Current aspects and goals of syntactic research. Development of contemporary syntactic concepts.

LIN5318 SEMANTICS I (3cr.)
Introduction to formal semantics with emphasis on the composition of meaning; research goals in formal semantics and overview of some
current research questions.

LIN5323 RESEARCH IN ENGLISH LINGUISTICS (3cr.)
Current issues in English linguistics.

LIN5324 RESEARCH IN SOCIOLINGUISTICS (3cr.)
Current issues in sociolinguistic research.

LIN5998 TRAVAUX PRATIQUES I / GUIDED RESEARCH I (3cr.)

LIN5999 TRAVAUX PRATIQUES II / GUIDED RESEARCH II (3cr.)

LIN6301 EXPERIMENTAL PHONETICS: PHYSIOLOGY (3cr.)
Physiological aspects of speech production.

LIN6302 EXPERIMENTAL PHONETICS: ACOUSTICS (3cr.)
Fundamentals of speech acoustics.

LIN6315 PHONOLOGY II (3cr.)
Current issues in formal and experimental phonology. Prerequisite: LIN5315 or equivalent.

LIN6317 SYNTAX II (3cr.)
Current issues in syntax. Prerequisite: LIN5317 or equivalent.

LIN6318 SEMANTICS II (3cr.)
Advanced topics in formal semantics; overview of current debates and technical proposals. Prerequisite: LIN5318 or equivalent.

LIN7301 STATISTICS FOR LINGUISTICS RESEARCH (3cr.)
Specialized statistical methods for linguistic analysis, including both descriptive and inferential statistics (e.g. frequency distribution, standard
deviation, ANOVA, MANOVA, Regression, Correlation, and T-tests). Training in statistical software. Reading and writing of reports on statistics
results. Practical training with linguistic data sets.

LIN7310 SEMINAR I (3cr.)
Topic to be announced.

LIN7311 SEMINAR II (3cr.)
Topic to be announced.

LIN7312 SEMINAR III (3cr.)
Topic to be announced.

LIN7319 FIRST LANGUAGE ACQUISITION (3cr.)
First language acquisition, concentrating on theoretical, experimental and methodological issues.
LIN7320 SECOND LANGUAGE ACQUISITION I (3cr.)
Second language acquisition, concentrating on theoretical, experimental and methodological issues.

LIN7330 TOPICS IN THEORETICAL LINGUISTICS I (3cr.)
Topic to be announced.

LIN7331 TOPICS IN THEORETICAL LINGUISTICS II (3cr.)
Topic to be announced.

LIN7332 SEMINAR IN THEORETICAL LINGUISTICS I (3cr.)
Topic to be announced.

LIN7333 SEMINAR IN THEORETICAL LINGUISTICS II (3cr.)
Topic to be announced.

LIN7340 SECOND LANGUAGE ACQUISITION II (3cr.)
Current issues in second language acquisition.

LIN7341 PSYCHOLINGUISTICS II (3cr.)
Current issues in psycholinguistics.

LIN7342 SOCIOLINGUISTICS II (3cr.)
Current issues in sociolinguistics.

LIN7343 NEUROLINGUISTICS (3cr.)
Fundamentals of neurolinguistics: concepts, methods and theories.

LIN7913 SÉMINAIRE IV / SEMINAR IV (3cr.)

LIN7921 COURS DE PRATIQUE PSYCHOLINGUISTIQUE / PRACTICUM IN PSYCHOLINGUISTICS (3cr.)

LIN7997 MÉMOIRE DE MAÎTRISE / M.A. RESEARCH PAPER

LIN8398 DOCTORAL SEMINAR
Development of presentational and writing skills (abstracts, articles); the inner workings of the linguistic community (conferences, types of publications, the publication process); the academic job market (applications, interviews); the academic career; the non-academic job market and the transferability of academic skills.

LIN9998 EXAMEN DE CANDIDATURE DU DOCTORAT / PhD QUALIFYING EXAMINATION

LIN9999 RECHERCHE ET THÈSE DE DOCTORAT / PhD THESIS RESEARCH

Management

The Telfer School of Management offers programs leading to graduate diplomas in Organizational Performance Management, Scientific Management and Leadership, and Leadership and Management (offered only in French at the moment), as well as to the degree of Master of Science (MSc) in Management.

The master's program is designed to train experts who can contribute to academic excellence and influence change in society by undertaking and disseminating rigorous academic, applied and policy research in management, particularly in the fields of innovation management and entrepreneurship.

Students in the program may opt to complete a concentration in either one of these two fields. The concentration appears on the transcript.

The MSc in Management is a participating program in the collaborative program in environmental sustainability at the master's level.

The PhD program in Management is offered under the auspices of the Faculty of Graduate and Postdoctoral Studies (FGPS) and the Telfer School of Management. It is offered on a full-time basis in the following five fields:

- Accounting and Control
- Entrepreneurship
- Finance
- Health Systems
- Organizational Behavior and Human Resources

Information on the fields and research interests of the professors is posted on the program website.
The program is currently offered in English. In accordance with University of Ottawa regulations, students have the right to produce their work, their thesis, and to answer examination questions in French or in English.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Management

Master of Science Management Specialization in Environmental Sustainability

Doctorate in Philosophy Management

Admission

Applicants who have a four-year undergraduate (honours) degree in management, in science, computer science, economics, social sciences or engineering, with the equivalent of the University of Ottawa “Minor in Administration” or “Engineering Management and Entrepreneurship Option” are eligible for admission to the MSc in Management program. To be considered, applicants must have at least a 75 per cent (B+) cumulative grade point average (CGPA), calculated in accordance with FGPS guidelines. Students lacking academic background in management may be required to complete prerequisite coursework as a condition of admission. The specific requirements of the qualifying program will be determined by the admissions committee based on the academic and professional profile of the applicant.

Applicants to the program must have achieved at least a 50th percentile score on either the GMAT (General Management Admission Test) or GRE (Graduate Record Examinations), and submit at least two letters of recommendation and a statement of research interest of between 800-1000 words. The research statement is a letter of intent stating the applicant’s motivation for studying in the MSc in Management program, their commitment to conducting research, and outlining their preferred areas of research interest. Applicants should indicate whether or not they wish to complete one of the two concentrations and they are encouraged to verify a possible research supervisor as part of the application process.

Applicants who have successfully completed compulsory credits or their equivalents prior to admission will be granted an exemption, that is, they will be permitted, on the advice of their supervisor, to replace those credits with elective credits in the program. To be eligible for exemption, the credits must have been completed with a grade of 70 per cent (B) or better no more than five years prior to admission to the MSc. The maximum number of credits for which an exemption can be granted is six. No exemption will be given for the course MGT 5300 Foundations of Management Theory. The general regulations of the FGPS, section B 2.7, apply for transfer of credits.

Students are normally admitted to the Program on a full-time basis and are required to register full-time for at least three sessions. Applicants applying to be admitted on a part-time basis may be considered, provided they have demonstrated a clear commitment and plan for completing their degree requirements in a timely way.

Language Requirements

Applicants must be able to understand, speak and write either English or French fluently and they must indicate in their application the language in which they intend to take their courses. Those whose first language is neither English nor French are required, at the time of application, to provide evidence of proficiency in one of these languages. Applicants whose first language is not English and who intend to study in English are required to provide one of the following as evidence of proficiency in English (the test scores cannot be more than two years old as of September 1 of the year of potential entry into the program):

- A score of at least 250 on the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, New Jersey, USA, 08540; see also www.web1.toefl.org
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: www.ielts.org
- A score of at least 14 on the CANTEST, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years of the last six years).

Candidates applying to study in French must submit one of the following to confirm their French proficiency:

- A score of at least 14 on the TESTCAN, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion, within the last five years, of a previous degree program in a French language university.
- Proof of recent prolonged residence and exercise of a profession in a French-speaking country (normally at least four years over the last six years).
Considering the significant amount of management research that is published in English, particularly in the fields of innovation management and entrepreneurship, all applicants need the ability to read and understand written English; proof of this ability may be required.

Language of Instruction

All core courses and some of the electives are offered in both French and English. Some of the seminars in the Management Research Seminar Series will be delivered in English and some in French so that the requirement may be completed fully in either language. There are sufficient elective courses in both languages for students to complete the elective requirements in either French or English. As per University of Ottawa policy, students can complete major assignments, examinations and their thesis in either English or French. This also applies to the oral presentations given by the students in the Management Research Seminar Series. Opportunities exist for students to use French or English as a primary language of communication as they conduct their research.

Program Requirements

MSc in Management

Students must complete 30 credits consisting of 18 credits of coursework, comprised of 9 credits of core courses and 9 credits of elective courses, and 12 credits for a thesis. In addition, they must attend the Management Research Seminar Series (MGT6991), and present their thesis proposal at one of the MRSS seminars (see point 3 below). Students who complete all three electives within one field and who complete a thesis in the same field will be awarded a concentration in that field.

Core courses (9 credits)

MGT6100 RESEARCH DESIGN METHODOLOGIES AND THE CONDUCT OF RESEARCH (3cr.)
MGT6300 FOUNDATIONS OF MANAGEMENT (3cr.)
MGT6991 SEMINAIRES DE RECHERCHE EN GESTION / MANAGEMENT RESEARCH SEMINAR SERIES

Either:
MGT5101 MULTIVARIATE RESEARCH METHODS (3cr.)
OR
MGT5102 QUALITATIVE RESEARCH METHODS (3cr.)

Electives

Students, in consultation with their thesis supervisor, select 9 credits from the list of elective courses in areas generally related to their chosen concentration and to their research topic.

1. Innovation Management
MGT6160 SYSTEMS OF INNOVATION (3cr.)
MGT6161 MANAGING CORPORATE INNOVATIONS (3cr.)
MGT6169 RECENT TOPICS IN INNOVATION MANAGEMENT (3cr.)

2. Entrepreneurship Field
MGT6110 ENTREPRENEURIAL PROCESS AND OPPORTUNITY RECOGNITION (3cr.)
MGT6111 VENTURE CAPITAL AND PRIVATE EQUITY (3cr.)
MGT6112 SOCIAL ENTREPRENEURSHIP (3cr.)

3. Other Courses
MGT6190 RESEARCH TOPICS IN MANAGEMENT (3cr.)
MGT6990 STAGE DE RECHERCHE/RESEARCH PRACTICUM (3cr.)
MGT6998 LECTURES DIRIGÉES/DIRECTED READINGS (3cr.)

Students can register to at most 3 credits of directed readings. In addition to the above courses, relevant courses from the MHA, MBA, and EMP programs, or from other graduate programs at the University of Ottawa or at another university, could be taken with the approval of the thesis supervisor, the MSc in Management program director, and the appropriate program director in the case of courses in other academic units, faculties and institutions.

Management Research Seminar Series (MGT6991)
Students must register continuously in MGT6991 Management Research Seminars series from the beginning of their program and must attend at least six seminars in the series. The notation “CTN” (for continuing activity) will be entered for each session until successful completion of the seminar requirements. The thesis supervisor, in the annual progress report of the student, will confirm attendance and active participation. A student whose proposal is not approved on the first attempt may be permitted to submit and present a second proposal. Failure to obtain approval following the second submission will result in a grade of NS and withdrawal from the MSc program.

MSc thesis (MGT7999) (12 credits)
Students must submit to their thesis committee, before the end of the second session of registration in the program, a clearly defined research proposal that has been approved by their thesis supervisor. Program approval of the proposal must be obtained as part of the Management Research Seminar Series (see point 3 above).

The master’s thesis should reveal that the candidate is able to work independently in a scholarly manner and is acquainted with the principal
works published on the subject of the thesis. Insofar as possible, the thesis should be an original contribution. Theses will comprise theoretical and/or empirical research contributions applying a wide range of data collection methodologies, and modelling and analysis techniques based on appropriate software applications. Data collection methodologies will include the gathering of secondary data from published or archived sources, and/or primary data through interviews, surveys, and ethnographic studies. Topics for thesis research may include managements issues identified in the academic literature or real challenges faced by organizations or a combination of these.

Upon submission, the completed thesis is examined by a committee comprised of the thesis supervisor and at least two other professors who are members of the FGPS and approved by the MSc in Management program committee. For information regarding the thesis, consult section G of the general regulations of the FGPS and the guide Preparing a thesis or a Research Paper, which are both accessible through the FGPS website at www.grad.uottawa.ca

**Collaborative program in Environmental Sustainability (with thesis)**

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

**Duration of program**

The program can be completed in six sessions or approximately 24 months, but may be completed more quickly. The maximum time allowed for completion of the program is four years.

**Residence**

Students admitted full-time must register full-time for at least three sessions.

**Minimum standards**

The minimum passing grade in all courses taken as part of the program is C+. Students who fail two courses (equivalent to six credits) or whose thesis proposal is rejected twice (NS grade in MGT 6991) must withdraw.

**Courses**

**MGT5100 RESEARCH DESIGN METHODOLOGIES AND THE CONDUCT OF RESEARCH (3cr.)**
Introduction to research and scientific inquiry in order to foster a better understanding of the research discovery process. Planning, designing, and conducting a research project; detailed discussion of the research methods and techniques available; selecting research methods and techniques appropriate for the nature of the problem and the objectives of the project. Exposure to various research methodologies including paradigms of social phenomena modeling, qualitative research, mathematical modeling methods, and experimental design approaches including randomized control trials (RCT) design principles. *Exclusion: MGT7101*

**MGT5101 MULTIVARIATE RESEARCH METHODS (3cr.)**
Analysis of the basic multivariate techniques that are often used in the social and life sciences in order to enable students to apply the correct technique to any given set of data, properly interpret the output of statistical computer packages, and understand and critique scientific papers that use these techniques. Topics will include principal components analysis, factor analysis, multivariate analysis of variance, multiple and logistic regression, log-linear analysis, and introduction to structural equation modeling.

**MGT5102 QUALITATIVE RESEARCH METHODS (3cr.)**
Designing qualitative studies, collecting and analyzing qualitative data, attaining research credibility, and writing a qualitative research report. Topics will include the case study, ethnography, phenomenology and grounded theory. Introduction to the use of qualitative data analysis software (such as N-Vivo). Critical evaluation of qualitative studies. *Exclusion: MGT7302*

**MGT5300 FOUNDATIONS OF MANAGEMENT (3cr.)**
Primary focus on building a strong foundation of the theories and practice of management. Exposure to current research issues and scholarly literature in management. Relevance and application of the various theories to the fields of innovation and entrepreneurship.

**MGT6110 ENTREPRENEURIAL PROCESS AND OPPORTUNITY RECOGNITION (3cr.)**
Current state of research in entrepreneurship, synthesis of scholarly literature, identifying priorities for future research. Topics will include entrepreneurial processes, opportunity and the nature of exploitation, the emergence of new ventures, financing new ventures, entrepreneurship, economic growth and policy.

**MGT6111 VENTURE CAPITAL AND PRIVATE EQUITY (3cr.)**
Role of venture capital and private equity in the enterprise development process and in the commercialization of innovation. Examination of the
following: assembly and investment of early-stage risk capital; operation of venture capital firms' equity and that of private firms; evaluation of investments; portfolio management; non-financial forms of value added provided by venture capital funds. Theory and practical exercises.

**MGT6112 SOCIAL ENTREPRENEURSHIP** (3cr.)  
Role of social entrepreneurs as change agents striving to create social value through entrepreneurship. Study of the emerging area of social entrepreneurship and related areas where social and economic goals and means are combined. Introduction to the concepts, practices, opportunities, and challenges of social entrepreneurship and related areas. Frameworks and tools for operating effectively in areas of nontraditional entrepreneurship. Engagement of students in a joint learning process to create a deeper understanding of these changing fields.

**MGT6160 SYSTEMS OF INNOVATION** (3cr.)  
Examination of the context in which firms and other organizations operate and of the nature and evolution of industries. Survey of research on the nature and evolution of national and regional systems of innovation, and on politically and geographically defined systems that influence the competitiveness of firms and the prosperity of citizens.

**MGT6161 MANAGING CORPORATE INNOVATIONS** (3cr.)  
Strategies and practices of innovation at the corporate level. Topics will include innovation processes and practices, R&D (research and development) management, organizational contexts of innovation management; firm-level theories of innovation management and firm performance; relationships between resources, capabilities, knowledge and skills and innovation, and the nature and influence of inter-organizational relationships (e.g., alliances, joint ventures, acquisitions, networks, ecosystems, etc.) on firms' innovative capacity.

**MGT6169 RECENT TOPICS IN INNOVATION MANAGEMENT** (3cr.)  
Seminar course focusing on recent research issues and topics in management. Topics may change from year to year.

**MGT6190 RESEARCH TOPICS IN MANAGEMENT** (3cr.)  
Seminar course focusing on current research issues and topics in management. Topics may change from year to year.

**MGT6990 STAGE DE RECHERCHE / RESEARCH PRACTICUM** (3cr.)  
Ce stage s'adresse aux étudiants qui désirent effectuer un projet de recherche auprès d'un organisme comme une entreprise, un ministère ou organisme public, une association à but non lucratif, un groupe de réflexion ou un établissement de recherche. Il a pour but de donner aux étudiants intéressés l'occasion d'appliquer les compétences en recherche acquises dans le cadre de ce programme. Ce stage oblige les étudiants à effectuer au cours d'une session des activités de recherche et à rédiger un rapport individuellement ou au sein d'une équipe, selon les besoins de l'organisme et l'étendue du projet. Préalable : L'inscription au stage doit être approuvée par le directeur du programme. Noté S (satisfaisant) ou NS (non satisfaisant). / Completion of a research project with an organization such as a company, a government department or agency, a nonprofit organization, a think-tank, and other research institutions. Application of research skills acquired during the program. Prerequisite to be completed over one session, either individually or within a small group of students, depending on the needs of the particular organization and the scope of the project. Written paper required. Prerequisite: approval by the program director. Graded S (Satisfactory) or NS (Not Satisfactory).

**MGT6991 SÉMINAIRES DE RECHERCHE EN GESTION / MANAGEMENT RESEARCH SEMINAR SERIES**  
Séminaires de recherche avec la participation de conférenciers invités. Les étudiants doivent assister à au moins six des séminaires des conférenciers invités durant leur programme. Noté S (satisfaisant) ou NS (non satisfaisant). / Research seminar series with invited speakers. Students must attend at least six of the invited speakers' seminars over the duration of their program. Graded S (Satisfactory) or NS (Not Satisfactory).

**MGT6998 LECTURES DIRIGÉES / DIRECTED READINGS** (3cr.)  
Études avancées dans un domaine de gestion sous la direction d'un professeur et aboutissant à un rapport écrit. L'étudiant peut proposer un sujet de recherche. Préalable : approbation du directeur du programme sur recommandation du directeur de thèse de l'étudiant. / Advanced study in an area of management under the supervision of a professor and leading to a major written report. Students may propose research topics. Prerequisite: approval by the program director on the recommendation of the student's thesis supervisor.

**MGT7101 METHODOLOGICAL FOUNDATIONS OF MANAGEMENT RESEARCH** (3cr.)  
Theoretical and methodological foundations of management research and research ethics are explored. Topics include the purpose of social science research; nature and role of theories; relationship between facts and values; theory construction, testing, falsification and inference; "positivist" and "non-positivist" methods; social studies of science and scientists; and research ethics involving human subjects. **Exclusion: MGT7100**

**MGT7102 THEORETICAL FOUNDATIONS OF MANAGEMENT** (3cr.)  
The foundations of various management disciplines are examined in the context of emerging and sometimes conflicting theoretical paradigms such as rational exchange process, sustainability, responsible management and need to balance environmental, economic and social outcomes.

**MGT7103 ADVANCED QUANTITATIVE ANALYSES IN MANAGEMENT** (3cr.)  
Topics will include measurement, univariate and simple multivariate statistics such as simple linear regression, multiple linear regression, logistic regression, analysis of variance, analysis of covariance, principal components analysis, and exploratory factor analysis. Selection and application of major statistical packages.

**MGT7104 SPECIAL TOPICS IN ANALYSIS FOR MANAGEMENT RESEARCH** (3cr.)  
Exploration of advanced analytical approaches from the domain perspective. Understanding of the benefits and limitations of each analytical approach and learning about the judgment required across management disciplines in the application of the approach. Application of computer-based implementations of analytical methods. Covering analyses and models used in varied management disciplines.
MGT7302 QUALITATIVE RESEARCH METHODS (3cr.)
Designing qualitative studies, collecting and analyzing qualitative data, attaining research credibility, and writing a qualitative research report. Topics will include the case study, ethnography, phenomenology and grounded theory. Introduction to the use of qualitative data analysis software (such as N-Vivo). Critical evaluation of qualitative studies. Exclusion: MGT5102.

MGT7999 THÈSE DE M.Sc. / MSc THESIS (12cr.)

MGT8101 FINANCIAL ACCOUNTING AND REPORTING (3cr.)
The theoretical foundations of accounting research and methodologies are examined. Topics include the role of accounting information in capital markets, earnings management, voluntary disclosure, the impact of accounting on judgment and decisions, accounting standards setting accounting standards for sustainable development, intangibles and intellectual capital.

MGT8102 ACCOUNTING AND CONTROL (3cr.)
The role of Accounting and other control instruments in ensuring good corporate governance. Topics include executive compensation, ownership structure, the role of the board of directors, effectiveness of internal controls, enterprise risk management, sustainable management, corporate governance requirements and practices in the public and private sectors.

MGT8103 SPECIAL TOPICS IN ACCOUNTING AND CONTROL RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of accounting and control. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar. Topics are offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8104 THEORETICAL ENTREPRENEURSHIP RESEARCH (3cr.)
Foundation theories of entrepreneurship are examined, including risk and uncertainty, rationales for enterprise growth, innovation process, opportunity recognition, market behaviour, financing new and growing ventures, and entrepreneurship as a social construction.

MGT8105 ENTREPRENEURSHIP RESEARCH (3cr.)
This course focuses on selected topics associated with entrepreneurship research, including internationalization processes, entrepreneurial cognition, feminist entrepreneurship, entrepreneurial marketing, financing enterprise growth, public policy issues and entrepreneurship support, science-based, social and environmental entrepreneurship.

MGT8106 SPECIAL TOPICS IN ENTREPRENEURSHIP RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of entrepreneurship. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar. Topics are offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8107 FINANCE (3cr.)
Theoretical foundations of corporate finance and governance; capital budgeting and investment/growth strategies; strategy and finance: risk and risk management; options; financing/capital structure decisions; payout/dividend policies; mergers and acquisitions; derivative theory (including theories of capital structure); derivatives and fixed-income securities; and risk capital financing.

MGT8108 RECENT DEVELOPMENTS IN FINANCE RESEARCH (3cr.)
Issues in modern finance such as behavioural finance; game-theoretic approaches to corporate finance; ethics in finance, agency theory, regulations and securities agency (e.g., security exchange commission) roles; and financial institutions and services.

MGT8109 SPECIAL TOPICS IN FINANCE RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of finance. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar, with topics offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8110 CURRENT ISSUES IN HEALTH SYSTEMS MANAGEMENT (3cr.)
Overview of developments, issues and challenges in health systems management, emphasizing management from a health systems perspective. Emerging innovations and the applications of innovations in health systems.

MGT8111 RESEARCH DESIGN AND METHODS FOR HEALTH SYSTEMS RESEARCH (3cr.)
Study designs used in healthcare informatics and research, such as experimental designs, observational and predictive studies, and qualitative inquiries. Review of appropriate analytical approaches for each study design.

MGT8112 SPECIAL TOPICS IN HEALTH SYSTEMS RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of health systems. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar, with topics are offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8113 FUNDAMENTALS OF HUMAN RESOURCES MANAGEMENT (3cr.)
Examination of the foundational research areas in Human Resources Management practice. Topics include job analysis, employee recruitment, selection and assessment methods, job performance, fairness and bias and psychometric principles.

MGT8114 FUNDAMENTALS OF ORGANIZATIONAL BEHAVIOUR (3cr.)
Overview of managerial/organizational practices aimed at maximizing work motivation and well-being. Theories of work motivation,
MGT8115 SPECIAL TOPICS IN ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT RESEARCH
(3cr.)
Critical evaluation of studies in targeted domains of organizational behaviour and human resources management. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar, with topics are offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT9997 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAM

MGT9998 PROJET DE THÈSE / THESIS PROPOSAL
Préalable / Prequisite : MGT9997

MGT9999 THÈSE DE DOCTORAT / DOCTORAL THESIS
Préalables / Prerequisites : MGT9997 et/and MGT9998

EMP5111 CREATIVITY AND INNOVATION (3cr.)

EMP5112 TECHNOLOGY POLICY AND R & D MANAGEMENT (3cr.)
Relationship between R & D and economic progress. Elements of the Canadian policy on technology; R & D activities in the private and public sectors; government incentives and support programs; comparison with the policies of other industrial countries. Technology planning and R & D management in a Canadian setting; technology forecasting, staffing, structure, strategy and support for R and D. Not accessible to students who have taken ADM 6263 or ADM 6264. Prerequisite: MBA 5330

MBA6226 NEW PRODUCT DEVELOPMENT (1.5cr.)
How to develop new products for high-tech applications in an environment of global competition and shrinking cycle times. Topics include creating the climate, generating ideas, screening ideas, product portfolio selection, team building, managing the formal gating process, testing, killing. New product launch. Product migration strategies. Prerequisite: MBA 6225.

MBA6262 ENTREPRENEURSHIP (1.5cr.)
Creating, growing, and sustaining or exiting a new firm in a technology-intensive industry. Issues important to the technology (the scope and nature of technological knowledge and intellectual property protection), financing (seed capital, venture capital, and initial public offerings), and inter-firm relationships (spin-offs, alliances and equity alliances, and acquisitions). The course is practically oriented and will draw upon local expertise to enhance its pertinence and appeal.

Mathematics and Statistics

Ottawa-Carleton Joint Program

The University of Ottawa offers a rich academic environment to study mathematics and statistics under the supervision of professors who have gained an international reputation for their research. Most major fields of research in mathematics and statistics are represented within the Department of mathematics and Statistics. Moreover, the Department is a participating unit in the master’s level collaborative programs in bioinformatics and in biostatistics. Additional information about the Department and its programs is posted on the departmental website at www.mathstat.uottawa.ca.

The Department offers a PhD program and an MSc program in mathematics and statistics. There are three options for the MSc program: MSc with thesis, MSc with project or MSc by coursework (i.e. with courses only). The MSc by coursework in the field of probability and statistics and the MSc with project in all fields can be completed in one year by taking courses over three consecutive sessions.

Since 1984, the graduate programs in mathematics and statistics have been under the umbrella of the Ottawa-Carleton Institute of Mathematics and Statistics (OCIMS). The OCIMS consists of the School of Mathematics and Statistics at Carleton University and the Department of Mathematics and Statistics at the University of Ottawa. The two units have pooled together their resources to offer each year a large selection of graduate courses.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have a right to submit their work, thesis, and exams in French or in English.
Programs

Master of Science Mathematics and Statistics Concentration in Mathematics
Master of Science Mathematics and Statistics Concentration in Statistics
Master of Science Mathematics and Statistics Specialization in Bioinformatics
Master of Science Mathematics and Statistics Specialization in Biostatistics
Doctorate in Philosophy Mathematics and Statistics

Admission

Admission to the graduate programs in mathematics and statistics is governed by the general regulations of the Ottawa-Carleton Institute of Mathematics and Statistics (OCIMS) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold a bachelor’s degree with a specialization or a major in mathematics and statistics (or equivalent) with a minimum average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Collaborative Programs

The Department of Mathematics and Statistics is a participating unit in the collaborative programs in Bioinformatics and in Biostatistics. Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of these programs posted on the FGPS website.

Program Requirements

MSc in Mathematics and Statistics

At least 50% of the credits must be from the student’s home university. The project counts for 6 credits and the thesis counts for 12 credits.

The student must register for one of the following two concentrations.

Concentration in mathematics

More than 50% of the credits must come from the list of courses in mathematics. See list below.

Concentration in statistics

More than 50% of the credits must come from the list of courses in statistics. See list below.

MSc with thesis

- 12 credits at the 5000 level or more in mathematics or in other related disciplines approved by the Department of Mathematics and Statistics.
- Presentation and successful defense of a thesis (MAT7999) based on an original research carried out under the direct supervision of a faculty member of the Department.

MSc with project

- 18 credits at the 5000 level or more in mathematics or in other related disciplines approved by the Department of Mathematics and Statistics.
• Project (MAT6997).

MSc by coursework

• 24 credits at the 5000 level or above in mathematics or in related disciplines approved by the Department of Mathematics and Statistics.

Mathematics courses

MAT5105 (MATH5818) DISCRETE APPLIED MATHEMATICS I: GRAPH THEORY (3cr.)
MAT5107 (MATH 5819) DISCRETE APPLIED MATHEMATICS II: COMBINATORIAL ENUMERATION (3cr.)
MAT5121 (MATH 5009) INTRODUCTION TO HILBERT SPACE (3cr.)
MAT5122 (MATH 5003) BANACH ALGEBRAS (3cr.)
MAT5125 (MATH 5007) REAL ANALYSIS I (Measure theory and integration) (3cr.)
MAT5126 (MATH 5008) REAL ANALYSIS II (Functional analysis) (3cr.)
MAT5127 (MATH 5005) COMPLEX ANALYSIS (3cr.)
MAT5131 (MATH 5405) ORDINARY DIFFERENTIAL EQUATIONS (3cr.)
MAT5133 (MATH 5406) PARTIAL DIFFERENTIAL EQUATIONS (3cr.)
MAT5134 (MATH 5407) TOPICS IN DIFFERENTIAL EQUATIONS (3cr.)
MAT5141 (MATH 5107) ALGEBRA I (3cr.)
MAT5142 (MATH 5109) ALGEBRA II (3cr.)
MAT5143 (MATH 5104) LIE ALGEBRAS (3cr.)
MAT5144 (MATH 5001) COMMUTATIVE ALGEBRA (3cr.)
MAT5145 (MATH 5106) GROUP THEORY (3cr.)
MAT5146 (MATH 5103) RINGS AND MODULES (3cr.)
MAT5147 (MATH 5108) HOMOLOGICAL ALGEBRA AND CATEGORY THEORY (3cr.)
MAT5148 (MATH 5102) GROUP REPRESENTATIONS AND APPLICATIONS (3cr.)
MAT5149 (MATH 5002) ALGEBRAIC GEOMETRY (3cr.)
MAT5150 (MATH 5201) TOPICS IN GEOMETRY (3cr.)
MAT5151 (MATH 5205) TOPOLOGY I (3cr.)
MAT5152 (MATH 5206) TOPOLOGY II (3cr.)
MAT5155 (MATH 5208) DIFFERENTIABLE MANIFOLDS (3cr.)
MAT5158 (MATH 6104) LIE GROUPS (3cr.)
MAT5160 (MATH 5300) MATHEMATICAL CRYPTOGRAPHY (3cr.)
MAT5161 (MATH 5301) MATHEMATICAL LOGIC (3cr.)
MAT5162 (MATH 6807) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (3cr.)
MAT5163 (MATH 5305) ANALYTIC NUMBER THEORY (3cr.)
MAT5164 (MATH 5306) ALGEBRAIC NUMBER THEORY (3cr.)
MAT5165 (MATH 5605) THEORY OF AUTOMATA (3cr.)
MAT5167 (MATH/COMP 5807) FORMAL LANGUAGE AND SYNTAX ANALYSIS (3cr.)
MAT5168 (MATH 5202) HOMOLOGY THEORY (3cr.)
MAT5169 (MATH 5207) FOUNDATIONS OF GEOMETRY (3cr.)
MAT5185 (MATH 5408) ASYMPTOTIC METHODS OF APPLIED MATHEMATICS (3cr.)
MAT5187 (MATH 5403) TOPICS IN APPLIED MATHEMATICS (3cr.)
MAT5301 (MATH 5609) TOPICS IN COMBINATORIAL MATHEMATICS (3cr.)
MAT5303 (MATH 5801) LINEAR OPTIMIZATION (3cr.)
MAT5304 (MATH 5803) NONLINEAR OPTIMIZATION (3cr.)
MAT5106 (MATH5808) COMBINATORIAL OPTIMIZATION (3cr.)
MAT5307 (MATH 5804) TOPICS IN OPERATIONS RESEARCH (3cr.)
MAT5308 (MATH 5805) TOPICS IN ALGORITHM DESIGN (3cr.)
MAT5309 (MATH 6002) HARMONIC ANALYSIS ON GROUPS (3cr.)
MAT5312 (MATH 6201) TOPICS IN TOPOLOGY (3cr.)
MAT5319 (MATH 6507) TOPICS IN PROBABILITY AND STATISTICS (3cr.)
MAT5324 (MATH 5607) GAME THEORY (3cr.)
MAT5325 (MATH 5802) TOPICS IN INFORMATION AND SYSTEMS SCIENCE (3cr.)
MAT5326 (MATH 6008) TOPICS IN ANALYSIS (3cr.)
MAT5327 (MATH 6101) TOPICS IN ALGEBRA (3cr.)
MAT5328 (MATH 6008) TOPICS IN ANALYSIS (3cr.)
MAT5329 (MATH 6009) TOPICS IN ANALYSIS (3cr.)
MAT5330 (MATH 6102) TOPICS IN ALGEBRA (3cr.)
MAT5331 (MATH 6103) TOPICS IN ALGEBRA (3cr.)
MAT5341 (MATH5821) QUANTUM COMPUTING (3cr.)
MAT5343 MATHEMATICAL ASPECTS OF WAVELETS AND DIGITAL SIGNAL PROCESSING (3cr.)
MAT5361 (MATH 6806) TOPICS IN MATHEMATICAL LOGIC (3cr.)
MAT5180 (MATH 5806) NUMERICAL ANALYSIS FOR DIFFERENTIAL EQUATIONS (3cr.)
Statistics courses
MAT5175 (STAT 5506) ROBUST STATISTICAL INFERENCE (3cr.)
MAT5181 (STAT 5703) DATA MINING I (3cr.)
MAT5182 (STAT 5702) MODERN APPLIED / COMPUTATIONAL STATISTICS (3cr.)
MAT5192 (STAT 5502) SAMPLING THEORY AND METHODS (3cr.)
MAT5193 (STAT 5503) LINEAR MODELS (3cr.)
MAT5195 (STAT 5505) DESIGN OF EXPERIMENTS (3cr.)
MAT5196 (STAT 5509) MULTIVARIATE ANALYSIS (3cr.)
MAT5313 (MATH 6507) TOPICS IN PROBABILITY AND STATISTICS (3cr.)
MAT5314 (MATH 6508) TOPICS IN PROBABILITY AND STATISTICS (3cr.)
MAT5315 ADVANCED DESIGN OF SURVEYS (3cr.)
MAT5317 (STAT 5602) ANALYSIS OF CATEGORICAL DATA (3cr.)
MAT5318 (STAT 5603) RELIABILITY AND SURVIVAL ANALYSIS (3cr.)
MAT5375 (STAT 5610) MATHEMATICAL STATISTICS (3cr.)
MAT5716 (STAT 5507) ADVANCED STATISTICAL INFERENCE (3cr.)
MAT5717 (STAT 5500) MULTIVARIATE NORMAL THEORY (3cr.)
MAT5992 (STAT 5902) SEMINAR IN BIOSTATISTICS (3cr.)

Mathematics and statistics courses
MAT5170 (STAT 5708) PROBABILITY THEORY I (3cr.)
MAT5171 (MATH 5709) PROBABILITY THEORY II (3cr.)
MAT5172 (STAT 5508) TOPICS IN STOCHASTIC PROCESSES (3cr.)
MAT5173 (STAT 5604) STOCHASTIC ANALYSIS (3cr.)
MAT5174 (STAT 5704) NETWORK PERFORMANCE (3cr.)
MAT5190 (STAT 5600) MATHEMATICAL STATISTICS I (3cr.)
MAT5191 (STAT 5501) MATHEMATICAL STATISTICS II (3cr.)
MAT5194 (STAT 5504) STOCHASTIC PROCESSES AND TIME SERIES ANALYSIS (3cr.)
MAT5197 (STAT 5601) STOCHASTIC OPTIMIZATION (3cr.)
MAT5198 (MATH 5701) STOCHASTIC MODELS (3cr.)
MAT5990 (MATH 5900) SÉMINAIRE / SEMINAR (3cr.)
MAT5991 (MATH 5901) TRAVAUX DIRIGÉS / DIRECTED STUDIES (3cr.)
MAT5996 (MATH 5906) STAGE DE RECHERCHE / RESEARCH INTERNSHIP (3cr.)
MAT6990 (MATH 6900) SÉMINAIRE / SEMINAR (3cr.)
MAT6991 (MATH 6901) TRAVAUX DIRIGÉS / DIRECTED STUDIES (3cr.)
MAT6997 (MATH510) PROJET EN MATHEMATIQUES ET STATISTIQUE / PROJECT IN MATHEMATICS AND STATISTICS (6cr.)
MAT7999 THÈSE DE MAÎTRISE / MSc THESIS
MAT9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION
MAT9999 (MATH 6909) THÈSE DE DOCTORAT / PhD THESIS

Collaborative program in Bioinformatics

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The requirements specific to the collaborative program are as follows:

- 3 compulsory credits in bioinformatics (BNF5106 / BLO5106).
- Registration in the seminar course in bioinformatics (BNF6100), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.
- Presentation and defence of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the bioinformatics collaborative program.

The primary program may require students to take additional courses, depending on their backgrounds.

Collaborative program in Biostatistics

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The following requirements must be met:

- 21 credits including EPI5240, EPI5241, EPI6178, EPI6278, MAT5190, MAT5191 and another 3 credits of graduate course in mathematics and statistics.
- Enrollment in the seminar course in biostatistics MAT5992 (STAT5902), which involves the preparation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defence of a thesis in biostatistics (MAT7999) based on an original research carried out under the supervision of a faculty
**Collaborative program in Biostatistics (by coursework)**

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

The following requirements must be met:

- 27 credits including EPI5240, EPI5241, EPI6178, EPI6278, MAT5490, MAT5491 and three graduate courses of 3 credits each in mathematics and statistics.
- Enrollment in the seminar course in biostatistics MAT5992 (STAT5902), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department of Mathematics and Statistics.

**Transfer from master’s to PhD**

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

**Duration of the program**

The requirements of the program are usually fulfilled within two years. The maximum time permitted is four years from the date of initial registration.

**Residence**

All students admitted full-time must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), or whose progress is deemed unsatisfactory are required to withdraw.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**MAT5105 (MATH5818) DISCRETE APPLIED MATHEMATICS I: GRAPH THEORY (3cr.)**
Paths and cycles, trees, connectivity, Euler tours and Hamilton cycles, edge colouring, independent sets and cliques, vertex colouring, planar graphs, directed graphs. Selected topics from one or more of the following areas: algebraic graph theory, topological theory, random graphs.

**MAT5106 (MATH5808) COMBINATORIAL OPTIMIZATION (3cr.)**
Network flow theory and related material. Topics will include shortest paths, minimum spanning trees, maximum flows, minimum cost flows. Optimal matching in bipartite graphs.

**MAT5107 (MATH 5819) DISCRETE APPLIED MATHEMATICS II: COMBINATORIAL ENUMERATION (3cr.)**
Ordinary and exponential generating functions; product formulas; permutations; partitions; rooted trees; cycle index; WZ method. Lagrange Inversions; singularity analysis of generating functions and asymptotics. Selected topics from one or more of the following areas: random graphs, random combinatorial structures, hypergeometric functions.

**MAT5121 (MATH 5009) INTRODUCTION TO HILBERT SPACE (3cr.)**

**MAT5122 (MATH 5003) BANACH ALGEBRAS (3cr.)**

**MAT5125 (MATH 5007) REAL ANALYSIS I (Measure theory and integration) (3cr.)**
General measure and integral, Lebesgue measure and integration on R, Fubini’s theorem, Lebesgue-Radon-Nikodym theorem, absolute continuity and differentiation, Lp-Spaces. Selected topics such as: Daniell-Stone theory. Prerequisite(s): Permission of the Program Director. Prerequisites: MAT3125 (MATH 3001 and MATH 3002).

**MAT5126 (MATH 5008) REAL ANALYSIS II (Functional analysis) (3cr.)**
Banach and Hilbert spaces, bounded linear operators, dual spaces. Topics selected from: weak- and weak-topologies, Alaoglu’s theorem, compact operators, differential calculus in Banach spaces, Riesz representation theorems. Prerequisite: MAT 5125 (MATH 5007).
MAT5127 (MATH 5005) COMPLEX ANALYSIS (3cr.)

MAT5131 (MATH 5405) ORDINARY DIFFERENTIAL EQUATIONS (3cr.)

MAT5133 (MATH 5406) PARTIAL DIFFERENTIAL EQUATIONS (3cr.)
First-order equations, characteristics method, classification of second-order equations, separation of variables, Green’s functions. Lp and Sobolev spaces, distributions, variational formulation and weak solutions, Lax-Milgram theorem, Galerkin approximation. Parabolic PDEs. Wave equations, hyperbolic systems, nonlinear PDEs, reaction diffusion equations, infinite-dimensional dynamical systems, regularity. Prerequisite: An intermediate level course on Ordinary Differential Equations such as MAT3130 Dynamical Systems or equivalent, or the permission of the School or Department.

MAT5134 (MATH 5407) TOPICS IN DIFFERENTIAL EQUATIONS (3cr.)

MAT5141 (MATH 5107) ALGEBRA I (3cr.)
Groups, Sylow subgroups, finitely generated abelian groups. Rings, field of fractions, principal ideal domains, modules. Polynomial algebra, Euclidean algorithm, unique factorization. Prerequisites: MAT 3141 and MAT 3143. Prerequisites: MAT3141 and MAT3143.

MAT5142 (MATH 5109) ALGEBRA II (3cr.)
Field theory, algebraic and transcendental extensions, finite fields, Galois groups. Modules over principal ideal domains, decomposition of a linear transformation, Jordan normal form. Prerequisite: MAT 5141 (MATH 5107).

MAT5143 (MATH 5104) LIE ALGEBRAS (3cr.)

MAT5144 (MATH 5001) COMMUTATIVE ALGEBRA (3cr.)
Prime spectrum of a commutative ring (as a topological space); localization of rings and modules; tensor product of modules and algebras; Hilbert’s Nullstellensatz and consequences for finitely generated algebras; Krull dimension of a ring; integral dependence, going-up, going-down; Noether Normalization Lemma and dimension theory for finitely generated algebras over a field; noetherian rings and Hilbert Basis Theorem; introduction to affine algebraic varieties and their morphisms. Prerequisite: MAT3143

MAT5145 (MATH 5106) GROUP THEORY (3cr.)

MAT5146 (MATH 5103) RINGS AND MODULES (3cr.)

MAT5147 (MATH 5108) HOMOLOGICAL ALGEBRA AND CATEGORY THEORY (3cr.)

MAT5148 (MATH 5102) GROUP REPRESENTATIONS AND APPLICATIONS (3cr.)

MAT5149 (MATH 5002) ALGEBRAIC GEOMETRY (3cr.)
Brief overview of commutative algebra, Hilbert’s Nullstellensatz, algebraic sets, and Zariski topology. Affine and projective varieties over algebraically closed fields. Regular functions and rational maps. Additional topics chosen from: the relation of varieties over complex numbers to complex analytic manifolds, genus, divisors, line bundles, Riemann-Roch Theorem, Bézout’s Theorem. Prerequisite: MAT3143

MAT5150 (MATH 5201) TOPICS IN GEOMETRY (3cr.)

MAT5151 (MATH 5205) TOPOLOGY I (3cr.)
Topological spaces, product and identification topologies, countability and separation axioms, compactness, connectedness, homotopy, fundamental group, net and filter convergence. Prerequisite: MAT 3153 (MATH 3001).

MAT5152 (MATH 5206) TOPOLOGY II (3cr.)
Covering spaces, homology via the Eilenberg-Steenrod axioms, applications, construction of a homology functor. Prerequisites: MAT 3143 and MAT 5151 (MATH 3100 and MATH 5205). Prerequisites: MAT3143 and MAT3151 (MATH 3100 and MATH 5205).

MAT5155 (MATH 5208) DIFFERENTIABLE MANIFOLDS (3cr.)

MAT5158 (MATH 6104) LIE GROUPS (3cr.)

MAT5160 (MATH 5300) MATHEMATICAL CRYPTOGRAPHY (3cr.)
Analysis of cryptographic methods used in authentication and data protection, with particular attention to the underlying mathematics, e.g. Algebraic Geometry, Number Theory, and Finite Fields. Advanced topics on Public-Key Cryptography: RSA and integer factorization, Diffie-Hellman, discrete logarithms, elliptic curves. Topics in current research. Prerequisites: undergraduate honours algebra, including group theory
and finite fields. *Prerequisite: undergraduate honours algebra, including group theory and finite fields.*

**MAT5161 (MATH 5301) MATHEMATICAL LOGIC (3cr.)**
A basic graduate course in mathematical logic. Propositional and Predicate logic, Proof theory, Gentzen’s Cut-Elimination, Completeness, Compactness, Henkin models, model theory, arithmetic and undecidability. Special Topics (time permitting) depending on interests of instructor and audience. Prerequisites: honours undergraduate algebra, analysis and topology (or permission of the instructor). *Prerequisite: Honours undergraduate algebra, analysis and topology (or permission of the instructor).*

**MAT5162 (MATH 6807) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (3cr.)**
Foundations of functional languages, lambda calculi (typed, polymorphically typed, untyped), Curry-Howard Isomorphism, proofs-as-programs, normalization and rewriting theory, operational semantics, type assignment, introduction to denotational semantics of programs, fixed-point programming. Topics chosen from: denotational semantics for lambda calculi, models of programming languages, complexity theory and logic of computation, models of concurrent and distributed systems, etc. Prerequisites: honours undergraduate algebra and either topology or analysis. Some acquaintance with Logic useful. *Prerequisite: Honours undergraduate algebra and either topology or analysis. Some acquaintance with Logic useful.*

**MAT5163 (MATH 5305) ANALYTIC NUMBER THEORY (3cr.)**

**MAT5164 (MATH 5306) ALGEBRAIC NUMBER THEORY (3cr.)**

**MAT5165 (MATH 5605) THEORY OF AUTOMATA (3cr.)**

**MAT5167 (MATH/COMP 5807) FORMAL LANGUAGE AND SYNTAX ANALYSIS (3cr.)**

**MAT5168 (MATH 5202) HOMOLOGY THEORY (3cr.)**

**MAT5169 (MATH 5207) FOUNDATIONS OF GEOMETRY (3cr.)**

**MAT5170 (STAT 5708) PROBABILITY THEORY I (3cr.)**
Probability spaces, random variables, expected values as integrals, joint distributions, independence and product measures, cumulative distribution functions and extensions of probability measures, Borel-Cantelli lemmas, convergence concepts, independent identically distributed sequences of random variables. Prerequisites: Permission of Program Director. *Prerequisites: MAT3125 and MAT3172 (MATH 3001, MATH 3002 and MATH 3500).*

**MAT5171 (MATH 5709) PROBABILITY THEORY II (3cr.)**
Laws of large numbers, characteristic functions, central limit theorem, conditional probabilities and expectation, basic properties and convergence theorems for martingales, introduction to Brownian motion. *Prerequisite: MAT 5170 (STAT 5708).*

**MAT5172 (STAT 5508) TOPICS IN STOCHASTIC PROCESSES (3cr.)**

**MAT5173 (STAT 5604) STOCHASTIC ANALYSIS (3cr.)**
Brownian motion, continuous martingales and stochastic integration.

**MAT5174 (STAT 5704) NETWORK PERFORMANCE (3cr.)**
The course will focus on advanced techniques in performance evaluation of large complex networks. Topic may include classical queueing theory and simulation analysis; models of packet networks; loss and delay systems; blocking probabilities. Prerequisites: Some familiarity with probability and stochastic processes and queuing, or permission of the instructor. *Prerequisite: Some familiarity with probability and stochastic processes and queuing, or permission of the instructor.*

**MAT5175 (STAT 5306) ROBUST STATISTICAL INFERENCE (3cr.)**

**MAT5181 (STAT 5703) DATA MINING I (3cr.)**
Visualization and knowledge discovery in massive datasets; unsupervised learning: clustering algorithms; dimension reduction; supervised learning: pattern recognition, smoothing techniques, classification. Computer software will be used. *Prerequisite: Permission of the Instructor.*

**MAT5182 (STAT 5702) MODERN APPLIED / COMPUTATIONAL STATISTICS (3cr.)**
Resampling and computer intensive techniques: bootstrap, jackknife with applications to bias estimation, variance estimation, confidence intervals, and regression analysis. Smoothing methods in curve estimation; Statistical classification and pattern recognition: error counting methods, optimal classifiers, bootstrap estimates of the bias of the misclassification error.

**MAT5185 (MATH 5408) ASYMPTOTIC METHODS OF APPLIED MATHEMATICS (3cr.)**
regular and singular perturbation for differential equations, multiple scale analysis, boundary layer theory, WKB theory.

MAT5187 (MATH 5403) TOPICS IN APPLIED MATHEMATICS (3cr.)

MAT5190 (STAT 5600) MATHEMATICAL STATISTICS I (3cr.)
Statistical decision theory; likelihood functions; sufficiency; factorization theorem; exponential families; UMVU estimators; Fisher's information; Cramer-Rao lower bound; maximum likelihood and moment estimation; invariant and robust point estimation; asymptotic properties; Bayesian point estimation. Prerequisites: MAT 3172 and MAT 3375. Prerequisites: MAT3172 and MAT3375.

MAT5191 (STAT 5501) MATHEMATICAL STATISTICS II (3cr.)
Confidence intervals and pivots; Bayesian intervals; optimal tests and Neyman-Pearson theory; likelihood ratio and score tests; significance tests; goodness-of-fit tests; large sample theory and applications to maximum likelihood and robust estimation. Prerequisite: MAT 5190.

MAT5192 (STAT 5502) SAMPLING THEORY AND METHODS (3cr.)
Unequal probability sampling with and without replacement; unified theory of standard errors; prediction approach; ratio and regression estimation; stratification and optimal designs; multistage cluster sampling; double sampling; domains of study; post-stratification; non-response; measurement errors. Related topics. Prerequisite: (MATH 4502).

MAT5193 (STAT 5503) LINEAR MODELS (3cr.)
Theory of non-full-rank linear models: estimable functions, best linear unbiased estimators, hypothesis testing, confidence regions; multi-way classification; analysis of covariance; variance component models: maximum likelihood estimation, MINQUE, ANOVA methods. Miscellaneous topics. Prerequisite: MAT 4175 (MATH 4500) or MAT 5190 (STAT 5600).

MAT5194 (STAT 5504) STOCHASTIC PROCESSES AND TIME SERIES ANALYSIS (3cr.)

MAT5195 (STAT 5505) DESIGN OF EXPERIMENTS (3cr.)
Overview of linear model theory; orthogonality; randomized block and split plot designs; Latin square designs; randomization theory; incomplete block designs; factorial experiments; confounding and fractional replication; response surface methodology. Miscellaneous topics. Prerequisites: MAT 3375 and MAT 3376 or MAT 5190 (STAT 5305 and STAT 4500 or STAT 5600). Prerequisites: MAT3375 and MAT3376 or MAT5190 (STAT 3505 and STAT 4500 or STAT 5600).

MAT5196 (STAT 5509) MULTIVARIATE ANALYSIS (3cr.)

MAT5197 (STAT 5601) STOCHASTIC OPTIMIZATION (3cr.)
Topics chosen from stochastic dynamic programming, Markov decision processes, search theory, optimal stopping. Prerequisite: STAT 3506 or MATH 4371.

MAT5198 (MATH 5701) STOCHASTIC MODELS (3cr.)
Markov systems, stochastic networks, queuing networks, spatial processes, approximation methods in stochastic processes and queuing theory. Applications to the modelling and analysis of computer-communications systems and other distributed networks.

MAT5301 (MATH 5609) TOPICS IN COMBINATORIAL MATHEMATICS (3cr.)

MAT5303 (MATH 5801) LINEAR OPTIMIZATION (3cr.)

MAT5304 (MATH 5803) NONLINEAR OPTIMIZATION (3cr.)

MAT5307 (MATH 5804) TOPICS IN OPERATIONS RESEARCH (3cr.)

MAT5308 (MATH 5805) TOPICS IN ALGORITHM DESIGN (3cr.)

MAT5309 (MATH 6002) HARMONIC ANALYSIS ON GROUPS (3cr.)

MAT5312 (MATH 6201) TOPICS IN TOPOLOGY (3cr.)

MAT5313 (MATH 6507) TOPICS IN PROBABILITY AND STATISTICS (3cr.)

MAT5314 (MATH 6508) TOPICS IN PROBABILITY AND STATISTICS (3cr.)
MAT5315 ADVANCED DESIGN OF SURVEYS (3cr.)

MAT5317 (STAT 5602) ANALYSIS OF CATEGORICAL DATA (3cr.)
Analysis of one-way and two-way tables of nominal data; multi-dimensional contingency tables, log-linear models; tests of symmetry, marginal homogeneity in square tables; incomplete tables; tables with ordered categories; fixed margins, logistic models with binary response; measures of association and agreement; applications biological.

MAT5318 (STAT 5603) RELIABILITY AND SURVIVAL ANALYSIS (3cr.)

MAT5319 (MATH 6507) TOPICS IN PROBABILITY AND STATISTICS (3cr.)

MAT5324 (MATH 5607) GAME THEORY (3cr.)

MAT5325 (MATH 5802) TOPICS IN INFORMATION AND SYSTEMS SCIENCE (3cr.)

MAT5326 (MATH 6008) TOPICS IN ANALYSIS (3cr.)

MAT5327 (MATH 6101) TOPICS IN ALGEBRA (3cr.)

MAT5328 (MATH 6008) TOPICS IN ANALYSIS (3cr.)

MAT5329 (MATH 6009) TOPICS IN ANALYSIS (3cr.)

MAT5330 (MATH 6102) TOPICS IN ALGEBRA (3cr.)

MAT5331 (MATH 6103) TOPICS IN ALGEBRA (3cr.)

MAT5341 (MATH5821) QUANTUM COMPUTING (3cr.)

MAT5343 MATHEMATICAL ASPECTS OF WAVELETS AND DIGITAL SIGNAL PROCESSING (3cr.)
Lossless compression methods. Discrete Fourier transform and Fourier-based compression methods. JPEG and MPEG. Wavelet analysis. Digital filters and discrete wavelet transform. Daubechies wavelets. Wavelet compression. Prerequisites: Linear algebra and Fourier series, or permission of the School or Department.

MAT5361 (MATH 6806) TOPICS IN MATHEMATICAL LOGIC (3cr.)

MAT5375 (STAT 5610) MATHEMATICAL STATISTICS (3cr.)
Limit theorems; sampling distributions; parametric estimation; concepts of sufficiency and efficiency; Neyman-Pearson paradigm, likelihood ratio tests; parametric and non-parametric methods for two-sample comparisons; notions of experimental design, categorical data analysis, the general linear model, decision theory and Bayesian inference. Prerequisites: MAT2121, (MAT2141 or MAT2342), MAT2375. Exclusion: Students in the MSc program cannot combine this course with MAT5190 (STAT5600) for credit towards the master's program.

MAT5176 (STAT 5507) ADVANCED STATISTICAL INFERENCE (3cr.)
Pure significance tests; uniformly most powerful unbiased and invariant tests; asymptotic comparison of tests; confidence intervals; large sample theory of likelihood ratio and chi-square tests; likelihood inference; Bayesian inference. Topics such as empirical Bayes inference, fiducial and structural inference, resampling methods. Prerequisites: MAT 4170 or equivalent and MAT 5191. Prerequisite: MAT4170 or equivalent and MAT5191.

MAT5177 (STAT 5500) MULTIVARIATE NORMAL THEORY (3cr.)

MAT5180 (MATH 5806) NUMERICAL ANALYSIS FOR DIFFERENTIAL EQUATIONS (3cr.)
**Mechanical Engineering**

**Ottawa-Carleton Joint Program**

Established in 1983, the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering (OCIMAE) combines the research strengths of the Department of Mechanical Engineering at the University of Ottawa and the Department of Mechanical and Aerospace Engineering at Carleton University.

The Institute offers graduate programs leading to the degrees of Master of Applied Science (MASc), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Mechanical Engineering and in Advanced Materials and Manufacturing.

Members of the Institute are involved in six main research fields: thermal and fluid engineering; solid mechanics and design; materials and manufacturing; controls and robotics; biomedical engineering; aeronautical and space engineering. Further information is posted on the departmental websites.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

**Programs**
Master of Applied Science Mechanical Engineering

Master of Engineering Mechanical Engineering

Doctorate in Philosophy Mechanical Engineering

Admission

Admission to the graduate program in Mechanical Engineering is governed by the general regulations of the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering (OCIMAE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Be the holder of a bachelor’s degree with a specialization, or a major in mechanical engineering (or equivalent) with a minimum average of 70% (B);
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills;
- Provide at least two confidential letters of recommendation from professors who are familiar with the applicant’s work;
- Provide a statement of purpose indicating their career goals and interests in the proposed research area;
- For admission to the MASc, identify at least one professor who is willing and available to act as thesis supervisor;
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Most of the courses in the graduate programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Transfer from master’s to PhD

Students in a master’s program who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of 5 graduate courses (15 credits) with a grade of A- or better in each;
- Satisfactory progress in the research program;
- Written recommendation from the supervisor and the thesis advisory committee;
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Following transfer, all the requirements of the doctoral program must be met.

Program Requirements

A. Master of applied science (MASc)

The requirements of the program are as follows:

- Successful completion of 15 course credits at the 5000 level or above approved by the thesis supervisor and the Department;
- Participation in the Mechanical and Aerospace Engineering departmental seminar series (MCG5900);
- Presentation and defence of a thesis (MCG7999) based on original research carried out under the direct supervision of a research faculty member in the Department.

B. Master of engineering (MEng)

Project Option

The requirements of the program are as follows:

- Successful completion of 24 course credits at the 5000 level or above approved by the Department;
Course Work Option

The requirements of the program are as follows:

- Successful completion of 30 course credits at the 5000 level or above approved by the Department;
- Participation in the Mechanical and Aerospace Engineering departmental seminar series (MCG5947).

NOTE: In accordance with FGPS regulation B.2.7, all students are expected to complete the major part of their program requirements while registered in the program at the University of Ottawa.

Transfer from Master’s to PhD Program

Outstanding students enrolled in the master’s program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

Duration of the Program

The requirements of the program are usually fulfilled within two years of full-time studies. The MEng program can be completed in one year or 16 months as a full-time student. The maximum time permitted is four years.

Residence

All students must complete a minimum of three sessions of full-time registration.

Minimum Standards

The passing grade in all courses is B. Students who fail six credits, the thesis proposal, the thesis or whose research progress report is deemed unsatisfactory are required to withdraw from the program.

Courses

In all programs, the student may choose graduate courses from either university with the approval of the Advisor or Advisory Committee. The available graduate courses are listed below. Course descriptions are to be found in the departmental section of the calendar concerned. All courses are of one session duration. Courses of each department are indicated by the prefix of the first number given as follows:

MCG 5XXX Department of Mechanical Engineering, University of Ottawa
MAAJ XXXX Department of Mechanical and Aerospace Engineering, Carleton University

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN** (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

**GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA** (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

**GNG5123 ENTERPRISE ARCHITECTURE** (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

**Solid Mechanics and Materials**

**MCG5101 (MAAJ 5001) THEORY OF ELASTICITY** (3cr.)

**MCG5102 (MAAJ 5002) ADVANCED STRESS ANALYSIS** (3cr.)
Solutions to special beam problems including beams on elastic foundations, curved beams, multi-span beams, etc., as well as some axisymmetric problems.
significance of assumptions is discussed and solution techniques including series solutions and energy methods are utilized.

**MCG5103 (MAAJ 5003) THEORY OF PERFECTLY PLASTIC SOLIDS (3cr.)**

**MCG5104 (MAAJ 5004) THEORY OF PLATES AND SHELLS (3cr.)**
A general coverage of various approaches to plate problems and the application of these methods to practical cases. A study of the theory of shells including deformation of shells without bending, stresses under various loading conditions, general theory of shells, shells forming surfaces of revolution.

**MCG5105 (MAAJ 5505) CONTINUUM MECHANICS (3cr.)**

**MCG5106 (MAAJ 5006) ADVANCED TOPICS IN ELASTICITY (3cr.)**

**MCG5107 (MAAJ 5507) ADVANCED DYNAMICS WITH APPLICATIONS (3cr.)**

**MCG5108 (MAAJ 5008) FINITE ELEMENT ANALYSIS (3cr.)**

**MCG5109 (MAAJ 5009) ADVANCED TOPICS IN FINITE ELEMENT ANALYSIS (3cr.)**

**MCG5110 (MAAJ 5100) MICROMECHANICS OF SOLIDS (3cr.)**

**MCG5114 (MAAJ 5104) ANALYSIS AND DESIGN OF PRESSURE VESSELS (3cr.)**

**MCG5117 (MAAJ 5107) INTRODUCTION TO COMPOSITE MATERIALS (3cr.)**

**MCG5118 (MAAJ 5108) INTRODUCTION TO PLASTICITY (3cr.)**

**MCG5119 (MAAJ 5109) FRACTURE MECHANICS (3cr.)**

**MCG5126 (MAAJ 5206) DEFORMATION OF MATERIALS (3cr.)**
The deformation and fracture properties of metals, ceramics and polymers. Introduction to dislocation theory. Rheological models. Analysis and interpretation of constant strain rate, constant stress and stress relaxation tests in terms of the material structure.

**MCG5129 (MAAJ 5209) HOT WORKING OF METALS (3cr.)**
High temperature mechanical properties in metals. Types of recovery, recrystallization and precipitation in metals and their effects on hot strength and structure. Hot rolling of metals. Selection of rolling schedules. Influence of as-rolled structures on room temperature tensile and fracture stresses, impact strength.
MCG5137 (MAAJ 5307) SPECIAL STUDIES IN SOLID MECHANICS AND MATERIALS (3cr.)

MCG5138 (MAAJ 5308) ADVANCED TOPICS IN MECHANICAL ENGINEERING (3cr.)

MCG5144 SUPERALLOYS AD CERAMIX-METAL MATRIX COMPOSITES (3cr.)
Manufacture and properties of superalloys and ceramic-metal matrix composites used in aerospace, turbine, mining and energy applications. Powder metallurgy, phase diagrams, mechanical alloying, deformation, creep, fatigue, fracture mechanics, wear and corrosion. Physics-based modelling of materials' strength including the contribution of solid solution, precipitation and ceramic particle strengthening as a function of application temperature.

MCG5180 (MAAJ 5800) FIBRE COMPOSITE MATERIALS (3cr.)
Computer-automated manufacturing techniques. Advanced topics in composite design: lamination theory, interlaminar stresses and free edge effects, lamina and laminate failure theories. Principles of non-destructive testing. Individual projects involving the design, manufacturing and testing of a fibre composite component or material. Limited enrolment. Prerequisite: MCG 5117 (MAAJ 5107) or permission of the Institute.

MCG5181 (MAAJ 5801) ADVANCED VIBRATIONS (3cr.)
Kinematics of vibrations, the single degree of freedom system, without and with damping, two degrees of freedom, several degrees of freedom, vibration of shafts, critical speeds, complex presentation, influence coefficients, matrix method, stability of solution, approximate methods.

MCG5182 (MAAJ 5802) THEORY OF ELASTIC INSTABILITY (3cr.)

MCG7355 SPECIAL TOPICS IN ADVANCED MATERIALS (3cr.)
Topics that may be covered include the following: nanocrystalline and amorphous materials; metals and ceramic-metal composites; functional materials; fibre-based engineering materials.

Thermofluids

MCG5111 (MAAJ 5101) GAS DYNAMICS (3cr.)

MCG5131 (MAAJ 5301) HEAT TRANSFER BY CONDUCTION (3cr.)

MCG5132 (MAAJ 5302) HEAT TRANSFER BY CONVECTION (3cr.)

MCG5133 (MAAJ 5303) HEAT TRANSFER BY RADIATION (3cr.)

MCG5134 (MAAJ 5304) HEAT TRANSFER WITH PHASE CHANGE (3cr.)

MCG5136 (MAAJ 5306) SPECIAL STUDIES IN FLUID MECHANICS AND HEAT TRANSFER (3cr.)

MCG5141 (MAAJ 5401) STATISTICAL THERMODYNAMICS (3cr.)

MCG5151 (MAAJ 5501) LAMINAR FLOW THEORY (3cr.)
Derivation and exact solutions of the Navier-Stokes equations. Low Reynolds number flows, Stokes flow. Oseen flow, lubrication theory. Laminar boundary layers. Introduction to hydrodynamic stability.

MCG5152 (MAAJ 5502) THEORY OF TURBULENCE (3cr.)
Review of the basic theories and experimental results of turbulent flow. Universal equilibrium theory, locally isotropic theories, isotropic turbulence,

MCG5155 (MAAJ 5505) INVISCID FLOW THEORY (3cr.)

MCG5156 (MAAJ 5506) MEASUREMENT IN FLUID MECHANICS (3cr.)

MCG5157 (MAAJ 5507) NUMERICAL COMPUTATION OF FLUID DYNAMICS AND HEAT TRANSFER (3cr.)

MCG5158 (MAAJ 5508) INDUSTRIAL FLUID MECHANICS (3cr.)
Application of simple flows to analysis of more complex systems. Pipe and duct systems, flow separation and control, aerosols, separation of particulates from flow, cavitation, unsteady flow.

MCG5161 (MAAJ 5601) ENVIRONMENTAL ENGINEERING (3cr.)

MCG5191 (MAAJ 5901) COMBUSTION IN PREMIXED SYSTEMS (3cr.)
Stoichiometry, thermo-chemistry, ignition, flame propagation, flame stabilization, diffusion flames, turbulent combustion, modelling.

MCG5192 (MAAJ 5902) COMBUSTION IN DIFFUSION SYSTEMS (3cr.)
Gaseous jet flames, combustion of liquid droplets, atomization, spray flames, coal combustion, fluidized bed combustion.

**Design - Manufacturing - Industrial Engineering**

MCG5115 (MAAJ 5105) NON-LINEAR OPTIMIZATION (3cr.)

MCG5159 (MAAJ 5509) ADVANCED PRODUCTION PLANNING AND CONTROL (3cr.)

MCG5165 (MAAJ 5608) INDUSTRIAL ORGANIZATION (3cr.)

MCG5169 (MAAJ 5609) ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

MCG5170 (MAAJ 5700) COMPUTER-AIDED DESIGN (3cr.)
The design process. Structure of computer-aided drafting software. Analysis and optimization software. Software integration. Parametric design. Major group design project which integrates concepts from all major areas of mechanical engineering. Exclusion: May not be taken for credit with MCG4322.

MCG5171 (MAAJ 5701) APPLIED RELIABILITY THEORY (3cr.)

MCG5172 (MAAJ 5702) INTRODUCTION TO MANAGEMENT OF AUTOMATION (ROBOTICS AND NUMERICAL CONTROLS) (3cr.)

MCG5173 (MAAJ 5703) SYSTEMS ENGINEERING AND INTEGRATION (3cr.)
Introduction to modelling methods employed for the planning and design of sub-systems and complex systems. Discrete and continuous time, lumped and distributed parameters models. State estimation. Parameters identification. Discretization and stochastic effects. Technological systems modelling and simulation examples.
MCG5176 (MAAJ 5706) INDUSTRIAL CONTROL SYSTEMS (3cr.)
Concept, analysis and design of classical and modern industrial control systems. Computer based control systems for robotics, automation, manufacturing and instrumentation applications. Design project of industrial control and automation systems. Not accessible to students who have taken MCG 4108.

MCG5177 (MAAJ 5707) ROBOT MECHANICS (3cr.)
Robotics overview. Transformations. Basics of robot kinematics, statics and dynamics. Introduction to practical robots, control and programming. Project in analysis, design or application of manipulators. Not accessible to students who have taken MCG 4132.

MCG5178 (MAAJ 5708) ADVANCED TOPICS IN CAD/CAM (3cr.)
Overview of totally integrated CAD/CAM systems. Details of design and manufacturing software tools. Methods of linking design and manufacturing tools to form an integrated CAD/CAM system. Students will undertake projects which will provide them with a "hands-on" experience.

MCG5179 (MAAJ 5709) MANUFACTURING SYSTEM ANALYSIS (3cr.)

MCG5184 MECHATRONICS (3cr.)
Models for passive and active components for electro-mechanical systems. Network representation of signals and energy transmission and conversion. Selection of sensors and actuators for the control of mechanical systems. Modelling and simulation for the design of mixed dynamic systems. Precludes additional credit for MCG 4136.

MCG5185 (MAAJ 5805) MULTIVARIABLE DIGITAL CONTROL (3cr.)

MCG5186 (MAAJ 5806) NON-LINEAR DISCONTINUOUS DYNAMICS AND CONTROL (3cr.)

General Course Codes

MCG5900 SÉMINAIRE DE M.A.Sc. / MASc SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars and to make one presentation. Graded S/NS.

MCG5947 SÉMINAIRE DE MAÎTRISE EN INGÉNIERIE / MASTER OF ENGINEERING SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. Les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS (Satisfaisant/Non Satisfaisant). // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars. Graded S/NS (Satisfactory/Non Satisfactory).

MCG6998 PROJET / PROJECT (6cr.)
Projet en génie mécanique ou en matériaux avancés et fabrication dirigé par un professeur approuvé par le directeur des études supérieures et donnant lieu à la rédaction d’un rapport approfondi (30-40 pages approx). Noté S (satisfaisant) ou NS (non satisfaisant) par le directeur du projet et un autre professeur nommé par le directeur des études supérieures en génie mécanique. Le projet est normalement complété en une session d’études à temps plein. Préalable : approbation du directeur des études supérieures en génie mécanique. // Project in mechanical engineering or in advanced materials and manufacturing supervised by a professor approved by the director of graduate studies and leading to the writing of an in-depth report (approx. 30-40 pages). Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the director of graduate studies in Mechanical Engineering. The project can normally be completed in one session of full-time study. Prerequisite: approval of director of graduate studies in Mechanical Engineering.

MCG7999 THÈSE DE MAÎTRISE / MASc THESIS

MCG9900 SÉMINAIRE DE DOCTORAT / PhD SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins quinze séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 15 seminars and make one presentation. Graded S/NS.

MCG9997 PRÉPARATION DU PROJET DE THÈSE DE DOCTORAT / PREPARATION FOR PhD THESIS PROPOSAL
À la suite de la réussite à l'examen de synthèse, inscription requise de tous les candidats au doctorat jusqu'à ce que le projet de thèse soit accepté par le Comité consultatif. // Following completion of the comprehensive examination, registration required for all PhD candidates until the thesis proposal is accepted by the Advisory Committee.
MCG9998 PRÉPARATION À L’EXAMEN GÉNÉRAL DE DOCTORAT / PREPARATION FOR PhD COMPREHENSIVE EXAMINATION
Inscription requise de tous les candidats au doctorat jusqu'à la réussite à l'examen de synthèse. / Registration required for all PhD candidates until the comprehensive examination is passed.

MCG9999 THÈSE DE DOCTORAT / PhD THESIS

Department of Mechanical and Aerospace Engineering Carleton University
Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings, please consult the Registration Instructions and Class Schedule booklet published in the summer. Carleton University course numbers (in parentheses) follow the University of Ottawa course number.

MCG5121 (MECH 5106) SPACE MISSION ANALYSIS AND DESIGN (3cr.)
Review of solar system and space exploration. Space mission design and geometry. Analysis of orbit design, transfers, interplanetary trajectories. Effect of environment on spacecraft design. Space propulsion and launch vehicle design. Launch sequence, windows, cost. Reusable launch systems. Also offered at the undergraduate level, with different requirements, as AERO 4802.

MCG5122 (MECH 5202) SMART STRUCTURES (3cr.)

MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS (3cr.)
Essential microstructural features of metals and alloys: crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

MCG5300 (MECH 5000) FUNDAMENTALS OF FLUID DYNAMICS (3cr.)
Differential equations of motion. Viscous and inviscid regions. Potential flow: superposition; thin airfoils; finite wings; compressibility corrections. Viscous flow: thin shear layer approximation; laminar layers; transition; turbulence modelling. Convective heat transfer: free versus forced convection; energy and energy integral equations; turbulent diffusion. Also offered at the undergraduate level, with different requirements, as AERO 4302, for which additional credit is precluded.

MCG5301 (MECH 5001) THEORY OF VISCOUS FLOWS (3cr.)
Navier-Stokes and boundary layer equations; mean flow equations for turbulent kinetic energy; integral formulations. Stability, transition, turbulence, Reynolds stresses; separation. Calculation methods, closure schemes. Compressibility, heat transfer, and three-dimensional effects.

MCG5303 (MECH 5003) INCOMPRESSIBLE NON-VISCOUS FLOW (3cr.)
The fundamental equations and theorems for non-viscous fluid flow; solution of two-dimensional and axisymmetric potential flows; low-speed airfoil and cascade theory; wing lifting-line theory; panel methods.

MCG5304 (MECH 5004) COMPRESSIBLE NON-VISCOUS FLOW (3cr.)
Steady isentropic, frictional, and diabatic flow; shock waves; irrotational compressible flow, small perturbation theory and similarity rules; second-order theory and unsteady, one-dimensional flow.

MCG5308 (MECH 5008) EXPERIMENTAL METHODS IN FLUID MECHANICS (3cr.)
Fundamentals of techniques of simulation of fluid dynamic phenomena. Theoretical basis, principles of design, performance and instrumentation of ground test facilities. Applications to aerodynamic testing.

MCG5309 (MECH 5009) ENVIRONMENTAL FLUID MECHANICS RELATING TO ENERGY UTILIZATION (3cr.)
Characteristics of energy sources and emissions into the environment. The atmosphere; stratification and stability, equations of motion, simple winds, mean flow, turbulence structure and dispersion near the ground. Flow and dispersion in groundwater, rivers, lakes and oceans. Physical and analytical modelling of environmental flows.

MCG5310 (MECH 5100) PERFORMANCE AND ECONOMICS OF AIRCRAFT (3cr.)
Aircraft performance analysis with emphasis on factors affecting take-off, landing and economic performance; high lift schemes; operating economics.

MCG5311 (MECH 5101) DYNAMICS AND AERODYNAMICS OF FLIGHT (3cr.)
Static stability theory. Euler's equations for rigid body motion; the linearized equations of motion; stability derivatives and their estimation. Longitudinal and lateral dynamic response of an aircraft to control and disturbance. Also offered at the undergraduate level, with different requirements, as AERO 4308, for which additional credit is precluded.

MCG5314 (MECH 5104) GROUND TRANSPORTATION SYSTEMS AND VEHICLES (3cr.)
Performance characteristics, handling and directional stability, ride comfort and safety of various types of ground vehicle systems including road vehicles, terrain-vehicle systems, guided transport systems, and advanced ground transport technology.
The following primary programs participate in the collaborative program in Medieval and Renaissance Studies:

- CVG7126 (CIVE 5204) BEHAVIOUR AND DESIGN OF STRUCTURAL STEEL MEMBERS
- MCG5488 (MECH 5803) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING

Coating methods including PVD, CVD, laser, thermal spray and electrochemical deposition are discussed in the context of failure prevention measures. Fundamental concepts and characteristics of modern stability definitions. Sensitivity and variational equations; linear variational equations; phase space analysis; guidance system classification, flight control systems, targeting, target tracking, sensing. Modern multivariable control analysis; design requirements, sensitivity, automation in the administration of manufacturing and project engineering. Optimization in the design of computer-assisted manufacturing (CAM). State of art.

Review of the basic theories and experimental results of turbulent flow. Universal equilibrium theory, locally isotropic theories, isotropic turbulence, constant strain rate, constant stress and stress relaxation tests in terms of the material structure. Constituent materials – fibres, resins, industrial reinforcements, prepreg. Manufacturing processes: preforming, fibre placement, liquid moulding, pultrusion, resin electro-mechanical, dissipative systems, and other engineering applications. Significance of assumptions is discussed and solution techniques including series solutions and energy methods are utilized.

The requirements of the program are usually fulfilled within two years. The maximum time permitted is four years from the date of initial satisfactory or NS (not satisfactory) by the supervisor and by another professor appointed by the director of graduate studies in Mechanical Engineering.

The Department of Mathematics and Statistics is a participating unit in the collaborative programs in Bioinformatics and in Biostatistics.

Admission

Master of Science Mathematics and Statistics Concentration in Mathematics

Programs

Invention/innovation process. Creative problem-solving techniques. Entrepreneurship. Organizational climate for stimulating invention. Theoretical foundations of accounting research and methodologies are examined. Topics include the role of accounting information in capital regulations and securities agency (e.g., security exchange commission) roles; and financial institutions and services. Students admitted full-time must register full-time for at least three sessions. The requirements specific to the collaborative program are as follows: Students can register at most 3 credits of directed readings. In addition to the above courses, relevant courses from the MHA, MBA, and EMP programs in which they intend to take their courses. Those whose first language is neither English nor French are required, at the time of application, to provide a statement of purpose indicating their career goals and interests in the proposed research area;
formulations; classical and finite element approaches for continuous systems; and linear stability, frequency response, and propagation solution methods. Precludes additional credit for MECH 5500.

MCG5352 (MECH 5502) OPTIMAL CONTROL SYSTEMS (3cr.)

MCG5353 (MECH 5503) ROBOTICS (3cr.)
The history of and introduction to robotics methodology. Robots and manipulators; homogeneous transformation, kinematic equations, solving kinematic equations, differential relationships, motion trajectories, dynamics. Control; feedback control, compliance, servomotors, actuators, external and internal sensors, grippers and vision systems. Microprocessors and their application to robot control. Programming.

MCG5354 (MECH 5504) GUIDANCE, NAVIGATION AND CONTROL (3cr.)

MCG5355 (MECH 5505) STABILITY THEORY AND APPLICATIONS (3cr.)
Fundamental concepts and characteristics of modern stability definitions. Sensitivity and variational equations; linear variational equations; phase space analysis; Lyapunov's direct method. Autonomous and nonautonomous systems; stability in first approximation; the effect of force type on stability; frequency method.

MCG5356 (MECH 5506) NEURO AND FUZZY CONTROL (3cr.)

MCG5124 (MECH 5507) ADVANCED KINEMATICS (3cr.)
Algebraic-geometry applications: kinematic calibration of serial and in-parallel robots; kinematic synthesis of planar, spherical, spatial mechanisms. Various DH-parametrisations, Jacobian formulations. Topics in: projective geometry; Cayley-Klein geometries; Plücker line coordinates; Gröbner bases; Grassmannians; kinematic mapping; Burmester theory. Emphasis on practical applications.

MCG5361 (MECH 5601) CREATIVE PROBLEM SOLVING AND DESIGN (3cr.)
Problem-solving processes and how they can be applied in engineering design. Emphasis on learning methodologies rather than accumulating information. Techniques can be successfully applied in any engineering speciality. (Also offered as IDES 5301)

MCG5362 (MECH 5602) FAILURE PREVENTION (FRACURE MECHANICS AND FATIGUE) (3cr.)
Design of engineering structures to ensure against failure due to fatigue or brittle fracture. Nature of fatigue and brittle fracture; selection of suitable material, geometry, and inspection procedures for the load and environmental conditions.

MCG5364 (MECH 5604) COMPUTATIONAL METALLURGY (3cr.)

MCG5381 (MECH 5603) LIGHTWEIGHT STRUCTURES (3cr.)

MCG5365 (MECH 5605) FINITE ELEMENT ANALYSIS I (3cr.)
An introduction to the finite element methodology, with emphasis on applications to heat transfer, fluid flow and stress analysis. The basic concepts of Galerkin's method, interpolation, numerical integration, and isoparametric elements are taught using simple examples.

MCG5366 (MECH 5606) FINITE ELEMENT ANALYSIS II (3cr.)
Time marching heat flow problems with linear and nonlinear analysis. Static plasticity. Time-dependent deformation problems; viscoplasticity, viscoelasticity, and dynamic analysis. Isoparametric elements and numerical integration are used throughout.

MCG5367 (MECH 5607) THE BOUNDARY ELEMENT (BEM) METHOD (3cr.)
Integral equations. The BEM for potential theory and for elastostatics in two-dimensions. Boundary elements and numerical integration schemes. Practical applications.

MCG5369 (MECH 5701) METALLIC PHASES AND TRANSFORMATIONS (3cr.)
Thermodynamics of crystals, phase diagrams, principles of alloy phases, thermal analysis. Transformation rate and mechanisms. Short and long range diffusional
transformations; diffusionless transformations. Phase transformations in engineering systems. Prerequisites: MCG2361/MCG2761 or MCG2142/MCG2542 (MAAE 2700 or the equivalent).

MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS (3cr.)
Essential microstructural features of metals and alloys: crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

MCG5345 (MECH 5700) SURFACES AND COATINGS (3cr.)
Surface characteristics of solid materials and surface degradation/failure mechanisms including wear, fretting, oxidation, corrosion, and erosion are introduced. Coating methods including PVD, CVD, laser, thermal spray and electrochemical deposition are discussed in the context of failure prevention measures.

MCG5374 (MECH 5704) INTEGRATED MANUFACTURING CIMS (3cr.)
Topics essential to CIMS including computer graphics, geometric modelling, numerically controlled machining, and flexible manufacturing. The fundamental data structures and procedures for computerization of engineering design, analysis and production. Also offered at the undergraduate level, with different requirements, as MECH 4704, for which additional credit is precluded.

MCG5375 (MECH 5705) CAD/CAM (3cr.)

MCG5480 (MECH 5800) SPECIAL TOPICS IN MECHANICAL AND AEROSPACE ENGINEERING (3cr.)
In-depth study of a topic in Mechanical and Aerospace Engineering.

MCG5489 (MECH 5801) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)
Topics will vary from year to year.

MCG5483 (MECH 5802) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5488 (MECH 5803) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5482 (MECH 5805) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5486 (MECH 5806) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5487 (MECH 5807) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5398 (MECH 5908) INDEPENDENT ENGINEERING STUDY (3cr.)
Students pursuing a master's degree by course work carry out an independent study, analysis, and solution of an engineering problem or design project. The results are given in the form of a written report and presented at a departmental seminar. Carried out under the general direction of a faculty member.

Other Courses of Particular Interest

Biomedical Engineering

BMG5300 (BIOM 5300) MODELLING OF RUBBER-LIKE ENGINEERING MATERIALS AND BIOLOGICAL SOFT TISSUES (3cr.)
Overview of the analytical and computational tools necessary for modelling rubber-like engineering materials and soft biological tissues: continuum mechanics for finite deformations, specific hyper-elastic constitutive equations, material characterization and finite element implementation. Ad-hoc review of physiology and microstructure of biological materials.

BMG5319 INTRODUCTION TO MICROFLUIDICS (3cr.)
Physics of liquid transport in micro-fabricated systems including physics at the microscale, hydrodynamics of microfluidic systems, diffusion mixing, introduction to microfabrication, examples of microfluidics devices and Micro PIV techniques, project. Prerequisites: MCG3143 or MCG3341/MCG3741 or equivalent. Strong background in fluid mechanics. Experience with computer-based projects (CAD, Matlab, CFD).

Chemical Engineering

CHG8188 POLYMER PROPERTIES AND CHARACTERIZATION (3cr.)
Polymer properties are described and discussed in the context of their nature, source and means of measurement. Chemical and microstructural properties;
physical states and transitions; thermal properties; mechanical properties and viscoelasticity models; degradation and stability; surface, electrical and optical properties, polymer additives; structure-property relationships.

Civil and Environmental Engineering

CVG7120 (CIVE 5101) INTRODUCTORY ELASTICITY (3cr.)

CVG7121 (CIVE 5102) ADVANCED ELASTICITY (3cr.)

CVG7122 (CIVE 5103) FINITE ELEMENT METHODS IN STRESS ANALYSIS (3cr.)

CVG7126 (CIVE 5204) BEHAVIOUR AND DESIGN OF STRUCTURAL STEEL MEMBERS (3cr.)

CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)

CVG7141 (CIVE 5602) ADVANCED METHODS IN COMPUTER-AIDED DESIGN (3cr.)

Mathematics and Statistics

MAT5195 (STAT 5505) DESIGN OF EXPERIMENTS

Unequal probability sampling with and without replacement; unified theory of standard errors; prediction approach; ratio and regression analysis. Smoothing methods in curve estimation; Statistical classification and pattern recognition: error counting methods, "positivist" and "non-positivist" methods; social studies of science and scientists; and research ethics involving human subjects.

MAT5191 (STAT 5501) MATHEMATICAL STATISTICS II


MAT5170 (STAT 5708) PROBABILITY THEORY I (3cr.)

MAT5146 (MATH 5103) RINGS AND MODULES (3cr.)

MAT5329 (MATH 6009) TOPICS IN ANALYSIS (3cr.)

MAT5307 (MATH 5804) TOPICS IN OPERATIONS RESEARCH (3cr.)

MAT5341 (MATH 5821) QUANTUM COMPUTING (3cr.)

MAT5151 (MATH 5205) TOPOLOGY I

MAT5234 (MATH 5223) TOPOLOGY II (3cr.)

MAT5241 (MATH 5214) FUNCTIONAL ANALYSIS I (3cr.)

MAT5317 (MATH 5817) COMPLEX ANALYSIS I (3cr.)

MAT5318 (MATH 5818) COMPLEX ANALYSIS II (3cr.)

Systems and Computer Engineering

ELG6101 (SYSC 5001) SIMULATION AND MODELLING

ELG6104 (SYSC 5004) OPTIMIZATION FOR ENGINEERING APPLICATIONS (3cr.)
Introduction to algorithms and computer methods for optimizing complex engineering systems. Includes linear programming, networks, nonlinear programming, integer and mixed-integer programming, genetic algorithms and search methods, and dynamic programming. Emphasizes practical algorithms and computer methods for engineering applications.

ELG6105 (SYSC 5005) OPTIMIZATION THEORY AND METHODS

ELG6141 (SYSC 5401) ADAPTIVE CONTROL (3cr.)

ELG6142 (SYSC 5402) ADVANCED DYNAMICS WITH APPLICATIONS TO ROBOTICS (3cr.)

ELG6152 (SYSC 5502) ADVANCED LINEAR SYSTEMS (3cr.)

ELG6153 (SYSC 5503) STOCHASTIC PROCESSES (3cr.)
Basic concepts of randomness, as applied to communications, signal processing, and queueing systems; probability theory, random variables, stochastic
processes; random signals in linear systems; introduction to decision and estimation; Markov chains and elements of queueing theory. *Exclusion: ELG 5119.*

**Engineering Management**

**EMPS145 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN** (3cr.)
2-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach. Case studies and application project.

**Medieval and Renaissance Studies (Collaborative)**

Since the 16th century, study of the middle ages implies studying a 'middle', or intermediary period, seen as standing between two great civilizations: Roman antiquity and the modern western world. This definition has had a major impact on scholarship, crystallizing a periodization that has now become traditional in most of the humanities.

The collaborative master’s in Medieval and Renaissance Studies (MDR) has two goals:

- To offer at the graduate level a multi-disciplinary education in Medieval and Renaissance Studies;
- To teach students the theoretical approaches and methods of research specific to the study of the period.

**Participating programs**

The following primary programs participate in the collaborative program in Medieval and Renaissance Studies:

- Classical Studies
- English
- History
- Lettres françaises
- Music
- Philosophy
- Religious Studies
- Spanish
- Theatre

Please see the websites of the Faculty of Graduate and Postdoctoral Studies (www.grad.outtawa.ca) for more information on the master’s program offered by each unit.

The title of the degree will indicate the discipline of the participating unit with the specification “specialization in Medieval and Renaissance Studies.”

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

- Maîtrise ès arts Lettres françaises Spécialisation en études médiévales et de la renaissance
- Master of Arts Classical Studies Specialization in Medieval and Renaissance Studies
- Master of Arts English Literature Specialization in Medieval and Renaissance Studies
- Master of Arts History Specialization in Medieval and Renaissance Studies
- Master of Arts Music Specialization in Medieval and Renaissance Studies
- Master of Arts Philosophy Specialization in Medieval and Renaissance Studies
- Master of Arts Religious Studies Specialization in Medieval and Renaissance Studies
- Master of Arts Spanish Specialization in Medieval and Renaissance Studies
- Master of Arts Theatre Specialization in Medieval and Renaissance Studies

**Admission**
Students who wish to enroll in the collaborative program in Medieval and Renaissance Studies must first be admitted to a master’s program in one of the participating units. Candidates must hold an honours degree or the equivalent.

Students must apply to the collaborative program at the same time as they apply to the master’s program in the participating unit.

**Language Requirements**

The courses offered by the collaborative program in Medieval and Renaissance Studies are offered in English, in French, and in a bilingual format. An excellent knowledge of English or French and a passive understanding of the other language are required. Each academic unit maintains its own language requirements. Except in the case of students in the departments of English and Français, all students have the right to submit assignments, the major research paper, or the thesis, and to answer examination questions in the official language of their choice.

**Program Requirements**

Students in the program must complete the requirements of their primary program and those of the collaborative program. One of the two 3-credit courses in medieval and Renaissance Studies (MDV5100 or MDV5500) will be counted towards the requirements of the primary program. Consequently, students in the specialization will have only one extra course to take.

The requirements of the collaborative program are as follows:

Two compulsory courses:

MDV5100 Medieval and Renaissance Studies Research Methods and Tools (3cr.)

OR

MDV5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3cr.)

AND

MDV5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3cr.)

Students must complete the two compulsory courses before they register to the major research paper or thesis.

A thesis or major research paper on a topic related to medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.

In both cases, the title of the degree will indicate the discipline of the participating unit with “specialization in Medieval and Renaissance Studies.”

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

**MDV5100 MEDIEVAL AND RENAISSANCE STUDIES RESEARCH METHODS AND TOOLS** (3cr.)

Approaches to the study of manuscripts (palaeography, codicology, iconography) and texts (explication, diplomatics, liturgy, stemmata) of the period.

**MDV5900 SÉMINAIRE DE RECHERCHE INTERDISCIPLINAIRE / INTERDISCIPLINARY RESEARCH SEMINAR** (3cr.)

Séminaire bilingue à thèmes variables destiné à explorer le sens et la valeur du travail interdisciplinaire en études médiévales et modernes. / Bilingual seminar using varying themes as a vehicle for exploring the meaning and value of interdisciplinary work in medieval and modern studies.

**Microbiology and Immunology**

The Department of Biochemistry, Microbiology and Immunology is located in the Faculty of Medicine and offers graduate programs leading to the degrees of Master of Science (MSc) and Doctor of Philosophy (PhD) in Microbiology and Immunology.

The programs refine critical and scholarly skills in fields and areas of specialization and prepare students for a variety of careers in teaching and research both within and outside of academia, including in a governmental, clinical, or industrial setting. Graduates are expected to have acquired autonomy in conducting research, in preparing scholarly publications, through a training that includes course work, research seminars, and independent research leading to a thesis.
Members of the Department are engaged in two main research fields: microbiology and host biology. Additional information is posted in the departmental website.

The Department is a participating unit in the following collaborative programs: the Bioinformatics program (at the master's level) and the Pathology and Experimental Medicine program (at the master's and doctoral levels).

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Microbiology and Immunology and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to submit their work, thesis, and exams in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Microbiology and Immunology
Master of Science Microbiology and Immunology Specialization in Bioinformatics
Master of Science Microbiology and Immunology Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Microbiology and Immunology
Doctorate in Philosophy Microbiology and Immunology Specialization in Pathology and Experimental Medicine

Admission

Admission to the graduate program in microbiology and immunology is governed by the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Hold a bachelor's degree with a specialization or a major (or equivalent) in biochemistry, biology, or microbiology with a minimum average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor member of the Department and of the FGPS who is willing and available to act as thesis supervisor.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Collaborative Program in Bioinformatics at the Master’s Level

The Department of Biochemistry, Microbiology and Immunology is a participating unit in the collaborative program in Bioinformatics at the master’s level. This program has been established for students wishing to include an interdisciplinary component in Bioinformatics as part of their degree in Microbiology and Immunology.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Bioinformatics program.

Collaborative Program in Pathology and Experimental Medicine at the Master’s Level

The Department of Biochemistry, Microbiology and Immunology is a participating unit in the collaborative program in Pathology and Experimental Medicine at the master’s and doctoral levels. This program has been established for students wishing to include an interdisciplinary component in Pathology and Experimental Medicine as part of their degree in Microbiology and Immunology.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Pathology and Experimental Medicine program.
Program Requirements

MSc in Microbiology and Immunology

The following requirements must be met:

- Successful completion of compulsory course MED8166 *Professionalism and Professional Skills*.
- Successful completion of the graduate course MIC5100.
- Successful completion of an additional 3-credit MIC graduate course.
- Successful completion of the seminar course (MIC5366), which involves the presentation of a seminar and regular attendance at the seminars presented by the Department.
- Successful presentation and defense of a thesis (MIC7999) based on original research carried out under the direct supervision of a faculty member of the Department.

NOTE: The Department may require students to take additional courses, depending on their backgrounds.

Collaborative program in Bioinformatics

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

- 3 compulsory credits in bioinformatics (BNF5106/BIO5106).
- Registration in the seminar course in bioinformatics (BNF6100), which involves a written report, the presentation of a seminar, and regular attendance at departmental seminars.
- Presentation and defence of a research thesis on a topic in bioinformatics based on original research carried out under the supervision of a faculty member participating in the bioinformatics collaborative program.
- Microbiology and immunology requires that students take the bioinformatics course and the bioinformatics seminar in addition to the primary program requirements.

Collaborative program in Pathology and Experimental Medicine

The requirements and regulations of both the primary program and of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Presentation and defence of a thesis on a topic in pathology and experimental medicine based on original research carried out under the supervision of a professor who is a member of the Pathology and Experimental Medicine collaborative program. At least one of the thesis examiners must be a member of the Pathology and Experimental Medicine collaborative program.

Transfer from master’s to PhD

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

Duration of the program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Residence

All students must complete a minimum of three sessions of full-time registration.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.
MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master's or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

MIC5100 HOST/PATHogen INTERACTIONS AND MOlecular IMmunoLOGY (3cr.)
This course will examine current issues in microbiology/immunology. Topics to be chosen to allow discussion across the broad areas of virology, immunology and bacteriology. Within each of the modules, the focus will be on host-pathogen interactions at the molecular level, how microorganisms utilize, modify or disrupt host cell functions, including immune cell functions and immune responses, to establish infection and cause diseases, or on immunological diseases which may have an infectious component. Prerequisite: At least one undergraduate course in microbiology and/or immunology and one course in molecular biology, or permission of the course coordinator.

MIC5366 MSc SEMINAR (3cr.)
Attendance at two half-day symposia with guest speakers, attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Microbiology and Immunology. Students must present at least one poster and one oral presentation during the course of their program. Graded S/NS

MIC7999 THÈSE DE MAÎTRISE / Msc THESIS
Avant la soutenance de sa thèse, il faut que chaque étudiant donne un séminaire portant sur ses recherches au Département / Prior to defending their thesis, each student will be required to present a formal seminar about their research to the department.

MIC8122 ADVANCED TOPICS IN IMMUNOLOGY (3cr.)
Focus on cellular immunology, including thymocyte maturation, induction and regulation of cellular responses, immune responses to pathogens, immunological memory, tolerance. Student assessments to be conducted by two methods: Weekly assessment of student presentations and participation in class discussions; assessment of take-home assignments such as completion of a research grant on a topic covered in the course. To be offered alternate years subject to sufficient demand. Prerequisite: MIC 4125 or equivalent.

MIC8124 ADVANCED TOPICS IN CELL DEATH (3cr.)
Molecular mechanisms of cell death. Particular attention to be paid to role of aberrant cell death in human disease. Offered in the Fall of odd numbered years.

MIC8125 SPECIAL TOPICS IN MICROBIOLOGY AND IMMUNOLOGY (3cr.)
Discussion of current topics in Microbiology and Immunology. Topics to vary from year to year depending on the interest of faculty members offering the course and students. Student assessments to be conducted by two methods: Weekly assessment of student presentations and participation in class discussions; assessment of take-home assignments such as completion of a research grant on a topic covered in the course. Prerequisite: Permission of the course coordinator.

MIC8126 IMMUNOCHEMISTRY (3cr.)
Focus is on antigen structure of protein and carbohydrate antigens, receptor structure of B cells and T cells, structure of MHC molecules, accessory molecules and cytokine receptors and cell signalling pathways induced by the antigen and cytokine receptors. Student assessments to be conducted by two methods: Weekly assessment of student presentations and participation in class discussions; assessment of take-home assignments such as completion of a research grant on a topic covered in the course. To be offered alternate years subject to sufficient demand. Prerequisite: MIC 4125 or equivalent.

MIC8129 CURRENT TOPICS IN STEM CELLS AND IMMUNE DEVELOPMENT (3cr.)
This course will focus on the haematopoietic system that gives rise to the many cell types of the immune system. Topics to be covered include the developmental processes of embryonic stem cell differentiation into mesoderm and then into haematopoietic and non-haematopoietic progenitors; development of adult haematopoietic and immune systems; symmetric and asymmetric division of cells; intrinsic transcription factors and extracellular microenvironment factors regulating cell fate; immunological aspects of stem-cell based therapy; new technologies and their use in the field, and experimental design. Prerequisite: At least one undergraduate course in immunology or cell biology, or permission of the course coordinator.

MIC8134 STRUCTURE AND EXPRESSION OF EUKARYOTIC AND PROKARYOTIC GENOMES (3cr.)
Sequencing of eukaryote and prokaryote genomes with emphasis on recent technologies, sequence alignments and databases and assembly of genomes from massively parallel sequencing data. Focus on mapping studies, including linkage disequilibrium-based genome-wide association study (GWAS), to characterize functional variants associated with complex traits. Analysis and structure of microbial metagenomes from environmental and human habitats, including structure-function analysis of microbial communities, microbiota-human disease correlations, and molecular phylogeny. Genome expression, including measures of RNA transcripts and proteins and statistical analysis of data. Combination of various -omics data to understand gene-environment interactions.

MIC8236 ADVANCED TOPICS IN VIROLOGY (3cr.)
An in-depth presentation of current topics in virological research. Topics will vary from year to year. To be offered every alternate year subject to sufficient demand. Prerequisite: MIC 4126 or equivalent.

MIC8238 ADVANCED TOPICS IN BACTERIOLOGY - MECHANISMS OF PATHOGENESIS (3cr.)
Recent advances and current topics in selected areas of bacteriology with emphasis on mechanisms of pathogenesis. Students present and discuss journal articles. Offered every alternate year subject to sufficient demand. Prerequisite: MIC 4124 or its equivalent.

MIC8366 PhD SEMINAR (3cr.)
Attendance at two half-day symposia with guest speakers, attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Microbiology and Immunology. Students will present a poster in their first and every alternate
year, and an oral presentation the second and every alternate year until they have permission to write their thesis. Graded S/NS

**MIC8401 ADVANCED TOPICS IN BACTERIAL GENETICS** (3cr.)
Microbial genetic and genomic methods: origin, purpose and functioning. Analysis and use of genomes to study bacterial pathogenesis and host-microbe interactions. **Prerequisite: MIC5224 or equivalent.**

**MIC8500 SPECIAL TOPICS IN HEALTH-RELATED ENVIRONMENTAL MICROBIOLOGY** (3cr.)
Recent advances and current topics in selected areas of health-related environmental microbiology. Topics reflect student interest. Offered in alternate years subject to sufficient demand. **Prerequisite: MIC 5500 or equivalent.**

**MIC8700 BIOLOGY AND PATHOGENESIS OF HIV INFECTION** (3cr.)
Biology and pathogenesis of Human Immunodeficiency Virus (HIV) infection. Genetics, replication, structure, regulation of gene expression, immunopathogenesis, antiviral therapy and vaccine development. Offered in alternate years subject to sufficient demand. **Prerequisite: BCH 3170 or equivalent and permission of instructor.**

**MIC9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)**

**MIC9999 THÈSE DE DOCTORAT / PhD THESIS**

**HMG8106 CLINICAL CYTOGENOMICS** (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG8107 CLINICAL BIOCHEMICAL GENETICS** (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG8108 CLINICAL MOLECULAR GENETICS** (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**Music**

The School of Music offers the Master of Music (MMus) and the MA in Music. There are two streams: one in performance, the other being musical research.

Performance studies are offered in piano, voice, orchestral instruments, and guitar.

The School of Music participates in collaborative programs in Women’s Studies and in Medieval and Renaissance Studies at the master’s level. For more information on these programs, see “Admission requirements.”

The programs operate within the general framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Music

Master of Music

**Admission**

Candidates are required to have one of the following:

- A BMus.
- A four-year honours BA in music.
- A four-year BA with a major in music.
- Or an equivalent degree or diploma.

A 75 percent (B+) average is required for the undergraduate degree or diploma. If the degree is from a conservatory, it is deemed equivalent if so
indicated on the transcript, or if the total course work is equivalent, to a four-year BA, and includes the equivalent of 6 credits in music history and 6 credits in music theory. In addition, applicants must perform an audition or submit an example of writing from undergraduate work in music history or music theory. The choice of evaluation depends on whether the student wishes to pursue the performance stream or the musicology/theory stream. Applicants may be asked to take placement tests in music history, music theory or aural skills. If remedial work is necessary, deficiencies must be remedied by the end of the first year.

Candidates are admitted either to the MMus or the MA. A student who has successfully completed the requirements of the MMus degree may, instead of accepting the MMus, become a candidate for the MA with the approval of the Graduate Studies Committee.

**Collaborative Program in Women’s Studies at the master’s level**

The School of Music is a participating unit in the collaborative program in women’s studies at the master’s level. This program has been established for students wishing to enrich their training in music by including an interdisciplinary component in Women’s studies. The specific requirements of the collaborative program include two core courses and a thesis or major research paper on a topic related to Women’s studies. Only one of the core "FEM" courses will be counted for credit towards the requirements of the master’s with thesis option.

Students should normally apply for admission to the Women’s studies collaborative program at the same time as they apply for admission to the master’s program in music.

For further details, please consult the Women’s studies program on the FGPS.

**Collaborative Program in Medieval and Renaissance Studies at the master's level**

The School of Music is a participating unit in the collaborative program in Medieval and Renaissance Studies at the Master's level. This program has been established for students wishing to enrich their training in Music by including an interdisciplinary component in Medieval and Renaissance Studies. The specific requirements of the collaborative program include two core courses in medieval studies and a thesis on a topic related to Medieval and Renaissance Studies.

Students should normally apply for acceptance in the Medieval and Renaissance Studies collaborative program at the same time as they apply for admission to the Master’s program in Music.

For further details, please consult the Medieval and Renaissance Studies program on the FGPS website.

**Graduate diplomas**

The School also offers two graduate diplomas, one in piano pedagogy research and another in orchestral studies. For further details on these diplomas, please consult the FGPS Diploma Website.

**Program Requirements**

Students in the MMus must complete 30 credits of courses, as well as two recitals and a recital defence.

Students in the MA with research paper must complete 27 credits consisting of 6 compulsory credits plus 15 elective credits and a 6-credit research paper.

Students in the MA with thesis must complete 18 credits of courses, a thesis proposal and a thesis.

**Details are specified below:**

**MMus (Performance) (30 credits)**

- Compulsory courses (15 credits):
  - MUS6900 INITIATION À LA RECHERCHE MUSICALE / INTRODUCTION TO MUSICAL RESEARCH (3cr.)
  - MUS6901 LEÇONS PARTICULIÈRES I / APPLIED MUSIC I (3cr.)
  - MUS6902 LEÇONS PARTICULIÈRES II / APPLIED MUSIC II (3cr.)
  - MUS6903 LEÇONS PARTICULIÈRES III / APPLIED MUSIC III (3cr.)
  - MUS6904 LEÇONS PARTICULIÈRES IV / APPLIED MUSIC IV (3cr.)

- One optional course (3 credits) from among:
  - MUS5901 PROSÉMINAIRE EN THÉORIE ET ANALYSE MUSICALES / PROSEMINAR IN MUSIC THEORY AND ANALYSIS (3cr.)
  - MUS5902 PROSÉMINAIRE EN MUSICOLOGIE / PROSEMINAR IN MUSICOLOGY (3cr.)
  - MUS5903 MÉTHODES DE RECHERCHE EN PÉDAGOGIE MUSICALE / RESEARCH METHODOLOGIES IN MUSIC PEDAGOGY (3cr.)
  - MUS5921 MÉTHODES D'ANALYSE DE LA MUSIQUE TONALE I / ANALYSIS AND ANALYTICAL METHOD: TONAL MUSIC I (3cr.)
  - MUS5922 MÉTHODES D'ANALYSE DE LA MUSIQUE POST-TONALE / ANALYSIS AND ANALYTICAL METHOD: POST-TONAL MUSIC (3cr.)
  - MUS6370 TOPICS IN MUSICOLOGY (3cr.)
  - MUS6930 SÉMINAIRE DE THÉORIE ET D'ANALYSE / SEMINAR IN THEORY AND ANALYSIS (3cr.)
  - MUS6931 THÈMES EN PÉDAGOGIE DE LA MUSIQUE / TOPICS IN MUSICAL PEDAGOGY (3cr.)
The programs are governed by the travail.

satisfaisant.

consentement aux soins, évaluation, intervention, congé et rédaction de notes de dossier à l'aide de la méthode SOAP (Subjective, Objective,

ERG6905 FORMATION CLINIQUE EN ERGOTHÉRAPIE V

Une moyenne globale non cumulative calculée pour chacune des sessions devra être maintenu à un minimum de B. La note de passage dans (satisfaisant) ou NS (non satisfaisant). Tout stage pour lequel la note NS a été obtenue doit être répété. Dans l'éventualité d'un deuxième échec

ERG5523 L'ENVIRONNEMENT PHYSIQUE, SOCIAL, CULTUREL ET INSTITUTIONNEL (1.5cr.)

Le gouvernement du Canada, par l'entremise de Santé Canada, appuie financièrement depuis le printemps 1999 le Consortium national de

MOUS50901 PROSÉMINAIRE EN THÉORIE ET ANALYSE MUSICALES / PROSEMINAR IN MUSIC THEORY AND ANALYSIS (3cr.)

MUS50903 PROSÉMINAIRE EN MUSICOLOGIE / PROSEMINAR IN MUSICOLOGY (3cr.)

* With permission of the Director of Graduate Studies, students enrolled in the MA and completing a research paper in piano pedagogy may replace one of the required courses by MUS50904 or a methodology course in EDU.

Compulsory courses* (6 credits)

Elective MUS credits (15 credits)

The choice of elective credits is subject to the approval of the research paper director. The School may stipulate additional requirements depending upon the student’s choice of research topic. Students are allowed to take up to 6 MUS credits at the 4000 level, provided they complete additional work to the satisfaction of the Director of graduate studies.

Research Paper (MUS6099) (6 credits)

The topic of the research paper must be approved before the end of the fall term in the second year. The final paper must receive the grade of "S" (satisfactory) from both the professor who supervised its preparation and from a second reader.

MA with thesis (18 credits)

Compulsory courses* (6 credits)

Elective MUS credits (12 credits)

The choice of elective credits is subject to the approval of the thesis supervisor. The School may stipulate additional requirements depending upon the student’s choice of research topic. Students are allowed to take up to 6 MUS credits at the 4000 level, provided they complete additional work to the satisfaction of the Director of graduate studies.

MUS7902 PROPOSITION DE THÈSE / THESIS PROPOSAL

Thesis (MUS7999)

Collaborative program in Women’s Studies

Students admitted to the Collaborative program in women’s studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

Two compulsory courses:

FEM5300 FEMINIST THEORIES (3cr.)
FEM5303 FEMINIST METHODOLOGIES (3cr.)

Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.
The requirements of the collaborative program are as follows:

Two compulsory courses:

MDV5100 Medieval and Renaissance Studies Research Methods and Tools (3cr.)

OR

MDV5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3cr.)

AND

MDV5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3cr.)

Students must complete the two compulsory courses before they register to the major research paper or thesis.

A thesis or major research paper on a topic related to Medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.

In both cases, the title of the degree will indicate the discipline of the participating unit with the specification "specialization in Medieval and Renaissance Studies."

Language requirements of the program

The MMus and MA have a second language requirement. To meet this requirement, students must either pass a proficiency test (ESL1000 or FLS1000) or an ESL/FLS course administered by the Official Languages and Bilingualism Institute (OLBI). Graded: S (Satisfactory) / NS (Not Satisfactory).

Duration of the program

Full-time students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

All of the courses below are not necessarily offered each year. For more information, students should consult the Department.

MUS5900 INITIATION À LA RECHERCHE MUSICALE / INTRODUCTION TO MUSICAL RESEARCH (3cr.)
Exclusion: MUS4928 Outils fondamentaux de recherche pour interprètes et chercheurs : catalogues thématiques, listes d'œuvres, bases de données, outils bibliographiques, rédaction universitaire, activités savantes. / Fundamental research tools for performers and academics: thematic catalogues, works lists, data bases, bibliographic tools, academic writing skills, and scholarly outlets.

MUS5901 PROSÉMINAIRE EN THÉORIE ET ANALYSE MUSICALES / PROSEMINAR IN MUSIC THEORY AND ANALYSIS (3cr.)
Survol des méthodes, pratiques et modèles de recherche contemporains en théorie et analyse musicales. / Survey of different contemporary research methodologies, models and practices in relation to music theory and analysis.

MUS5902 STAGE / PRACTICUM (3cr.)
Stage dirigé permettant aux étudiantes et aux étudiants de mettre en pratique leurs connaissances et leur expertise. Rédaction d'un rapport évalué par le superviseur de stage et un professeur du programme. Noté : S/NS. / A supervised practicum designed to allow students to put their knowledge and developing expertise to work. Students will be required to submit a written report that will be evaluated by the practicum supervisor and a professor. Graded: S/NS. Préalables : Permission du professeur superviseur de l'étudiant et du directeur des études supérieures; disponibilité d'un stage jugé convenable par l'École de musique. / Prerequisites: Permission of the student's supervisor and director of graduate studies; availability of a placement deemed suitable by the School of Music.
MUS5903 PROSÉMINAIRE EN MUSICOLOGIE / PROSEMINAR IN MUSICOLOGY (3cr.)
Survol des méthodes de recherche actuelles en musicologie, y compris la musicologie historique, l'étude de genre, la théorie critique, l'étude critique de l'interprétation et l'étude des médias. / Survey of different current research methodologies in musicology, including historical musicology, genre studies, critical theory, performance studies, and media studies.

MUS5904 MÉTHODES DE RECHERCHE EN PÉDALOGIE MUSICALE / RESEARCH METHODOLOGIES IN MUSIC PEDAGOGY (3cr.)
Exploration des méthodes de recherche en pédagogie musicale, y compris des approches et des cadres théoriques issus des sciences sociales. / Exploration of research methodologies in music pedagogy research, including theoretical frameworks and methodologies derived from the social sciences.

MUS5911 SÉMINAIRE DE RECHERCHE / RESEARCH SEMINAR (3cr.)
Forum de discussion sur la méthodologie, les problèmes et le cadre théorique de la recherche, dans le contexte des recherches poursuivies par les étudiants et les étudiantes inscrits. Préalable : Connaissance passive de l'anglais. / Discussion of research methodology, problems and theoretical frameworks in relation to participating students' research. Prerequisite: Passive knowledge of French.

MUS5921 MÉTHODES D'ANALYSE DE LA MUSIQUE TONALE I / ANALYSIS AND ANALYTICAL METHOD: TONAL MUSIC I (3cr.)

MUS5923 MÉTHODES D'ANALYSE DE LA MUSIQUE POSTTONALE / ANALYSIS AND ANALYTICAL METHOD: POSTTONAL MUSIC (3cr.)

MUS6099 MÉMOIRE / RESEARCH PAPER (6cr.)

MUS6370 TOPICS IN MUSICOLOGY (3cr.)

MUS6900 LEÇONS PARTICULIÈRES I / APPLIED MUSIC I (3cr.)

MUS6901 LEÇONS PARTICULIÈRES II / APPLIED MUSIC II (3cr.)
Préalable : MUS6900. / Prerequisite: MUS6900.

MUS6902 LEÇONS PARTICULIÈRES III / APPLIED MUSIC III (3cr.)
Préalable : MUS6901. / Prerequisite: MUS6901.

MUS6903 LEÇONS PARTICULIÈRES IV / APPLIED MUSIC IV (3cr.)
Préalable : MUS6902. / Prerequisite: MUS6902.

MUS6904 MUSIQUE ET AFFAIRES / THE BUSINESS OF MUSIC (3cr.)
Étude d'institutions et d'entreprises contemporaines professionnelles rattachées à la gestion d'une carrière de musicien professionnel. / The study of present-day institutions and industries connected to the performance of music and aspects of professional preparation, organization, and presentation.

MUS6909 INTERPRÉTATION ORCHESTRALE PROFESSIONNELLE / PROFESSIONAL ORCHESTRAL PERFORMANCE (3cr.)

MUS6911 MUSIQUE DE CHAMBRE I / CHAMBER MUSIC I (3cr.)
Étude et présentation publique du répertoire de musique de chambre. Leçons hebdomadaires et cours de groupe. Ouvert à tous les étudiants qui peuvent être accommodés dans un groupe de musique de chambre viable pour la durée du cours. / Study and performance of the chamber music repertoire. Weekly coaching and performance classes. Open to all students who can be accommodated into a viable chamber ensemble.

MUS6912 INTERPRÉTATION DU LIED ET DE LA MÉLODIE / ART SONG INTERPRETATION (3cr.)
Étude et présentation publique du répertoire du lied et de la mélodie. Ouvert aux étudiants en chant et en piano, et aux autres instrumentistes avec permission spéciale de l'École de musique. / Study and performance of the art song repertoire. Open to pianists and voice students, and to other instrumentalists with permission of the the School of Music.

MUS6913 MUSIQUE DE CHAMBRE II / CHAMBER MUSIC II (3cr.)
MUS6926 THÈMES EN COMPOSITION MUSICALE / TOPICS IN MUSICAL COMPOSITION (3cr.)

MUS6930 SÉMINAIRE EN THÉORIE ET D'ANALYSE / SEMINAR IN THEORY AND ANALYSIS (3cr.)

MUS6931 THÈMES EN PÉDAGOGIE DE LA MUSIQUE / TOPICS IN MUSICAL PEDAGOGY (3cr.)
Les thèmes étudiés comprennent les facteurs cognitifs liés aux habiletés en lecture musicale; le contrôle de la dimension expressive dans l'interprétation; l'importance de la pratique dans la maîtrise des mouvements techniques; les habiletés développées par une approche fondée sur l'apprentissage à l'oreille comparativement à une approche basée sur l'apprentissage de la lecture; les mémoires auditives, visuelles et tactiles impliquées dans la mémorisation de la musique. / Themes being studied will include the cognitive factors related to the skills involved in reading music; the control of expressive aspects of playing; the role of practising in mastering the technical movements; the skills related to an ear training approach versus a note-reading approach; the aural, visual and tactile memory skills involved in memorising music.

MUS6932 THÈMES EN PÉDAGOGIE DU PIANO / TOPICS IN PIANO PEDAGOGY (3cr.)
Les thèmes étudiés comprennent les réflexes conditionnés d'un sujet aux stimuli musicaux complexes impliqués dans l'apprentissage du jeu pianistique; une analyse approfondie des recherches sur l'efficacité et la pertinence des méthodes de piano déjà reconnues; l'étude des habiletés motrices impliquées dans le développement de la technique; les questions de santé impliquées dans les blessures liées au jeu du piano. / Themes being studied will include a subject’s conditioned responses to complex musical stimuli in the context of learning to play the piano; in-depth understanding of the research evaluating the effectiveness and relevance of already established piano methods; study of the motor skills involved in developing piano technique; health issues involved in the injuries related to piano playing.

MUS6950 SÉMINAIRE EN MUSICOLOGIE / SEMINAR IN MUSICOLOGY (3cr.)
Thèmes choisis en musicologie parmi lesquels se trouvent la réception, l'opéra, l'herméneutique, la politique, la musique de film et les autographes de compositeurs. /Selected topics in musicology to include reception studies, opera studies, hermeneutics, politics, film music studies, and sketch studies.

MUS6965 PRODUCTION D'OPÉRAS I / OPERA PRODUCTION I (3cr.)
Étude, mise-en-scène et présentation publique d'opéra. Ouvert à tous les étudiants du M.Mus. en chant. Préalable : permission du directeur du programme d'études supérieures. / The study, staging and performance of an opera or operas. Open to all MMus students in vocal performance. Prerequisite: Approval of the Director of Graduate Studies.

MUS6966 PRODUCTION D'OPÉRAS II / OPERA PRODUCTION II (3cr.)
Continuation de MUS 6965. Étude, mise-en-scène et présentation publique d'opéra. Ouvert à tous les étudiants du M.Mus. en chant. Préalable : permission du directeur du programme d'études supérieures et MUS 6965. / Continuation of MUS 6965. The study, staging and performance of an opera or operas. Open to all MMus students in vocal performance. Prerequisite: Approval of the Director of Graduate Studies and MUS 6965.

MUS6970 RÉPERTOIRE DE MUSIQUE DE CHAMBER / CHAMBER MUSIC REPERTOIRE (3cr.)
Étude d'une partie du répertoire de musique de chambre du point de vue de l'interprète : bibliographie, techniques d'ensemble, techniques d'interprétation. Travaux pratiques (interprétation). / Study of selected chamber music repertoire from the performer’s perspective: literature, ensemble techniques, performance practices. Practical work.

MUS6993 THÈMES EN INTERPRÉTATION / TOPICS IN PERFORMANCE (3cr.)
Thèmes liés à l'interprétation et aux différentes habiletés requises : technique, mémorisation, contrôle de l’anxiété liée à la performance. / Topics relating to performance and the various skills required: technique, memorization, controlling performance anxiety.

MUS6994 ÉTUDES INDIVIDUELLE EN PÉDAGOGIE DE LA MUSIQUE / INDEPENDENT STUDIES IN MUSICAL PEDAGOGY (3cr.)
Ce cours comprend une recherche supervisée en laboratoire ou en atelier où l'on explore un sujet au choix en pédagogie musicale. / This course involves guided research in a laboratory or workshop setting where the student pursues an individual research topic in musical pedagogy under the supervision of a professor.

MUS6995 LECTURES DIRIGÉES DANS LE DOMAINE DE LA PÉDAGOGIE DE LA MUSIQUE / DIRECTED READINGS IN MUSICAL PEDAGOGY (3cr.)
Ce cours comprend la lecture critique supervisée d’un ensemble de documents en pédagogie musicale choisis par l’étudiant ou l’étudiante. L’étudiant ou l’étudiante doit rédiger un travail écrit. / This course involves the critical directed reading of a body of appropriate literature in musical pedagogy determined by the student under the supervision of a professor. Students are required to submit a written report.

MUS6996 ÉTUDE INDIVIDUELLE EN INTERPRÉTATION / INDEPENDENT STUDIES IN PERFORMANCE (3cr.)
Recherche supervisée en atelier où l’on explore un sujet de recherche en interprétation sous la direction d’un professeur. / Guided research in a workshop setting where the student pursues an individual research topic in interpretation under the supervision of a professor.

MUS6997 LECTURES DIRIGÉES DANS LE DOMAINE DE THÉORIE / DIRECTED READINGS IN THEORY (3cr.)

MUS6998 LECTURES DIRIGÉES EN MUSICOLOGIE / DIRECTED READINGS IN MUSICOLOGY (3cr.)
Neuroscience

The Department of Cellular and Molecular Medicine is located in the Faculty of Medicine and offers graduate programs leading to the degrees of Master of Science (MSc) and Doctor of Philosophy (PhD) in Neuroscience.

The Department of Cellular and Molecular Medicine is located at the Health Sciences Center of the University of Ottawa. Through its cross-appointed and adjunct members, the Department has research affiliations with the following institutes: the Loeb Research and University of Ottawa Heart Institutes at the Ottawa Hospital (Civic Campus), the Royal Ottawa Hospital, the Canadian Red Cross, Health Canada, National Research Council and the Department of National Defense.

The programs help students develop their theoretical knowledge as well as their capacity for critical analysis. This is achieved through reading and critiquing the scientific literature, conducting experiments in the laboratory, analyzing the data and results generated, and presenting their results in the form of research seminars or posters. The programs prepare candidates for a variety of careers in teaching and research both within and outside of academia.

Graduates of the program will acquire autonomy in conducting research and in preparing scholarly publications and grant applications. A comprehensive set of courses, state-of-the-art research facilities and outstanding research opportunities ensure a career in neuroscience.

The Department is a participating unit in the collaborative program in Human and Molecular Genetics and in Pathology and Experimental Medicine at the master's and doctoral levels.

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Neuroscience and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Neuroscience
Master of Science Neuroscience Specialization in Human and Molecular Genetics
Master of Science Neuroscience Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Neuroscience
Doctorate in Philosophy Neuroscience Specialization in Human and Molecular Genetics
Doctorate in Philosophy Neuroscience Specialization in Pathology and Experimental Medicine

Admission
Admission to the graduate program in neuroscience is governed by the general regulations of the FGPS. Applications are evaluated based on the following criteria:

- Applicants must have achieved a minimum admission average of 75% (B+) calculated in accordance with FGPS guidelines. For additional information, applicants should consult the NSC graduate program website.
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Collaborative Program in Human and Molecular Genetics at the Master’s Level**

The Department of Neuroscience is a participating unit in the collaborative program in Human and Molecular Genetics at the master’s and doctoral levels. This program has been established for students wishing to include an interdisciplinary component in Human and Molecular Genetics as part of their degree in Neuroscience.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Human and Molecular Genetics program.

**Collaborative Program in Pathology and Experimental Medicine at the Master’s Level**

The Department of Neuroscience is a participating unit in the collaborative program in Pathology and Experimental Medicine at the master’s and doctoral levels. This program has been established for students wishing to include an interdisciplinary component in Pathology and Experimental Medicine as part of their degree in Neuroscience.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Pathology and Experimental Medicine program.

**Program Requirements**

**MSc in Neuroscience**

- Successful completion of compulsory course MED8166 Professionalism and Professional Skills.
- 6 credits of graduate courses including either NSC5102 or NSC5104 or equivalent, approved by the Department.
- Enrollment in the seminar course (NSC8324S), which involves the presentation of a seminar and regular attendance at the departmental seminars.
- Presentation and defense of a thesis (NSC7999) based on original research carried out under the direct supervision of a research faculty member in the Department.

The Department may require students to take additional courses, depending on their backgrounds.

**Collaborative program in Human and Molecular Genetics**

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

- Six credits of courses, three credits of which must be from the student’s primary program and three of which must be HMG credits.
- Enrollment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Presentation and successful defence of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Master’s candidates intending to transfer directly to the doctoral program must meet the conditions set by their primary program.

Course selection is subject to the approval of the HMG program director.

**Collaborative program in Pathology and Experimental Medicine**
The requirements and regulations of both the primary program and of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Presentation and defence of a thesis on a topic in pathology and experimental medicine based on original research carried out under the supervision of a professor who is a member of the Pathology and Experimental Medicine collaborative program. At least one of the thesis examiners must be a member of the Pathology and Experimental Medicine collaborative program.

**Transfer from master’s to PhD**

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program.

**Duration of program**

The requirements of the program are usually fulfilled within two years of full-time studies. Students are allowed a maximum of four years, after the initial registration date, to complete the program.

**Residence**

All students must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

**Courses**

**MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS**

Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

**NSC5102 CELLULAR AND MOLECULAR NEUROSCIENCE** (3cr.)

The molecular and cellular properties of neurons. Emphasis to be placed on the molecular basis of electrical activity of neurons and chemical synaptic transmission.

**NSC5104 SYSTEMS NEUROSCIENCE** (3cr.)

Structure and function of representative components of the nervous system to be presented in an integrated and comprehensive manner, emphasizing a reductionist approach to the study of neural networks and their behavioural output. Prerequisites: PHS 3240 or equivalent or permission of the program director.

**NSC5106 MOLECULAR PSYCHIATRY** (3cr.)

Study of genetic and neurochemical bases of mental illnesses using transgenic and gene knockout mouse models, animal behavioural paradigms, in vivo imaging. Gene therapy approaches in psychiatry; influence of environmental stressors. Prerequisites: PHS 3240 or BIO 3170/BIO 3570 or PSY 3301/PSY 3701 or equivalent or permission of the program director.

**NSC7100 NEUROTRANSMISSION AND NEUROMODULATION** (3cr.)

Molecular and cell biology of neurotransmission including the identity, actions and mechanisms of neurotransmitters and neuromodulators. Use of computer simulations to explore the complex interactions between synaptic input and the electrical architecture of neurons.

**NSC7999 THÉSE DE MAÎTRISE / MSc THESIS**

**NSC8103 DEVELOPMENTAL NEUROSCIENCE** (3cr.)

Fundamental concepts of development of the nervous system with an emphasis on those aspects unique to this tissue type. Topics to include control of proliferation and differentiation, axonal outgrowth and pathfinding, synaptogenesis and formation of neuronal maps, neuronal plasticity, growth factor action and neural regeneration.

**NSC8104 COMPUTATIONAL NEUROSCIENCE** (3cr.)

Basic concepts of sensory-motor processing from the cellular level of excitable membranes and synaptic signalling mechanisms to the emergent properties of complex neural networks.

**NSC8105 MOLECULAR BIOLOGY AND THE NEURON** (3cr.)
Emphasis on how signal transduction regulates neuronal function. Topics to include the role of the cytoskeleton in neuronal function, membrane sorting in exocytosis and endocytic pathways, metabotropic and ionotropic receptor signaling, signaling by the GTP-binding proteins, plasma membrane and vesicular transporters, role of protein-protein interactions in the regulation of neuronal signaling, and genomic and proteomic approaches to study neuronal signaling.

**NSC8106 MECHANISMS OF NEUROLOGICAL DISEASE** (3cr.)
Current knowledge of select neuropathologies with emphasis on the underlying genetics and biochemistry of these conditions. Examination of some fundamental cellular processes important for understanding neurological diseases.

**NSC8324 SEMINAR FOR MSc STUDENTS**
All graduate students enrolled in the MSc program or who have been admitted to a PhD program without an MSc must participate in these seminars for one year. Two seminars must be presented by each student during the year.

**NSC8325 SEMINAR FOR PhD STUDENTS**
All graduate students enrolled in the PhD program must participate in these seminars for one year during their doctoral or post MSc training. Two seminars must be presented by each student during the year: one on an assigned subject, the other on his or her research project.

**NSC8340 NEUROMUSCULAR FUNCTION AND DYSFUNCTION** (3cr.)
Topics to be covered include factors controlling muscle- and synapse-specific gene expression, regulation of myogenesis and muscle cell growth, formation of the neuromuscular junction, motor neuron - muscle interactions, the role of the cytoskeleton in organization of post-synaptic domains, functional role of ion channels in muscle, molecular genetics of neuromuscular disease. **Prerequisite: CMM 5340 or equivalent**

**NSC9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAM (PhD)**

**NSC9999 THÈSE DE DOCTORAT / PhD THESIS**

**HMG8106 CLINICAL CYTOGENOMICS** (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG8107 CLINICAL BIOCHEMICAL GENETICS** (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG8108 CLINICAL MOLECULAR GENETICS** (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**Nursing**

The School of Nursing offers the following programs: a graduate diplomas in Primary Health Care for Nurse Practitioners (PHCNP), a Master of Science (MSc) in Nursing and a Doctor of Philosophy (PhD) in Nursing.

**Master’s program**

The goal of the master’s program is to educate registered nurses for an advanced practice role and/or doctoral studies. Graduates of the program are prepared to assume leadership roles in improving the quality of nursing care in various health care settings. The program provides rigorous academic preparation based on theory and research to address health-related phenomena experienced by individuals, families, groups, aggregates and communities.

The master’s program is offered in English and French with a thesis option or a clinical option (course based) and on a full-time or part-time basis.

The courses from the master's program can be offered by distance modalities. The courses from the PHCNP Diploma are offered using a combination of face-to-face and distance modalities. Francophones from minority communities on the Canadian west and east coasts and in the Territories benefit from additional privileges thanks to the Consortium national de formation en santé (CNFS). CNFS is a nationally-represented organization that comprises ten university- and college-level academic institutions offering French-language education in various health-related fields.

The department offers a collaborative program in Women’s studies at the master's level. For more information on this program, see 'Admission'.

**Doctoral program**

The goal of the doctoral program in nursing is to prepare scientists capable of conducting innovative research that results in new and significant contributions to nursing knowledge. The students engage in creative thinking, critical appraisal and synthesis of scholarly work in their field of interest using a wide range of philosophical, theoretical and methodological perspectives.
Admissions are for full-time students only. To be considered as having full-time status, students must register to a minimum of 6 credits per session and must be geographically available and visit the campus regularly. The courses in the program are offered in French and in English.

The PhD program consists of three fields:

- Evidence informed decision making in nursing and health care;
- Sociopolitical, educational and historic contexts of nursing;
- Nursing practice and delivery systems.

In accordance with the University of Ottawa policy, students can write exams, course assignments and the thesis in either language (English or French).

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Science Nursing

Master of Science Nursing Specialization in Women's Studies

Doctorate in Philosophy Nursing

**Admission**

Candidates for the Master of Science in Nursing will be considered for admission under the general regulations of the FGPS. Applicants must meet the following requirements:

- Have completed a baccalaureate in nursing (equivalent to the degree offered by the University of Ottawa) with at least 70% (B) average
- Have successfully completed an introductory statistics course (or equivalent) within the last six (6) years.

This course must be completed prior to commencing the program or, if not, during the first session in the program. A current certificate of competence from the College of Nurses of Ontario or equivalent from another province is required. The equivalent of two years of recent nursing practice as a registered nurse, preferably in the chosen area of concentration, is strongly recommended.

**Graduate Diplomas or Specialization**

The Master of Science in Nursing program also offers the opportunity to complete additional qualifications notably a Diploma in Primary Health Care for Nurse Practitioners; or a Graduate Diploma in Health Services and Policy Research; or a Specialization in Women studies.

**Diploma in Primary Health Care for Nurse Practitioners**

Candidates for the Diploma in Primary Health Care for Nurse Practitioners will be considered for admission under the general regulations of the FGPS. Applicants must have completed a baccalaureate in nursing (equivalent to the degree offered by the University of Ottawa) with at least a B (70%) average and have successfully completed an introductory statistics course (or equivalent) within the last six (6) years. This course must be completed prior to commencing the program or, if not, during the first session in the program. A current certificate of competence from the College of Nurses of Ontario is required. The equivalent of two years’ nursing practice (3,640 hours) as a registered nurse is also required.

**Graduate Diploma in Health Services and Policy Research (Temporarily suspended.)**

The MSc in nursing program (thesis option) and the Doctoral program offer a Graduate Diploma in Health Services and Policy Research that permits students in the Master’s or Doctoral program to be sufficiently competent to carry out independent policy-relevant health services research. Although they may have acquired some of these competencies within the master of science and doctoral program in nursing, the Diploma permits them to tailor their education to ensure that they have the relevant and sufficient competencies needed to engage in high quality research in this field. Diploma recipients have the knowledge and skills to contribute to improved accessibility, quality, effectiveness, and efficiency of health services for Ontarians and all Canadians. They work as effective partners with policy-makers to ensure that newly created information is shared with relevant decision-makers and is used to help create a healthier, more productive population.

To obtain relevant information, consult the FGPS website.

**Collaborative Program in Women's Studies at the Master's Level**

The MSc in nursing program (thesis option) participates in the collaborative program in women's studies at the master's level. This program was established for students wishing to enrich their training in nursing by including an interdisciplinary component in women's studies. The specific requirements of the collaborative program include two core "FEM" courses and a thesis on a topic related to Women's studies. Students in the
collaborative program must complete three credits additional to those required in the regular program.

Students should normally apply for acceptance in the women’s studies collaborative program at the same time as they apply for admission to the master's program in nursing.

For further details, please consult the Women’s studies program on the FGPS website.

**Program Requirements**

**MSc with Thesis Option**

Four compulsory courses (15 credits):

- NSG5130 Development of knowledge and theory in nursing as a discipline (3cr.)
- NSG5140 Research methods in nursing (3cr.)
- NSG5192 Statistical analysis in nursing (3cr.)
- NSG5210 Advanced nursing practice in primary health care (6cr.)
  or
- NSG5220 Advanced nursing practice in tertiary health care (6cr.)

One elective graduate course (3 credits)

The selection is subject to approval by the program director.

Master's thesis (NSG7999)

**MSc with Clinical Option**

Five compulsory courses (21 credits):

- NSG5130 Development of knowledge and theory in nursing as a discipline (3cr.)
- NSG5140 Research methods in nursing (3cr.)
- NSG5192 Statistical analysis in nursing (3cr.)
- NSG5210 Advanced nursing practice in primary health care (6cr.)
  or
- NSG5220 Advanced nursing practice in tertiary health care (6cr.)
- NSG6401 CLINICAL PROJECT IN ADVANCED NURSING PRACTICE (6cr.)

Three elective courses (9 credits):

Subject to approval from the program director, appropriate electives may be chosen from other graduate programs offered at the University of Ottawa or at other universities.

**MSc in Nursing with a Diploma in Primary Health Care for Nurse Practitioners (PHCNP)**

**Clinical Option**

Eleven compulsory courses (45 credits):

- NSG5130 Development of knowledge and theory in nursing as a discipline (3cr.)
- NSG5140 Research methods in nursing (3cr.)
- NSG5192 Statistical analysis in nursing (3cr.)
- NSG5350 Pathophysiology for the nurse practitioner (3cr.)
- NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
- NSG5370 Advanced health assessment and diagnosis I (3cr.)
- NSG5375 Advanced health assessment and diagnosis II (3cr.)
- NSG5380 Therapeutics in primary health care I (3cr.)
- NSG5385 Therapeutics in primary health care II (3cr.)
- NSG53401 Integrative practicum (12cr.)
- NSG6401 CLINICAL PROJECT IN ADVANCED NURSING PRACTICE (6cr.)

**Collaborative Program in Women’s Studies**

Students admitted to the Collaborative program in women’s studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.
The Women's Studies requirements are:

- Two compulsory courses:
  FEM5300 FEMINIST THEORIES (3cr.)
  FEM5103 FEMINIST METHODOLOGIES (3cr.)
  Students must complete the two compulsory courses before their first registration for the major research paper or thesis.
- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women's Studies Graduate Committee as well as by the student's primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.
- The thesis supervisor must possess Women's Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women's Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.
- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women’s studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.
- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

**Duration of the Program**

Master's students are expected to complete all requirements within two years. The maximum time permitted is four years from the date of initial registration. The thesis must be submitted within four years of the date of initial registration in the program.

**Minimum Standards**

The passing grade in all courses in the program is B. Students who fail two courses or six credits must withdraw.

**Courses**

The following courses are not necessarily offered every year.

**NSG5130 Development of knowledge and theory in nursing as a discipline** (3cr.)
Prevailing nursing conceptualizations and their links to practice, research and education. Historical development and structure of contemporary nursing knowledge. Critique of middle-range theories appropriate to the study of nursing phenomena.

**NSG5140 Research methods in nursing** (3cr.)
Critical appraisal of research in nursing. Methodological issues related to research problem conceptualization; design selection; sampling; instrument development; data management and analysis. Creation of a nursing research proposal. **Prerequisite: NSG 5130.**

**NSG5192 Statistical analysis in nursing** (3cr.)
Introduction to the planning, analysis and interpretation of quantitative research in nursing including: analysis of inferential statistics; analysis of variance and covariance; and linear regression.

**NSG5210 Advanced nursing practice in primary health care** (6cr.)
Nurses' role in advanced nursing practice. Theoretical foundations, concepts and strategies in primary health care. Clinical practicum as consultant, educator, researcher, leader and clinician in primary health care. **Prerequisite or corequisite: NSG 5130.**

**NSG5220 Advanced nursing practice in tertiary health care** (6cr.)
Nurses' role in advanced nursing practice. Theoretical foundations, concepts and strategies associated with caring for patients and their families in complex care situations. Clinical practicum as consultant, educator, researcher, leader and clinician in tertiary health care settings. **Prerequisite or corequisite: NSG 5130.**

**NSG5350 Pathophysiology for the nurse practitioner** (3cr.)
Examine theoretical and practice related concepts in pathophysiology as a basis for advanced nursing practice. Explore alterations in physiological function with an emphasis on age-related, acute, episodic, and chronic conditions found in primary health care practice. Seminar: 3 hours/week. Course for PHCNP students only.

**NSG5360 Roles and responsibilities of the nurse practitioner** (3cr.)
Compare and contrast advanced practice nursing and related frameworks to develop, integrate, sustain, and evaluate the role of the nurse practitioner within primary health care. Critically analyze and develop strategies to implement advanced practice nursing competencies with a focus on the community. Seminar: 3 hours/week. Course for PHCNP students only.

**NSG5370 Advanced health assessment and diagnosis I** (3cr.)
Analyze and critique concepts and frameworks essential to advanced health assessment and diagnosis using clinical reasoning skills. Apply clinical, theoretical and research knowledge in comprehensive and focused health assessment for the individual client’s diagnostic plan of care. Course for PHCNP students only. **Prerequisite or corequisite: NSG5350.**
NSG5375 Advanced health assessment and diagnosis II (3cr.)
Integrate knowledge and apply conceptual frameworks integral to advanced health assessment and diagnosis in advanced nursing practice. Demonstrate initiative, responsibility, and accountability in complex decision making for individuals, groups, and/or families within the nurse practitioner scope of practice based on current research findings. Seminar: 3 hours per week. Clinical: 6 hours per week. Course for PHCNP students only. Prerequisite: NSG5370.

NSG5380 Therapeutics in primary health care I (3cr.)
Critically appraise and interpret concepts and frameworks integral to pharmacotherapy, advanced counseling, and complementary therapies for common conditions across the lifespan. Develop, initiate, manage, and evaluate therapeutic plans of care that incorporate client values and acceptability, goals of therapy, analysis of different approaches, pharmacotherapeutic principles. Course for PHCNP students only. Prerequisite or co-requisite: NSG5370.

NSG5385 Therapeutics in primary health care II (3cr.)
Integrate conceptual frameworks and evidence underlying the study of pharmacotherapy, advanced counseling, and complementary therapies for complex client situations. Demonstrate substantive initiative, responsibility, and accountability in complex decision making. Course for PHCNP students only. Prerequisite: NSG5380. Co-requisite: NSG5375.

NSG5401 Integrative practicum (12cr.)
Synthesize the competencies essential to advanced nursing practice to provide primary health care for clients across the life span. Demonstrate autonomy, decision-making, and critical analysis of organizational and system issues that influence scope of practice, professional accountability, and outcomes. Course for PHCNP students only. Prerequisites: NSG 5350, NSG 5360, NSG 5370, NSG 5375, NSG 5380 and NSG 5385.

NSG6115 Design of multiple interventions in community health (3cr.)
Theoretical basis for the design and evaluation of multistrategy and multi-level community health programs. Key design issues including synergies among interventions, intervention adaptation for contextual environment and implementation barriers. Integrated theories, planning tools and evaluation strategies to be discussed, using multiple intervention case studies. Prerequisites: NSG 5130; NSG 5210 or NSG 5220; NSG 5140; or equivalents. Prerequisites: NSG5130; NSG5210 (or 5220); NSG5140; or equivalents

NSG6133 DECISION MAKING IN CLINICAL PRACTICE (3cr.)
Examination of decision models as they relate to decision making at the patient, practitioner, and policy maker levels. Study of the patient decision making process. Exploration of decision support strategies and evaluation of practitioner’s decision support skills.

NSG6134 Educator’s role in advanced nursing practice (3cr.)

NSG6135 Palliative/end of life care: an interprofessional approach (3cr.)
Philosophy and practice of palliative/end of life care across the lifespan and in diverse health settings. Critical examination of theory, research, practice and policy issues related to care of individuals and families facing life threatening illness. Exploration of concepts of death, dying, bereavement within health care systems, culture, and society using an interprofessional approach. Prerequisite: Permission of Program Director.

NSG6140 Qualitative Research in Nursing and Health Sciences (3cr.)
Advanced qualitative research approaches including data analysis methods used in Nursing and other health disciplines. Pre-requisite: NSG5140 Research Methods in Nursing (or equivalent).

NSG6150 Historical context in nursing practice (3cr.)
Historical context for selected nursing practice topics and leadership styles. Nursing and health care from the 19th to the late 20th century from a feminist and social history standpoint. Perspectives and patterns of explanation for past nursing practices. Appraisal of primary and secondary sources, methods and theoretical approaches.

NSG6160 POLICY, POLITICAL ACTION AND CHANGE IN HEALTH CARE (3cr.)
Policy analysis, political action, organization and change theories. Acquisition of advanced nursing practice skills in policy and organizational analysis, application of change theory, lobbying, negotiating and strategizing.

NSG6170 SOCIOCULTURAL HISTORY OF THE BODY (3cr.)
This graduate seminar examines the body in terms of object of history as understood by the health professionals. Topics such as hygiene and the social image of the body, as well as the history of illness and death are covered.

NSG6401 CLINICAL PROJECT IN ADVANCED NURSING PRACTICE (6cr.)
Utilization of theory and evidence based practices relevant to a clinical field. Clinical practicum structured around the design, implementation, and evaluation of a clinical project. Prerequisites: NSG5210 or NSG5220, or NSG5360 (for PHCNP students only) and NSG5140.

NSG6998 Thèmes en sciences infirmières / Special topics in nursing (3cr.)
La recherche et l'expertise dans certains secteurs de spécialisation des soins infirmiers. Peut comporter un practicum. Thèmes à approuver au préalable par la Direction du programme. / Research and advanced practice in a specialized area of nursing. May include a clinical practicum. Program approval required for topic selection.

NSG6999 Études dirigées / Directed study (3cr.)
Apprêtsissement des connaissances dans un domaine d'intérêt particulier, avec l'approbation du programme. / Study of an area of particular interest in greater depth. Program approval is required.

**NSG7100 Theoretical and philosophical perspectives in nursing (3cr.)**
Critical analysis of nursing knowledge development and the influence on nursing research and practice. Comparison and contrast of theories and philosophies in nursing with an emphasis on substantive areas of nursing that are of interest to the student. (Course is reserved for PhD students.)

**NSG7103 DECISION MAKING IN NURSING (3cr.)**
Analysis and synthesis of decision and change models at client, practitioner and policy maker levels. In-depth exploration of selected conceptual, methodological, and design challenges to improve decision-making capacities of populations or to promote uptake of evidence-based nursing practices. (Course is reserved for PhD students.)

**NSG7104 EVALUATING COMPLEX NURSING INTERVENTIONS (3cr.)**
Discussion of design issues associated with complex interventions. Exploration of strategies for developing, implementing, and evaluating programs targeted to changing multiple levels of health care. Analysis of models, evidence, and policies appropriate to intervention design and examination of barriers to effective change. (Course is reserved for PhD students.)

**NSG7105 Research seminar I (3cr.)**
In-depth coverage and critical analysis of diverse research problems. Development of the research project through peer discussions, and presentations by experts. (Course reserved for PhD students.)

**NSG7106 Research seminar II (3cr.)**
In-depth coverage and critical analysis of diverse research design methods. Development of the thesis proposal through peer discussions, and presentations by experts. (Course reserved for PhD students.) Prerequisite: NSG7105

**NSG7110 Doctoral seminar (3cr.)**
Drafting and finalizing the thesis proposal, which is presented and defended orally. Graded S/NS. Prerequisites: NSG7100, NSG7105, NSG7106 and EDU7193 or EDU8190 or equivalent.

**NSG7990 Thèse de maîtrise / Master's thesis**
Préalables : NSG 5530, NSG 5540, NSG 5610 ou NSG 5620 (pour étudiantes MSc seulement) et NSG 5592. / Prerequisites: NSG 5310, NSG 5410, NSG 5210 ou NSG 5220 (reserved for MSc students) and NSG 5192.

**NSG9998 Examen de synthèse / Comprehensive examination**
L'examen de synthèse est un élément obligatoire du programme de doctorat et doit être complété avec succès avant de s'inscrire à la thèse. Il comporte une épreuve écrite et une épreuve orale portant sur un ou des thèmes reliés au champ de recherche de l'étudiant et l'étudiante.
Préalable ou concomitant: NSG 7110. / The comprehensive exam is mandatory in the doctoral program and must be successfully completed before registration to the thesis. The exam has a written and an oral component focusing on one or several topics related to the student’s research field. Prerequisite or co-requisite: NSG 7110.

**NSG9999 Thèse de doctorat / PhD thesis**
Préalable : NSG 9998. / Prerequisite: NSG 9998.

* Course with a clinical component

**Occupational Therapy**
La mission du programme de maîtrise est sciences de la santé en ergothérapie de l'Université d'Ottawa est de former des professionnels de la santé capables de desservir la population francophone de l'Ontario et des autres provinces canadiennes, dans le contexte bilingue et multiculturel du pays.

Le programme de maîtrise a pour but de former des ergothérapeutes compétents dont la pratique est à la fois centrée sur le client et fondée sur les résultats probants et les lignes directrices en vigueur pour la pratique clinique. Les étudiants développent non seulement les connaissances et compétences nécessaires à l'exercice de la profession (savoirs, savoir-faire, savoir-être et savoir agir) mais aussi les habiletés d'analyse critique et de synthèse nécessaires pour évaluer les résultats publiés dans des revues scientifiques.

L'ergothérapie est une science et un art qui tente de prévenir le handicap, de rétablir ou de promouvoir l'occupation, la santé et le bien-être des individus. Les ergothérapeutes travaillent en collaboration avec des personnes ou des groupes de personnes pour prévenir ou résoudre les difficultés de rendement occupationnel. Ces difficultés peuvent survenir suite à un problème de santé, un problème de développement, des barrières environnementales ou des limitations reliées au vieillissement. Elles peuvent être reliées aux domaines des soins personnels, des loisirs et de la productivité. Les ergothérapeutes invitent leurs clients à faire appel à leurs forces créatives pour réinventer leur vie et se construire une nouvelle autonomie.

Le programme d'études respecte les normes établies par l'Association canadienne des ergothérapeutes (ACE). Ainsi, les diplômés du programme auront développé les compétences nécessaires pour l'entrée en pratique. En plus des cours, ils auront complété les 1000 heures de stages requises par l'ACE. Ces stages obligatoires peuvent être, entre autres, effectués au sein des hôpitaux, des conseils scolaires, d'organismes communautaires, de la clinique universitaire interdisciplinaire et des centres de réadaptation de la région de la capitale nationale ou à l'extérieur de la région.
Le programme est contingent et requiert six sessions d'études consécutives à temps plein, y compris les stages. Toutefois, pour les étudiants détenteurs d'un baccalauréat en ergothérapie au moment de l'admission, le programme offre un cheminement court menant à l'obtention du diplôme de maîtrise en trois sessions (un an). Les objectifs du programme de formation sont atteints grâce à la réussite des cours théoriques et pratiques, des séminaires d'intégration et des stages. Les activités de formation sont regroupées sous les six thèmes suivants :

**Thème 1 :** Croissance personnelle et professionnelle;

**Thème 2 :** Connaissance de l'être humain, des activités qui lui sont propres (ses rôles occupationnels), de son interaction avec son environnement et sa communauté;

**Thème 3 :** Connaissance à la fois des facteurs qui limitent le rendement occupationnel et du processus ergothérapique centré sur le client qui remédie aux limites du rendement occupationnel;

**Thème 4 :** Connaissance des communautés et des besoins de santé de la population;

**Thème 5 :** Analyse critique de la connaissance;

**Thème 6 :** Intégration des connaissances.

Le mandat du programme d'ergothérapie étant de former des professionnels bilingues capables de desservir les populations francophones, le programme de cours est offert uniquement en français. Cependant, les travaux et examens peuvent être rédigés soit en français, soit en anglais. Également, bien que le programme de cours soit en français, certains stages cliniques peuvent être effectués dans des milieux bilingues ou anglophones. Les étudiants doivent donc avoir aussi une connaissance fonctionnelle de l'anglais. Le programme est régi par les règlements généraux de la Faculté des études supérieures et postdoctorales (FESP). En plus des règlements généraux de la FESP, le programme est régi par des règlements qui lui sont spécifiques.

**Programs**

**Master of Health Sciences Occupational Therapy**

**Admission**

Les titulaires d’un baccalauréat spécialisé ou de l’équivalent, avec une moyenne de “B” (70 %), calculée selon les directives de la FESP, peuvent être admissibles au programme de maîtrise en ergothérapie.

Les candidats doivent également rencontrer les exigences supplémentaires suivantes :

- Posséder une bonne connaissance du français, écrit et parlé, et une connaissance fonctionnelle de l’anglais, écrit et parlé. Les compétences linguistiques à l’oral et à l’écrit seront vérifiées lors des entrevues de sélection qui se dérouleront dans les deux langues;
- Avoir obtenu un minimum de 3 crédits en anatomie du système locomoteur (par exemple, ANP1506 Anatomie humaine et physiologie II ou l’équivalent) ;
- Avoir obtenu un minimum de 6 crédits en psychologie, soit un cours d’introduction à la psychologie, soit cours de psychologie du développement de l’enfant (par exemple, PSY1501 Introduction à la psychologie expérimentale ou l’équivalent et PSY2505 Psychologie du développement ou l’équivalent);
- Avoir obtenu un minimum de 3 crédits en statistiques (par exemple, HSS2781 Mesure et analyse des données ou l’équivalent);
- Avoir obtenu un minimum de 3 crédits en sociologie (par exemple, SOC1501 Éléments de sociologie ou l’équivalent) ou en anthropologie (par exemple, ANT1501 Anthropologie sociale et culturelle ou l’équivalent);
- Une expérience de travail ou de bénévolat impliquant des habiletés de relation d’aide, et ce au cours des trois dernières années, est un élément positif et sera considérée dans l’analyse des dossiers. Cette expérience doit être exposée dans le curriculum vitae des candidats avec les coordonnées de la personne ressource ou un document certifiant cette expérience (lettre, certificat ou autre).

NOTE : Les cours préalables doivent avoir été complétés dans les six années précédant la demande d’admission.

Les cotes de cours indiquées ci-dessus entre parenthèses représentent des équivalents à l’Université d’Ottawa et sont données à titre d’exemple pour aider le candidat dans son choix de cours. Les équivalences pour les préalables à l’admission peuvent être vérifiées auprès du secrétariat scolaire de la Faculté des sciences de la santé.

**Cours de conversation anglaise**

Pour préparer les étudiants à passer leurs stages en milieu bilingue, l’École des sciences de la réadaptation offre un cours de conversation anglaise (REAI5940) qui peut être recommandé ou exigé selon la compétence linguistique du candidat.

**Admission au cheminement court**

Les titulaires d’un Baccalauréat en ergothérapie d’une université canadienne reconnue par l’ACE, avec une moyenne de “B” (70 %), calculée
selon les directives de la FÉSP, peuvent également être admissibles au cheminement court du programme de maîtrise en ergothérapie. Ces personnes se verront créditer 30 crédits de cours en raison de leur formation, leur diplôme et leur expérience clinique. Il ne leur sera pas nécessaire de refaire les 1,000 heures de formation clinique déjà complétées au Baccalauréat auxquelles s’ajoutent celles acquises sur le marché du travail.

Les candidats doivent également rencontrer les exigences supplémentaires suivantes :

- Détenir un diplôme de Baccalauréat en ergothérapie d’une université qui était agréée par l’ACE au moment de la diplomation;
- Avoir travaillé comme ergothérapeute dans un milieu clinique pour l’équivalent d’au moins deux années complètes à temps plein;
- Être membre en règle ou être éligible à devenir membre en règle de l’Ordre professionnel de sa province au moment de la première inscription;
- Avoir une connaissance active du français, à l’oral, et avoir une connaissance suffisante de l’anglais pour consulter la documentation scientifique dans cette langue;
- Soumettre une proposition de mémoire de maîtrise, au maximum deux pages, jugée satisfaisante et qui spécifie : le domaine de recherche d’intérêt, la problématique qui intéresse le candidat, la question de recherche, la méthodologie proposée et le nom du professeur qui accepte de diriger le mémoire proposé. Le candidat pourra développer cette proposition de mémoire avec son directeur potentiel.

Consortium national de formation en santé (CNFS)

Le gouvernement du Canada, par l’entremise de Santé Canada, appuie financièrement depuis le printemps 1999 le Consortium national de formation en santé (CNFS). Le CNFS est un consortium d’universités et d’établissements de santé répartis dans l’ensemble du Canada qui vise à faciliter l’accès à des études en sciences de la santé à des étudiants provenant de milieux francophones en contexte minoritaire. Le CNFS a permis l’ajout de places supplémentaires au programme d’ergothérapie pour des francophones de l’extérieur du Québec et de l’Ontario. Il est prévu que les étudiants qui sont accueillis dans le cadre du CNFS fassent la majorité de leurs stages cliniques dans leur province d’origine.

Program Requirements

Le programme propose deux cheminement : le cheminement régulier et le cheminement court. Le programme régulier (A) peut être suivi en faisant uniquement des cours et des stages ou en faisant des cours, des stages et un mémoire. Dans les deux cas, les exigences en matière de stages sont les mêmes. Le cheminement court (B) est offert aux étudiants déjà détenteurs d’un baccalauréat en ergothérapie qui répondent aux conditions spécifiques décrites dans la section « Admission ». Le cheminement court est décrit plus loin.

A. Cheminement régulier (60 crédits)

1. Cheminement avec cours (60cr.) :

55,5 crédits de cours obligatoires

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<td>ERG5521 OCCUPATION HUMAINE</td>
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<td>ERG5523 L’ENVIRONNEMENT PHYSIQUE, SOCIAL, CULTUREL ET INSTITUTIONNEL</td>
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<tr>
<td>ERG5524 SPIRITUALITÉ ET QUESTIONS DE SENS COMME DÉTERMINANTS DE LA SANTÉ</td>
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<td>ERG5712 PRATIQUES PROFESSIONNELLES EN ERGOTHÉRAPIE I</td>
<td>3cr.</td>
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<td>ERG5721 DIMENSIONS DE LA PERSONNE</td>
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<td>ERG5722 PERSPECTIVES THÉORIQUES ET MODÈLES EN ERGOTHÉRAPIE</td>
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<td>ERG5731 ATTEINTES À LA SANTÉ PHYSIQUE DES PERSONNES</td>
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<tr>
<td>ERG5752 MÉTHODOLOGIE DE LA RECHERCHE ET ANALYSE DES DONNÉES DE RECHERCHE EN RÉADAPTATION I</td>
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<tr>
<td>ERG5753 MÉTHODOLOGIE DE LA RECHERCHE ET ANALYSE DES DONNÉES DE RECHERCHE EN RÉADAPTATION II</td>
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<tr>
<td>ERG5901 FORMATION CLINIQUE EN ERGOTHÉRAPIE I</td>
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<td>ERG5902 FORMATION CLINIQUE EN ERGOTHÉRAPIE II</td>
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<tr>
<td>ERG6715 PRATIQUES PROFESSIONNELLES EN ERGOTHÉRAPIE II</td>
<td>3cr.</td>
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<td>ERG6741 INTERVENTION DE L’ERGOTHÉRAPEUTE AUPRÈS DES ENFANTS</td>
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<td>ERG6743 INTERVENTION DE L’ERGOTHÉRAPEUTE AUPRÈS DES ADULTES (SANTÉ MENTALE)</td>
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<td>ERG6744 INTERVENTION DE L’ERGOTHÉRAPEUTE AUPRÈS DES PERSONNES AGÉES</td>
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<td>ERG6754 ANALYSE DES FAITS SCIENTIFIQUES POUR LA PRATIQUE ERGOTHÉRAPIQUE</td>
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<td>ERG6755 SÉMINAIRE DE RECHERCHE</td>
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<td>ERG6761 SÉMINAIRE D’INTÉGRATION DES ACQUIS EN ERGOTHÉRAPIE</td>
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<td>ERG6903 FORMATION CLINIQUE EN ERGOTHÉRAPIE III</td>
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<td>ERG6904 FORMATION CLINIQUE EN ERGOTHÉRAPIE IV</td>
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<td>ERG6905 FORMATION CLINIQUE EN ERGOTHÉRAPIE V</td>
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Les stages cliniques sont de 1000 heures réparties sur cinq stages (ERG5901, ERG5902, ERG6903, ERG6904 et ERG6905).

4.5 crédits de cours optionnels (3 cours de 1.5 crédits)
ERG5533 SANTÉ ET HANDICAP – PERSONNES, COMMUNAUTÉS ET POPULATIONS (1.5cr.)
ERG6548 INTERVENTION PARTICULIÈRE EN ERGOTHÉRAPIE (1.5cr.)
ERG6549 THÈMES CHOISIS EN ERGOTHÉRAPIE (1.5cr.)
ERG6550 PERSPECTIVE PARTICULIÈRE EN ERGOTHÉRAPIE (1.5cr.)
REA6547 SANTÉ ET RÉADAPTATION AU TRAVAIL (1.5cr.)

2. Cheminement avec cours et mémoire (60cr.)

58.5 crédits de cours obligatoires
(liste ci-haut mais remplacer ERG 6755 (3cr.) par ERG 6999 (6cr.))

.5 crédit de cours optionnel
(liste ci-haut)

Les stages cliniques sont de 1000 heures réparties sur cinq stages (ERG5901, ERG5902, ERG6903, ERG6904 et ERG6905).

Le cheminement choisi devra être approuvé par la direction du programme.

Pour participer aux stages, il faut présenter certains documents, conformément aux exigences des agences, des milieux cliniques et du Ministère de la Santé de l'Ontario, visant à protéger les clients ainsi que les étudiants.

Les documents à soumettre à la personne responsable des immunisations à la Faculté des sciences de la santé sont les suivants :

- Immunisations : Une fois rempli par un médecin ou une infirmière, l'étudiant doit retourner le formulaire "dossier d'immunisation" au plus tard à la date indiquée dans l'inscription de l'année.
- Vérification du dossier de police secteur sensible / population vulnérable : l'étudiant doit soumettre une preuve aux dates prévues, la première date étant à l'autonne de la 1ère année.
- Ajustement du masque N95 : Des séances sont offertes à l'automne de la 1ère année au pavillon des sciences de la santé. L'étudiant recevra une attestation qu'il devra soumettre.
- Les formulaires et le guide de procédures concernant les immunisations et les autres exigences pré-stages sont disponibles sur le site de la Faculté des sciences de la santé : www.sante.ottawa.ca, sous exigences d'inscription aux cours cliniques et aux stages.
- S'il n'a pas accès à internet, l'étudiant peut obtenir une version papier de ces documents en téléphonant au (613) 562-5404.

Exigences minimales et échechs pour le cheminement régulier

Une moyenne globale non cumulative calculée pour chacune des sessions devra être maintenue à un minimum de B. La note de passage dans chaque cours individuel est de C+. Tout cours obligatoire échoué doit être repris. L'étudiant qui a subi deux échecs (l'équivalent de six crédits) doit se retirer du programme. Du point de vue de ce règlement, les stages sont considérés équivalents à trois crédits chacun. Les stages sont notés S (satisfaisant) ou NS (non satisfaisant). Tout stage pour lequel la note NS a été obtenue doit être répété. Dans l'éventualité d'un deuxième échec au même stage ou à deux stages différents, l'étudiant doit se retirer du programme.

Durée du cheminement régulier

On s'attend à ce que toutes les exigences soient remplies en deux années d'études à temps plein. Le délai maximum permis est de quatre ans à partir de la date initiale d'inscription au programme.

B. Cheminement court (30 crédits)

24 crédits de cours obligatoires
ERG5521 OCCUPATION HUMAINE (3cr.)
ERG5722 PERSPECTIVES THÉORIQUES ET MODÈLES EN ERGOTHÉRAPIE (3cr.)
ERG5752 MÉTHODOLOGIE DE LA RECHERCHE ET ANALYSE DES DONNÉES DE RECHERCHE EN RÉADAPTATION I (3cr.)
ERG5753 MÉTHODOLOGIE DE LA RECHERCHE ET ANALYSE DES DONNÉES DE RECHERCHE EN RÉADAPTATION II (3cr.)
ERG6754 ANALYSE DES FAITS SCIENTIFIQUES POUR LA PRATIQUE ERGOTHÉRAPIQUE (3cr.)
ERG5998 LECTURES DIRIGÉES ET PROJET DE MÉMOIRE (3cr.)
ERG6999 MEMOIRE DE RÉCHERCHE (6cr.)

6 crédits de cours optionnels parmi les cours optionnels offerts au programme de Maîtrise en ergothérapie ou par d'autres programmes d'études supérieures à l'Université d'Ottawa, cours pertinents à l'ergothérapie et/ou à leur projet de recherche pour le mémoire. Ces cours doivent être approuvés au préalable par le directeur de mémoire et la directrice du programme.

Durée du cheminement court

Le cheminement court se fait soit sur une année scolaire (trois sessions à temps plein) ou sur trois années à temps partiel. La durée maximum
permise est de trois ans pour les études à temps plein ou quatre ans pour les études à temps partiel.

**Résidence pour le cheminement court**

L'étudiant admis à temps plein doit s'inscrire pour trois sessions à temps plein.

**Normes minimales pour le cheminement court**

Une moyenne globale non cumulative calculée pour chacune des sessions devra être maintenue à un minimum de B. La note de passage dans chaque cours individuel est de C+. Tout cours obligatoire échoué doit être repris. L'étudiant qui a subi deux échecs (l'équivalent de six crédits) doit se retirer du programme.

**Courses**

**ERG5511 INTRODUCTION À L’ERGOTHÉRAPIE (1.5cr.)**
Introduction aux concepts, aux valeurs, aux bases philosophiques et historiques de la profession de même qu'aux rôles et fonctions de l'ergothérapeute. Initiation au processus de l'activité humaine comme outil d'intervention.

**ERG5521 OCCUPATION HUMAINE (3cr.)**

**ERG5523 L’ENVIRONNEMENT PHYSIQUE, SOCIAL, CULTUREL ET INSTITUTIONNEL (1.5cr.)**
Étude théorique et pratique des multiples environnements qui exercent une influence sur, et qui sont influencés par, l'activité humaine. Concomitant: ERG 5511.

**ERG5524 SPIRITUALITÉ ET QUESTIONS DE SENS COMME DÉTERMINANTS DE LA SANTÉ (1.5cr.)**
Intégration des concepts de base de l’ergothérapie dans une perspective spirituelle de l'être humain déterminé par le sens qu’il donne à sa vie. Préalable : ERG5521.

**ERG5533 SANTÉ ET HANDICAP – PERSONNES, COMMUNAUTÉS ET POPULATIONS (1.5cr.)**
Intégration de la perspectiviste des atteintes à la santé par l'étude des déterminants de la santé et du handicap pour les personnes, les communautés et les populations ainsi que des mécanismes politiques et sociaux qui exercent une influence sur une prestation équitable des soins de santé. Préalable : ERG6743 ou ERG6744.

**ERG5712 PRATIQUES PROFESSIONNELLES EN ERGOTHÉRAPIE I (3cr.)**
Étude théorique et pratique des différents aspects de la relation d'aide en réadaptation, soit les principes de communication interpersonnelle, les aspects déontologiques et éthiques, les principes organisationnels et les mises en application. Concomitant: ERG5901.

**ERG5714 PRINCIPES D’ÉVALUATION ET DE TRAITEMENT EN ERGOTHÉRAPIE (3cr.)**

**ERG5721 DIMENSIONS DE LA PERSONNE (3cr.)**
Étude du développement de l'être humain de la naissance à la mort, dans ses dimensions physiques, cognitives, perceptuelles, affectives, ainsi que de l'importance relative de chacune de ces dimensions pour l'activité humaine. Concomitant: ERG 5511.

**ERG5722 PERSPECTIVES THÉORIQUES ET MODÈLES EN ERGOTHÉRAPIE (3cr.)**
Introduction aux cadres de référence, aux modèles théoriques et aux modèles de pratique en ergothérapie. Préalable: ERG 5712.

**ERG5731 ATTEINTES À LA SANTÉ PHYSIQUE DES PERSONNES (3cr.)**
Analyse des processus pathogènes qui portent atteinte à la santé physique ainsi que des problèmes fonctionnels connexes.

**ERG5732 ATTEINTES À LA SANTÉ MENTALE DES PERSONNES (3cr.)**
Analyse des processus pathogènes qui portent atteinte à la santé mentale ainsi que des problèmes fonctionnels connexes.

**ERG5752 MÉTHODOLOGIE DE LA RECHERCHE ET ANALYSE DES DONNÉES DE RECHERCHE EN RÉADAPTATION I (3cr.)**
Initiation aux différentes méthodes qui permettent de répondre à des questions pertinentes à la pratique et relatives à la fréquence, l’incidence, l’étiologie, le pronostic, l’efficacité, l’efficacité, la corrélation coût-efficacité dans le domaine de la réadaptation. Étude des processus suivants : définition d’une question de recherche, sélection d’une méthodologie appropriée, collecte de données, méthodes d’analyse de données. Un accent particulier sera mis sur la critique et la synthèse des écrits scientifiques qui sous-tendent les meilleures pratiques.

**ERG5753 MÉTHODOLOGIE DE LA RECHERCHE ET ANALYSE DES DONNÉES DE RECHERCHE EN RÉADAPTATION II (3cr.)**
Application des méthodes de recherche permettant de répondre à des questions pertinentes à la pratique et relatives à l’expérience individuelle de la maladie, du handicap, ou relative à d'autres facteurs ayant un impact sur le rendement occupacional, la culture des organisations, l’évolution
des théories et le développement à base communautaire. Mise en œuvre des processus suivants : définition d’une question de recherche, sélection d’une méthodologie appropriée, collecte de données, méthodes d’analyse de données. Un accent particulier sera mis sur la critique et la synthèse des écrits scientifiques qui sous-tendent les meilleures pratiques.

ERG5901 FORMATION CLINIQUE EN ERGOTHÉRAPIE I

ERG5902 FORMATION CLINIQUE EN ERGOTHÉRAPIE II

ERG6548 INTERVENTION PARTICULIÈRE EN ERGOTHÉRAPIE (1.5cr.)
Étude d’une intervention particulière, spécialisée et d’actualité relativement à la pratique en ergothérapie. Préalable : ERG6743 ou ERG6744.

ERG6549 THÈMES CHOISIS EN ERGOTHÉRAPIE (1.5cr.)
Étude d’un thème contemporain relatif à la pratique de l’ergothérapie. Préalable : ERG6743 ou ERG6744.

ERG6550 PERSPECTIVE PARTICULIÈRE EN ERGOTHÉRAPIE (1.5cr.)
Approfondissement d’une perspective particulière relativement à la pratique de l’ergothérapie. Préalable : ERG6743 ou ERG6744.

ERG6715 PRATIQUES PROFESSIONNELLES EN ERGOTHÉRAPIE II (3cr.)

ERG6741 INTERVENTION DE L’ERGOTHÉAPEUTE AUPRÈS DES ENFANTS (3cr.)

ERG6742 INTERVENTION DE L’ERGOTHÉAPEUTE AUPRÈS DES ADULTES (SANTÉ PHYSIQUE) (3cr.)

ERG6743 INTERVENTION DE L’ERGOTHÉAPEUTE AUPRÈS DES ADULTES (SANTÉ MENTALE) (3cr.)

ERG6744 INTERVENTION DE L’ERGOTHÉAPEUTE AUPRÈS DES PERSONNES AGÉES (3cr.)

ERG6754 ANALYSE DES FAITS SCIENTIFIQUES POUR LA PRATIQUE ERGOTHÉRAPIQUE (3cr.)

ERG6755 SÉMINAIRE DE RECHERCHE (3cr.)
Sous la direction d’un professeur en ergothérapie, synthèse et analyse des écrits sur un thème particulier pour la constitution d’une équipe de recherche et la mise en œuvre d’un projet relevant des principes élémentaires de recherche et de rédaction scientifique. Le projet de recherche, fait en équipe, peut prendre la forme d’une revue systématique des écrits, d’une méta-analyse, de la préparation d’une demande de fonds de recherche ou d’un projet pilote. Préalable: ERG 5752, ERG 5753.

ERG6761 SÉMINAIRE D’INTÉGRATION DES ACQUIS EN ERGOTHÉRAPIE (3cr.)
Synthèse et intégration des connaissances et des données théoriques et pratiques de la recherche en ergothérapie. Préalables : ERG6744 et ERG6904.

ERG6903 FORMATION CLINIQUE EN ERGOTHÉRAPIE III I

ERG6904 FORMATION CLINIQUE EN ERGOTHÉRAPIE IV

ERG6905 FORMATION CLINIQUE EN ERGOTHÉRAPIE V

ERG6998 LECTURES DIRIGÉES ET PROJET DE MÉMOIRE (3cr.)
Examen approfondi d’une problématique ou d’un courant théorique en ergothérapie en lien avec le domaine de recherche du mémoire sous la supervision du directeur de mémoire. Noté S (satisfaisant) ou NS (non satisfaisant)
ERG6999 MÉMOIRE DE RECHERCHE (6cr.)
Sous la direction d’un membre du corps professoral, mise en œuvre d’un projet de recherche relevant des principes élémentaires de recherche déjà acquis et rédaction du mémoire en présentant les résultats. L’étudiant doit faire approuver le choix de son directeur ainsi que de son sujet de mémoire par le comité des études supérieures avant de s’inscrire à la troisième session d’études (avril). Le mémoire, d’une cinquantaine de pages, consiste en l’approfondissement d’une question théorique ou appliquée reliée à l’ergothérapie à l’aide d’une méthodologie stricte. Noté S/NS. Exclusion : ERG 6755. Préalable: ERG 5752, ERG 5753.

REA5940 CONVERSATION ANGLAISE POUR LES STAGES EN RÉADAPTATION/ENGLISH CONVERSATION FOR CLINICAL PLACEMENTS IN REHABILITATION
Cours visant la préparation des étudiants en réadaptation pour l’intervention ayant lieu en anglais : relation d’aide, entrevue initiale, consentement aux soins, évaluation, intervention, congé et rédaction de notes de dossier à l’aide de la méthode SOAP (Subjective, Objective, Assessment, Plan). La terminologie spécifique aux différents domaines de la réadaptation est abordée. Noté (S) satisfaisant ou (NS) non satisfaisant. Ce cours est réservé aux étudiants inscrits à l’un des programmes de maîtrise professionnels de l’École des sciences de la réadaptation. Il ne peut compter parmi les crédits requis pour le programme mais il pourra être imposé comme exigence additionnelle à l’admission. / Course aimed at preparing students to converse effectively with English-speaking colleagues and clients. Topics will include English terms and dialogue related to forming a therapeutic relationship, the initial interview, obtaining informed consent, assessment, intervention, discharge and the charting of notes using the SOAP (Subjective, Objective, Assessment, Plan) method. Specific rehabilitation terminology will be presented. Graded (S) satisfactory or (NS) non satisfactory. This course is reserved for students registered in one of the professional master’s programs within the School of Rehabilitation Sciences. Cannot be counted towards the credits required for the student’s program but may be specified as an additional requirement at admission.

REA6547 SANTÉ ET RÉADAPTATION AU TRAVAIL (1.5cr.)

Pastoral Theology

By virtue of the federation of Saint Paul University with the University of Ottawa, the Faculty of Theology of Saint Paul University offers graduate programs leading to the degrees conferred jointly by the senates of both universities.

Other graduate theology programs within the sole jurisdiction of the Senate of Saint Paul University are also offered; their description and requirements can be found in the calendar of the Faculty of Theology.

The Faculty of Theology offers the following programs whose degrees are conferred jointly by the senates of the University of Ottawa and Saint Paul University:

- Graduate Diploma in Contemplative Theology and Spiritual Mentorship;
- Master of Arts in Theology;
- PhD in Theology;
- Master of Pastoral Theology;
- Doctor of Ministry;
- Master in Religious Education.

Master of Pastoral Theology

The Master of Pastoral Theology (MPTh) offers theological knowledge and professional pastoral education to students planning to engage in ministry after an undergraduate degree in theology. Its scope is to prepare the "general practitioner" for ministry.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.

Programs

Master of Pastoral Theology

Admission

To be admitted to the MA program, the candidate must:

- The candidate must hold an honour’s bachelor’s degree in theology (BTh) or an honours bachelor’s degree in another area with 60 credits of theology, with a minimum 70 per cent average (B).
The candidate must provide three letters of reference, using forms supplied by the University. One of the letters must be written by a person from an academic milieu. An interview is normally required.

Program Requirements

Master of Pastoral Theology

The MPTH is a 30-credit program composed of the following elements:

Six academic courses (18 credits):
- Three foundational courses (9 credits):
  THO5301 PASTORAL THEOLOGY (3cr.)
  IPA5321 PASTORAL MINISTRY AND PSYCHOLOGY (3cr.)
  IPA5322 PASTORAL MINISTRY AND SOCIOLOGY (3cr.)
- Two courses (6 credits) to be chosen from:
  THO5302 CATECHETICAL PASTORAL THEOLOGY (3cr.)
  THO5303 LITURGICAL PASTORAL THEOLOGY (3cr.)
  DCA5310 CHURCH LAW AND PASTORAL MINISTRY (3cr.)
  THO5304 CHRISTIAN COMMUNITY IN ITS SOCIAL DIMENSION (3cr.)
  THO5305 CHRISTIAN COMMUNITY AND ITS DEVELOPMENT (3cr.)
- One elective (3 credits) to be chosen from:
  - The previous list
  - THO5307 STUDIES IN PASTORAL PRACTICE I (3cr.) or THO5308 STUDIES IN PASTORAL PRACTICE II (3cr.)
  - Any other course which, in the judgment of the Faculty, fulfills the objectives of the program.

Students may propose any course which they consider relevant to their particular future ministry. Given the present context of the Church, the following areas are particularly suggested: spiritual direction, basic counselling skills, ecumenical ministry, mission and new evangelization.

Two practicums (12 credits):
IPA5481 PROFESSIONAL MINISTRY PRACTICUM I (6cr.)
IPA5482 PROFESSIONAL MINISTRY PRACTICUM II (6cr.)

Duration of program

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

Master of Pastoral Theology

DCA5310 CHURCH LAW AND PASTORAL MINISTRY (3cr.)
Theological reflection on and practical application of Canon Law to some areas of pastoral ministry, specifically marriage and reconciliation.

IPA5321 PASTORAL MINISTRY AND PSYCHOLOGY (3cr.)
Interaction between theology and psychology with reference to pastoral ministry, the experience of the believer, the development of faith and of religious attitudes. The pastoral implications of psychological theories of the individual and his/her social relations: impact on cognitive processes, emotion, behaviour, competence, values. Psychological perspectives on the pastoral minister's practice, role and identity.

IPA5322 PASTORAL MINISTRY AND SOCIOLOGY (3cr.)
Interaction between theology and sociology with reference to pastoral ministry. A study of the pastoral implications of socio-historical structures, and of social and cultural change. Analysis of how the social milieu forms the way people think, feel and act, and the reflection on the importance of this formation for values and beliefs. Sociological perspectives on Christian communities' practice, role and identity.
THOS301 PASTORAL THEOLOGY (3cr.)

THOS302 CATECHETICAL PASTORAL THEOLOGY (3cr.)
Theological reflection on the practice and principles of catechesis. The development and growth of faith in current pastoral contexts. Methodologies, learning styles, growth processes and approaches tailored in view of various groups and settings.

THOS303 LITURGICAL PASTORAL THEOLOGY (3cr.)
Theological reflection on the liturgical experience and expression of Christian communities. Principles, dynamics, and actualization of liturgical celebration, including sacraments, paraliuturgies and prayer services. Roles and ministries in liturgical celebrations.

THOS304 CHRISTIAN COMMUNITY IN ITS SOCIAL DIMENSION (3cr.)
The Christian community as a social reality embodying beliefs and values. Its relationship to and responsibility toward contemporary society and church: local, national, international. Present social questions and the Christian social tradition.

THOS305 CHRISTIAN COMMUNITY AND ITS DEVELOPMENT (3cr.)

THOS307 STUDIES IN PASTORAL PRACTICE I (3cr.)
Study of a specific topic or issue in pastoral theology.

THOS308 STUDIES IN PASTORAL PRACTICE II (3cr.)
Study of a specific topic or issue in pastoral theology.

Stage / Practicum

The main objective of the practicum is to foster a ministerial identity that is informed by the study of theology, practical theological reflection and the acceptance and praxis of ministerial responsibility in a setting where well-defined professional objectives can be achieved and evaluated.

IPA5481 PROFESSIONAL MINISTRY PRACTICUM I (6cr.)
Supervised ministry in a local church or other ministerial setting. Emphasis on the receptive skills and attitudes of the pastoral minister. Theological, sociological, and psychological theories are introduced which will enable the pastoral agent to observe, analyze, and integrate events within the religious community. Cognitive, behavioural, motivational, and emotional components are related to people's individual, social, and interpersonal life. Professional ethical issues are addressed. Codes of ethics in allied professions are used when appropriate. Supervision occurs in small groups under the guidance of a supervisor from the Saint Paul University.

IPA5482 PROFESSIONAL MINISTRY PRACTICUM II (6cr.)
In collaboration with a supervisor the student actively addresses a segment of his ministry drawn from Practicum I (e.g., relationships, or the community, or individuals). Action plans are formulated and carried out. Implications for religious structure, liturgy, homiletics, sacraments are developed and implemented. Emphasis is placed on critical, informed involvement, resource and time management in the exercise of collegial and co-responsible lay and ordained leadership in preaching, liturgical presiding, and community facilitation. Supervision occurs in small groups under the guidance of a supervisor from the Saint Paul University. Prerequisite: IPA 5481.

La supervision du programme se fait par rétroaction des autres étudiants, de comptes rendus, échantillonnage de travaux, enregistrements sonores, échanges et autres rapports.

Eighteen hours (including a minimum of ten hours on site) of preparation and work each week, over one semester. Program supervision takes place by way of feedback from other students, debriefing, work samples, tape recordings and verbatim or other reports.

Pathology and Experimental Medicine (Collaborative)

The Faculty of Medicine offers graduate programs leading to master's (MSc) and doctoral (PhD) degrees in several disciplines. The objective of the Pathology and Experimental Medicine collaborative program is to provide graduate students with the knowledge and skills to examine the basic mechanisms of disease pathology, and to develop new strategies for prevention and treatment. The degree awarded specifies the primary program and indicates “specialization: Pathology and Experimental Medicine.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Participating programs

The following primary programs participate in the collaborative program in Pathology and Experimental Medicine:
The MSc and the PhD in Cellular and Molecular Medicine of the Department of Cellular and Molecular Medicine.
- The MSc and the PhD in Biochemistry of the Department of Biochemistry, Microbiology and Immunology.
- The MSc and the PhD in Microbiology and Immunology of the Department of Biochemistry, Microbiology and Immunology.
- The MSc and the PhD in Neuroscience of the Department of Cellular and Molecular Medicine.

Programs

Master of Science Biochemistry Specialization in Pathology and Experimental Medicine
Master of Science Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine
Master of Science Microbiology and Immunology Specialization in Pathology and Experimental Medicine
Master of Science Neuroscience Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Biochemistry Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Microbiology and Immunology Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Neuroscience Specialization in Pathology and Experimental Medicine

Admission

Admission to the collaborative program in Pathology and Experimental Medicine is governed by the general regulations of the FGPS. Candidates must indicate in their application for admission form that they wish to be accepted in the collaborative program.

To be accepted into the collaborative program students must:
- Be admitted to one of the programs participating in the collaborative program.
- Provide at least one letter of recommendation from a professor who is willing and available to act as thesis supervisor.
- Be sponsored into the collaborative program by a faculty member, normally the thesis supervisor, who must be a member of the Pathology and Experimental Medicine program.

Program Requirements

The requirements to be met by students in the collaborative program at the master’s level are as follows:
- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course (PME5367).
- Successful completion of the compulsory seminar in the student’s primary program.
- Presentation and defence of a thesis on a topic in pathology and experimental medicine based on original research carried out under the supervision of a professor who is a member of the Pathology and Experimental Medicine collaborative program. At least one of the thesis examiners must be a member of the Pathology and Experimental Medicine collaborative program.

Transfer from master’s to PhD

The regulations for transfer from MSc to PhD without being required to write a master’s thesis are those in effect in the student’s primary program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Thesis Advisory Committee (TAC)

The composition of the Thesis Advisory Committee (TAC) and the frequency of committee meetings follow the regulations of the respective primary program. At least one member of the TAC, in addition to the thesis supervisor, must be part of the Pathology and Experimental Medicine collaborative program.
Courses

PME5367 SEMINAR
Presentation of one poster during the Research Day organized by the Pathology and Experimental Medicine collaborative program. Active participation in the annual Pathology Research Day of the Department of Pathology and Laboratory Medicine. Poster evaluated by Pathology and Experimental Medicine program faculty members. Graded S/NS.

PME8112 Cell Biology and the Molecular Basis of Pathological Phenotypes (3cr.)
Molecular principles of cell biology, with a focus on the mechanisms of disease. Disorders in cell biological processes that underlie many pathological phenotypes, such as intracellular transport, mitochondrial dynamics, cell biology of the nucleus and the regulation of the cytoskeleton. Emphasis on emerging experimental techniques, including functional assay design, fluorescence microscopy (multi-photon, confocal), assays like Fluorescence Resonance Energy Transfer (FRET), Fluorescence Lifetime Imaging Microscopy (FLIM), Fluorescence Recovery After Photobleaching (FRAP), photoactivation and uncaging and electron microscopy. Participants will have hands-on experience and will work to apply these techniques to their own research problems by rotation through participating laboratories. The experiments performed by the students during the course will be assembled into a manuscript-style paper for submission at the end of the term to be graded by the course co-ordinator. Enrolment is limited to 10 students and preference will be given to students whose projects are related directly to these concepts and techniques.

PME8367 SEMINAR
Presentation of one poster during the Research Day organized by the Pathology and Experimental Medicine collaborative program. Active participation in the annual Pathology Research Day of the Department of Pathology and Laboratory Medicine. Poster evaluated by Pathology and Experimental Medicine program faculty members. Graded S/NS.

Courses related to the collaborative program offered by each participating unit.

BCH8107 ADVANCED TOPICS IN STRUCTURE AND FUNCTION OF PLASMA LIPOPROTEINS (3cr.)
Recent advances in our knowledge of the plasma lipoproteins with a special emphasis on their role in the etiology of atherosclerosis. The subject will be introduced by an overview of the general structural properties of lipoproteins which will be followed by detailed discussion of the structure, metabolism and genetics of the apolipoproteins, the proteins and enzymes that modify lipoproteins and cell surface lipoprotein receptors. Other topics will include cholesterol homeostasis, plasma cholesterol transport and disorders of lipoprotein metabolism.

CMM5001 THE PATHOLOGICAL BASIS OF DISEASE (3cr.)
Introductory Course for Non-Medical Graduate Students in the Life Sciences. This course will consist of a brief introduction to pathology describing the manifestation of disease at the macroscopic and microscopic level. This will be followed by (i) A description of various types of microscopy and methodology. (ii) Concepts in flow cytometry, tissue/cell fractionation, (iii) Histo-/cytochemistry and immunohisto-/cytochemistry. (iv) Normal cells and tissues. (v) Organs. (vi) The general pathology of cells and tissues including hypertrophy, aplasia, atrophy, hyperplasia, metaplasia, dysplasia, neoplasia, storage diseases, extracellular space pathologies, necrosis and apoptosis. Blood vessel and cardiac pathologies will be covered as well as concepts in neuropathology, organ/system specific pathologies and genetic diseases.

CMM5105 INTRODUCTION TO CANCER BIOLOGY (3cr.)
An introduction to the biology of cancer. Major topics in cancer biology include the following: tumor suppression/oncogenes; apoptosis in cancer; cell immortalization and senescence; genomic instability; multistep tumorigenesis/inflammation in cancer; biology of angiogenesis; rational therapies.

CMM5315 CELLULAR AND MOLECULAR BASIS OF CARDIOVASCULAR FUNCTION/DYSFUNCTION (3cr.)
Mechanism of failing heart and cardiovascular system, its associated functions and associated conditions. Therapies for restoring function. Topics include: regulation of heart development, cell signaling, cellular and molecular mechanisms of atherosclerosis and heart disease, hormonal regulation, hypertension, bioenergetics, cardiovascular genomics and genetics, cell therapy, and regenerative medicine.

CMM8105 ADVANCED TOPICS IN CANCER BIOLOGY (3cr.)
Advanced study of recent developments in the field of cancer biology with emphasis on cellular and molecular aspects. Specific topics to be covered include: angiogenesis, apoptosis, cancer genetics, cell signaling, genetic instability, oncogenes and tumour suppressors.

NSC8101 ADVANCED TOPICS IN NEUROPATHOLOGY (3cr.)
General histopathological responses of central and peripheral nervous tissue to pathological stimuli including hypoxic-ischemic, traumatic, inflammatory/infectious, demyelinating and toxic. Emerging topics in neurology and neuropathology including the following: the pathology and pathogenesis of protein-based neurodegenerative disorders, the emerging family of RNA-mediated neurological disorders, mendelian and non-mendelian genetic diseases of the nervous system (including the role of microRNA in neurological disease), advances in diseases of skeletal muscle, advances in the molecular pathogenesis of Central Nervous System tumours, and advances in metabolic/mitochondrial/storage diseases.

Philosophy
The Department of Philosophy offers MA (with or without thesis) and PhD programs in Philosophy. The programs are offered in English and French. According to the University’s policy, students may pursue their studies in the official language of their choice.

The Department participates in the collaborative programs in Women’s Studies (at the MA level), in Medieval and Renaissance Studies (at the MA level) and in Canadian Studies (at the PhD level). For more information on these programs, see “Admission.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Philosophy
Master of Arts Philosophy Specialization in Medieval and Renaissance Studies
Master of Arts Philosophy Specialization in Women’s Studies
Doctorate in Philosophy Philosophy
Doctorate in Philosophy Philosophy Specialization in Canadian Studies

Admission

To be admitted to the MA program a candidate must have an honours BA in Philosophy (or the equivalent) with a minimum "B" average. The Department reserves the right to impose a preliminary examination.

Candidates lacking the necessary background may be admitted to a qualifying program.

An application dossier must include official transcripts and two letters of recommendation. For the master's with thesis, the dossier must also include a description of the intended field of research, and a sample of written work in philosophy (15-25 pp.).

Collaborative programs

The Department of Philosophy is a participating unit in the collaborative programs in Women's Studies (master's level only) and in Medieval and Renaissance Studies (master's level only).

- The collaborative program Women's Studies has been established for students wishing to enrich their training in philosophy by including an interdisciplinary component in Women’s studies. The specific requirements of the collaborative program include two core courses and a thesis on a topic related to Women's studies. Only one of the core “FEM” courses will be counted towards the requirements of the master's in philosophy.

- The collaborative program in Medieval and Renaissance Studies has been established for students wishing to enrich their training in Philosophy by including an interdisciplinary component in Medieval and Renaissance Studies. The specific requirements of the collaborative program include two core courses in medieval studies and a thesis on a topic related to Medieval and Renaissance Studies.

Students should indicate in their initial application for admission to the master's program in Philosophy that they wish to be accepted into one of the collaborative programs. For the collaborative program in Women’s Studies, requests submitted following admission will be considered on an exceptional basis. For further details, see the description of these programs posted on the FGPS website.

Language requirements

Proficiency in both French and English is strongly encouraged so that students may take advantage of the full range of activities - lectures, personal contacts, and courses - available in the Department (graduate courses are normally not duplicated in the two languages).

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Program Requirements

MA in Philosophy

The MA may be obtained by fulfilling the requirements of either of the following options:

- The MA program with thesis, consisting of 4 (one-session) courses, an approved thesis project, and a thesis, including defence.
- The MA program without thesis, consisting of 8 (one-session) courses. In exceptional cases, students may take one course in another
An accelerated route leading from the MA program into the PhD program is available (see PhD Program).

MA candidates must also complete a proficiency requirement in the second official language. This requirement can be completed in one of three ways:

- Passing (50%) the FLS 1000 exam; OR
- Completing 6 credits of FLS courses at your level (as determined by the Official Languages and Bilingualism Institute); OR
- Successfully completing a Philosophy graduate seminar given in French. (N.B. As per University regulations, students may write examinations and papers in the official language of their choice.)

**Collaborative program in Women’s Studies**

Students admitted to the Collaborative program in women's studies at the master's level must meet the requirements for a master's degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women’s Studies requirements are:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5303 FEMINIST METHODOLOGIES (3cr.)
  - Students must complete the two compulsory courses before their first registration for the major research paper or thesis.
- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student's primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.
- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.
- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women’s studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women's Studies Graduate Committee.
- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women's Studies Graduate Committee.

**Collaborative program in Medieval and Renaissance Studies**

Students in the program must complete the requirements of their primary program and those of the collaborative program. One of the two 3-credit courses in Medieval and Renaissance Studies (MDV5100 or MDV5500) will be counted towards the requirements of the primary program. Consequently, students in the specialization will have only one extra course to take.

The requirements of the collaborative program are as follows:

Two compulsory courses:

MDV5100 Medieval and Renaissance Studies Research Methods and Tools (3cr.)

OR

MDV5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3cr.)

AND

MDV5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3cr.)

Students must complete the two compulsory courses before they register to the major research paper or thesis.

A thesis or major research paper on a topic related to Medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.

In both cases, the title of the degree will indicate the discipline of the participating unit with the specification "specialization in Medieval and Renaissance Studies."

**Duration of program**

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

**Residence**

The residence requirement for students admitted on a full-time basis is three sessions. It is possible to prepare for the MA degree entirely on a part-time basis. A part-time student can take no more than two courses per session.
Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

NOTE: Courses are listed in English, unless they are taught bilingually (French/English) or exclusively in French. Some of the courses listed in English have a French-language counterpart. To see when this is so, see the list in the French-language version of this web page by clicking on the “Français” link located in the top right corner of this page.

For a detailed description of the seminars available in any year, please consult the department webpage. Information is normally available early in the winter for the next academic year.

PHI5331 ANCIENT PHILOSOPHY I (3cr.)

PHI5332 MEDIEVAL PHILOSOPHY I (3cr.)

PHI5333 MODERN PHILOSOPHY I (3cr.)

PHI5334 ANGLO AMERICAN PHILOSOPHY I (3cr.)

PHI5335 FRENCH PHILOSOPHY I (3cr.)

PHI5336 GERMAN PHILOSOPHY I (3cr.)

PHI5341 LOGIC AND PHILOSOPHY OF SCIENCE I (3cr.)

PHI5342 EPISTEMOLOGY I (3cr.)

PHI5343 METAPHYSICS I (3cr.)

PHI5344 PHILOSOPHICAL ANTHROPOLOGY I (3cr.)

PHI5345 ETHICS I (3cr.)

PHI5346 SOCIAL AND POLITICAL PHILOSOPHY I (3cr.)

PHI5347 PHILOSOPHY OF RELIGION I (3cr.)

PHI5348 PHILOSOPHY OF HISTORY I (3cr.)

PHI5349 ANCIENT PHILOSOPHY II (3cr.)

PHI5350 ANCIENT PHILOSOPHY III (3cr.)
PHI5351 MEDIEVAL PHILOSOPHY II (3cr.)

PHI5352 MEDIEVAL PHILOSOPHY III (3cr.)

PHI5353 MODERN PHILOSOPHY II (3cr.)

PHI5354 MODERN PHILOSOPHY III (3cr.)

PHI5355 ANGLO AMERICAN PHILOSOPHY II (3cr.)

PHI5356 ANGLO AMERICAN PHILOSOPHY III (3cr.)

PHI5357 FRENCH PHILOSOPHY II (3cr.)

PHI5358 FRENCH PHILOSOPHY III (3cr.)

PHI5359 GERMAN PHILOSOPHY II (3cr.)

PHI5360 GERMAN PHILOSOPHY III (3cr.)

PHI5361 LOGIC AND PHILOSOPHY OF SCIENCE II (3cr.)

PHI5362 LOGIC AND PHILOSOPHY OF SCIENCE III (3cr.)

PHI5363 EPISTEMOLOGY II (3cr.)

PHI5364 EPISTEMOLOGY III (3cr.)

PHI5365 METAPHYSICS II (3cr.)

PHI5366 METAPHYSICS III (3cr.)

PHI5367 PHILOSOPHICAL ANTHROPOLOGY II (3cr.)

PHI5368 PHILOSOPHICAL ANTHROPOLOGY III (3cr.)

PHI5369 ETHICS II (3cr.)

PHI5370 ETHICS III (3cr.)

PHI5371 SOCIAL AND POLITICAL PHILOSOPHY II (3cr.)

PHI5372 SOCIAL AND POLITICAL PHILOSOPHY III (3cr.)
PHI5373 PHILOSOPHY OF RELIGION II (3cr.)

PHI5374 PHILOSOPHY OF RELIGION III (3cr.)

PHI5375 PHILOSOPHY OF HISTORY II (3cr.)

PHI5376 PHILOSOPHY OF HISTORY III (3cr.)

PHI5377 AESTHETICS II (3cr.)

PHI5378 AESTHETICS III (3cr.)

PHI5319 AESTHETICS I (3cr.)

PHI6101 SELECTED PROBLEMS I (3cr.)

PHI6102 SELECTED PROBLEMS II (3cr.)

PHI6103 SELECTED PROBLEMS III (3cr.)

PHI6904 ÉTUDE DIRIGÉE/DIRECTED STUDY (3cr.)
Travail à préparer sous la direction d’un membre du corps professoral du département. Préalable : permission du comité des études supérieures. / Paper to be prepared under the direction of a professor in the department. Prerequisite: Permission of the Graduate Studies Committee.

PHI6999 RECHERCHE DIRIGÉE (M.A.) / DIRECTED RESEARCH (MA)

PHI7999 RECHERCHE ET THÈSE DE MAÎTRE / MA THESIS RESEARCH

PHI8995 MÉMOIRE DE RECHERCHE (Ph.D.) / MAJOR RESEARCH PAPER (PhD)

PHI8998 EXAMEN DE CANDIDATURE (Ph.D.) / CANDIDACY-EXAMINATION (PhD)

PHI8999 RECHERCHE DIRIGÉE (Ph.D.) / DIRECTED RESEARCH (PhD)

PHI9999 RECHERCHE ET THÈSE DE DOCTORAT / PhD THESIS RESEARCH

**Physics**

**Ottawa-Carleton Institute for Physics**

Established in 1983, the Ottawa-Carleton Institute for Physics (OCIP) combines the research strengths of the University of Ottawa and Carleton University. The Institute offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in Physics.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.
Members of the Institute are engaged in research in different fields of Physics: condensed matter; high energy and biological physics; medical physics; photonics. Additional information is posted in the departmental website.

Particularly for the medical physics program, research supervision may be provided by members of other institutions in the area such as hospitals, cancer clinics and government laboratories.

Most of the requirements of these programs must be fulfilled in English. Research activities may be conducted in English or in French, or in both languages, depending on the main language of the professor and of the members of the research group.

The programs are governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the website of the FGPS.

**Programs**

**Master of Science Physics**

**Master of Science Physics Specialization in Science, Society and Policy**

**Doctorate in Philosophy Physics**

**Admission**

Admission to the graduate program in Physics is governed by the general regulations of the Ottawa-Carleton Institute for Physics (OCIP) and by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

To be considered for admission, the applicant must meet the following criteria:

- Be the holder of a bachelor’s degree with a specialization, or a major in Physics (or equivalent) with a minimum average of 70% (B);
- Demonstrate a good academic performance as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills;
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work;
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area;
- Identify at least one professor who is willing and available to act as thesis supervisor.

Applicants to the Accelerated Stream of the MSc must meet the following additional requirements:

- Have an admission average of 8.0;
- Have a thesis supervisor who has agreed to continue to direct their research at the MSc level;
- Have identified the 4000 or 5000 level course completed with a grade of at least A- that is to count towards the MSc.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

**Transfer from master's to PhD**

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Achievement of an A- average in the last two years of undergraduate studies;
- Completion of at least two graduate courses (6 credits) with a grade of A- or better in each;
- Satisfactory progress in the research program;
- Written recommendation by the supervisor;
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met. Following the transfer, all of the requirements of the doctoral program must be met:

- A total number of 18 credits of graduate coursework (MSc+PhD);
- The comprehensive exam (PHY9998) to be completed within 12 months of the transfer;
- Participation in the departmental seminar series;
- A thesis.
Collaborative programs
The Ottawa-Carleton Institute for Physics is one of the participating units in the collaborative program in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of the program posted on the FGPS website.

Program Requirements

Master’s with thesis

The following requirements must be met:

- Successful completion of three graduate courses at the 5000 level or above in physics or in other related disciplines approved by the Department of Physics*;
- Participation in the Institute’s seminar series;
- Presentation and successful defense of a thesis (PHY7999) based on original research carried out under the direct supervision of a faculty member of the Department.

*For students accepted into the Accelerated Stream, the number of courses to be completed while registered in the MSc is reduced to two. In special circumstances, the thesis may not be required. In that case, the requirements of the MSc can be met by successfully completing 10 graduate courses at the 5000 level or above as well as a comprehensive examination. Participation in the Institute’s seminar series is also required. Note that students in the Accelerated Stream are not eligible for the coursework MSc.

Physics in modern technology option

- Successful completion of six graduate courses at the 5000 level or above in physics or in other related disciplines approved by the Department of Physics;
- Successful completion of the Physics in Modern Technology work term (PHY 5495);
- Participation in the Institute’s seminar series.

Note: Students in the physics in modern technology option are required to complete a work term rather than a research thesis. Although every effort is made to find a work term position for every student in the physics in modern technology option, no guarantee of employment can be made. To minimize the likelihood of a work term position not being found, acceptance in the option will be limited to reflect the availability of work term placements. In the event that a work term placement cannot be found, students may fulfill the master’s degree requirements with courses only as described in option A. Students in this option are normally expected to complete all their requirements in three consecutive terms.

Collaborative program in Science, Society and Policy

The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree.

- Satisfactory completion of the core course (ISP5101 or ISP5501, 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation of “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

Transfer from master’s to PhD

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis. For additional information, please consult the “Admission” section of the PhD program. Note that students in the Accelerated Stream of the MSc are not eligible for fast-track to the PhD.

Duration of the program

The requirements of the program are usually fulfilled within two years. Students in the accelerated stream are expected to complete all requirements within three sessions. The maximum time permitted is four years from the date of initial registration.

Residence

All students must complete a minimum of three sessions of full-time registration.

Minimum standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), or the comprehensive exam or whose research
progress is deemed unsatisfactory are required to withdraw from the program.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**Condensed Matter Physics**

**PHY5100 (PHYJ 5401) SOLID STATE PHYSICS I** (3cr.)

**PHY5110 (PHYJ 5402) SOLID STATE PHYSICS II** (3cr.)

**PHY5151 (PHYJ 5403) TYPE I & II SUPERCONDUCTORS** (3cr.)

**PHY5167 (PHYS5291) ADVANCED TOPICS IN MEDICAL PHYSICS** (3cr.)
Topics may include medical imaging physics, cancer therapy physics, medical biophysics, or radiation protection and health physics. Topics vary from year to year. Prerequisites: PHY 5161 (PHYS 5203) plus, as appropriate to the topic offered, at least one of PHY 5112 (PHYS 5204), PHY 5164 (PHYS 5206), PHY 5165 (PHYS 5207); or permission of the Department.

**PHY5320 (PHYJ 5508) INTRODUCTION TO THE PHYSICS OF MACROMOLECULES** (3cr.)
The chemistry of macromolecules and polymers; random walks and the static properties of polymers; experimental methods; the Rouse model and single chain dynamics; polymer melts and viscoelasticity; the Flory-Huggins theory; the reptation theory; computer simulation algorithms; biopolymers and copolymers.

**PHY5347 (PHYJ 5509) PHYSICS, CHEMISTRY AND CHARACTERIZATION OF MINERAL SYSTEMS** (3cr.)
The materials science of mineral systems such as the network and layered silicates. Indepth study of the relations between mineralogically relevant variables such as atomic structure, crystal chemistry, site populations, valence state populations, crystallization conditions, etc. Interpretation and basic understanding of key characterization tools such as microprobe analysis, Mössbauer spectroscopy, x-ray diffraction and optical spectroscopy.

**PHY5362 (PHYJ 5006) COMPUTATIONAL METHODS IN MATERIAL SCIENCES** (3cr.)
Introduction to modern computational techniques used in material science research. Classical molecular dynamics, classical and quantum Monte Carlo methods, plane-wave based electronic band structure calculations, Carr-Parrinello quantum molecular dynamics. Applications to condensed matter systems: basic simulation techniques, force-field based methods in the study of thermodynamic and physical properties of solids, first-principles quantum mechanical methods.

**PHY5380 (PHYJ 5407) SEMICONDUCTOR PHYSICS I** (3cr.)
Brillouin zones and band theory. E-k diagram, effective mass tensors, etc. Electrical properties of semiconductors.

**PHY5381 (PHYJ 5408) SEMICONDUCTOR PHYSICS II: OPTICAL PROPERTIES** (3cr.)

**PHY5384 (PHYJ 5308) PHYSICS OF FIBER OPTIC SYSTEMS** (3cr.)

**PHY5387 (PHYJ 5504) PHYSICS OF MATERIALS** (3cr.)
Microscopic characteristics related to the physical properties of materials. Materials families: metals and alloys, ceramics, polymers and plastics, composites, layered materials, ionic solids, molecular solids, etc. Specific materials groups. Equilibrium phase diagrams and their relation to microstructure and kinetics. Experimental methods of characterization. Interactions and reactions. *Prerequisite: PHY 4382 or equivalent. Cannot be combined for credit with PHY 4387.*

**PHY5922 (PHYJ 5507) ADVANCED MAGNETISM** (3cr.)
Study of some of the experimental and theoretical aspects of magnetic phenomena found in ferro-, ferri-, antiferro-magnetic and spin glass materials. Topics of current interest in magnetism. Prerequisite: PHY 4385 or equivalent.

**PHY5951 (PHYJ 5409) PHYSIQUE DE BASSE TEMPÉRATURES / LOW TEMPERATURE PHYSICS II (3cr.)**

**PHY6371 (PHYJ 5404) TOPICS IN MÖSSBAUER SPECTROSCOPY (3cr.)**
Experimental techniques used to measure Mössbauer spectra. Physics of the Mössbauer effect: recoilless emission/absorption, anisotropic Debye-Waller factors, second order Doppler shifts, etc. Mössbauer lineshape theory with static and dynamic hyperfine interactions. Distributions of static hyperfine parameters. Physics of the hyperfine parameters: origin of the hyperfine field, transferred and supertransferred fields, calculations of electric field gradients, etc. Applications of Mössbauer spectroscopy to various areas of solid state physics and materials science.

**PHY6382 (PHYJ 5406) PHYSICS OF SEMICONDUCTOR SUPERLATTICES (3cr.)**
Fundamental physics of two-dimensional quantized semiconductor structures. Electronic and optical properties of superlattices and quantum wells. Optical and electronic applications. This course is intended for students registered for the Ph.D. in semiconductor physics research. Prerequisite: Advanced undergraduate or graduate course in solid state physics.

**Particle, Nuclear and Atomic Physics**

**PHY5966 (PHYJ 5401) EXPERIMENTAL TECHNIQUES OF NUCLEAR AND ELEMENTARY PARTICLE PHYSICS (3cr.)**
A course intended for students interested in high energy experimental physics. Large accelerators for charged particles. Particle detectors: nuclear emulsion, bubble chamber, spark chamber, Vertex detectors and calorimeters etc. Study of properties of elementary particles through analysis of experimental results. Prerequisite: PHY4360

**PHY5967 (PHYS 5602) ELEMENTARY PARTICLE PHYSICS / PHYSIQUE DES PARTICULES (3cr.)**

**PHOTONICS**

**PHY5310 (PHYJ 5310) ADVANCED OPTICS AND PHOTONICS (3cr.)**
Introduction to laser physics: Optical resonators, light-matter interaction, basic operation of lasers, coherence, light control and manipulation, beam optics, Fourier optics. Guided wave optics: light propagation, allowed modes, dispersion. This course cannot be combined for credit with PHY4310.

**PHY5311 (PHYJ 5311) QUANTUM OPTICS I (3cr.)**
Classical and semi-classical light-matter interaction; gauges and energy conservation; two level systems in the resonant, under-resonant and over-resonant limit; time-dependent perturbation theory and Fermi's golden rule; semi-classical laser theory; Landau Zener tunnelling and multi-photon transitions; tunnel ionization and multi-photon ionization.

**PHY5312 (PHYJ 5312) QUANTUM OPTICS II (3cr.)**
Quantum light-matter interaction; quantization of the light field and of Schrödinger equation; number states and coherent states; photon emission and absorption; two-photon decay; photoelectric effect; Lamb shift, line-width and renormalization; Casimir effect; multi-photon processes; density operator; quantum theory of decay; quantum laser theory.

**PHY5318 (PHYJ 5318) MODERN OPTICS (3cr.)**
Electromagnetic wave propagation; reflection, refraction; Gaussian beams; guided waves. Laser theory: stimulated emission, cavity optics, gain and bandwidth, atomic and molecular lasers. Mode locking, Q switching. Diffraction theory, coherence, Fourier optics, holography, laser applications. Optical communication systems, nonlinear effects: devices, fibre sensors, integrated optics. Also offered at the undergraduate level, with different requirements, as PHYS 4208 for which additional credit is prescribed. Prerequisite: permission of the Department.

**PHY5330 (PHYJ 5330) FIBER OPTICS COMMUNICATIONS (3cr.)**
techniques, dispersion compensating fibres, optical filters, fibre Bragg gratings, soliton generation, long-haul lightwave systems, high-capacity systems. Precludes additional credit for ELG 5103.

**PHYS331 (PHYJ 5331) FIBER OPTICS SENSORS** (3cr.)

**PHYS332 (PHYJ 5332) NONLINEAR OPTICS** (3cr.)
Nonlinear optical susceptibility, wave equation description of nonlinear optics processes: second harmonic generation, intensity dependent refractive index, sum- and frequency-generation, parametric amplification; quantum mechanical theory of nonlinear optics; Brillouin and Raman scattering; the electro-optic effect; nonlinear fibre optics and solitons.

**PHYS333 (PHYJ 5333) MODE LOCKED LASERS** (3cr.)

**Medical Physics**

**PHYS5112 (PHYS 5204) PHYSICS OF MEDICAL IMAGING** (3cr.)
Physical foundation of, and recent developments in, transmission x-ray imaging, computerized tomography, nuclear medicine, magnetic resonance imaging, and ultrasound, for the imaging physics specialist. Imaging system performance: contrast, resolution, modulation transfer function, signal-to-noise ratio, detective quantum efficiency. Essentials of image display and processing.

**PHYS5161 (PHYS 5203) MEDICAL RADIATION PHYSICS** (3cr.)

**PHYS5163 (PHYS 5208) RADIATION PROTECTION** (2cr.)

**PHYS5164 (PHYS 5206) MEDICAL RADIOTHERAPY PHYSICS** (3cr.)

**PHYS5165 (PHYS 5207) RADIOBIOLOGY** (3cr.)

**PHYS5166 (PHYS 5209) MEDICAL PHYSICS PRACTICUM** (3cr.)

**PHYS5168 (PHYS 5210) ANATOMY AND PHYSIOLOGY FOR MEDICAL PHYSICISTS**
Overview of human anatomy and physiology as background for the application of physics to cancer therapy and medical imaging. Anatomy as depicted by imaging technologies such as CT, MRI, and radiography will be emphasized. Graded: Satisfactory or Not satisfactory (S/N/S). Prerequisite: Enrollment in the graduate field of medical physics or permission of the Department.

**Physics in Modern Technology**

**PHYS5495 (PHYS 5905) PHYSICS IN MODERN TECHNOLOGY WORK TERM**
Practical experience for students in the physics in modern technology stream. Satisfactory / not satisfactory grade, to be based on the grades obtained for the written and oral reports as well as on the evaluations of the employer. Prerequisites: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department. Prerequisite: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department.

**General**

**PHYS5130 (PHYJ 5001) EXPERIMENTAL CHARACTERIZATION TECHNIQUES IN MATERIALS SCIENCE, PHYSICS, CHEMISTRY, AND MINERALOGY** (3cr.)
Survey of experimental techniques used in materials science, condensed matter physics, solid state chemistry, and mineralogy to characterize materials and solid substances. Diffraction (X-ray diffraction, neutron diffraction...). Spectroscopy (infra-red spectroscopy, Raman spectroscopy, nuclear magnetic resonance, Mössbauer spectroscopy, electron spin resonance...). Microscopy and imaging (scanning electron microscopy, transmission electron microscopy, optical microscopy, magnetic resonance imaging...). Other analytic techniques (thermal analysis, wet chemistry, bulk thermodynamic properties, linear response and dc susceptibility...).

**PHYS5140 (PHYS 5801) METHODS IN THEORETICAL PHYSICS I** (3cr.)

**PHYS5141 (PHYS 5802) METHODS IN THEORETICAL PHYSICS II** (3cr.)
Transfer from master's to PhD
The maximum number of courses or seminars per session for which students are allowed to register is three. Courses with a code lower than
1.5cr.

The thesis can be in any one of the four fields. It is prepared in regular consultation with the supervisor and evaluated by a committee of
8x1679

PARISH, which is the only requirement of POL6999, must be completed before the end of the third session of registration (and
8x2264

The School of Political Studies is one of the participating units in the collaborative programs in Women's Studies (master's level only) and in
8x2536

Canadian Studies (at the PhD level). For more information on this program, see "Admission."

Two options are available for the MA, the MA with thesis and the MA with research paper.

requirement at admission.

MA with thesis

The candidate must provide three letters of reference, using forms supplied by the University. One of the letters must be written by a
8x3912

Analytical capacity;

Hypotheses;

Microscopic characteristics related to the physical properties of materials. Materials families: metals and alloys, ceramics, polymers and plastics, composites,
8x5098

AND MINERALOGY

PHY5130 (PHYJ 5001) EXPERIMENTAL CHARACTERIZATION TECHNIQUES IN MATERIALS SCIENCE, PHYSICS, CHEMISTRY,

and Fabry-Perot Interferometers, Bragg gratings. signal detection schemes. Distributed sensing and multiplexing. Applications for optical fibre sensors.

PHY5311 (PHYJ 5311) QUANTUM OPTICS I

PHY8165 (PHYS 6601) PARTICLE PHYSICS PHENOMENOLOGY

year. Prerequisites: PHY 5161 (PHYS 5203) plus, as appropriate to the topic offered, at least one of PHY 5112 (PHYS 5204), PHY 5164 (PHYS 5206),

A total number of 18 credits of graduate coursework (MSc+PhD);

progress is deemed unsatisfactory are required to withdraw from the program.

All students are permitted to hand in their assignments in French or in English.

IPA5482 PROFESSIONAL MINISTRY PRACTICUM II

and psychological theories are introduced which will enable the pastoral agent to observe, analyze, and integrate events within the religious community.

The main objective of the practicum is to foster a ministerial identity that is informed by the study of theology, practical theological reflection and the acceptance

THO5301 PASTORAL THEOLOGY

DCA5310 CHURCH LAW AND PASTORAL MINISTRY

The candidate must provide three letters of reference, using forms supplied by the University. One of the letters must be written by a
50 pages and consists of an advanced study of a question related to the physiotherapy, for example, clinical issues, rehabilitation techniques, self-care, and legal and ethical aspects of physiotherapy. This course includes practical exercises and cases.

The examination will be assessed based on the thesis or the major research paper. The examination will be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners, or one examiner of the master's program, will be appointed on the basis of their expertise.

FEM 1000 (FEM 1000) FRENCH LANGUAGE SKILLS I

The candidate must demonstrate their level of competence in both languages. The School of Political Studies reserves the right to require a language test for either language.

Successful completion of the Pathology and Experimental Medicine seminar course (PME5367).

Un cours d'anatomie et physiologie des divers appareils est recommandé (par exemple ANP 1000 ou ANP 2000 ou le equivalent). Les étudiants sont également encouragés à suivre des cours de biologie et de chimie pour renforcer leur compréhension des processus physiologiques et moléculaires.

The candidate must provide three letters of reference, using forms supplied by the University. One of the letters must be written by a

Research skills, from the student's thesis supervisor and from the professors in the courses taken in

the master's program.

Graded
PHY9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)

PHY9999 (PHYS 6009) THÈSE DE DOCTORAT / PhD THESIS

Specialized Courses

PHY5100 (PHYJ 5401) SOLID STATE PHYSICS I (3cr.)

PHY5110 (PHYJ 5402) SOLID STATE PHYSICS II (3cr.)

PHY5151 (PHYJ 5403) TYPE I & II SUPERCONDUCTORS (3cr.)

PHY5320 (PHYJ 5508) INTRODUCTION TO THE PHYSICS OF MACROMOLECULES (3cr.)
The chemistry of macromolecules and polymers; random walks and the static properties of polymers; experimental methods; the Rouse model and single chain dynamics; polymer melts and viscoelasticity; the Flory-Huggins theory; the reptation theory; computer simulation algorithms; biopolymers and copolymers.

PHY5322 BIOLOGICAL PHYSICS (3cr.)

PHY5347 (PHYJ 5509) PHYSICS, CHEMISTRY AND CHARACTERIZATION OF MINERAL SYSTEMS (3cr.)
The materials science of mineral systems such as the network and layered silicates. Indepth study of the relations between mineralogically relevant variables such as atomic structure, crystal chemistry, site populations, valence state populations, crystallization conditions, etc. Interpretation and basic understanding of key characterization tools such as microprobe analysis, Mössbauer spectroscopy, x-ray diffraction and optical spectroscopy.

PHY5362 (PHYJ 5006) COMPUTATIONAL METHODS IN MATERIAL SCIENCES (3cr.)
Introduction to modern computational techniques used in material science research. Classical molecular dynamics, classical and quantum Monte Carlo methods, plane-wave based electronic band structure calculations, Carr-Parrinello quantum molecular dynamics. Applications to condensed matter systems: basic simulation techniques, force-field based methods in the study of thermodynamic and physical properties of solids, first-principles quantum mechanical methods.

PHY5380 (PHYJ 5407) SEMICONDUCTOR PHYSICS I (3cr.)
Brillouin zones and band theory. E-k diagram, effective mass tensors, etc. Electrical properties of semiconductors.

PHY5381 (PHYJ 5408) SEMICONDUCTOR PHYSICS II: OPTICAL PROPERTIES (3cr.)

PHY5384 (PHYJ 5308) PHYSICS OF FIBER OPTIC SYSTEMS (3cr.)

PHY5387 (PHYJ 5504) PHYSICS OF MATERIALS (3cr.)
Microscopic characteristics related to the physical properties of materials. Materials families: metals and alloys, ceramics, polymers and plastics, composites, layered materials, ionic solids, molecular solids, etc. Specific materials groups. Equilibrium phase diagrams and their relation to microstructure and kinetics. Experimental methods of characterization. Interactions and reactions. Prerequisite: PHY 4382 or equivalent. Cannot be combined for credit with PHY 4387.

PHY5495 (PHYS 5905) PHYSICS IN MODERN TECHNOLOGY WORK TERM
Practical experience for students in the physics in modern technology stream. Satisfactory / not satisfactory grade, to be based on the grades obtained for the written and oral reports as well as on the evaluations of the employer. Prerequisites: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department. Prerequisite: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department.

PHY5495 (PHYS 5905) PHYSICS IN MODERN TECHNOLOGY WORK TERM
Practical experience for students in the physics in modern technology stream. Satisfactory / not satisfactory grade, to be based on the grades obtained for the written and oral reports as well as on the evaluations of the employer. Prerequisites: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department. Prerequisite: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department.

**PHY5922 (PHYJ 5507) ADVANCED MAGNETISM (3cr.)**
Study of some of the experimental and theoretical aspects of magnetic phenomena found in ferro-, ferri-, antiferro-magnetic and spin glass materials. Topics of current interest in magnetism. Prerequisite: PHY 4385 or equivalent.

**PHY5951 (PHYJ 5409) PHYSIQUE DE BASSE TEMPÉRATURES / LOW TEMPERATURE PHYSICS II (3cr.)**

**PHY6371 (PHYJ 5404) TOPICS IN MÖÖSSBAUER SPECTROSCOPY (3cr.)**
Experimental techniques used to measure Mössbauer spectra. Physics of the Mössbauer effect: recoilless emission/absorption, anisotropic Debye-Waller factors, second order Doppler shifts, etc. Mössbauer lineshape theory with static and dynamic hyperfine interactions. Distributions of static hyperfine parameters. Physics of the hyperfine parameters: origin of the hyperfine field, transferred and supertransferred fields, calculations of electric field gradients, etc. Applications of Mössbauer spectroscopy to various areas of solid state physics and materials science.

**PHY6382 (PHYJ 6406) PHYSICS OF SEMICONDUCTOR SUPERLATTICES (3cr.)**
Fundamental physics of two-dimensional quantized semiconductor structures. Electronic and optical properties of superlattices and quantum wells. Optical and electronic applications. This course is intended for students registered for the Ph.D. in semiconductor physics research. Prerequisite: Advanced undergraduate or graduate course in solid state physics.

In addition, the following courses may be taken for credit at the graduate level at the discretion of chairperson of the Physics Department. However, only one such course may be counted toward the credits required for the master's or doctoral degree:

**PHY4327 APPLICATIONS OF INTEGRATED CIRCUITS IN PHYSICS (3cr.)**
A course designed to introduce students having no formal background of electronics to the use of integrated circuits in designing laboratory apparatus. Both digital and analogue circuits will be covered. Topics are chosen from counters, gates, wave-shaping, microcomputers, D/A and A/D conversion, op amps, filters, lock-in amplifiers, and phase locked loops. This course is offered in alternate years. Prerequisites: PHY3902, PHY3904.

**PHY4330 ADVANCED DYNAMICS (3cr.)**
Advanced mechanics: Lagrangian and Hamiltonian formulations; canonical transformations: Hamilton-Jacobi theory. Relativity: Lorentz transformation; tensor analysis; relativistic classical mechanics. Prerequisites: PHY2333, PHY2361.

**PHY4335 PHYSICS OF CONTINUOUS MEDIA (3cr.)**

**PHY4346 GENERAL RELATIVITY (3cr.)**
An introduction to the mathematical techniques and experimental tests of the general theory of relativity. This course is offered in alternate years. Prerequisites: PHY3341, PHY2361.

**PHY4361 APPLIED NUCLEAR PHYSICS (3cr.)**

**PHY4362 SUBATOMIC PHYSICS I (3cr.)**

**PHY4368 SUBATOMIC PHYSICS II (3cr.)**
Properties of leptons, quarks and hadrons. The fundamental interactions, conservation laws, invariance principles and quantum numbers. Resonances in hadron-hadron interactions. Three body phase space. Dulitz plots. Quark model of hadrons, mass formulae. Weak interactions, parity violation, decay of neutral kaons, CP violation, Cabibbo theory. Prerequisite: PHY4362.

**PHY4370 QUANTUM MECHANICS (3cr.)**
Students admitted to the Collaborative program in women's studies at the master's level must meet the requirements for a master's degree in Political Science with specialization in environmental sustainability, must take at least one of their courses in French. This rule applies to the secondaires. Enrolment is limited to 10 students and preference will be given to students whose projects are related directly to these concepts and current interest in magnetism.

Le programme préconise une formation centrée sur le client et sur l'intégration des résultats probants issus de la recherche dans la prise de décision clinique. Les bases conceptuelles du programme reposent à la fois sur les sciences du mouvement (kinésiologie et patho-kinésiologie) et les sciences cliniques, et intègrent les bases du modèle de la classification internationale du fonctionnement du handicap et de la santé en tant que norme pour décrire et mesurer la santé.

Le programme de maîtrise en sciences de la santé en physiothérapie s'étend sur six sessions consécutives, soient deux années d'études à temps plein; il compte 60 crédits de cours et 1025 heures de stage. Les stages obligatoires peuvent s'effectuer au sein des hôpitaux, des conseils scolaires et des centres de réadaptation de la région de la capitale nationale. Ces stages peuvent également avoir lieu à l'extérieur de la région.

Le programme suit les normes de formation établies par le Conseil Canadien pour l'Agrément des Programmes Universitaires en Physiothérapie. Ainsi, au terme de leur formation, les candidats désirant s'inscrire au tableau de l'Ordre des physiothérapeutes de l'Ontario doivent réussir l'examen national en physiothérapie. Ce examen est administré par l'Alliance Canadienne de la Réglementation de la Physiothérapie.

Le mandat du programme de physiothérapie étant de former des professionnels bilingues capables de desservir les populations francophones, le programme de cours est offert uniquement en français. Cependant, les travaux et examens peuvent être rédigés soit en français, soit en anglais. Également, bien que le programme de cours soit en français, certains stages cliniques peuvent être effectués dans des milieux bilingues ou anglophones. Les étudiants doivent donc avoir aussi une connaissance fonctionnelle de l'anglais.

Le programme est régi par les règlements généraux de la Faculté des études supérieures et postdoctorales (FÉSP). En plus des règlements généraux de la FÉSP, le programme est régi par des règlements qui lui sont spécifiques.
PSY 1501 Introduction à la psychologie expérimentale ou l’équivalent et PSY 2505 Psychologie du développement ou l’équivalent.

- Trois (3) crédits en statistiques (par exemple, HSS 2781 Mesure et analyse des données ou l’équivalent).
- Une expérience de bénévolat ou de travail en relation d’aide au cours des trois dernières années serait un atout.

NOTE : Les cours préalables doivent avoir été complétés dans les six années précédant la demande d’admission.

Les cotes de cours indiquées ci-dessus entre parenthèses représentent des équivalents à l’Université d’Ottawa et sont données à titre d’exemple pour aider le candidat dans son choix de cours. Les équivalences pour les préalables à l’admission peuvent être vérifiées auprès du secrétariat scolaire de la Faculté des sciences de la santé.

**Consortium national de formation en santé pour francophones (CNFS)**

Le gouvernement du Canada, par l’entremise de Santé Canada, appuie financièrement depuis le printemps 1999 le Consortium national de formation en santé (CNFS). Le CNFS est un consortium d’universités et d’établissements de santé répartis dans l’ensemble du Canada qui vise à faciliter l’accès à des études en sciences de la santé à des étudiants provenant de milieux francophones en contexte minoritaire. Le CNFS a permis l’ajout de places supplémentaires au programme en physiothérapie pour des francophones de l’extérieur du Québec et de l’Ontario. Il est prévu que les étudiants qui sont accueillis dans le cadre du CNFS fassent la majorité de leurs stages cliniques dans leur province d’origine.

**Cours de conversation anglaise**

Pour préparer les étudiants à passer leurs stages en milieu bilingue, l’Ecole des sciences de la réadaptation offre un cours de conversation anglaise (REA5940) qui peut être recommandé ou exigé selon la compétence linguistique du candidat.

**Program Requirements**

Le programme propose deux cheminement, l’un avec cours et l’autre avec mémoire.

**A. Cheminement avec cours**

L’étudiant devra compléter 54 crédits de cours obligatoires, 3 crédits de travaux dirigés en physiothérapie (PHT 6753 : Séminaire de recherche) et deux (2) cours optionnels de 1.5 crédits.

**B. Cheminement avec cours et mémoire**

L’étudiant devra compléter 54 crédits de cours obligatoires et un mémoire de recherche de 6 crédits. Le mémoire est une production originale de 50 pages et consiste en l’approfondissement d’une question reliée à la physiothérapie à l’aide d’une méthodologie stricte. Le sujet du mémoire peut être théorique ou appliqué au champ d’étude (étude de cas). Le mémoire devra être présenté oralement aux professeurs et aux étudiants du programme. Pour suivre le cheminement avec mémoire, il faut obtenir l’approbation de la direction du programme.

Pour les deux cheminements, en plus des 60 crédits, l’étudiant devra compléter six stages cliniques totalisant 1025 heures réparties sur 29 semaines, tel que prescrit par le Conseil Canadien pour l’Agrément des Programmes Universitaires en Physiothérapie. Il devra également compléter deux activités d’intégration post-stage non créditées. Pour participer aux stages, il faut présenter certains documents conformément aux exigences des agences, des milieux cliniques et du Ministère de la Santé de l’Ontario, visant à protéger les clients ainsi que les étudiants.

**Durée du programme**

On s’attend à ce que les étudiants complètent toutes les exigences dans une période de deux ans. La thèse doit être soumise dans les quatre années qui suivent l’inscription initiale au programme.

**Exigences minimales et échecs**

Une moyenne globale non cumulative calculée pour chacune des sessions devra être maintenue à un minimum de B. La note de passage dans chaque cours individuel est de C+. L’étudiant qui a subi deux échecs (l’équivalent de six crédits) doit se retirer du programme. Du point de vue de ce règlement, les stages I, II, III, IV, V et VI sont considérés équivalents à trois crédits chacun. Les stages sont notés S (satisfaisant) ou NS (non satisfaisant). Tout stage pour lequel la note NS a été obtenue doit être répété. Dans l’éventualité d’un deuxième échec au même stage ou à deux stages différents, l’étudiant doit se retirer du programme.

**Courses**

**PHT5522 INTRODUCTION À LA BIOMÉCANIQUE (1.5cr.)**

Concepts mathématiques utiles à l’analyse du mouvement et réponse biomécanique des divers tissus. Rôle des structures articulaires et musculaires dans la production du mouvement et le contrôle de la posture : types de mouvements, déterminants de la stabilité articulaire, facteurs qui influencent la performance musculaire, etc.

**PHT5525 MARCHE HUMAINE ET ANALYSE BIOMÉCANIQUE CLINIQUE (1.5cr.)**

**PHT5326 PHYSIOLOGIE DE L’EXERCICE EN RÉADAPTATION (1.5cr.)**

**PHT5551 PRATIQUE FACTUELLE I (1.5cr.)**
Intégration des résultats probants et du raisonnement scientifique au raisonnement clinique par la lecture et la critique d’articles de recherche en lien avec les autres cours du programme de physiothérapie (thème 2). Concomitant : PHT 5751.

**PHT5552 PRATIQUE FACTUELLE II (1.5cr.)**
Intégration des résultats probants et du raisonnement scientifique au raisonnement clinique par la lecture et la critique d’articles de recherche en lien avec les autres cours du programme de physiothérapie (thème 3). Préalable : PHT 5551.

**PHT5711 PRINCIPE DE PRATIQUE CLINIQUE (3cr.)**

**PHT7241 MOTRICITÉ HUMAINE I : FONDEMENTS NEUROBIOLOGIQUES ET ASPECTS PRATIQUES (3cr.)**

**PHT7242 ANATOMIE DU SYSTÈME LOCOMOTEUR ET NEUROANATOMIE (3cr.)**
Module d’auto-apprentissage et lectures recommandées pour une mise à jour des connaissances de l’anatomie et de la physiologie du système locomoteur et du système nerveux, nécessaires à la physiothérapie.

**PHT5723 BIOMÉCANIQUE ET ÉVALUATION DU QUADRANT INFÉRIEUR ET DU QUADRANT SUPÉRIEUR (3cr.)**

**PHT7277 MOTRICITÉ HUMAINE II : DE L’ENFANCE À LA SÉNESCENCE (3cr.)**

**PHT7391 PRINCIPES DE RÉÉDUCATION I : MÉTHODES DE BASE ET EXERCICES THÉRAPEUTIQUES (3cr.)**

**PHT7392 PRINCIPES DE RÉÉDUCATION II : MÉTHODES ÉLECTROTHÉRAPEUTIQUES (3cr.)**

**PHT7551 MÉTHODOLOGIE DE LA RECHERCHE EN RÉADAPTATION (3cr.)**

**PHT7900 STAGE I**
Préalable : PHT 5711.

**PHT7902 STAGE II**
Préalables : PHT 3901, PHT 5731.

**PHT6514 PROMOTION DE LA SANTÉ ET ADMINISTRATION DES SERVICES DE SANTÉ EN PHYSIOTHÉRAPIE (1.5cr.)**

PHT6536 PRINCIPES DE RÉÉDUCATION VI : ÉVALUATION, RÉÉDUCATION ET PRISE EN CHARGE DES AFFECTIONS RHUMATOLOGIQUES (1.5cr.)

PHT6541 L’APPROCHE INTERPROFESSIONNELLE (1.5cr.)
Le travail d’équipe dans le domaine de la santé nécessite une compréhension implicite des rôles de chacun des intervenants d’une équipe de soins. Ce cours permettra le partage des connaissances et stimulera une approche interprofessionnelle qui est centrée sur la personne. Ce cours s’appuiera sur l’apprentissage collaboratif en petits groupes.

PHT6542 APPROCHES SPÉCIALISÉES II : ÉVALUATION ET RÉÉDUCATION SENSORIMOTRICE NEUROLOGIQUE (1.5cr.)

PHT6543 APPROCHES SPÉCIALISÉES III : PHYSIOTHÉRAPIE DU SPORTIF ET MéDECINE DU SPORT (1.5cr.)

PHT6544 MÉCANISMES ET PRISE EN CHARGE DE LA DOULEUR EN PHYSIOTHÉRAPIE (1.5cr.)
Ce cours vise à permettre au futur physiothérapeute de développer une connaissance approfondie du phénomène douleur et de ses impacts pour les personnes. Les étudiants sont invités à explorer différents thèmes abordant la douleur tant dans ses aspects physiologiques que psychologiques et comportementaux. Les principes pour l’évaluation et la mesure des composantes de la douleur sont aussi abordés de même que ceux devant guider l’approche thérapeutique chez les individus présentant de la douleur aigue ou de la douleur chronique. Ce cours comporte aussi des présentations individuelles de la part des étudiants sur des thèmes particuliers et pertinents au cours.

PHT6545 APPROCHES SPÉCIALISÉES V : RÉÉDUCATION VESTIBULAIRE (1.5cr.)
Évaluation et traitement en physiothérapie des patients ayant des troubles et lésions de l’oreille interne. Interventions visant à abolir le vertige paroxystique positionnel bénin, pour réduire les étourdissements et les vertiges, pour augmenter l’acuité visuelle dynamique, pour améliorer l’équilibre debout et pendant la marche chez les patients ayant un déficit vestibulaire unilatéral et bilatéral. Préalable : PHT 6734.

PHT6548 OUTILS DIAGNOSTIQUES EN PHYSIOTHÉRAPIE (1.5cr.)
Connaître les principaux outils diagnostiques pouvant être utilisés pour la prise en charge en physiothérapie, tels la radiographie la résonance magnétique, l’ultra-scan diagnostique, les tests sanguins et plusieurs autres tests médicaux. Déterminer la nécessité de demander ces tests et savoir comment interpréter les résultats en fonction de la condition du client. Préalable : PHT 6737.

PHT6733 PRINCIPES DE RÉÉDUCATION III : ÉVALUATION ET RÉÉDUCATION CARDIAQUE ET RESPIRATOIRE (3cr.)

PHT6734 PRINCIPES DE RÉÉDUCATION IV : ÉVALUATION ET RÉÉDUCATION SENSORI-MOTRICES CHEZ L’ADULTE (3cr.)

PHT6735 PRINCIPES DE RÉÉDUCATION V : ÉVALUATION, RÉÉDUCATION ET PRISE EN CHARGE DES AFFECTIONS ORTHOPÉDIQUES (3cr.)

PHT6737 PRINCIPES DE RÉÉDUCATION VII : ÉVALUATION, RÉÉDUCATION ET PRISE EN CHARGE DES AFFECTIONS SYSTÉMIQUES MULTIPLES (3cr.)
Maladies systémiques présentant des symptômes semblables à des problèmes neuro-musculo-squelettiques. Identification des problèmes qui

**PHT6741 APPROCHES SPÉCIALISÉES I : TECHNIQUES DE MOBILISATIONS VERTÉBRALES ET PÉRIPHÉRIQUES** (3cr.)

**PHT6753 SÉMINAIRE DE RECHERCHE** (3cr.)
En groupe de quatre, les étudiants sont appelés à conceptualiser une expérience de recherche sur un sujet d’intérêt pour le groupe, sous la direction d’un professeur. Le travail doit comprendre : recension des écrits, contribution originale à l’état des connaissances, analyse critique des résultats, rapport écrit et présentation des résultats aux pairs. Réservé aux étudiants dans le cheminement avec cours. Concomitant : PHT 5751.

**PHT6903 STAGE III**

**PHT6904 STAGE IV**
Préalable : PHT 6903.

**PHT6905 STAGE V**
Concomitant : PHT 6904.

**PHT6906 STAGE VI**
Préalable : PHT 6905.

**PHT6999 MÉMOIRE DE RECHERCHE** (6cr.)
L’étudiant est amené individuellement à réaliser, sous la direction d’un professeur, les diverses étapes d’un projet de recherche de nature clinique, incluant la recension des écrits, la formulation des hypothèses, la collecte et l’analyse de données ainsi que la diffusion des résultats sous forme orale et écrite. La rédaction d’un mémoire, rapport de recherche écrit exhaustif, est obligatoire. Réservé aux étudiants dans le cheminement avec cours et mémoire. Noté S/NS. Exclusion : PHT 6753. Concomitant : PHT 5751.

**REA5940 CONVERSATION ANGLAISE POUR LES STAGES EN RÉADAPTATION/ENGLISH CONVERSATION FOR CLINICAL PLACEMENTS IN REHABILITATION**
Cours visant la préparation des étudiants en réadaptation pour l’intervention ayant lieu en anglais : relation d’aide, entretien initial, consentement aux soins, évaluation, intervention, congé et rédaction de notes de dossier à l’aide de la méthode SOAP (Subjective, Objective, Assessment, Plan). La terminologie spécifique aux différents domaines de la réadaptation est abordée. Noté S/NS satisfaisant ou (NS) non satisfaisant. Ce cours est réservé aux étudiants inscrits à l’un des programmes de maîtrise professionnels de l’École des sciences de la réadaptation. Il ne peut compter parmi les crédits requis pour le programme mais il pourra être imposé comme exigence additionnelle à l’admission. Cours conçu pour aider le candidat dans son choix de cours. Les équivalences pour les préalables à l’admission peuvent être vérifiées auprès du secrétariat du département.

**REA6547 SANTÉ ET RÉADAPTATION AU TRAVAIL** (1.5cr.)

### Political Science

The School of Political Studies offers graduate programs leading to the Graduate Diploma in Public Management and Governance, and to the degrees of Master of Arts (MA) and PhD in Political Science. The MA program is offered both full- and part-time whereas the PhD program is offered full-time only. The programs are offered in French and English.

- It is possible to follow the Master’s or the PhD program exclusively in French.
- Students who register in their program in French (MA or PhD) must take the majority of their courses in French:
  - Master’s with Thesis: students must take at least three of their required courses in French.
  - Master’s with Major Research Paper: students must take at least four of their required courses in French.
  - Ph.D.: students must take at least three courses in French.
- Students who register in their program in English (MA or PhD) must take and pass at least one of their required courses in French.
- All students are permitted to hand in their assignments in French or in English.
- At the time of admission, students must have an active knowledge of French and a passive understanding of English.
- French is the working language of the School’s meetings, including those of the graduate students’ association, and in the School’s internal communications.
Two options are available for the MA, the MA with thesis and the MA with research paper.

The department participates in the collaborative programs in Women’s Studies (at the MA level), in Environmental Sustainability (at the MA level) and in Canadian Studies (at the PhD level). For more information on this program, see “Admission.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Political Science

Master of Arts Political Science Specialization in Environmental Sustainability

Master of Arts Political Science Specialization in Women's Studies

Doctorate in Philosophy Political Science

Doctorate in Philosophy Political Science Specialization in Canadian Studies

**Admission**

The following are minimum requirements for admission to the master's program. Meeting these minimal requirements alone does not guarantee acceptance. The School of Political Studies also takes into account the number of places available and the student’s aptitude for higher level research.

- Students who have a BA with honours in Political Science or its equivalent with a minimum average of 70 % (B), calculated in accordance with FGPS guidelines, may be admitted directly to the MA program.
- Students who do not have a BA with honours in Political Science, but who have a BA with a minor in Political Science or a BA in a related discipline, and a minimum average of 75 % (B +), may be accepted for a qualifying year, the content of which will be decided in consultation with the director of graduate studies in the political science.
- An active knowledge of French or English is essential. All students admitted will have to take at least one of their courses in French, and all students must be capable of reading texts in English and French. Candidates must indicate in their application the language in which they plan to take the majority of their courses. Those students who plan to study mainly in English will have to demonstrate in their application an active knowledge of English. All students whose first language is other than English or French must provide proof in their application of their level of competence in both languages. The School of Political Studies reserves the right to require a language test for either language.

**Collaborative programs**

The School of Political Studies is one of the participating units in the collaborative programs in Women's Studies (master’s level only) and in Environmental Sustainability (master’s level only).

- The collaborative program in Women’s Studies was created to enable students to enrich their education in political science by adding the interdisciplinary dimension of Women’s Studies. The program consists of two compulsory Women’s Studies (FEM) courses as well as a thesis or a research paper on a subject linked to Women’s Studies. One of the FEM courses will count towards the requirements of the master’s program with thesis, replacing one of the elective courses. Both FEM courses will count towards the requirements of the master’s program with research paper, replacing two of the electives.
- To be accepted into the collaborative program in environmental sustainability, the student must:
  - be admitted into the MA program in Political Science;
  - in the case of a program with thesis, provide a reference letter from a professor that confirms that s/he is willing to supervise the student's thesis in the context of the collaborative program; and
  - submit a letter of intent that identifies the subject or the research question and explain your interest in pursuing studies in the collaborative program.

Students should indicate in their initial application for admission to the master's program in Political Science that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

**Language requirements**

Students may take the collaborative program in environmental sustainability in French or in English. Each student registered in the MA in Political Science with specialization in environmental sustainability, must take at least one of their courses in French. This rule applies to the program as a whole, not specifically the courses in the collaborative program.

**Program Requirements**
Two options are available: the MA with thesis and the MA with research paper. The MA with major research paper, which emphasizes course work and the writing of a research paper, is offered in the areas of Canadian and Quebec politics and international and comparative politics. The MA with thesis is offered in all three fields of study and places greater emphasis on individual research.

**Fields**

The master’s program offers the following fields of study:

- International relations;
- Canadian and Quebec politics;
- Political thought and the analysis of ideologies;
- Comparative politics;
- Women and politics;
- Environmental politics;
- Political economy;
- Citizenship, diversity and migration.

**MA with thesis**

The requirements of the MA with thesis are the following:

- completion of 12 credits of courses;
- presentation and defence of the thesis proposal; and
- Master’s thesis.

**Course requirements**

Students are required to take the following courses:

- a core course in the chosen field of study (3 credits);
- POL6101 Research Methods in Political Science (3cr.); and
- two other courses (3 credits each) chosen from the optional courses and seminars offered.

All students must successfully complete at least one course given in French. Registration is limited to a maximum of three courses / seminars per session, not including the thesis proposal. Registration in the thesis proposal should take place preferably in the first session and at the latest in the third session. The individual program of study is decided in consultation with the director of graduate studies and a professor in the student’s field of study, both of whom must approve it. Courses with a code lower than 5XXX are not permitted.

**Thesis proposal (POL6999)**

Students should begin the process of selecting a thesis topic and potential supervisor immediately upon commencing the program. The topic and supervisor are selected in consultation with an adviser and must be registered with the Faculty of Graduate and Postdoctoral Studies no later than the end of the second session in the program. Once the topic and supervisor have been chosen, the thesis proposal is prepared with the help of the supervisor.

The defence of the topic, which is the only requirement of POL6999, must be completed before the end of the third session of registration (and preferably earlier). Once the topic has been defended, students are allowed to register for the thesis (POL7989).

The thesis proposal could be organized in the following way:

- Statement of the research question;
- Hypotheses;
- Research methods (techniques and data to be used);
- Theoretical or practical relevance of the thesis;
- Provisional bibliography.

The thesis proposal is assessed by a committee, composed of the thesis supervisor and another professor chosen by the School of Political Studies in consultation with the student and the thesis supervisor.

**MA thesis (POL7989)**

The thesis can be in any one of the four fields. It is prepared in regular consultation with the supervisor and evaluated by a committee of professors proposed by the director of the School of Political Studies.

The master’s thesis should be evaluated according to the following criteria.

- Rigour of the methodology;
- Knowledge of the key scholarly literature relevant to the thesis;
- The quality of the research question;
- Analytical capacity;
- The coherence, clarity and quality of the argument, and of the writing.
These criteria will be applied according to what can reasonably be expected of a master’s student who has been registered in the thesis option for four sessions.

Concretely, the thesis can focus on the study of one or more political phenomena narrowly defined, on the discussion of a concept, a hypothesis, or a critical analysis of an author’s work. The master’s thesis should be 80-120 pages (double spaced – 20,000 to 30,000 words), including any notes and bibliography. A thesis longer than 125 double-spaced pages (31,250 words) will not be accepted.

**MA with research paper**

The requirements of the MA with major research paper are the following:

- Completion of 24 credits of courses;
- Research paper.

**Course requirements**

- One core course (3 credits) in the chosen field of study;
- POL6101 Research Methods in Political Science;
- Four other courses (3 credits each) chosen from the elective courses and seminars offered, or from the other core courses.

The individual program of study is decided in consultation with the director of graduate studies and a professor in the student’s field of study, both of whom must approve it. All students must successfully complete at least one course given in French.

The maximum number of courses or seminars per session for which students are allowed to register is three. Courses with a code lower than 5XXX are not permitted.

**Research paper (POL.7979)**

Upon completion of 12 credits, which must include two core courses as well as the methodology course, students are permitted to register for the major research paper. The first registration normally takes place in the third session. The goal of the major research paper is to evaluate a student’s capacity to complete a coherent literature review of a well-defined topic relating to a precise research question. Students are not required to do original research; rather, they are expected to analyze the relevant literature on a topic, relating to the question underlying their research. The topic and the literature to be consulted must be approved by two professors in the School of Political Studies.

The major research paper should demonstrate:

- The ability to conduct research;
- A knowledge of the relevant literature in the chosen topic;
- The capacity to address a research question in a coherent, structured, and well-written manner.

These criteria will be applied according to what can be reasonably expected of a full-time master’s student who has been enrolled in the major research paper option for two sessions (including the summer).

The major research paper, which is written under a professor’s supervision, should be about 12,000 words or 50 pages. It is evaluated by the professor as well as by another professor recommended by the director of the master’s program. Each of the two professors will assign a letter grade, the average of which will constitute the student’s final mark.

**Collaborative program in Women’s Studies**

Students admitted to the Collaborative program in women’s studies at the master’s level must meet the requirements for a master’s degree in their primary program as well as the requirements of the women’s studies program. Normally, the women’s studies courses are recognized as partial fulfillment of the requirements of the student’s primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

Women’s Studies requirements are:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5103 FEMINIST METHODOLOGIES (3cr.)

Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.

- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women’s studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women’s Studies Graduate Committee.

- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women’s Studies Graduate Committee.

**Collaborative program in Environmental Sustainability**
Students in the program must complete the requirements of their primary program and those of the collaborative program. The credits completed for the specialization also count towards the primary degree. Additional credits are not required.

- **Courses**

  Students registered in the collaborative program must complete and pass the following courses:

  - Masters with thesis
    - One compulsory course (3 credits) from among the following two:
      - EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY
      - EVD5500 SÉMINAIRE EN DURABILITÉ DE L’ENVIRONNEMENT
    
    This course replaces one of the optional courses in the MA in Political Science.

  - Masters with research paper
    - One compulsory course (3 credits) from among the following two:
      - EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY
      - EVD5500 SÉMINAIRE EN DURABILITÉ DE L’ENVIRONNEMENT
    - One optional course chosen from the list in the collaborative program.
    
    These courses replace two of the optional courses in the MA in Political Science.

- **Research paper/thesis**

  Students must also write their thesis or Major Research Paper in the area of environmental sustainability. The collaborative program committee will determine if the student’s research subject conforms to this requirement.

  - MA with research paper
    - POL7979 RESEARCH PAPER
    
    Upon completion of 12 credits, which must include two core courses as well as the methodology course, students are permitted to register for the major research paper. The first registration normally takes place in the third session. The goal of the major research paper is to evaluate a student’s capacity to complete a coherent literature review of a well-defined topic relating to a precise research question. Students are not required to do original research; rather, they are expected to analyze the relevant literature on a topic, relating to the question underlying their research. The topic and the literature to be consulted must be approved by two professors in the School of Political Studies.

**Transfer from master’s to PhD**

Students in the MA program at the University of Ottawa who have performed exceptionally well academically, who have demonstrated solid research skills and who are deemed sufficiently mature, may proceed to the doctoral program without completing their master’s degree. The conditions for transfer are as follows:

- Successful completion of at least four POL graduate courses (12 credits) with an A average as well as an A+ in at least one of the courses;
- Approval of the Graduate Studies Committee of the School of Political Studies. The committee makes its decision on the basis of written reports on the student’s maturity and research skills, from the student’s thesis supervisor and from the professors in the courses taken in the master’s program.

The request for transfer must be made during the third session of full-time registration (or equivalent), and the transfer must take place before the end of the fourth session. The Graduate Studies committee will take into account the student’s grades, thesis plan (or draft plan) and the reports from professors who taught the courses taken at the master’s.

Following the transfer, the student must successfully complete all the requirements of the PhD program. Students who transfer but do not complete the PhD program can however obtain the MA degree provided they meet all of its requirements.

**Duration of program**

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

**Residence**

Students admitted on a full-time basis must register full-time for a minimum of three sessions.

**Minimum standards**

Students must maintain a minimum average of B during their master’s program. Those who receive a grade lower than B in two courses or more will be required to withdraw.

**Courses**

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POL5106 SELECTED TOPICS IN POLITICAL SCIENCE (3cr.)

POL5123 CANADIAN POLITICS (3cr.)
Presentation and analysis of a contemporary issue in Canadian politics.

POL6100 SEMINAR IN INTERNATIONAL RELATIONS (3cr.)

POL6101 RESEARCH METHODS IN POLITICAL SCIENCE (3cr.)
Examination of the methodological approaches used in political analysis, including the epistemological issues surrounding these approaches. A portion of the seminar deals with the challenges of designing a thesis proposal and writing the thesis itself. Reserved for master's students.

POL6118 CORE SEMINAR IN COMPARATIVE POLITICS (3cr.)
Critical study of the principal theoretical approaches in comparative politics, the debates about them and the different methodological frameworks in comparative politics.

POL6119 SEMINAR IN CANADIAN AND QUEBEC POLITICS (3cr.)

POL6120 SEMINAR IN POLITICAL THOUGHT (3cr.)

POL6999 PROJET DE THÈSE / THESIS PROPOSAL

POL7102 SELECTED TOPICS IN INTERNATIONAL RELATIONS (3cr.)

POL7103 SELECTED TOPICS IN POLITICAL THOUGHT (3cr.)

POL7104 SELECTED TOPICS IN CANADIAN AND QUEBEC POLITICS (3cr.)

POL7105 POWER, POLITICS, AND SOCIETY (3cr.)
Study of the diverse ways that political thought has conceptualized power, the forms it takes, the ways it functions and its impact on/in politics and society. The approach may be historical or thematic. The exact topic is announced at the beginning of the session.

POL7106 SUBJECTIVITY AND INTERSUBJECTIVITY (3cr.)
Study of the foundations of subjectivity and intersubjectivity. The approach may be historical or thematic. The exact topic is announced at the beginning of the session.

POL7107 FOUNDATIONS OF MODERN POLITICAL THOUGHT (3cr.)
Study of the authors, schools of thought and ideologies that constitute modernity. The exact topic is announced at the beginning of the session.

POL7108 IDEOLOGY AND SOCIAL TRANSFORMATION (3cr.)
Study of various ways of understanding nature and of the importance of ideas, values/principles, and ideology in the context of social and political change. The approach may be historical or thematic. The exact topic is announced at the beginning of the session.

POL7109 GOVERNANCE AND GLOBALIZATION (3cr.)
Analysis of institutions and practices of regulation at the international level in the context of globalization. Study of major trends in national and international governance, including forces of resistance. Case studies.

POL7110 INTERNATIONAL POLITICAL ECONOMY (3cr.)
Analysis of the political aspects of the international economy and how economic issues affect societies and international politics. Case studies. Examination of historical and contemporary theoretical approaches.

POL7111 SPACE AND TERRITORIALITY (3cr.)
Analysis of issues relating to the production, control and use of space in world order. Study of diverse contemporary theories concerning space and territoriality.

POL7112 SECURITY AND CONFLICTS: CONTEMPORARY ISSUES (3cr.)
Analysis of the causes, mechanisms and consequences of inter-state conflicts (wars, crises) and/or intra-state conflicts (civil war, secession). Examination of relevant theoretical literature.

POL7113 CITIZENSHIP AND IDENTITY (3cr.)
Analysis of contemporary citizenship and identity issues in Canada. The approach may be historical or thematic, and the exact topic is announced at the beginning of the session.
**POL.7114 CONSTITUTION AND INSTITUTIONS** (3cr.)
Analysis of constitutional and institutional issues in contemporary Canadian politics. The exact topic is announced at the beginning of the session.

**POL.7115 POLITICAL PARTIES AND MOVEMENTS** (3cr.)
Analysis of current issues affecting political forces in Canada: parties, groups and movements. The exact topic is announced at the beginning of the session.

**POL.7116 PUBLIC POLICY** (3cr.)
Analysis of current public-policy issues in Canada. The exact topic is announced at the beginning of the session.

**POL.7117 INTER-FIELD SEMINAR** (3cr.)
In this seminar, taught by at least two professors, students examine a topic that draws on knowledge from at least two of the program’s fields of study (political thought, Canadian politics, international politics). The exact topic is announced at the beginning of the session.

**POL.7119 CREATION AND TRANSFORMATION OF STATES AND POLITICAL REGIMES** (3cr.)
Study of theories of state-building and transformation (including strategies of adaptation within a context of globalisation; issues of state collapse), as well as the study of democratic and authoritarian regimes and their transformations (transition, consolidation, collapse), in a comparative perspective.

**POL.7120 COMPARATIVE POLITICAL ECONOMY** (3cr.)
Study of theoretical approaches concerning the evolution of power relations between states and markets in different regions of the world; of the political economy of social movements; of political struggles regarding socio-economic inequalities. The emphasis will be on the political economy of both developed states and of highly industrialised countries.

**POL.7121 COMPARATIVE POLITICS OF IDENTITIES** (3cr.)
Study of theories concerning identity (primordialism, instrumentalism, constructivism) and of the role of ethnic, national, religious, linguistic and gender identities in political processes (violence, accommodation among different identity groups, management of diverse identities by the state).

**POL.7122 SPECIAL TOPICS IN COMPARATIVE POLITICS** (3cr.)
Topics to covered in rotation: Africa, Latin America, Asia, Middle East and former Soviet bloc (and possibly Western Europe/United States)

**POL.7135 ADVANCED QUANTITATIVE METHODS** (3cr.)
Advanced quantitative methods and their application in political science. Topics include multivariate regression analysis, maximum likelihood estimation and panel analysis. Review of advanced software packages for data organisation and development of tools for data collection.

**POL.7136 ADVANCED QUALITATIVE METHODS** (3cr.)
Qualitative research methods and their application in political science. The methods covered include fieldwork, interviews, participant observations, archival research and discourse analysis.

**POL.7137 INTERPRETATIVE OR CRITICAL METHODOLOGIES** (3cr.)
Interpretative or critical methodologies and their application in political science: genealogy, deconstructivism, fieldwork approach, feminist analysis, new materialism, and decolonising methodologies.

**POL.7366 DOCTORAL METHODOLOGY SEMINAR** (3cr.)
Advanced reflection on the methodological aspects and issues of thesis research (methods of inquiry, practical considerations, data analysis, interpretation of results, etc.). Students acquire the knowledge needed to design and formulate the thesis proposal. This seminar is reserved for PhD students in Political Science. It is offered once every two weeks over two consecutive sessions.

**POL.7979 MÉMOIRE / RESEARCH PAPER** (6cr.)

**POL.7989 THÈSE DE MAÎTRISE / MA THESIS** (12cr.)

**POL.8100 DIRECTED READINGS** (3cr.)

**POL.8110 SEMINAR IN THE MINOR FIELD: INTERNATIONAL RELATIONS** (3cr.)
Evolution of theories and concepts in political economy as an approach to studying international affairs. Examination of various schools of thought.

**POL.8111 SEMINAR IN THE MINOR FIELD: COMPARATIVE POLITICS** (3cr.)
Study of the evolution of theories, concepts and methods in comparative politics as an approach to studying domestic politics and transnational influences, including states, regimes and institutions; the politics of identity; and political economy.

**POL.8112 SEMINAR IN THE MINOR FIELD: CANADIAN AND QUÉBEC POLITICS** (3cr.)
The fundamentals of political economy as an approach to studying political phenomena. Canada’s place in the global economy, intergovernmental relations, social movements and changes in the forms of federal intervention are among the topics covered.
POL8113 SEMINAR IN THE MINOR FIELD: POLITICAL THOUGHT (3cr.)
Examination of key ideological movements (key questions, main concepts, major texts). Analysis of theories on the formation and transformation of ideologies. Contemporary ideological dynamics.

POL9200 THEORIES AND PROBLEMS IN INTERNATIONAL RELATIONS (6cr.)

POL9218 THEORIES AND PROBLEMS IN COMPARATIVE POLITICS (6cr.)
Study of the evolution of theories, concepts and methods in comparative politics as an approach to studying domestic politics and transnational influences, including states, regimes and institutions; the politics of identity; and political economy. The comprehensive examination in the major field is held at the end of the course.

POL9219 THEORIES AND PROBLEMS IN CANADIAN AND QUEBEC POLITICS (6cr.)
Examination of key ideological movements (key questions, main concepts, major texts). Analysis of theories on the formation and transformation of ideologies. Contemporary ideological dynamics. The comprehensive examination in the major field is held at the end of the course.

POL9310 COMPREHENSIVE EXAMINATION IN THE MAJOR FIELD

POL9320 COMPREHENSIVE EXAMINATION IN THE MINOR FIELD
Prerequisites: POL8110 or POL8111 or POL8112 or POL8113

POL9350 THESIS PROPOSAL

POL9999 THÈSE DE DOCTORAT / PhD THESIS

Public Administration

The School of Political Studies located in the Faculty of Social Science offers graduate programs leading to the Master of Arts (MA) and the Doctor of Philosophy (PhD) degrees in Public Administration.

The main objective of the master programs is to provide students with leading-edge theoretical and conceptual knowledge to enable them to understand and analyze public administration, as well as equipping them with the know-how and skills necessary for success in a constantly changing organizational environment. Emphasis is placed on the development of research skills.

The MA program aims to familiarize students with critical methods of knowledge production and to develop their capacity for conducting basic and applied research. Furthermore, they will develop the ability to extract from research the learning necessary for undertaking their responsibilities as public managers and policy analysts.

The PhD program aims to prepare students for academic and research careers. The various components of the doctoral program (courses, comprehensive examination, thesis proposal, thesis and defence) are all designed to develop the student’s capacity for high level independent research in social sciences.

The programs offer two fields or concentrations in public administration: public management and public policy. These fields are not mutually exclusive, but constitute the two main components of public administration studies.

The MA program is offered both full- and part-time, whereas the PhD program is offered full-time only. The programs are offered in French and English and the use of both languages is encouraged. Students can choose the master’s with thesis or the master’s with research paper.

Public Administration is a participating unit in the collaborative programs in Women’s Studies and in Environmental Sustainability (at the master’s level). For more information on this program, see Admission.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Public Administration

Master of Arts Public Administration Specialization in Environmental Sustainability

Master of Arts Public Administration Specialization in Women's Studies
Admission

Admission to the graduate program in Public Administration is governed by the general regulations of the FGPS.

To be considered for admission, applicants must hold a bachelor’s degree with specialization or a major in public administration or in a related discipline with a minimum average of 70% (B).

MA Program

Students can choose the MA with thesis or the MA with research paper.

Collaborative Program in Women’s Studies at the Master’s Level

The public administration program participates in the collaborative program in Women’s Studies at the master’s level. The collaborative program was created to enable students to enrich their education in public administration by adding the interdisciplinary dimension of women’s studies. Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. For further details, see the description of the program posted on the FGPS website.

The Women’s Studies program consists of two compulsory Women’s Studies (FEM) courses as well as a thesis or a research paper on a subject linked to Women’s Studies. One of the FEM courses will count towards the requirements of the master’s program with thesis, replacing the elective course. Both FEM courses will count towards the requirements of the master’s program with research paper replacing two electives.

Collaborative Program in Environmental Sustainability

To be accepted into the collaborative program, the student must:

- Be admitted first into the MA program in Public Administration.
- Provide a reference letter from a professor that confirms that s/he agrees to supervise the student’s major research paper or thesis in the context of the collaborative program.
- Submit a letter of intention that identifies the topic or the research question and explains why he or she wishes to pursue the collaborative program.

Students may take the collaborative program in environmental sustainability in English or in French.

Language Requirements

Students whose first language is other than French or English must provide proof in their application of their level of competence in these languages. The Public Administration Program reserves the right to conduct an interview and to require a test in either language. If a student’s research interests require comprehension of a language other than French or English, the Public Administration Program may require proof of such competency.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Program Requirements

Master’s degree with thesis

- 12 course credits including 9 compulsory credits (PAP6502*, PAP6103; and PAP6110 or PAP6111) and 3 elective credits chosen from the graduate courses in public administration or in other programs.
- Presentation of a thesis proposal (PAP6998).
- Presentation and defense of a thesis (PAP7999) based on an original research carried out under the direct supervision of a faculty member of the Department.

NOTE: Registration is limited to a maximum of three courses / seminars per session, not including the thesis proposal. Registration in the thesis proposal should take place as early as possible, ideally in the first session but by the third session at the latest.

*PAP6502, offered only in French, is compulsory for all students. Language support is available to those who might need it.

PAP6998 PROJET DE THÈSE DE MAÎTRISE / MASTER'S THESIS PROPOSAL

Students should begin the process of selecting a thesis topic and potential supervisor immediately upon commencing the program. The topic and supervisor are selected in consultation with an adviser and must be registered with the FGPS no later than the end of the second session in the
program. Once the topic and supervisor have been chosen, the thesis proposal is prepared with the help of the supervisor.

The defence of the topic, which is the only requirement of POL6998, must be completed before the end of the third session of registration (preferably earlier). Once the topic has been defended, students are allowed to register for the thesis (PAP7999).

The thesis proposal is assessed by a committee, composed of the thesis supervisor and another professor chosen by the professor in charge of graduate studies in public administration in consultation with the student and the thesis supervisor.

PAP7999 THÈSE DE MAÎTRISE / MA THESIS (12cr.)

The thesis is prepared under the direction of the supervisor and evaluated following submission by a committee of professors proposed by the professor in charge of graduate studies in public administration. It is normally approximately twenty-five thousand words (between 80 and 120 pages).

The thesis must demonstrate the student’s capacity for scholarly analysis of a specific subject. It does not have to be an exhaustive study of the kind expected of a doctoral dissertation, but it must display a capacity for rigorous analysis of a specific subject. It is judged as much for its methodological quality as for its contribution to knowledge.

Master’s degree with research paper

- 18 credits including 9 compulsory credits (PAP6502*; PAP6103; and PAP6110 or PAP6111) and 9 elective credits chosen from the graduate courses in public administration or in other programs.
- Presentation of a research paper (PAP7998) based on an original research carried out under the direct supervision of a faculty member of the Department.

NOTE: Registration is limited to a maximum of three courses / seminars per session, not including the thesis proposal.

*PAP6502, offered only in French, is compulsory for all students. Language support is available to those who might need it.

PAP7998 MÉMOIRE / RESEARCH PAPER (6cr.)

Registration for the research paper is permitted in the second session. The research paper is approximately 12,000 words (50 pages) in length. It is evaluated by the supervisor and by another professor appointed by the professor in charge of graduate studies. Research papers are graded alpha and the grade (the average of both evaluations) appears on the transcript.

Collaborative program in Women's Studies

Students admitted to the Collaborative program in women's studies at the master's level must meet the requirements for a master's degree in

their primary program as well as the requirements of the women's studies program. Normally, the women's studies courses are recognized as

partial fulfillment of the requirements of the student's primary program, in which case the passing grade in the relevant FEM course or courses is

the same as that specified for the primary program.

The Women's Studies requirements are:

- Two compulsory courses:
  FEM5300 FEMINIST THEORIES (3cr.)
  FEM5103 FEMINIST METHODOLOGIES (3cr.)

Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

- A thesis or research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the
  Women’s Studies Graduate Committee as well as by the student’s primary program. The thesis or research paper must demonstrate
  knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

- The thesis supervisor must possess Women’s Studies and/or feminist expertise. In the case of a research paper, the supervisor should,
  ideally, possess Women’s Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a
  professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.

- Thesis or research paper proposal: The thesis or research paper proposal must be approved by the Women’s Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women's studies by the end of the
  third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to
  the Women's Studies Graduate Committee.

- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the
  Women’s Studies Graduate Committee.

Collaborative program in Environmental Sustainability

Students in the collaborative program must complete the requirements of their primary program and those of the collaborative program.

Students registered in the collaborative program in environmental sustainability must complete and pass the following courses:

Masters with thesis:

The compulsory course (3 credits)
EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)

This course replaces the elective course in the MA with thesis option.
**Masters with major research paper**
The compulsory course (3 credits):
EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)

**AND**
One course chosen from the list of electives in the collaborative program.

These courses replace two of the three elective courses in the MA with research paper option.

**Research paper/thesis**
Students must also write their Major Research Paper or Thesis in the area of environmental sustainability. The collaborative program committee will determine if the student's research topic conforms to this requirement.

**Co-op option**
In collaboration with the University of Ottawa’s co-op office, a co-op option is offered to a limited number of students in the master's with research paper. This option gives selected students the opportunity to acquire practical work experience by completing two one-session (four months) work placements, normally in the public service.

There are two possibilities within the co-op option. One is to complete the first co-op work placement in the spring session of the first year and the second placement in the winter session of the second year. The other possibility is to complete two consecutive work placements over the spring session of the first year and the fall session of the second year. The eight-month placement enables students to engage in a longer project within the host organization and thus acquire a more valuable work experience. In both cases, students who enrol in the co-op option will obtain twelve credits (six credits per work placement) for their work experience and co-op reports. Each work term is graded P/F (Pass or Fail), based on the employer’s report and on a written report completed by the student. The student reports will be evaluated by a professor in the program (who also serves as the program’s representative on the University’s co-op Committee).

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the MA degree.

To remain enrolled in the co-op option, students must:

- Maintain full-time status.
- Maintain a 7.0 grade point average.
- Obtain a passing grade for each work term.

**Transfer from master’s to PhD**
Students enrolled in the master’s program with thesis may be allowed to transfer to the PhD program without being required to write a master's thesis. For additional information, please consult the “Admission” section of the PhD program.

**Duration of program**
Full-time students are expected to fulfill all requirements of the master’s with thesis and the master’s with research paper with co-op option within two years. Full-time students are expected to fulfill all requirements of the master’s with research paper (without co-op) within 16 months. The maximum time permitted is four years from the date of initial registration in the program, whether full- or part-time.

**Residence**
All students must complete a minimum of three sessions of full-time registration at the beginning of the program. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the date of initial registration in the program.

**Minimum standards**
The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, the research paper, the thesis or whose progress is deemed unsatisfactory are required to withdraw.

**Courses**

**PAP6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)**
Exérience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting, Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report.

**PAP6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)**
Exérience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. Préalable : PAP6001. / Experience in a workplace setting, Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Prerequisite: PAP6001.
PAP6101 GLOBALIZATION AND CONTINENTAL INTEGRATION (3cr.)
Examination of the impacts of socio-economic, technological and cultural globalization on our systems of governance both internationally and domestically. Analysis of the role of the nation-state in a context of simultaneous decentralization and internationalization, with a particular focus on global institutions and North American integration.

PAP6102 DEMOCRATIC GOVERNANCE (3cr.)
This seminar provides an examination of how democratic governments structure their decision-making processes for effectiveness, representation and accountability. A particular focus of this seminar is a critical evaluation of the New Public Management reforms, and an in-depth review of different models of government intervention and policy-making from a comparative perspective.

PAP6103 RESEARCH METHODS (3cr.)
Study of different methodological approaches used in public administration, conceptual tools and research methods (discourse analysis, content analysis, quantitative methods (statistics and probability), interview techniques, etc.) necessary for leading-edge research in public management and policy public. Epistemological and ontological questions related to the different approaches. Development of major research paper or thesis proposal.

PAP6110 THEORIES OF PUBLIC MANAGEMENT (3cr.)
(Core course for students in the field of public management.) Presentation of major components of public management (managerial roles and functions, planning, organizational cultures, leadership and motivation, human resources managements, change management, etc.). Study of the main theoretical approaches in public management, with the aim of relating them critically to one another and undertaking a critical analysis of the methodological and theoretical contributions of the various approaches.

PAP6111 THEORIES OF PUBLIC POLICY (3cr.)
(Core course for students in the field of public policy.) Presentation of the different stages of the policy process, notably emergence, development, implementation and evaluation, as well as the influence of institutions, ideas and interests on public policy. The objective is to present the main theoretical approaches (neo-institutionalism, post-positivism, political economy, etc.) with the aim of relating them critically to one another and critically analyzing their methodological and theoretical contributions.

PAP6120 ETHICS IN THE PUBLIC SECTOR (3cr.)
Study of the theoretical and empirical issues related to ethics in the public sector, analysis of the literature on the philosophical and political foundations of ethical reflection and the literature on ethics and public administration. Themes addressed include citizenship and democracy, responsibility and accountability, the public interest, contemporary issues in ethics in the public sector and social justice in public decision-making.

PAP6121 PUBLIC ADMINISTRATION: COORDINATION AND CONSISTENCY (3cr.)
Examination of the influence of structural and social processes on the theory and practice of public administration. The course will examine the mechanisms and issues of coordination in its multiple forms: multi-level coordination, coordination across the public, private and community sectors, horizontal and vertical coordination. The course will also address the challenges and issues of consistency in the process of public policy development and implementation and will examine a number of cases and international comparisons.

PAP6122 CULTURE AND POWER IN PUBLIC ORGANIZATIONS (3cr.)
Informal dimensions of public organizations, including organizational cultures and power relations that mesh with organizational issues. Sociopolitical analysis of organizations to improve understanding of factors of inertia, resistance and blockage that influence, to different degrees, possibilities for innovation and change in public administration.

PAP6130 SELECTED THEMES IN PUBLIC ADMINISTRATION (3cr.)

PAP6980 LECTURE DIRIGÉE / DIRECTED READING (3cr.)

PAP6998 PROJET DE THÈSE DE MAÎTRISE / MASTER’S THESIS PROPOSAL

PAP7998 MÉMOIRE / RESEARCH PAPER (6cr.)
L’inscription au mémoire est permise dès la deuxième session d’études. Le mémoire a environ douze mille mots (environ 50 pages). Il est évalué par la personne qui l’a dirigé et par un autre professeur nommé par le directeur des études supérieures. Le mémoire est noté S (satisfaisant) ou NS (non satisfaisant). / Registration for the research paper is permitted in the second session. The research paper is approximately 12,000 words (50 pages) in length. It is evaluated by the supervisor and by another professor appointed by the professor in charge of graduate studies. The research paper is graded S (satisfactory) or NS (not satisfactory).

PAP7999 THÈSE DE MAÎTRISE / MA THESIS (12cr.)

PAP8111 RESEARCH SEMINAR IN PUBLIC ADMINISTRATION II (3cr.)
Preparation for writing the thesis (including the thesis proposal) in public administration. Continuation of the themes presented in the previous seminar (PAP8510 Séminaire de recherche en administration publique I). Different stages of research in public management and public policy, notably the development of the research question, literature review, theoretical framework, methodological approach and the development of empirical data. Different strategies of knowledge diffusion (conferences, articles, book chapters, etc.) and preparation for the thesis proposal defence. Prerequisite: PAP8510

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PAP8510 SÉMINAIRE DE RECHERCHE EN ADMINISTRATION PUBLIQUE I (3cr.)
Préparation à la rédaction de la thèse (incluant le projet de thèse) en administration publique. Présentation des dimensions ontologiques (qu’est-ce qui compose le domaine du savoir?) et épistémologique (comment savons-nous ce que nous savons ?) caractérisant la recherche en gestion publique et en politiques publiques. Initiation aux différentes étapes de la production de connaissances (formulation de la problématique de recherche, revue de littérature, cadre théorique, etc.).

PAP9310 PUBLIC MANAGEMENT (3cr.)
In-depth study of the field of public management. Presentation of the formal dimensions (direction, organization, budgeting, strategy, planning, control, etc.) and informal dimensions (leadership, motivation, mobilization, organizational culture, coordination, power relations, etc.) in public management. Critical analysis of the principal theoretical approaches and tendencies of public management and their theoretical and methodological contributions.

PAP9311 PUBLIC POLICY (3cr.)
In-depth study of the field of public policy. Different stages in the policy process (emergence, development, implementation and evaluation). The objective is to present the main theoretical approaches and tendencies (neo-institutionalism, post-positivism, political economy, etc.), relating them critically to one another and critically analyzing their methodological and theoretical contributions.

PAP9320 SEMINAR IN MAJOR FIELD: PUBLIC MANAGEMENT (3cr.)
This course deepens the knowledge acquired in the course PAP9310 Public Management for doctoral candidates with public management as the Major Field.

PAP9330 SEMINAR IN MAJOR FIELD: PUBLIC POLICY (3cr.)
This course deepens the knowledge acquired in the course PAP9311 Public Policy for doctoral candidates with public policy as the Major Field.

PAP9980 LECTURE DIRIGÉE / DIRECTED READING (3cr.)
Étude indépendante, sous la direction d’un professeur membre du programme. Le sujet et les exigences doivent être approuvés par le directeur des études supérieures./ Independent study under the direction of a faculty member in the program. The topic and requirements must be approved by the director of graduate studies.

PAP9988 EXAMEN DE SYNTHÈSE – champ mineur / COMPREHENSIVE EXAMINATION – Minor Field
L’examen de synthèse a pour but de vérifier les connaissances dans le champ mineur. Il a lieu généralement vers la fin de la troisième session d’inscription au programme. / The comprehensive examination is aimed at evaluating the student’s knowledge of their minor field.

PAP9989 EXAMEN DE SYNTHÈSE – champ majeur / COMPREHENSIVE EXAMINATION / Major Field
L’examen de synthèse a pour but de vérifier les connaissances dans le champ majeur. Il a lieu généralement vers la fin de la troisième session d’inscription au programme. / The comprehensive examination is aimed at evaluating the student’s knowledge of their major field.

PAP9997 PROJET DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL

PAP9999 THÈSE DE DOCTORAT / PhD THESIS

Public and International Affairs

The Graduate School of Public and International Affairs offers a multidisciplinary master’s program focusing on public and international affairs. The degree awarded is the Master of Arts (MA) in Public and International Affairs. The program is offered on a part-time and full-time basis and also offers a coop option to full-time registered students.

Full-time and part-time students in the Master in Public and International Affairs must successfully complete a total of 6 core courses, 4 elective specialized seminars, 1 capstone seminar and the research paper for a total of 39 credits.

Public and international affairs is a participating unit in the collaborative program in Environmental Sustainability as well as in the collaborative program in Science, Society and Policy.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

International Reciprocal Agreement

The Graduate School of Public and International Affairs has signed an agreement with Wuhan University. This agreement makes it possible for students who wish to obtain a master’s in public and international affairs from the University of Ottawa to receive a conditional offer of admission to the master’s whereby they complete the fourth year of the bachelor’s degree of their home university at the University of Ottawa and then continue on to the master’s for two more years and qualify for the University of Ottawa master’s degree after a total of five years of study (3+1+2).

Programs
Master of Arts Public and International Affairs

Master of Arts Public and International Affairs Specialization in Environmental Sustainability

Master of Arts Public and International Affairs Specialization in Science, Society and Policy

**Admission**

To gain admission to the MA in Public and International Affairs, applicants must have completed an honours undergraduate degree (or its equivalent) in the social sciences, in arts, in management, or in law, with at least a 75% (B+) average (calculated in accordance with the FGPS guidelines). Applicants with degrees in other disciplines may also be considered, depending on the relevance of their previous degree and experience to the MA in Public and International Affairs.

A minimum of 2 years of full-time professional work experience is required in order to follow the part-time program. Part-time work over the summer months or during previous studies (co-op, internship) will not be considered to be equivalent. An interview may be required to assess the relevance of the work experience.

A basic knowledge of economics is required. There are two ways to meet this requirement. The first is for students to have successfully completed introductory courses in macroeconomics and microeconomics at the undergraduate level. At the University of Ottawa, this requirement can be met by taking the courses ECO1102 and ECO1104, or their equivalent. The Faculty of Social Sciences will offer these courses in the summer to facilitate the completion of this requirement. Equivalent courses from other universities are also accepted.

The second way to meet the economics requirement is to take a remedial course offered by the Graduate School of Public and International Affairs. Students who lack these courses, could still be admitted to the program, on the condition that they take a remedial course in economics offered by the Graduate School of Public and International Affairs during their first session. The course, entitled “Economics for Public Management and Policy” (API5100), offers an intensive survey of the economics and mathematical skills necessary to be adequately prepared for the program’s core courses in economics. Completion of this course will also be recommended for students who may need to ensure that they have the necessary basic skills in mathematical analysis. This remedial course will be in addition to the 39 credits required by the program.

Applicants should note that meeting the minimum requirements does not guarantee their admission. In making decisions, the admission committee of the Graduate School of Public and International Affairs takes into account all application material as well as the number of places available.

**Language requirements**

Candidates who have not graduated from a French-speaking or an English-speaking university must pass the computerized Test of English as a Foreign Language (TOEFL), or equivalent, before admission. For additional information, please click on “Apply Now” at the top of this page.

All applicants must be able to understand speak and write proficiently either English or French and have a passive knowledge (ability to understand the spoken and written word) of the other language. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Co-op option**

To be admitted into the co-op option, students must commence the Master’s Public and International Affairs in the fall session and be registered full time. Applications for the co-op option must be received by the end of the first month of the student’s registration in the Master’s Public and International Affairs. Acceptance into the co-op option is offered on a competitive basis and is managed by the Co-op Office. Enquiries should be directed to that office.

**Collaborative programs**

The Graduate School of Public and International Affairs is one of the participating units in the collaborative programs in Environmental Sustainability (master’s level only) and in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

**Program Requirements**

The MA in Public and International Affairs requires the successful completion of a total of 39 credits, as follows:
- six compulsory courses (18 credits)
- four elective courses (12 credits)
- a capstone seminar (AP16399) (3 credits)
- a research paper (6 credits)

For the co-op option, the degree requires, in addition to completion of the two co-op internships, the successful completion of a total of 39 credits, as follows:

- six compulsory courses (18 credits)
- four elective courses (12 credits)
- a capstone seminar AP16399 (3 credits)
- a research paper (6 credits)

All students must take at least one course (3 credits) in the second official language.

With the permission of the program director, up to two courses (six credits) may be replaced by courses offered by other academic units.

For information regarding the research paper, consult Thesis and research paper.

**First year**

The first year of study is essentially dedicated to the core courses that will allow students to gain a strong multidisciplinary foundation in public and international affairs.

Students registered full-time must complete four compulsory courses, involving different disciplines, in the fall session and two compulsory courses, plus two elective courses, in the winter session. Through these six compulsory courses, students acquire the foundation required to understand contemporary issues in the formulation of public policy and the conduct of international affairs and allowing them to take seminars on more specialized topics offered by the program.

Students registered part-time must complete the compulsory courses (18 credits) within the first two years of registration in the program.

**Second year**

The second year of the program is designed to allow students to acquire deeper knowledge. It requires the full-time student to complete three sets of requirements:

- a set of two elective seminars
- a capstone seminar
- a research paper

Students registered part-time must complete the compulsory courses (18 credits) within the first two years of registration in the program.

**Third and fourth year**

A third, and possibly fourth, year will be necessary for students enrolled part-time so as to permit the completion of the remaining requirements:

- four optional courses
- the capstone seminar
- the research paper

**Compulsory courses**

API5105 CONCEPTS AND ISSUES IN INTERNATIONAL AFFAIRS (3cr.)
API5116 DEMOCRATIC GOVERNMENT AND PUBLIC POLICY (3cr.)
API5125 MACROECONOMIC POLICY (3cr.)
API5126 MICROECONOMICS FOR PUBLIC POLICY (3cr.)
API5135 ETHICS AND MORAL REASONING FOR PUBLIC AND INTERNATIONAL AFFAIRS (3cr.)
API5136 RESEARCH METHODS FOR PUBLIC POLICY (3cr.)

**Elective courses**

API6311 PUBLIC ECONOMICS (3cr.)
API6312 PUBLIC FINANCE (3cr.)
API6313 MULTI-LEVEL GOVERNANCE AND PUBLIC POLICY (3cr.)
API6314 HEALTH POLICY (3cr.)
API6315 SOCIAL POLICY (3cr.)
API6316 ENVIRONMENTAL POLICY (3cr.)
API6317 IMMIGRATION, DIVERSITY AND PUBLIC POLICY (3cr.)
API6319 SPECIAL TOPICS IN PUBLIC POLICY (3cr.)
API6331 INTERNATIONAL FINANCE (3cr.)
API6332 INTERNATIONAL TRADE (3cr.)
API6333 INTERNATIONAL LAW AND ETHICS (3cr.)
API6334 REGIONALISM AND INTEGRATION (3cr.)
API6335 CANADIAN FOREIGN POLICY (3cr.)
API6336 DEFENSE POLICY AND MILITARY AFFAIRS (3cr.)
API6337 PEACE OPERATIONS AND POST-CONFLICT RECONSTRUCTION (3cr.)
API6339 SPECIAL TOPICS IN INTERNATIONAL AFFAIRS (3cr.)
API6351 INTERNATIONAL ECONOMICS AND DEVELOPING COUNTRIES (3cr.)
API6353 HUMAN RIGHTS AND DEMOCRATIZATION (3cr.)
API6356 ENVIRONMENT, NATURAL RESOURCE MANAGEMENT AND DEVELOPMENT (3cr.)
API6357 CONFLICT AND HUMAN SECURITY (3cr.)
API6360 Multilateralism and International Institutions (3cr.)
API6361 US Foreign Policy (3cr.)
API6362 Diplomacy and Conflict Resolution (3cr.)
API6363 Politics and Conflict in the Middle East (3cr.)
API6364 War and Organized Violence (3cr.)
API6365 Contemporary Security Studies (3cr.)

Capstone seminar (API6399)
These seminars allow students to apply, in an integrated manner, the knowledge, the theoretical and conceptual tools, and the research techniques acquired in the program to a specific policy problem, while being exposed to the more practical challenges of making policy and conducting international affairs.

Each seminar focuses on a specific case or problem of public policy, international affairs or international development and it requires that students work in teams to prepare a detailed policy brief, offering both rigorous analysis and alternatives for action to address the problem at hand. At the end of the seminar series, students must present their policy brief to their fellow students, faculty members, and senior fellows at the School. In their work, students are expected to draw on the knowledge acquired during the program.

Moreover, each capstone seminar is led by a regular faculty member, in conjunction with a practitioner associated with the program, thus providing students with a better appreciation for the real-life constraints faced by policy-makers, diplomats and development workers. Guest lectures and site visits may also be used to provide students with a better understanding of the case examined in their seminar.

There are between 5 and 8 capstone seminars per year.

Research paper (API6999)
Students, under the supervision of a professor, will write a major research paper on a topic in public and international affairs. The paper, which will be about 12,000 words in length, will be graded by two professors: the supervisor and another professor associated with the program and appointed by the graduate studies co-ordinator. Research papers are graded alpha and the grade (average of both evaluations) appears on the transcript.

Co-op option
Co-op students must register full-time and successfully complete:

- six compulsory courses (18cr.);
- four elective courses (12cr.);
- the capstone seminar;
- two work terms (API6001, API6002); and
- a research paper (API6999).

Each work term (API6001 and API6002) is graded P/F (pass/fail), based on the employer’s report and on the written report completed by the student.

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op internship credits are additional to the minimum requirements of the degree.

To remain in the co-op option, students must:

- be registered full-time;
- maintain a 7.0 cumulative grade point average; and
- obtain a satisfactory grade (P) for each co-op work term.

International exchanges
API6910 STAGE INTERNATIONAL / INTERNATIONAL INTERNSHIP (3cr.)
The Graduate School of Public and International Affairs encourages students registered full-time to participate in international exchanges in the second year of the program. These exchanges are arranged in collaboration with the International Office, which deals with administrative matters and remains in contact with the students before, during and after their stay abroad.

Collaborative program in Environmental Sustainability
Students in the collaborative program must complete the requirements of the program in Public and International Affairs and those of the collaborative program.

Students registered in the collaborative program in environmental sustainability must complete and pass the following courses:

- EVD5100 SEMINAR IN ENVIRONMENTAL SUSTAINABILITY (3cr.)
- One optional course chosen from the list in the collaborative program.

These courses replace two of the elective courses in the MA in Public and International Affairs.

**Major research paper**

Students must also write their major research paper (API6999) in the area of environmental sustainability. The collaborative program committee will determine if the student’s research subject conforms to this requirement.

**Collaborative program in Science, Society and Policy**

The requirements of both the program in Public and International Affairs and the collaborative program must be met. The credits completed for the specialization count also towards the degree in Public and International Affairs.

- Satisfactory completion of the core course: ISP5101 or ISP5501 (3cr.);
- Satisfactory completion of the practicum ISP5103;
- Satisfactory completion of the research paper (API6999).

**Duration of the program**

Students registered full-time are expected to fulfill all requirements within two years, and students registered part-time are expected to fulfill all requirements within three years. The maximum time permitted is four years from the date of initial registration in the program.

**Minimum standards**

The passing grade in all courses is 65% (C+). Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

**API5100 ECONOMICS FOR PUBLIC MANAGEMENT AND POLICY** (3cr.)
The foundations of macroeconomics and microeconomics. Topics covered in microeconomics include: the consumer and the firm; supply; demand and the role of prices; competition and the invisible hand; imperfect competition; coordination failure and incomplete information; public goods and externalities; transaction costs and property rights; income distribution and the tax system; free trade. Topics covered in macroeconomics include: unemployment, inflation and the monetary system; fiscal and monetary policy; growth, development, and living standards. Reserved for students needing to upgrade their knowledge of economics or mathematics prior to taking some courses in the program. Grading: S (satisfactory) / NS (non-satisfactory).

**API5105 CONCEPTS AND ISSUES IN INTERNATIONAL AFFAIRS** (3cr.)
Examination of major concepts and issues in contemporary international affairs. Analysis of the history and development of international relations; major approaches to the study of world politics and global governance; key global issues affecting human welfare in terms of security, economy and environment; practices of governance in a world where the boundary between international and domestic affairs is becoming increasingly blurred.

**API5116 DEMOCRATIC GOVERNMENT AND PUBLIC POLICY** (3cr.)
Study of the making of public policy in Canada and other liberal democracies, with emphasis on how democratic institutions, norms and politics shape public policy. Topics include the workings of democratic governments, the constitutional constraints placed on their authority, intergovernmental relations, the role of the bureaucracy and its relation to the political executive, policy design and the selection of policy instruments, public opinion and agenda-setting, citizen engagement, lobbying and interest representation.

**API5125 MACROECONOMIC POLICY** (3cr.)
Focus on the power and limitations of macroeconomic policy in promoting long term growth and in stabilizing short run fluctuations. Topics include the determination of output, employment, investment, inflation, interest rate, balance of payments, and the exchange rate. Analysis of the local and global economic consequences of fiscal and monetary policies implemented by governments. An examination of the actual conduct of fiscal and monetary policy by governments will place the Canadian experience in a comparative perspective.

**API5126 MICROECONOMICS FOR PUBLIC POLICY** (3cr.)
Systematic exposition of the principles and techniques of microeconomic theory that are most useful in analyzing public policies. Topics include the theory of the consumer, the theory of the firm, market mechanisms and general equilibrium analysis. The course will offer a general framework to improve the understanding of the resource allocation and welfare consequences associated with policies such as taxes, subsidies, regulation, and government transfers. Case studies of government intervention in the economy will be used to illustrate the concepts and theories examined.
API5135 ETHICS AND MORAL REASONING FOR PUBLIC AND INTERNATIONAL AFFAIRS (3cr.)
Examination of ethics and moral reasoning applied to the study of public policy and international affairs. Current debates in moral philosophy and how they help better understand contemporary controversies in public and international affairs. Examination of a number of current policy debates, such as issues of justice in social and environmental policy, the use of military intervention in international affairs, and the accommodation of religious and ethnic differences in liberal democracies.

API5136 RESEARCH METHODS FOR PUBLIC POLICY (3cr.)
Introduction to the various methods used in policy research and to use of multivariate quantitative methods to conduct a research project. Research design, data sources and analysis. The qualitative methods examined include the use of focus groups and interviews; quantitative methods include simple and multiple regression, logistic regression, and factor analysis.

API6001 STAGE I / INTERNSHIP I (6cr.)
Expérience en milieu de travail. Noté S (satisfaisant) / NS (non satisfaisant) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. Préalable : permission du responsable des études supérieures. / Experience in a workplace setting. Graded S (satisfactory) / NS (not satisfactory) by a professor in the program based on the written report and the evaluation of the internship supervisor. Prerequisite: permission of the graduate studies co-ordinator.

API6002 STAGE II / INTERNSHIP II (6cr.)
Expérience en milieu de travail. Noté S (satisfaisant) / NS (non satisfaisant) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. Préalable : permission du responsable des études supérieures. / Experience in a workplace setting. Graded S (satisfactory) / NS (not satisfactory) by a professor in the program based on the written report and the evaluation of the internship supervisor. Prerequisite: permission of the graduate studies co-ordinator.

API6311 PUBLIC ECONOMICS (3cr.)
Public economics studies how government intervention affects the economy. Topics covered include the efficiency of the competitive equilibrium, departures from efficiency, externalities and public goods, imperfect competition and asymmetric information; issues in political economy, including rent-seeking; and the inter-temporal issues of social security and economic growth. Case studies of policies will be drawn from Canada and other countries.

API6312 PUBLIC FINANCE (3cr.)
Public expenditures and taxation, mainly in Canada. Topics covered include social welfare programs; employment insurance; public pensions: old age security and the Canada pension plan; health care; education; personal income tax; consumption taxation; taxes on wealth and property; corporate tax; fiscal federalism in Canada including equalization payments among provincial governments.

API6313 MULTI-LEVEL GOVERNANCE AND PUBLIC POLICY (3cr.)
Impact of federalism, intergovernmental relations (IGR), and multi-level governance on the policy process in Canada; comparisons will be made to other federations (e.g., Australia) and quasi-federations (e.g., the European Union). The course looks at both the growing role of municipal and Aboriginal governments in the policy process, the impact of multi-level governance for policy and program efficiency and effectiveness, and the implications for accountability, transparency and citizen engagement in governance.

API6314 HEALTH POLICY (3cr.)
Examination of the development of health policy in Canada and selected other OECD countries. Issues covered include the funding of health-care, the role of public, non-profit, and private organizations in the delivery of health care, intergovernmental relations in this field, disease prevention and health promotion, and the impact of government policy generally on the health status of the population.

API6315 SOCIAL POLICY (3cr.)
Examination of the development and transformation of the welfare state in Canada and other OECD countries. Topics covered include poverty and income support, unemployment insurance, child care and family policy, as well as pensions. The course examines the political, economic, and demographic factors that have shaped social policy.

API6316 ENVIRONMENTAL POLICY (3cr.)
Examination of the development of environmental policies in Canada and selected other OECD countries. Topics covered include sustainable development, water and atmospheric pollution, the protection of species-at-risk, biotechnology, and climate change. The course examines the political and economic factors that shape environmental policy, including the interplay between domestic and international factors.

API6317 IMMIGRATION, DIVERSITY AND PUBLIC POLICY (3cr.)
Issues of immigration and diversity with an emphasis on public policy. Topics covered include the impact of immigration on Canada’s population and economy, its implications for public policies, diversity and conceptions of citizenship in Canada, the United States and the European Union, and attitudes towards immigration and diversity, including discrimination.

API6319 SPECIAL TOPICS IN PUBLIC POLICY (3cr.)

API6331 INTERNATIONAL FINANCE (3cr.)
Analysis of international financial markets and the environment in which they operate. Topics covered include foreign exchange markets (spot, forward, currency futures and options markets); purchasing power parity and the interest rate parity conditions; the exchange rate systems -- past to present (Breton Woods and post-Breton Woods periods); special topics such as currency and financial crises, the pricing of currency derivatives, the need for a new international financial architecture, the volatility/overshooting models of exchange rates, the European monetary system and the target zones and realignment models; the European economic and monetary union and the theory of optimal currency areas; the relative merits of fixed, flexible and hybrid exchange rate regimes.
API6332 INTERNATIONAL TRADE (3cr.)
Theoretical and empirical aspects of international trade. Topics covered include the gains from trade; the causes and consequences of trade; the alternatives to free trade (tariffs, quotas and non-tariff barriers, customs unions); factor movements, growth, and the theory of direct foreign investment; Canadian trade and foreign investment policies.

API6333 INTERNATIONAL LAW AND ETHICS (3cr.)
Issues in international affairs from a legal and ethical perspective. The course investigates the obligations and rights of actors in the international system, as well as the ethical and legal dimensions of specific important issues in international affairs, such as the legitimacy of the use of force, humanitarian crises and the "responsibility to protect", the international debt of developing countries, and the protection of the commons (e.g. oceans, atmosphere).

API6334 REGIONALISM AND INTEGRATION (3cr.)
Theories and practice of regional cooperation and integration. Topics include different forms of regionalism, including economic, political and security cooperation, in the European Union, North America, and other regions of the world. The course also addresses the implications of regionalism and integration for Canada's foreign and domestic policy.

API6335 CANADIAN FOREIGN POLICY (3cr.)
Historical and contemporary analysis of Canada's foreign policy. Topics include the emergence and growth of Canada as an actor on the world stage, its evolving priorities and roles in international affairs, the relationship between foreign and domestic policies, the management of Canadian foreign policy, and current issues and challenges.

API6336 DEFENSE POLICY AND MILITARY AFFAIRS (3cr.)
Processes and outputs of defense policy in key Western states, including Canada. The course begins with an overview of the threats to security in the modern world and then examines models of defense policy making, before moving on to a more detailed analysis of the defense policies of selected states and how they are made.

API6337 PEACE OPERATIONS AND POST-CONFLICT RECONSTRUCTION (3cr.)
Concepts and practice of peacekeeping, peace-making and post-conflict reconstruction. Topics include the history and development of peace operations before and after the Cold War, preventive diplomacy, conflict resolution, humanitarian emergencies, the role of military and civilian actors in peace operations, and the rehabilitation of countries after civil war.

API6339 SPECIAL TOPICS IN INTERNATIONAL AFFAIRS (3cr.)

API6351 INTERNATIONAL ECONOMICS AND DEVELOPING COUNTRIES (3cr.)
Introduction to the economic analysis of developing countries. The course will address the different tools used to measure economic development as well as the obstacles to growth and development in the Third World. Issue areas considered include macro-economic adjustment, financing development, population growth, human capital, technological progress and facilitating institutions.

API6353 HUMAN RIGHTS AND DEMOCRATIZATION (3cr.)
The politics of human rights in the context of countries in the process of democratization. Topics include the historical evolution of the meaning of "human rights"; the philosophical foundations of the concept of human rights; formal mechanisms for protecting human rights; experiences of implementation of human rights legislation and enforcement; rights-based approaches to international development; the activities and policies of non-governmental organizations promoting human rights; transitional justice and institutional reform in the context of democratizing countries.

API6356 ENVIRONMENT, NATURAL RESOURCE MANAGEMENT AND DEVELOPMENT (3cr.)
Examination of the relation among natural resource management, environmental protection, and development. Topics include the factors shaping the management of natural resources in developing countries, the impact of environmental and natural resources policies on the development of countries, the importance of environmental issues in the development policies of international organizations, and the impact of environmental issues on the prospects for a sustainable form of development.

API6357 CONFLICT AND HUMAN SECURITY (3cr.)
Examination of the relationship between conflicts and development, and exploration of the concept of human security as an approach to both development and peace-building. Students will become familiar with key theories of conflict, with particular attention to recent theories of “new wars” in the context of globalized economies and transnational networks. Exploration of the relationship between conflict and development outcomes using case studies.

API6360 Multilateralism and International Institutions (3cr.)
History and evolution of institutions of multilateral governance. Different institutional forms and practices of multilateralism, including the nineteenth century balance of power system and collective security systems-- beginning with the League of Nations and continuing with the United Nations. Dynamics of multilateral governance within regional institutions (e.g. the EU and NATO), as well as contemporary international regimes in different issue areas (e.g. economic and environmental regimes). The nature of multilateral governance in a world in which non-state actors and private authority are increasingly important.

API6361 US Foreign Policy (3cr.)
Study of United States foreign policy, analyzing both historical and contemporary themes such as democracy- and trade-promotion, security issues, and the environment. Study of the changing place in the world of the United States of America as well as of actors such as the White House, the National Security Council, Congress, the military, interest groups and lobbies, the news media, and mass opinion.

API6362 Diplomacy and Conflict Resolution (3cr.)
Examination, by means of a combination of conceptual and case study sessions, of the role of diplomacy in the resolution of conflict. The objective of the course is to more fully understand where conflict resolution fits in contemporary international relations and to broaden our understanding of how diplomacy, including track two processes, works as a conflict resolution mechanism. Special emphasis may be placed on particular aspects of the subject, such as track two diplomacy and its relationship with official diplomacy in the resolution of conflicts.

**API6363 Politics and Conflict in the Middle East (3cr.)**
An overview of contemporary Middle East politics, with a focus on the Arab-Israeli conflict, in the context of domestic, regional and international dynamics, with space given to the conflicting narratives of the Palestinians, the Arab States, and Israel. The course will examine crucial issues that affect the Middle East today, such as the influence of colonialism and nationalism; the role of authoritarian rule; the role of the military in state and politics; the politics of religion and the challenge of political Islam; and the growth of democratic politics, with reference to the 2011 “Arab Revolutions”.

**API6364 War and Organized Violence (3cr.)**
While the number of inter-state wars is decreasing, other forms of organized violence, such as civil wars, genocides, terrorism, asymmetrical wars, or international military interventions continue to be a threat to international security. This course will provide students with an overview of recent theoretical contributions to the study of organized violence.

**API6365 Contemporary Security Studies (3cr.)**
Critical analysis of a range of transformations in the realm of security, and the challenges they present for analysts and policymakers. Study of how security has become a pervasive theme and dominant concern of modern political life, and of how traditional ideas and institutions that defined security are being challenged by dynamics that cross state borders, and involve a diverse range of new ideas, organizations and technologies.

**API6399 CAPSTONE SEMINAR (3cr.)**

**API6410 STAGE INTERNATIONAL / INTERNATIONAL INTERNSHIP (3cr.)**
Stage de quatre mois à l’étranger, permettant à l’étudiant ou étudiante d’observer et de participer à la pratique des affaires internationales par l’entremise du travail au sein d’une organisation gouvernementale ou internationale. Le stage comprend l’obligation de rédiger un rapport qui comporte une analyse de la manière dont les connaissances et les habiletés acquises durant le programme d’études ont été mises en pratique durant le stage. Le stage est noté S/NS par un professeur de l’École supérieure d’affaires publiques et internationales en tenant compte du rapport de l’étudiant et de celui du superviseur du stage. Prétable : réussite de tous les cours obligatoires; approbation du responsable des études supérieures API / Four-month internship abroad, introducing the student to the practical application of international affairs from the perspective of life and work in the office of a government or international organization. Each student prepares, as part of this internship, a report that analyzes how knowledge and skills acquired in their program of study have been employed during their internship. The internship is graded S/NS by a professor of the Graduate School of Public and International Affairs based on the student's report and that of the internship supervisor. Prerequisite: Completion of all compulsory courses; approval of the API graduate program director.

**API6999 MÉMOIRE / RESEARCH PAPER (6cr.)**

**Public Ethics**

The Faculty of Philosophy at Saint Paul University, in collaboration with the Faculties of Theology and of Human Sciences, offers a Graduate Diploma in Public Ethics and a program leading to the Master of Arts in Public Ethics (MA Pub.Ethics). This degree is conferred jointly by the Senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The program is based upon course and seminar work, reflection on practical experience, and research in public ethics. The program is designed for students wishing to specialize in public ethics at the graduate level or to prepare themselves for doctoral work; for mid-career professionals wishing to reflect and build on their professional experience and previous studies and who may wish to advance their careers, make career changes, or prepare for doctoral studies.

**Program Objectives**

The program is designed to prepare graduates who are public ethics analysts and consultants with competencies in the following:

- To discern the values and ethical concerns involved in particular policy statements or social and political practices and to propose appropriate strategies for taking these values and ethical concerns into consideration in the further formulation of policy statements and establishment of such practices at regional, national and international levels;
- To study more deeply the major ethical questions raised by society;
- To discern the values and the ethical concerns arising from, or involved in, a society defined more and more in terms of information creation and transfer and to propose appropriate strategies for taking these values and ethical concerns into consideration in the further evolution of an information-oriented communication society.

The program is governed by the *general regulations* of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.
Programs

Graduate Diploma Public Ethics
Master of Arts Public Ethics

Admission

To be admitted to the master's program, candidates must:

- Have obtained an honours bachelor's degree, or the equivalent, in philosophy, ethics, political science, governance studies, public policy, or in another discipline judged relevant, with a minimum grade point average of 70% (B);
- Submit two letters of reference, at least one of which must be from a professor;
- Be proficient in at least one of Canada's two official languages, and have a good enough reading knowledge of the other official language to be able to read texts in that language.

In exceptional cases, candidates who do not meet the first two criteria as defined above may be admitted to the master's program, provided they can demonstrate, to the satisfaction of the Admissions Committee, that they possess adequate knowledge and professional experience (for example, experience as a policy analyst in the public sector). Depending on the case, such candidates may be required to complete qualifying courses in pertinent disciplines prior to admission.

Qualifying program

1. Candidates may enroll in a qualifying program on the recommendation of the Admission Committee (it is not possible to apply directly to a qualifying program).
2. The number of credits taken in a qualifying program may not exceed 36.
3. The qualifying program must be completed within three consecutive sessions or less.
4. The student must obtain a minimum grade of C+ in each course, and have an overall B average.
5. Students wishing to complete their qualifying courses at another university are advised to have their course of studies approved in advance by the program coordinator.

Language requirement

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the "Admission" section of the general regulations of the FGPS.

In accordance with Saint Paul University and the University of Ottawa policy, students have a right to produce their work and to answer examination questions in French or in English.

Program Requirements

The Master of Arts in Public Ethics program consists of coursework and a research paper or thesis.

The master's program with research paper or thesis is a two-year program.

Students may apply to complete part of the program on a part-time basis as long as the three-session residency requirement has been met. All students, whether part-time or full-time, must complete all degree requirements within four years of their initial registration in the program.

Master's program with research paper (36cr.)

- Compulsory courses (18cr.)
  
  EPE5101 SOCIAL PHILOSOPHY (3cr.)
  EPE6300 MAIN ETHICAL THEORIES I (3cr.)
  EPE6307 MAIN ETHICAL THEORIES II (3cr.)
  EPE6309 ETHICS, PHILOSOPHY AND PUBLIC POLICY (3cr.)
  EPE6310 SEMINAR IN PUBLIC ETHICS I (3cr.)
  EPE6311 SEMINAR IN PUBLIC ETHICS II (3cr.)

- Optional courses (12cr.)
  - Four courses (12cr.) chosen from among the following:

    EPE6301 MILITARY AND PEACEKEEPING ETHICS (3cr.)
The MRE is conferred jointly by the University of Ottawa and Saint Paul University.

The Faculty of Human Sciences at Saint Paul University offers a program leading to the Master in Religious Studies (MRE), conferred jointly by

The request for transfer must be made during the third session of full-time registration (or ... pprobation déontologiques, planification et exécution de la recherche et de la rédaction. Réservé aux étudiants inscrits à

Duration of the program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Residence

Students must register full-time for a minimum of three sessions.

Minimum standards

The passing grade in all courses is C+. Students who incur two failures are withdrawn from the program.

Courses

EPE5101 SOCIAL PHILOSOPHY (3cr.)
Study of the philosophical underpinnings of social life from the theoretical approaches of living together and of the common good, to problems of contemporary societies, such as solidarity and social citizenship rights.
EPE6300 MAIN ETHICAL THEORIES I (3cr.)
Study of the classic and canonical works of Aristotelian or virtue ethics, deontology, contractualism, and consequentialism including utilitarianism. Initiation to the basic concepts grounding each theory and assessment of their strengths and weaknesses.

EPE6301 MILITARY AND PEACEKEEPING ETHICS (3cr.)
Examination of the thought on ethics by philosophers and military personnel. Readings from Cicero, Julius Caesar, Marcus Aurelius before turning to renaissance and modern thinkers. Contemporary ethics of war, the nature of the soldier and the peacekeeper. Theoretical discussions and a detailed look at current policies and thinking at the Department of National Defence.

EPE6302 ENVIRONMENTAL ETHICS (3cr.)
Ethical analysis of environmental policies. Nature of the relationship between humans and the environment.

EPE6303 ETHICS AND HUMAN RIGHTS (3cr.)

EPE6304 ETHICS AND INTERNATIONAL DEVELOPMENT (3cr.)
Ethical components of development and underdevelopment theories. Rights and obligations of wealthy countries towards poor countries. Ethical critique of policies governing international aid.

EPE6305 ETHICS AND HEALTH CARE (3cr.)

EPE6306 ETHICS, PRIVACY AND INFORMATION (3cr.)
Analysis of the impact of the development of New Information and Communications Technologies (NTIC) on privacy and the confidentiality of personal information.

EPE6307 MAIN ETHICAL THEORIES II (3cr.)
Study of the main 20th- and 21st-century versions of the classical ethical theories, and of how these theories are challenged by and attempt to respond to contemporary ethical issues. Prerequisites: EPE6300 MAIN ETHICAL THEORIES I

EPE6308 SECULARISM AND PUBLIC LIFE (3cr.)
Study of the relationship between secularism and public life in contemporary liberal democratic societies, focusing especially on institutions, government and the Canadian public sphere.

EPE6309 ETHICS, PHILOSOPHY AND PUBLIC POLICY (3cr.)
Study of the concrete and normative aspects of public policy and of their ethical and philosophical implications, both locally and globally. Study of the main public policy issues and challenges in Canada as well as in other countries.

EPE6310 SEMINAR IN PUBLIC ETHICS I (3cr.)
Acquiring essential skills for developing a research question in public ethics. Methodologies include literature review, case-study approaches and critical analyses of texts. Preparation and approval of research plan.

EPE6311 SEMINAR IN PUBLIC ETHICS II (3cr.)
Critical analyses of policies and philosophical and ethical texts that are relevant to the major research paper or the thesis. Prerequisites: EPE6310

EPE6320 SELECTED TOPICS IN ETHICS (3cr.)
Study of a specialized area in ethics.

EPE6901 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)
Étude avancée d’un sujet déjà analysé dans le cadre du programme, exploration d’un thème dans un domaine particulier de l’éthique. / Advanced study of a question already analysed within the framework of the program, exploration of a theme in a particular area of ethics.

EPE6902 RESEARCH INTERNSHIP (3cr.)
Practical application of acquired theoretical knowledge in public ethics in a professional setting. A minimum of 130 hours professionally supervised in an environment that includes a public ethics component or involves analyses of public policies. The internship incorporates a cumulative reflexive practice that serves to encourage the critical integration of theory and practice. The internship culminates in the writing of a detailed practicum report. Graded S/NS (satisfactory/not satisfactory) by a professor in the program based on the written report and the evaluation of the internship supervisor. Prerequisites: Completion of 9 credits in the MA program with an average of at least B. Approval of the internship proposal by the program director.

EPE6998 MÉMOIRE / RESEARCH PAPER (3cr.)

EPE6999 THÈSE DE MAÎTRISE / MASTER’S THESIS (12cr.)

CMN5115 COMMUNICATION ETHICS (3cr.)
Emphasis on the significance of ethical principles and responsibilities of public communicators, as well as sanctions faced when communicators fail to uphold these principles. Critique of self-regulation of the media. Analysis of argumentation. Study of legal precedents with respect to defamation.
ECS5304 ETHICAL DIMENSIONS OF CONFLICT (3cr.)
Conceptual and procedural ethical issues concerning norms of justice and reconciliation. Relation of ethical issues to self-other dialectics,
dynamics of discourse and power, gender and class, memory and agency.

PAP6102 DEMOCRATIC GOVERNANCE (3cr.)
This seminar provides an examination of how democratic governments structure their decision-making processes for effectiveness,
representation and accountability. A particular focus of this seminar is a critical evaluation of the New Public Management reforms, and an in-
depth review of different models of government intervention and policy-making from a comparative perspective.

SOC7150 INTERETHNIC RELATIONS: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)
Principal sociological theories in interethnic relations, and the use of these theories in the analysis of the social structure of a number of
multiethnic societies, especially Canada.

Other graduate courses deemed appropriate to the program and offered within the areas of specialization available through the other faculties of
Saint Paul University or the University of Ottawa may, with permission, be included in the program.

**Religious Education**

The Faculty of Human Sciences at Saint Paul University offers a program leading to the Master in Religious Studies (MRE), conferred jointly by
the Senates of Saint Paul University and of the University of Ottawa, with which Saint Paul is federated.

**Objectives**

- Enhance the attitudes, knowledge and skills of Catholic religious educators;
- Provide additional possibilities for personal growth in faith;
- Provide a better understanding and integration of the principles and methods of religious education;
- Provide resources for the integration of Christian faith and service.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the
programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.

**Programs**

Master of Religious Education

**Admission**

- To be admitted to the MRE program a candidate must hold a baccalaureate degree from an accredited institution with a minimum 70 per
  cent (B) average.
- A candidate must have successfully completed at least five 3-credit courses in the field of education. Candidates holding a teacher’s
certificate or a BEd are considered as having fulfilled this prerequisite.
- A candidate must have successfully completed at least five 3-credit courses in the field of theology. Two of these courses must be
  introductory courses in the Old and New Testaments. At least two of the three other courses must be courses in the field of theology
  (biblical studies, spirituality, ethics, Church history or systematic theology). One 3-credit course may be in a field of religious studies
  considered acceptable by the admissions committee. For teachers in the Separate School system of the Province of Ontario, the
  OECTA/OSSTA Ministry Course in Religious Education (Parts I, II and III) will be recognized as the equivalent of two 3-credit courses.
- A candidate must have experience in the teaching of religious education: (1) teachers of boards of education must have two years of
teaching experience with at least one year of teaching religious education authenticated by a letter from the supervisory officer of the
school board; (2) with regard to teachers of parish religious education programs or diocesan directors of religious education, this condition
for admission may be fulfilled in another way deemed equivalent by the Faculty of Theology.

**Degree**

The MRE is conferred jointly by the University of Ottawa and Saint Paul University.

**Program Requirements**
The Master’s degree in Religious Education (MRE) is a professional program consisting of 30 credits. The MRE program consists of two modules: a theological module and a religious education module.

As the primary objective of the program consists in training competent teachers in religious education, the program is centred on the practicum of teaching religious education. The theoretical courses are intended to facilitate the two practicums.

**Duration of the Program**

The MRE program is a part-time program with a three-year cycle. Students will register as part-time regular students. The program must be completed within four years.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

**Master in Religious Education**

The theological module consists of the following courses:

**THO5101 JESUS THE CHRIST AND SALVATION** (3cr.)
The message and activity of Jesus of Nazareth. The meaning of the death and resurrection of Jesus as the eschatological event of salvation. The identity of Jesus and the question of God. Teaching the message and person of Jesus.

**THO5102 CHURCH AND WORLD** (3cr.)
The Church as institution and event. Its Christological origin. The importance of history for understanding the Church and its traditions. The Church's mission in the world with a specific focus on education. Conditions and means of membership.

**THO5103 LITURGY** (3cr.)
Theology and historical development of liturgy. Its major components: the liturgical seasons, the process of Christian initiation, different forms of liturgical prayer. Liturgy and youth. Liturgy and catechesis.

**THO5104 MORAL EXISTENCE AND CHRISTIAN LIFE** (3cr.)

**THO5105 FAITH AND THE CHALLENGES OF MODERN CULTURE** (3cr.)
The interaction of Christian faith, religion and cultural processes. The implications for education.

The religious education module consists of the following courses:

**THO5106 RELIGIOUS EDUCATION** (3cr.)
The transmission of faith in the current cultural context. The main theories of religious education.

**THO5107 TEACHING AND FAITH TRADITION** (3cr.)
The history of catechetics. The role of the teacher in religious education. The challenges of transmitting a faith tradition in religious education.

**THO5110 LEADERSHIP IN CATHOLIC INSTITUTIONS** (3cr.)
Exploration of the concepts and practices of leadership for Catholic Institutions (history of Catholic institutions, models of leadership, leadership in Bible and tradition, faith leadership in schools, canonical contexts).

**THO5111 ETHICAL, CULTURAL AND RELIGIOUS ISSUES FOR CATHOLIC LEADERS** (3cr.)
Examination of some of the ethical, cultural and religious challenges facing leaders of Catholic educational institutions (epochal shift of modernity, community and individual, the human rights tradition, the Christian ethical and moral framework, the ecumenical and inter-religious context, spirituality).

**IPA5180 SOCIOLOGICAL AND PSYCHOLOGICAL PERSPECTIVES ON RELIGIOUS DEVELOPMENT** (3cr.)
The developmental religious process from a psychological perspective. Faith development as an emotional, intellectual, volitional and experiential process. The
social context and variables (family, rural/urban, class, sex, etc.) of faith. Faith and human experience.

OR

THO5108 CHRISTIANITY AND WORLD RELIGIONS (3cr.)
History of the relationship of Christianity to the main spiritual traditions of the world. Convergences and divergences. Theological and anthropological ground for dialogue among the traditions. Christian education and world religions.

IPA5181 PRACTICUM IN RELIGIOUS EDUCATION I (3cr.)
Students receive training in the basic skills necessary for teaching religious education. This course helps religion teachers to plan their teaching process of a specific religious education program currently used by school boards or dioceses, to understand these programs in relation to the principles of religious education, to practice the specific program in a school or parish context, and to evaluate it. Student evaluation takes place by way of feedback from fellow students, debriefing, work samples, tape recordings, verbatim, or other reports. This practicum will be conducted under the supervision of an experienced and qualified catechist and MRE program faculty. It generally will be held during the second or the third year of the program.

IPA5182 PRACTICUM IN RELIGIOUS EDUCATION II (3cr.)
Students receive training in the planning, practice and evaluation of teaching religious education. This course helps religion teachers to plan and write original religious education materials, to teach these materials, and to evaluate both the materials and the process. Student evaluation takes place by way of feedback from fellow students, debriefing, verbatim, and other suitable reports. This practicum is a group learning and evaluation process under the supervision of an experienced and qualified catechist and MRE program faculty. It generally will be held during the second or third year of the program.

Religious Studies

The Department of Classics and Religious Studies offers programs of study leading to the degrees of Master of Arts (MA) in Religious Studies and Doctor of Philosophy (PhD) in Religious Studies.

Objectives and methods

The Department of Classics and Religious Studies (sector: Religious Studies) focuses on the study of the religious phenomenon through teaching and research in the same manner and on the same level as any other category of facts accessible to human experience and observation.

The disciplines that play a role in the study of religions are primarily of a historical, sociological, psychological and anthropological nature. Such a study must take into account the plurality of religious traditions and expressions in society and examine the relationships among them.

Research on the meaning of religious phenomena is accomplished through analysis and comparison of the various means of religious expression, both in the past and present. No tradition is considered normative.

Areas of research

The programs focus on religions in Canada, including Amerindian and Inuit traditions, and on religions in the comparative cultural context as well as religions in the Graeco-Roman World. The comparative cultural approach provides an opportunity to explore religious phenomena across different religious traditions expressly within their specific cultural contexts. The program favours the methods of anthropology, history, psychology and sociology.

The Department participates in collaborative programs in Women’s Studies and in Medieval and Renaissance Studies at the MA level. For more information on these programs, see "Apply now."

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Religious Studies
Master of Arts Religious Studies Specialization in Medieval and Renaissance Studies
Master of Arts Religious Studies Specialization in Women's Studies
Doctorate in Philosophy Religious Studies
Doctorate in Philosophy Religious Studies Specialization in Canadian Studies
Admission

Applicants who hold a baccalaureate with honours in Religious Studies or the equivalent with at least second-class standing may be admitted to the master’s program. Those who do not have an honours degree in religious studies may be admitted to a qualifying year during which they complete the requirements normally included in the honours program. The qualifying year comprises a minimum of five courses equivalent to selected compulsory courses of the honours program at the University of Ottawa.

Official applications for admission should be submitted by the deadlines listed on the website of the Faculty of Graduate and Postdoctoral Studies. Applications received after a deadline will be considered only if positions are available.

As part of their application, applicants must submit a statement (1-2 pages) describing their research interests.

All applicants must be able to understand, speak, and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Collaborative programs

The Religious Studies sector of the Department of Classics and Religious Studies is a participating unit in the collaborative programs in Women’s Studies (master’s level only) and in Medieval and Renaissance Studies (master’s level only).

- The program in Women’s Studies has been established for students wishing to enrich their training in Religious Studies by including an interdisciplinary component in Women’s studies. The specific requirements of the collaborative program include two core courses and a thesis or major research paper on a topic related to Women’s studies. The compulsory courses of these collaborative programs fit into the religious studies course requirements and do not add to the number of courses required for the master’s in Religious Studies.

- The program in Medieval and Renaissance Studies has been established for students wishing to enrich their training in Religious Studies by including an interdisciplinary component in Medieval and Renaissance Studies. The specific requirements of the collaborative program include two core courses in medieval studies and a thesis on a topic related to Medieval and Renaissance Studies.

Students should indicate in their initial application for admission to the master’s program in Religious Studies that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

Program Requirements

MA with thesis

The master’s program with thesis consists of 18 credits in courses and directed studies, and the writing and defence of a thesis.

The 18 credits in courses comprise:

SRS5115 SEMINAR IN RELIGIOUS STUDIES (3cr.)
or
SRS5915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)
SRS5928 PROJET DE THÈSE / THESIS PROPOSAL (3cr.)

Two graduate courses in Religious Studies (6cr.)

One additional course or directed study in Religious Studies (3cr.)

SRS7988 RECENSION DES ÉCRITS - M.A. / LITERATURE REVIEW - MA (3cr.)

For students in a collaborative program, the 18 credits in courses comprise:

SRS5115 SEMINAR IN RELIGIOUS STUDIES (3cr.)
or
SRS5915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)
SRS5928 PROJET DE THÈSE / THESIS PROPOSAL (3cr.)

Two compulsory courses in the collaborative program (6cr.)

One graduate course in Religious Studies (3cr.)
Students are allowed to register for a maximum of 15 credits per session in courses or seminar work and/or directed studies at the master's level.

Graduate students are allowed to take undergraduate courses for no more than one third of their course work, provided they complete additional work to the satisfaction of the professor.

**Literature Review**

Students must complete a directed study (SRS7988) on the scholarly literature in the field of their research project. This literature review should be broader than, and does not replace, the more specific review of literature that normally forms part of a thesis or research paper. Students survey and discuss the literature in a paper approximately 25 pages in length. The reading list must be approved in advance by the student’s thesis supervisor. The paper is evaluated S/NS by the professor directing the study and one other professor. Instructions regarding the literature review can be obtained from the Director of Graduate Studies in the department.

**Thesis**

After consultation with the research supervisor and not later than the second session of studies, the student must present a thesis topic to the Graduate Studies Committee for approval.

Before the end of the first year of studies, the thesis project must be presented for examination and discussion at a colloquium attended by professors and students of the department. After the colloquium, the project must be submitted to the Graduate Studies Committee for approval. Instructions regarding the colloquium and the thesis project can be obtained from the Director of Graduate Studies in the department.

For additional information on deadlines and on the writing, submission, examination, and revision of the thesis, please consult the general regulations of the FGPS as well the section on "Thesis and research paper".

**Colloquium**

Participation in the department's regular research colloquia is compulsory for all registered graduate students.

**MA with research paper (30 credits)**

The master's program with research paper consists of 24 credits in courses and directed studies, and a research paper (6 credits).

The 24 credits in courses comprise:

SRS5115 SEMINAR IN RELIGIOUS STUDIES (3cr.)

or

SRS5915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)

Four graduate courses in Religious Studies (12cr.)

Two additional courses or directed studies in Religious Studies

SRS7988 RECENSION DES ÉCRITS - M.A. / LITERATURE REVIEW - MA (3cr.)

For students in a collaborative program, the 24 credits in courses comprise:

SRS5115 SEMINAR IN RELIGIOUS STUDIES (3cr.)

or

SRS5915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)

Two compulsory courses in the collaborative program (6cr.)

Three graduate courses in Religious Studies (9cr.)

One additional course or directed study in Religious Studies (3cr.)

SRS7988 RECENSION DES ÉCRITS - M.A. / LITERATURE REVIEW - MA (3cr.)

Students are allowed to register for a maximum of 15 credits per session in courses or seminar work and/or directed studies at the master's level.

Graduate students are allowed to take undergraduate courses for no more than one third of their course work, provided they complete additional work to the satisfaction of the professor.

**Research paper**

The research paper, which is worth six credits, is a critical study of approximately 40 pages directed by a full-time professor of religious studies chosen by the student. Registration for this research paper (SRS 5999) should be done following approval by the professor selected. The paper will be evaluated by the professor who directed it and by another professor appointed by the department. This paper should demonstrate the student’s research potential and ability to investigate a problem in depth.

**Literature review**

Students must complete a directed study (SRS7988) on the scholarly literature in the field of their research project. This literature review should be broader than, and does not replace, the more specific review of literature that normally forms part of a thesis or research paper. Students survey and discuss the literature in a paper approximately 25 pages in length. The reading list must be approved in advance by the student’s thesis supervisor. The paper is evaluated S/NS by the professor directing the study and one other professor. Instructions regarding the literature review can be obtained from the Director of Graduate Studies in the department.
Colloquium
Participation in the department's regular research colloquia is compulsory for all registered graduate students.

Collaborative program in Women's Studies

Students admitted to the Collaborative program in women's studies at the master's level must meet the requirements for a master's degree in their primary program as well as the requirements of the women's studies program. Normally, the women's studies courses are recognized as partial fulfillment of the requirements of the student's primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women's Studies requirements are:

- Two compulsory courses:
  FEM5300 FEMINIST THEORIES (3cr.)
  FEM5103 FEMINIST METHODOLOGIES (3cr.)

- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women's Studies Graduate Committee as well as by the student's primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

- The thesis supervisor must possess Women's Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women's Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.

- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women's Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women's studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women's Studies Graduate Committee.

- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a professor approved by the Women's Studies Graduate Committee.

Collaborative program in Medieval and Renaissance Studies

Students in the program must complete the requirements of their primary program and those of the collaborative program. One of the two 3-credit courses in Medieval and Renaissance Studies (MDV5300 or MDV5500) will be counted towards the requirements of the primary program. Consequently, students in the specialization will have only one extra course to take.

The requirements of the collaborative program are as follows:

Two compulsory courses:

MDV5100 Medieval and Renaissance Studies Research Methods and Tools (3cr.)

OR

MDV5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3cr.)

AND

MDV5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3cr.)

Students must complete the two compulsory courses before they register to the major research paper or thesis.

A thesis or major research paper on a topic related to Medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.

In both cases, the title of the degree will indicate the discipline of the participating unit with the specification "specialization in Medieval and Renaissance Studies."

Transfer from master's to PhD

Students enrolled in the MA program in Religious Studies at the University of Ottawa may be allowed to transfer to the PhD program. For additional information, please consult the "Admission" section of the PhD program.

The transfer to the PhD must be completed by the end of the fourth session following initial registration in the MA program. The total number of credits to be completed for the Master's and PhD combined is 30 credits.

Duration of program

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

Residence

The residence requirement is three sessions for students admitted on a full-time basis.

Minimum standards
The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

SRS5101 SECOND TEMPLE JUDAISM (3cr.)
Central questions and recent developments in the study of Judaism in the period of the Second Temple.

SRS5102 PSYCHOANALYSIS AND RELIGION (3cr.)
Psychoanalytic thought relating to religion since the work of Sigmund Freud; therapeutic traditions and theories derived from the writings of Melanie Klein, D. Winnicott, W.R.D. Fairbairn and Jacques Lacan.

SRS5103 FREUD, JUNG AND RELIGION (3cr.)
An examination of Sigmund Freud’s and Carl Jung’s writings pertaining to religion and mythology.

SRS5107 ORIGINS OF CHRISTIANITY (3cr.)
Current questions and recent developments in the study of the origins of Christianity.

SRS5115 SEMINAR IN RELIGIOUS STUDIES (3cr.)
An orientation to the study of religion at an advanced level.

SRS5116 CURRENT APPROACHES TO THE STUDY OF RELIGION (3cr.)
The methodological terrain of the current study of religion: the history, theoretical and methodological contributions, and influence of various approaches.

SRS5305 RELIGION AND SOCIETY IN CROSS-CULTURAL ANALYSIS (3cr.)
Comparative sociological analysis of the relations between religion and society in different cultures and regions.

SRS5320 RELIGION AND ANTHROPOLOGY - SELECTED TOPICS (3cr.)
Major theories and debates in anthropological analyses of religion and the associated methodology of ethnography.

SRS5320 RELIGION ET ANTHROPOLOGIE - THÈMES CHOISIS (3cr.)
Théories et débats à la base des analyses anthropologiques du religieux, et de la méthodologie ethnographique dont elles sont inséparables.

SRS5901 HISTOIRE DES SCIENCES DES RELIGIONS / HISTORY OF RELIGIOUS STUDIES (3cr.)
Analyse historique des théories et des approches méthodologiques de l’étude de la religion; développement institutionnel des sciences des religions. / Analysis of theories and methodological approaches in the historical study of religion; the institutional development of religious studies.

SRS5902 TEXTES ET RÉCITS RELIGIEUX / RELIGIOUS TEXTS AND NARRATIVES (3cr.)
Approches actuelles dans l’étude des textes et récits religieux. Études d’aspects tels que l’oralité, l’intertextualité, l’expression, l’aréception et l’idéologie. / Current approaches to the study of religious texts and narratives, exploring such aspects as orality, intertextuality, performance, reception, and ideology.

SRS5903 RITES ET SYMBOLES RELIGIEUX / RELIGIOUS RITES AND SYMBOLS (3cr.)
Approches actuelles dans l’étude des rites et symboles religieux. Étude de la dynamique du symbolisme, de la corporalité, de la communauté, de l’expression et de l’identité. / Current approaches to the study of religious rites and symbols, exploring the dynamics of symbolism, embodiment, performance, community, and identity.

SRS5915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)
Introduction approfondie à l’étude savante du religieux. / An orientation to the study of religion at an advanced level.

SRS5918 RELIGION, ART ET CULTURE / RELIGION, ART AND CULTURE (3cr.)
Étude de la représentation du religieux dans les arts (arts visuels, musique, théâtre, littérature, cinéma) ou de la contribution des arts à la religion. / An examination of the representation of religion in the arts ( visual art, music, drama, literature, and film) or of the contribution of the arts to religion.

SRS5920 APPROCHES ACTUELLES DANS L’ÉTUDE DE LA RELIGION / CURRENT APPROACHES TO THE STUDY OF RELIGION (3cr.)
Le domaine méthodologique de l’étude contemporaine de la religion, y compris l’historicité, les contributions théoriques ou méthodologiques et l’influence de diverses approches. / The methodological terrain of the current study of religion: the history, theoretical and methodological contributions, and influence of various approaches.

SRS5923 LES DÉSÉSSES ET LES FEMMES DANS LE MYTHE ET LE SYMBOLE / GODDESSES AND WOMEN IN MYTH AND SYMBOL (3cr.)
Étude des théoriciens actuels qui fondent leur analyse critique de l’idéologie et de la culture sur les représentations féminines dans l’imagier religieuse. / An examination of the work of current theorists who make use of female representations in religious imagery for the purpose of critical analysis of ideology and culture.
SRS5924 LE JUDAISME DU SECOND TEMPLE / SECOND TEMPLE JUDAISM (3cr.)
Questions essentielles et développements récents dans l'étude du judaïsme du Second Temple. / Central questions and recent developments in the study of Judaism in the period of the Second Temple.

SRS5925 ORIGINES DU CHRISTIANISME / ORIGINS OF CHRISTIANITY (3cr.)
Questions actuelles et développements récents dans l'étude des origines du Christianisme. / Current questions and recent developments in the study of the origins of Christianity.

SRS5926 RELIGION DANS L'ANTIQUITÉ TARDIVE / RELIGION IN LATE ANTIQUITY (3cr.)
Étude de la religion dans le monde méditerranéen de l'Antiquité tardive, en particulier des questions de transformation religieuse, de discours, de conflit, de pluralisme et d'identité. / An examination of religion in the Mediterranean world in Late Antiquity, with particular attention to religious transformation, discourse, conflict, pluralism, and identity.

SRS5927 TRADITIONS CHAMANIQUES / SHAMANIC TRADITIONS (3cr.)
Étude anthropologique des visions du monde chamane et des religions utilisant la transe, ainsi que des pratiques rituelles, thérapeutiques ou artistiques qui y sont associées. / Anthropological study of shamanic worldviews and trance-based religions, and the associated ritual, therapeutic and artistic practices they inform.

SRS5928 PROJET DE THÈSE / THESIS PROPOSAL (3cr.)
La planification et réalisation d'une thèse : définition d'un cadre théorique, formulation de la problématique, mise au point de la méthodologie, détermination des hypothèses et de l'argumentation, préparation d'une description détaillée du projet de thèse, présentation du projet dans un colloque, évaluation et approbation déontologiques, planification et exécution de la recherche et de la rédaction. Réservé aux étudiants inscrits à un programme avec thèse. Préalables: SRS5115/SRS5315 ou SRS8115/SRS8915. / The planning and implementation of a thesis: establishing a theoretical framework, formulating the question, refining the methodology, defining the hypotheses and lines of argumentation, preparing a detailed description of the thesis project, presenting the project in a colloquium, obtaining ethics approval, planning and carrying out the research and writing. Restricted to students registered in a program with thesis. Prerequisites: SRS5115/SRS5915 or SRS8115/SRS8915.

SRS5999 MÉMOIRE / RESEARCH PAPER (6cr.)

SRS6100 RELIGION AND LAW (3cr.)
An examination of the ways in which law defines and regulates religion, focusing especially on the treatment of minority religious groups and the concept of religious diversity.

SRS6101 RELIGION AND HUMAN RIGHTS (3cr.)
An examination of the intersection of human rights regimes and the ways in which they define and delimit religion in the context of current issues.

SRS6900 ÉTUDE COMPARATIVE DU RELIGIEUX / COMPARATIVE STUDY OF RELIGION (3cr.)
Étude comparative d'un thème ou d'un aspect du religieux tel qu'il se manifeste dans diverses cultures. / A comparative study of a theme or aspect of religion as manifested in diverse cultures.

SRS6905 RELIGION ET SOCIÉTÉ / RELIGION AND SOCIETY (3cr.)
Étude de diverses perspectives méthodologiques et théoriques s'appliquant à la dynamique entre religion et société. / An examination of the dynamic between religion and society through a variety of theoretical and methodological perspectives.

SRS6906 RELIGION ET PSYCHOLOGIE / RELIGION AND PSYCHOLOGY (3cr.)
Étude de théories psychologiques actuelles telles que la psychologie critique, la psychologie des profondeurs et la psychologie de l'ego, et de leur rapport aux sciences des religions. / An examination of current psychological theories, such as critical psychology, depth psychology, and ego psychology, as they relate to topics in religious studies.

SRS6907 THÈMES CHOISIS EN CHRISTIANISME / SELECTED TOPICS IN CHRISTIANITY (3cr.)
Étude d'un sujet particulier concernant le christianisme, circonscrit dans un cadre temporel, géographique ou thématique. / Examination of a specific topic in Christianity, defined temporally, geographically or thematically.

SRS6915 THÈMES CHOISIS EN HISTOIRE DES RELIGIONS AU CANADA / SELECTED TOPICS IN THE HISTORY OF RELIGIONS IN CANADA (3cr.)
Étude approfondie des aspects particuliers de l'histoire des religions dans un contexte canadien. / An in-depth examination of particular aspects of the history of religions in a Canadian context.

SRS6915 SYSTÈMES RELIGIEUX DES AMÉRINDIENS ET DES INUIT / AMERINDIAN AND INUIT RELIGIOUS SYSTEMS (3cr.)
Étude de l'expression et de la conceptualisation de la religion chez les Amérindiens et les Inuits. / An examination of the expression and conceptualization of religion in Amerindian and Inuit cultures.

SRS6920 LES RELIGIONS DANS LE CONTEXTE MONDIAL / RELIGIONS IN A GLOBAL CONTEXT (3cr.)
Analyse critique des formes, des concepts et du contenu des religions dans le contexte mondial; théories et débats actuels en sciences des religions. / Critical examination of the forms, concepts, and content of religions in a global context; current theories and discussions in religious studies.

SRS6921 LA RELIGION DANS LE CANADA D'AUJOURD'HUI / RELIGION IN CONTEMPORARY CANADA (3cr.)
La religion au Canada depuis la Deuxième Guerre mondiale; analyses sociologiques, anthropologiques ou historiques. / Religion in Canada since the Second World War; sociological, anthropological, or historiographical analyses.
SRS6922 THEMES CHOISIS EN JUDAÏSME / SELECTED TOPICS IN JUDAISM (3cr.)
Étude approfondie d’un sujet particulier relevant du judaïsme, depuis les traditions rabbiniques jusqu’à la vie des juifs d’aujourd’hui. / A close examination of a specific topic in Judaism from Rabbinic traditions to contemporary Jewish life.

SRS6923 RELIGIONS DE L’ASIE / RELIGIONS OF ASIA (3cr.)
Étude d’un ou plusieurs systèmes religieux de l’Asie, à partir de théories et méthodes actuelles en sciences des religions, telles que les approches interprétativistes, matérialistes, phénoménologiques, historiques, philosophiques, ethnographiques, poststructurales, postcoloniales, etc. / An exploration of one or more religious systems of Asia, using current theoretical and methodological approaches in religious studies (e.g., interpretivist, materialist, phenomenological, historical, philosophical, ethnographic, poststructural, postcolonial, etc.).

SRS6924 LA RELIGION DANS LA PENSEÉ FÉMINISTE ACTUELLE / RELIGION AND CURRENT FEMINIST THOUGHT (3cr.)
Étude de l’influence des théories féministes actuelles sur les méthodes et théories en sciences des religions. / An examination of the influence of current feminist theory on methods and theories in religious studies.

SRS6925 GENRE ET RELIGION / GENDER AND RELIGION (3cr.)
Étude des débats entourant la notion de genre comme catégorie d’analyse dans les sciences des religions. / An examination of developments within religious studies pertaining to the use of gender as a category of analysis.

SRS6980 ÉTUDES DIRIGÉES I / DIRECTED STUDY I (3cr.)

SRS7080 ÉTUDES DIRIGÉES II / DIRECTED STUDY II (6cr.)

SRS7988 RECENSION DES ÉCRITS - M.A. / LITERATURE REVIEW - MA (3cr.)
Vue d’ensemble de la littérature savante du champ d’études dans lequel se situe le mémoire ou la thèse de maîtrise. Rapport écrit à évaluer par le professeur qui l’a dirigé plus un autre professeur. Évalué S/NS. Prérequis: SRS5115/SRS5915. / Review of the scholarly literature in the field of study in which the master’s research paper or thesis is situated. Paper to be evaluated by the professor who supervised it and another professor. Evaluated S/NS. Prerequisite: SRS5115/SRS5915.

SRS7989 THÈSE DE MAÎTRISE / MA THESIS

SRS8016 TRAVAUX DIRIGÉS II / SUPERVISED RESEARCH II (6cr.)

SRS8115 SEMINAR IN RELIGIOUS STUDIES (3cr.)
An orientation to the study of religion at an advanced level.

SRS8915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)
Introduction approfondie à l’étude savante du religieux. / An orientation to the study of religion at an advanced level.

SRS8916 TRAVAUX DIRIGÉS I / SUPERVISED RESEARCH I (3cr.)

SRS9989 THÈSE DE DOCTORAT / PhD THESIS

SRS9998 EXAMEN DE SYNTHÈSE (Ph.D.) / COMPREHENSIVE EXAMINATION (PhD)

Science, Society and Policy (Collaborative)

The collaborative program in Science, Society and Policy allows students registered in one of the participating master’s programs to specialize in science and innovation policy.

The objective of the collaborative program is to provide students with the knowledge and skills needed to evaluate the challenges confronting decision-making at the interface of science and policy. Students will have an opportunity to explore how evidence is used in decision-making, how current policies shape the scientific enterprise, and how emerging technologies interact with society.

The degree awarded specifies the primary program and indicates “Specialization in Science, Society and Policy.”

The program operates within the framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Participating programs
The following primary programs participate in the collaborative program in Science, Society and Policy:

- MA in Communication
- MA in Geography
- MSc in Geography
- MA in Public and International Affairs
- MSc in Biology
- MSc in Chemistry
- MSc in Earth Sciences
- MSc in Physics
- MSc in Chemical Engineering
- MSc in Civil Engineering
- Master of Information Studies (MIS)

**Programs**

Master of Applied Science Chemical Engineering Specialization in Science, Society and Policy
Master of Applied Science Civil Engineering Specialization in Science, Society and Policy
Master of Applied Science Electrical and Computer Engineering Specialization in Science, Society and Policy
Master of Arts Communication Specialization in Science, Society and Policy
Master of Arts Geography Specialization in Science, Society and Policy
Master of Arts Public and International Affairs Specialization in Science, Society and Policy
Master of Information Studies (Bilingual) Specialization in Science, Society and Policy
Master of Science Biology Specialization in Science, Society and Policy
Master of Science Chemistry Specialization in Science, Society and Policy
Master of Science Earth Sciences Specialization in Science, Society and Policy
Master of Science Geography Specialization in Science, Society and Policy
Master of Science Physics Specialization in Science, Society and Policy

**Admission**

Admission to the collaborative program in Science, Society and Policy is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Applications for admission may be submitted at the time of application to a participating master’s program (i.e. primary program) at the University of Ottawa or upon acceptance into a participating master’s program at the University of Ottawa.

To be accepted into the collaborative program candidates must:

- Be admitted to one of the programs participating in the collaborative program;
- Submit a collaborative program registration form;
- Submit a 1-page cover letter (500 words maximum) outlining their interest in the collaborative program and how their research topic or area aligns with the scope of inquiry at the Institute for Science, Society and Policy;
- In the case of a thesis-based program, the collaborative registration form must be signed by the student’s thesis supervisor, as consent to participate in the collaborative program.

Note that some of the primary programs have a co-op option. Students in the collaborative program may also have access to the co-op option provided that space is available, that they meet the co-op admission requirements, and that required courses do not conflict with the schedule of co-op placements.

**Program Requirements**
The requirements of both the primary program and of the collaborative program must be met.

In accordance with the policy of each primary program, the ISP course credits may also count towards the primary program.

**Master’s program with thesis**

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the core course (ISP5101 or ISP5501; 3 credits);
- Presentation and defence of a thesis on a research topic relating to science, society and policy, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the thesis is appropriate for the designation of “Specialization in Science, Society and Policy.” At least one of the thesis advisory committee members and thesis examiners must be recommended by the Science, Society and Policy Graduate Committee.

**Master’s program with research paper/project**

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the core course ISP5101 (3cr.);
- Satisfactory completion of the practicum ISP5103 (3cr.);
- Satisfactory completion of the research paper, which must be on a topic relating to science, society or policy, carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Science, Society and Policy Graduate Committee will determine whether or not the topic of the research paper is appropriate for the designation of “Specialization in Science, Society and Policy.” Two professors evaluate the research paper. One of the two is selected by the primary program, and the other is recommended by the Director of the Science, Society and Policy Graduate Program, upon recommendation by the SSP Graduate Committee.

**Duration of the program**

Full-time students are expected to complete all requirements within two years. The maximum time permitted in all cases is four years.

**Minimum standards**

The passing grade in ISP courses is B. Students who fail two courses are withdrawn from the program.

**Recognition of ISP courses in primary programs:**

- Students in the following programs must take two (2) additional courses (ISP5101 or ISP5501; and ISP5103) to qualify for the Science, Society and Policy specialization:
  - Communication (MA with research paper)
  - Public and International Affairs (MA)
- Students in the following programs must take one (1) additional course (ISP5101 or ISP5501) to qualify for the Science, Society and Policy specialization:
  - Communication (MA with thesis)
  - Geography (MA)
  - Geography (MSc)
  - Information Studies (MIS)
  - Biology (MSc)
  - Chemistry (MSc)
  - Earth Sciences (MSc)
  - Physics (MSc)
  - Chemical Engineering (MASc)
  - Civil Engineering (MASc)
  - Electrical and Computer Engineering (MASc)
- For students in any of the following programs, one or two of the Science, Society and Policy (ISP) courses may replace courses in the student’s primary program, provided that the student has obtained the necessary approvals from their supervisor and/or graduate program director:
  - Public and International Affairs (MA)
  - Geography (MA)
  - Geography (MSc)
  - Information Studies (MIS)

**Courses**

**ISP5101 DECISION-MAKING AT THE INTERFACE OF SCIENCE AND POLICY** (3cr.)
This course explores a number of critical issues in the design and implementation of science (or, more generally, evidence)-based policy. Topics will include: the nature of scientific evidence; who has standing in the provisioning of scientific evidence; the science and non-science of risk assessment; ethical dimensions of policy design and implementation; the role of science in policy design and implementation; the policy making process; and science policy performance evaluation.

**ISP5102 SCIENCE & TECHNOLOGY GOVERNANCE AND COMMUNICATION** (3cr.)
This course explores a number of critical issues in the governance of science and technology (S&T) in democratic societies, with particular emphasis on the Canadian context. Topics will include the following: the history of S&T governance and communication in both Canada and abroad; an overview of the Canadian S&T policy and regulatory landscape; the role of government, the private sector and civil society in S&T governance; policy and regulatory experiments in fostering innovation (and the success thereof); the evolution of public S&T communication strategies and governance of emerging technologies.

**ISP5103 CAPSTONE SEMINAR IN SCIENCE, SOCIETY AND POLICY** (3cr.)
Involves partnering with organization(s) working on an issue relating to science, society and policy. In consultation with a member of the organization, students analyze the issue and complete a written report, either singly or in interdisciplinary teams, under the direction of the seminar professor who is responsible for evaluating the report.

**Social Work**

The School of Social Work offers a master’s program (offered in French only) and a doctoral program (PhD) in social work. The School is a member of the Canadian Association for Social Work Education (CASWE) and the MSS program is approved by the Program Accreditation Bureau of that association.

**Master’s program**

The master’s program in social work offers professional training focused on the analysis of social inequality, minority contexts and the needs and characteristics of the French-speaking population in Ontario.

The aim of the program is to prepare social workers to assume a leadership role in terms of the development, delivery and evaluation of practices and social policies. The program also aims to promote, through social action, the recognition of the rights of marginalized populations or of those living in minority contexts, as well as their access to social services.

The master’s program aims to train “practitioner-researchers” who will acquire analytical and critical thinking related to the practice of social work and the knowledge associated to it.

The School of Social Work aims to achieve these objectives through a research -intervention dynamic in the following two fields of study: family-child and health.

The MSS program consists of two years of training. The first provides students with the theoretical and practical foundations of the social work profession. The second aims to deepen knowledge in one of the two fields of study: health or family - children.

**Doctoral program**

The objective of the PhD program is to train high-calibre researchers or professionals, to provide them with tools to analyze the articulation of the dimensions of micro- and macro intervention practices in social work, and to significantly contribute to the renewal of these practices. Students will acquire critical and in-depth knowledge of social work in its multiple contexts, through scientific reasoning steps to successfully complete the doctoral thesis. The option of completing a practicum in research-intervention is available.

The doctoral program offers two research fields: Health and Family-Childhood.

The compulsory courses of the program are offered in French only. It is possible to take the elective course in French or in English. In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English. If the thesis is written in English, the abstract must be in French and vice versa.

It is recommended that candidates who do not hold a degree in social work complete the practicum in research-intervention during the program.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Social Work

Doctorate in Philosophy Social Work

**Admission**
Les conditions d’admission sont les suivantes :

- Détenir un baccalauréat général de 4 ans ou un baccalauréat spécialisé en sciences sociales, en sciences de la santé, ou l’équivalent.
- Avoir maintenu une moyenne d’au moins « B ».
- Posséder une expérience en service social ou connexe à la profession.
- Avoir obtenu un minimum de six crédits de méthodes de recherche ou l’équivalent.
- Démontrer son aptitude à poursuivre en français des études supérieures. Un test de compétence linguistique pourrait être exigé.
- Présenter un projet de formation précisant le domaine d’études envisagé, la problématique de recherche proposée ainsi que l’expérience de stage prévu.

Les titulaires d’un baccalauréat avec spécialisation en service social peuvent obtenir des équivalences.

**Équivalences**

Sujet à l’approbation de la Faculté des études supérieures et postdoctorales certaines équivalences sont accordées, sur étude des dossiers individuels et sur recommandation de l’École de service social, pour des expériences de travail supervisées par un professionnel d’expérience, à condition de démontrer clairement que les objectifs de formation pratique prévus au stage d’intervention de 1ère année (SVS 5601) auront été pleinement atteints lors de ces expériences de travail. Des critères précis et rigoureux s’appliquent et cette clause ne sera utilisée qu’exceptionnellement pour les personnes possédant une solide expérience de travail professionnel.

Les personnes détentrant un certificat de 30 crédits en service social ou dans un champ d’étude connexe, peuvent obtenir 3 crédits de cours optionnels. Les personnes ayant deux certificats peuvent obtenir jusqu’à 6 crédits de cours optionnels.

Les titulaires d’un baccalauréat avec spécialisation en service social peuvent obtenir des équivalences (approximativement la première année).

Des équivalences de cours (maximum 9 crédits optionnels de 1ère année) peuvent être accordées aux personnes ayant réussi avec une note minimale de B+ des cours similaires au niveau du deuxième ou troisième cycle, selon la pertinence des cours réussis et les normes d’agrément de l’Association canadienne pour la formation en travail social (ACFTS).

**Résidence et scolarité**

Toutes les exigences du programme de maîtrise en service social doivent être remplies en quatre ans, selon les règlements de la Faculté des études supérieures et postdoctorales. Le programme est offert normalement à temps plein. Toutefois, l’inscription à temps partiel est possible dans des cas particuliers. Le maximum de crédits permis lors d’une inscription à temps partiel est de six.

**Première année**

Il faut avoir réussi 21 crédits de cours obligatoires de cote 5000, y compris le stage d’intervention, et 9 crédits de cours optionnels.

Il est possible de s’inscrire à certains cours optionnels de cote 6000 à condition d’avoir réussi les cours obligatoires SVS5500 et SVS5510 et d’avoir obtenu la permission du professeur responsable du cours de cote 6000 en question.

**Deuxième année**

L’inscription à temps plein pendant trois sessions (septembre-décembre; janvier-avril et mai-août) est requise pour compléter la deuxième année du programme.

Les personnes autorisées à s’inscrire à temps partiel en 2e année du programme doivent s’inscrire à temps plein à la session où elles suivent les cours concomitants SVS6530, 6515 et 6601 ou SVS6601.

**Langue du programme**

La langue du programme, y compris celle de la supervision des mémoires et des stages, est le français.

**Mémoire de recherche**

Le mémoire constitue l’aboutissement du projet de maîtrise. Il vise à démontrer les capacités de recherche et d’intervention dans le champ d’étude choisi.

**Stages**

La région de la capitale du Canada offre une grande variété de stages d’intervention aux niveaux municipal, provincial et fédéral. L’École de service social a établi des ententes avec des organismes sociaux en vue d’offrir un apprentissage spécialisé en recherche-intervention dans le champ d’étude santé et celui de famille-enfance.

**Program Requirements**

Les cours obligatoires sont offerts tous les ans. Les cours optionnels ne sont pas tous offerts chaque année.
**Première année**

Trente crédits sont exigés pour réussir la première année, soit 21 obligatoires et 9 optionnels.

Cours obligatoires : (21 cr.)

- SVS5500 FONDEMENTS THÉORIQUES DU SERVICE SOCIAL (3cr.)
- SVS5510 ANALYSE SOCIOHISTORIQUE DES POLITIQUES SOCIALES ET DU SERVICE SOCIAL AU CANADA (3cr.)
- SVS5530 MÉTHODES D'INTERVENTION EN SERVICE SOCIAL (3cr.)
- SVS5501 STAGE D'INTERVENTION EN SERVICE SOCIAL (6cr.)
- SVS5709 LABORATOIRE DE PRÉPARATION AUX STAGES DE MAÎTRISE (3cr.)
- SVS5710 SÉMINAIRE D'INTÉGRATION THÉORIE-PRATIQUE (3cr.)

Cours optionnels : (9 cr.)

- SVS5501 CHANGEMENT SOCIAL ET SERVICE SOCIAL (3cr.)
- SVS5502 ANALYSE DES PROBLÈMES SOCIAUX ET PRATIQUE DU SERVICE SOCIAL (3cr.)
- SVS5512 ANALYSE COMPARATIVE DES SERVICES SOCIAUX (3cr.)
- SVS5531 INTERVENTION AUPRÈS DES INDIVIDUS ET DES FAMILLES (3cr.)
- SVS5532 INTERVENTION AUPRÈS DES GROUPES (3cr.)
- SVS5533 INTERVENTION COMMUNAUTAIRE (3cr.)
- SVS5534 INTERVENTION INTERCULTURELLE ET SERVICE SOCIAL (3cr.)
- SVS5535 INTERVENTION FÉMINISTE ET SERVICE SOCIAL (3cr.)

**Deuxième année**

Trente crédits sont exigés pour réussir la deuxième année, soit 6 obligatoires, 18 dans le champ d'étude choisi et 6 optionnels.

Cours obligatoires : (6 cr.)

- SVS6530 SÉMINAIRE D'INTÉGRATION EN RECHERCHE-INTERVENTION (3cr.)
- SVS6515 PRÉPARATION AU MÉMOIRE DE RECHERCHE (3cr.)

**Option 1**

**CHAMP D'ÉTUDE SANTÉ : (18 cr.)**

- SVS6500 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE DE LA SANTÉ (3cr.)
- SVS6510 MÉTHODES DE RECHERCHE QUALITATIVE ET QUANTITATIVE DANS LE DOMAINE DE LA SANTÉ (3cr.)
- SVS6601 STAGE DE RECHERCHE-INTERVENTION EN MILIEU DE SANTÉ (6cr.)
- SVS6620 MÉMOIRE DE RECHERCHE : DOMAINE SANTÉ (6cr.)

**OU**

**CHAMP D'ÉTUDE FAMILLE-ENFANCE : (18 cr.)**

- SVS6500 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
- SVS6710 MÉTHODES DE RECHERCHE QUALITATIVE ET QUANTITATIVE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
- SVS6801 STAGE DE RECHERCHE-INTERVENTION FAMILLE-ENFANCE (6cr.)
- SVS6820 MÉMOIRE DE RECHERCHE : DOMAINE FAMILLE-ENFANCE (6cr.)

**Option 2**

**CHAMP D'ÉTUDE SANTÉ : (18 cr.)**

- SVS6500 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE DE LA SANTÉ (3cr.)
- SVS6510 MÉTHODES DE RECHERCHE QUALITATIVE ET QUANTITATIVE DANS LE DOMAINE DE LA SANTÉ (3cr.)
- SVS6620 MÉMOIRE DE RECHERCHE : DOMAINE SANTÉ (6cr.)

2 cours optionnels de cote 6000 de 3cr. chacun.

**OU**

**CHAMP D'ÉTUDE FAMILLE-ENFANCE : (18 cr.)**

- SVS6500 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
- SVS6710 MÉTHODES DE RECHERCHE QUALITATIVE ET QUANTITATIVE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
- SVS6820 MÉMOIRE DE RECHERCHE : DOMAINE FAMILLE-ENFANCE (6cr.)

2 cours optionnels de cote 6000 de 3cr. chacun.

Cours optionnels : (6 cr.)

- SVS6501 PROMOTION DE LA SANTÉ ET PRATIQUES PRÉVENTIVES EN SERVICE SOCIAL (3cr.)
- SVS6502 POLITIQUES SOCIALES EN SANTÉ ET EN FAMILLE-ENFANCE (3cr.)
- SVS6503 SANTÉ MENTALE ET SOCIÉTÉ (3cr.)
- SVS6504 TOXICOMANIES ET CONTEXTE SOCIAL (3cr.)
- SVS6701 MODELES CONTEMPOURAINS DE PRATIQUE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
- SVS6703 GÉRONTOLOGIE ET SERVICE SOCIAL (3cr.)
- SVS6704 ENFANCE ET JEUNESSE EN DIFFICULTÉ (3cr.)
SVS6705 PROBLÉMATIQUE DE LA VIOLENCE ET INTERVENTION SOCIALE (3cr.)
SVS6706 FEMMES, SERVICE SOCIAL ET POLITIQUES SOCIALES (3cr.)
SVS6707 POPULATIONS AUTOCHTONES ET SERVICE SOCIAL (3cr.)
SVS6708 ADMINISTRATION DES SERVICES DE SANTÉ ET DE FAMILLE-ENFANCE (3cr.)

Certains cours optionnels pourront s'ajouter sous "Thèmes choisis". Un cours de trois crédits ou l’équivalent de niveau supérieur, d’un autre département de la Faculté, ou d’une autre faculté, peut être inscrit dans le programme de maîtrise, sous réserve d’approbation de la personne responsable des études supérieures et après consultation avec le département responsable des dits cours.

**Durée du programme**

On s'attend à ce que les étudiants remplissent toutes les exigences dans une période de deux ans. Le mémoire doit être soumis dans les quatre années qui suivent l'inscription initiale au programme.

**Exigences minimales**

La note de passage dans tous les cours est de C+. Les étudiants qui échouent deux cours (équivalents à 6 crédits) doivent se retirer du programme.

**Courses**

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<th>Course Code</th>
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<tr>
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Concomitant au stage SVS 5601. Réflexions sur les théories et sur l'éthique de la pratique, dans le contexte de leur application à l'expérience en...
SVS6500 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE DE LA SANTÉ (3cr.)
Analyse de diverses conceptions de la santé / maladie et des liens avec les conditions sociales et les politiques publiques. Étude des enjeux de la « médicalisation / professionnalisation du social » et implications pour l'intervention et la recherche en service social. Préalables : SVS5601 et SVS5710.

SVS6501 PROMOTION DE LA SANTÉ ET PRATIQUES PRÉVENTIVES EN SERVICE SOCIAL (3cr.)
Débat épistémologique entourant les notions de promotion et la prévention; examen critique des pratiques en service social et des programmes en santé et famille-enfance.

SVS6502 POLITIQUES SOCIALES EN SANTÉ ET EN FAMILLE-ENFANCE (3cr.)
Examen des enjeux sous-jacents aux politiques de santé et de famille-enfance : contrôle social, expertise, coûts et bénéfices; évaluation des orientations de ces politiques et des enjeux qui les sous-tendent.

SVS6503 SANTÉ MENTALE ET SOCIÉTÉ (3cr.)
Analyse des liens entre des problématiques de santé mentale et le contexte socioculturel. Étude des diverses perspectives conceptuelles et pratiques en égard à la santé / maladie mentale et implications pour l'intervention en service social.

SVS6504 TOXICOMANIES ET CONTEXTE SOCIAL (3cr.)
Situation de la toxicomanie dans le contexte social, politique et économique actuel; examen des diverses théories explicatives du phénomène et des modèles d'intervention qui s’en dégagent.

SVS6510 MÉTHODES DE RECHERCHE QUALITATIVE ET QUANTITATIVE DANS LE DOMAINE DE LA SANTÉ (3cr.)

SVS6515 PRÉPARATION AU MÉMOIRE DE RECHERCHE (3cr.)
Examen critique de textes et documents dont la liste a été approuvée par la directrice ou le directeur de mémoire. Approfondissement de la problématique et de la méthodologie choisies pour le mémoire. Rédaction d'un travail préparatoire au mémoire. Noté Alpha. Préalables : SVS6500 et SVS6510 ou SVS6700 et SVS6710.

SVS6530 SÉMINAIRE D’INTÉGRATION EN RECHERCHE-INTERVENTION (3cr.)
Réflexion globale et systématique sur l'expérience de stage afin de comprendre et d'appliquer les concepts de recherche-intervention. Noté S/NS. Préalables : SVS6500 et SVS6510 ou SVS6700 et SVS6710.

SVS6561 LECTURES DIRIGÉES : DOMAINE SANTÉ (3cr.)

SVS6601 STAGE DE RECHERCHE-INTERVENTION EN MILIEU DE SANTÉ (6cr.)
Suite au choix d'un champ d'intervention relié à la santé, évaluation des compétences mises en pratique en recherche-intervention. Préalables : SVS6500 et SVS6510.

SVS6620 MÉMOIRE DE RECHERCHE : DOMAINE SANTÉ (6cr.)

SVS6700 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
Analyse critique des divers modèles et enjeux de la pratique et de la recherche en famille-enfance, en tenant compte des facteurs structurels en place; liens entre pratique, recherche et idéologie. Préalables : SVS5601 et SVS5710.

SVS6701 MODÈLES CONTEMPORAINS DE PRATIQUE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
Étude des grands courants pratiques du service social familial et les présupposés idéologiques qu’ils véhiculent; enjeux pour la clientèle et pertinence pour le milieu francophone.

SVS6703 GÉRONTOLOGIE ET SERVICE SOCIAL (3cr.)
Analyse des enjeux reliés au vieillissement de la population (santé, travail, rôle social et économique, retraite); évaluation des approches d'intervention auprès de cette clientèle.

SVS6704 ENFANCE ET JEUNESSE EN DIFFICULTÉ (3cr.)
Examen des problèmes concernant l'enfance et la jeunesse ainsi que les pratiques aussi bien sociales que pénales qui s'y greffent. Évaluations de ces pratiques.

SVS6705 PROBLÉMATIQUE DE LA VIOLENTES ET INTERVENTION SOCIALE (3cr.)
Examen des problèmes reliés à la violence au sein de la famille, compte tenu des personnes en cause. Stratégies d'intervention et évaluation de celles-ci.

SVS6706 FEMMES, SERVICE SOCIAL ET POLITIQUES SOCIALES (3cr.)
Promotion des femmes en milieu professionnel; impact des politiques sociales sur les femmes; étude des politiques en matière d'emploi : équité salariale, discrimination et harcèlement sexuel.

SVS6707 POPULATIONS AUTOCHTONES ET SERVICE SOCIAL (3cr.)
Examen des problématiques propres à ces populations; stratégies d'intervention appropriées.

**SVS6708 ADMINISTRATION DES SERVICES DE SANTÉ ET DE FAMILLE-ENFANCE** (3cr.)

Théories et modèles d’organisation et de gestion des organismes de santé et de famille-enfance; planification stratégique, supervision du personnel.

**SVS6761 LECTURES DIRIGÉES : DOMAINE FAMILLE-ENFANCE** (3cr.)

**SVS6801 STAGE DE RECHERCHE-INTERVENTION FAMILLE-ENFANCE** (6cr.)

À partir d’une expérience structurée, apprentissage combiné de l’intervention et de la recherche en famille-enfance. Préalables : SVS6700 et SVS6710.

**SVS6820 MÉMOIRE DE RECHERCHE : DOMAINE FAMILLE-ENFANCE** (6cr.)

**SVS7501 ÉPISTÉMOLOGIE ET SERVICE SOCIAL** (3cr.)

Étude des principales théories de la connaissance (positivisme, phénoménologie, constructivisme, structuralisme, théories critiques, perspectives postmodernes) et leurs rapports avec le service social comme champ d’intervention et de recherche. Les liens entre les théories de la connaissance et la problématisation des questions de recherche en service social. Réservé aux étudiants de doctorat.

**SVS7502 ÉTUDE AVANCÉE DES THÉORIES ET DES PRATIQUES D'INTERVENTION SOCIALE** (3cr.)

Étude approfondie et examen critique des outils conceptuels (configuration, champ, monde social, micro-pouvoir, etc.) utiles pour une analyse contextualisée des pratiques d’intervention sociale. Réservé aux étudiants de doctorat.

**SVS7590 SÉMINAIRE DE RECHERCHE AVANCÉ EN SERVICE SOCIAL** (3cr.)

Habiletés avancées de recherche. Toutes les étapes de la démarche scientifique seront considérées et discutées. En plus de faire une analyse des approches méthodologiques les plus récentes en sciences sociales, le séminaire constituera pour l’étudiant une occasion de réfléchir sur les enjeux d’une démarche interdisciplinaire en service social.

**SVS9901 PRACTICUM : RECHERCHE-INTERVENTION / PRACTICUM: RESEARCH INTERVENTION**

À partir d’une expérience structurée en recherche-intervention, l’étudiant approfondit ses connaissances de l’organisation des services sociaux, des pratiques d’intervention sociale, des politiques sociales ainsi que de la recherche appliquée dans le domaine d’intérêt vécu par sa thèse. Le nombre d’heures du practicum est de 450. Noté S/NS. / A structured experience in research-intervention allowing students to deepen their knowledge of the organization of social services, social intervention practices, social policies as well as of applied research in the field of interest of their thesis. The practicum extends over 450 hours. Graded S/NS. Préalables : SVS/7501, SVS/7502, SVS/7590 et un cours au choix. / Prerequisites: SVS7501, SVS7502, SVS7590 and one elective course.

**SVS9997 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION**

Préalables : SVS7501, SVS7502, SVS7590 et un cours au choix / Prerequisites: SVS7501, SVS7502, SVS7590 and the elective course.

**SVS9998 PROJET DE RECHERCHE / RESEARCH PROJECT**

Préalable / Prerequisite: SVS 9997

**SVS9999 THÈSE DE DOCTORAT / PhD THESIS**

Préalable / Prerequisite: SVS 9998

**Sociology**

The School of Sociological and Anthropological Studies offers the following programs: Master of Arts (MA) and PhD in sociology; Master of Arts (MA) in anthropology. In addition, the School participates in the following collaborative programs: women’s studies (master’s level) and Canadian studies (doctoral level).

The MA in sociology is offered as a full-time and a part-time program, in French and in English. In English, the maximum number of annual admissions is fixed according to the procedure explained in the Admission section below. In accordance with the University of Ottawa regulation, students may write their assignments, research papers, theses and examinations in either English or French.

Two options are available for the master’s program: the MA with thesis and the MA with research paper, to which admissible students may add the co-op option. Students in both options are eligible for admission to the collaborative program in women’s studies. For more information, see the section "Apply for admission."

The PhD in sociology is offered as a full-time program only, in English and in French. However, both required seminars are offered in French exclusively. The doctoral program aims to train sociologists capable of conducting research on the social relations that define the conditions of existence and the transformations of contemporary societies, while using the most up-to-date theoretical and methodological tools. The program’s two main fields of research are minorities and culture, and political sociology. Students in the doctoral program are eligible for admission to the collaborative program in Canadian studies. For more information, see the section "Apply for admission."

Professors in the School of Sociological and Anthropological Studies conduct research in a number of areas. For a more complete understanding of the breadth of research being undertaken at the School, students are encouraged to consult the list of professors and their areas of interest,
which extend well beyond the fields of research mentioned above.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Sociology
Master of Arts Sociology Specialization in Women's Studies
Doctorate in Philosophy Sociology
Doctorate in Philosophy Sociology Specialization in Canadian Studies

Admission

Students who have a BA with honours or major in sociology, with a minimum average of 70% (B) calculated in accordance with FGPS guidelines, may be admitted to the MA program.

Students who have an honours BA with a minimum average of 70% (B) in another discipline, calculated in accordance with FGPS guidelines, may be accepted into a qualifying program, requiring them to complete a maximum of eight courses.

All students must be able to read and understand texts in French and in English. Students must indicate in their application the language in which they plan to take the majority of their courses. The school reserves the right to require a language test for either language.

The maximum number of students admitted annually in the MA in sociology in English is limited to the average of admissions to the French version in the previous three years. The maximum number of admissions for the current year is available from the secretariat of the School of Anthropological and Sociological Studies.

Collaborative program in women's studies

This program was created to enable students to enrich their education in sociology by adding the interdisciplinary dimension of women's studies. The women's studies program consists of two compulsory women's studies (FEM) courses as well as a thesis or research paper on a subject related to women's studies. FEM courses are recognized by the master's program in sociology. Students registered in the collaborative program therefore do not have to take any additional courses.

Students should indicate in their initial application for admission to the master's program in sociology that they wish to be accepted into the collaborative program. For further details, see the description of the collaborative program in women's studies.

Program Requirements

The main areas of specialization at the master's level include:

- Interethnic relations
- Development
- Political sociology
- Gender relations

Students are not limited to these areas of specialization when choosing a research topic for their thesis or research paper. For a more complete understanding of the breadth of research being conducted at the School, students can consult the list of professors and their areas of interest, which extend far beyond the areas of specialization mentioned above.

In accordance with the University of Ottawa regulation, students can write their assignments, research papers, theses and examinations in either English or French.

MA with thesis

The requirements of the MA with thesis are as follows:

- 15 credits at the master's level, including:
  - SOC6101 RESEARCH DESIGN IN SOCIOLOGY (3cr.)
  - and
  - one of the following methodology courses:
SOC7140 ADVANCED QUANTITATIVE METHODOLOGY (3cr.)
SOC7141 ADVANCED QUALITATIVE METHODOLOGY (3cr.)

- SOC7990 THESIS OR RESEARCH PAPER PROPOSAL
- SOC7999 THESE DE MAÎTRISE / MASTER’S THESIS

One graduate course or equivalent (3 credits) from another program may count as part of the coursework for a master’s with thesis, subject to the approval of the supervisor of graduate studies in sociology, and after consultation with the department responsible for the course. Two graduate courses (FEM5103 and FEM5300) are allowed for students enrolled in the collaborative master’s program in women’s studies.

**Thesis or research paper proposal (SOC7990)**

Students should begin the process of selecting a thesis topic and a supervisor immediately upon commencing the program. The supervisor must be a member of the School of Sociological and Anthropological Studies and of the FGPS. The topic and supervisor must be registered no later than the end of the second session in the program.

Registration for the thesis proposal (SOC7990) takes place preferably in the second session, but at the latest in the third. Each student is assigned to a thesis advisory committee, composed of three professors, including the thesis supervisor. The committee members are proposed by the thesis supervisor, in consultation with the student, and appointed by the Graduate Studies Committee of the School.

The thesis proposal is prepared under the guidance of the thesis supervisor and must be approved by the Thesis Advisory Committee. Once the project has been approved, the preparation and writing of the thesis begins. For additional information, consult section G in the FGPS General Regulations.

The aim of the proposal is to develop:
- the capacity to formulate a clear research protocol
- familiarity with the scholarly literature related to the project
- the ability to circumscribe the limits and scope of the project, both conceptually and methodologically
- the ability to carry out the remaining steps leading from the proposal to the completion of the master’s thesis

**Master’s thesis (SOC7999)**

For information regarding the thesis, consult the web site of the sociology program.

**MA with research paper**

The requirements of the MA with research paper are the following:
- 21 credits at the master’s level, including:
  - SOC6101 RESEARCH DESIGN IN SOCIOLOGY (3cr.)
  - one of the following two methodology courses:
    SOC7140 ADVANCED QUANTITATIVE METHODOLOGY (3cr.)
    SOC7141 ADVANCED QUALITATIVE METHODOLOGY (3cr.)
- SOC7990 THESIS OR RESEARCH PAPER PROPOSAL
- SOC7938 MÉMOIRE / RESEARCH PAPER (6cr.)

Up to two graduate courses (6 credits) from another program may count as coursework for the master’s program with research paper, subject to the approval of the supervisor of graduate studies in sociology and after consultation with the department responsible for the course(s) concerned.

**Thesis or research paper proposal (SOC7990)**

Students should begin the process of selecting a research paper topic and a supervisor immediately upon commencing the program, and the process must be completed by the end of the second session. The supervisor must be a member of the School of Sociological and Anthropological Studies and of the FGPS. The proposal must be approved by a committee consisting of two professors, including the supervisor. The second committee member is proposed by the supervisor, in consultation with the student, and then appointed by the chair of the School or the supervisor of graduate studies.

The aim of the proposal is to develop:
- the capacity to formulate a clear research protocol
- familiarity with the scholarly literature related to the project
- the ability to circumscribe the limits and scope of the project, both conceptually and methodologically
- readiness to move on from the proposal to the next stage leading to the submission of the research paper.

**Research paper (SOC7938)**

For information regarding the research paper, consult the website of the sociology program.

**Co-op option**
The MA in Sociology, with the assistance of the University of Ottawa’s co-op office, offers a co-op stream to a limited number of students who will request this option in their admission file. The co-op option gives selected students the opportunity to acquire practical work experience by completing two paid one-session, work placements.

The option for the co-op stream is as follows. The first co-op placement will be in the summer of the first year, and the second work placement will take place in the fall of the second year. Students who enrol in the co-op option will obtain twelve credits (six credits per work placement) for their work experience. Each work term is graded P/F (Pass or Fail), based on the employer’s report and on a written report completed by the student. The student’s report must be 15 to 20 pages, including appendices. A regular professor from the School will evaluate the student reports.

The credits awarded for co-op work terms may not be used to obtain equivalences for other courses. In other words, the co-op credits are additional to the minimum requirements of the degree.

To remain enrolled in the co-op program, a student must:

- maintain full-time status;
- maintain a 7.0 grade point average; and
- obtain a passing grade for each co-op work term

**Collaborative program in women’s studies**

The requirements of the specialization in women’s studies are as follows:

- Two compulsory courses:
  - FEM5300 FEMINIST THEORIES (3cr.)
  - FEM5103 FEMINIST METHODOLOGIES (3cr.)

  Students must complete the two compulsory courses prior to registering for the research paper or thesis.
- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the women’s studies graduate committee as well as by the sociology program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

For additional information, please consult the description of the women’s studies collaborative program.

**Duration of the program**

Students in the thesis option are expected to complete all requirements within two years of full-time study. Those in the research paper option are expected to complete within four sessions (16 months) of full-time study. The maximum time permitted, whether full- or part-time, is four years from the date of initial registration in the program.

**Residence**

Students admitted full-time must register full-time for at least three sessions.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses or whose research progress is deemed unsatisfactory are withdrawn from the program.

**Courses**

**SOC6001 STAGE COOP I / CO-OP WORK TERM I** (6cr.)

Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme selon l'évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l'étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : admission au régime coop. / Prerequisite: admission to the coop option.

**SOC6002 STAGE COOP II / CO-OP WORK TERM II** (6cr.)

Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme selon l'évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l'étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : SOC6001 / Prerequisite: SOC6001

**SOC6101 RESEARCH DESIGN IN SOCIOLOGY** (3cr.)

Training in advanced sociological research. Topics addressed are: the relationship between theory and empirical research; identification of research problematics and the formulation of research questions; choosing a methodology.

**SOC7101 CITIZENSHIP AND RIGHTS** (3cr.)

Explores relationship between citizenship and rights, focusing on structural and discursive conditions of citizenship and struggles for recognition.
and equality.

**SOC7102 MIGRATION AND MOBILITY** (3cr.)
Explores different forms of international and internal migration and mobility, as well as the multiple factors that favour, channel, or circumvent the movement of populations.

**SOC7103 SOCIOLOGY OF THE ENVIRONMENT** (3cr.)
Origins of environmental problems and conflicts; social theories of environmental degradation, controversies and disasters; perspectives on human-nature interactions.

**SOC7104 SOCIAL NETWORKS AND SOCIAL RELATIONS** (3cr.)
Fundamental theories, epistemologies, methodologies of sociology of social networks. Operationalization of paradigms used in empirical research and their application in the analysis of different social dynamics.

**SOC7105 SOCIOLOGY OF THE FAMILY** (3cr.)
Sociological analysis of the family; household division of labour; “parenting”; family formation; the life course; intimate relations; family policies.

**SOC7106 THE LIFECOURSE AND GENERATIONS** (3cr.)
Inter-generational dynamics; the life course; social, political, and cultural aspects of youth and lifecourse transitions; life stages as social categories.

**SOC7107 SOCIOLOGY OF RELIGIONS** (3cr.)

**SOC7108 SOCIOLOGY OF HEALTH** (3cr.)
Discussion of significant social factors pertaining to contemporary experiences of health. Analysis of recent principal theoretical and empirical contributions to this domain.

**SOC7109 FRANCOPHONIE, LANGUAGE, AND POWER** (3cr.)
Analysis of social group relations and linguistic practices relating to cultural affiliations and citizenship. Studies of contemporary research in this domain, particularly on the Francophonie in Canada.

**SOC7110 CONTEMPORARY SOCIOLOGICAL THEORIES** (3cr.)
In depth examination of the main theoretical currents in sociology.

**SOC7111 SELECTED TOPICS IN CONTEMPORARY SOCIOLOGY** (3cr.)
In depth examination of an issue or question linked to new trends or research areas in sociology.

**SOC7112 SOCIOLOGY OF CULTURE** (3cr.)
Critical analysis of the range of sociology of culture theories; exploration of the role of cultural organizations; social movements; globalization of cultural practices.

**SOC7113 SOCIAL CHANGE** (3cr.)
Analysis of transformations, transitions, emerging social phenomena; social changes (macro and micro). Concepts, theories, case studies.

**SOC7120 SOCIOLOGICAL EPISTEMOLOGY** (3cr.)
Issues related to the social shaping of science; critical examination of sociological knowledge.

**SOC7140 ADVANCED QUANTITATIVE METHODOLOGY** (3cr.)
Overview of advanced methods of quantitative analysis of data, including multivariate analysis. Examination of use of these methods in the sociological literature. Application of these methods in a research project; definition of a research question and determination of a theoretical framework, selection of a quantitative approach, research ethics, development of data collection tools, collection of data.

**SOC7141 ADVANCED QUALITATIVE METHODOLOGY** (3cr.)
Creation of a research project and selection of a fieldwork site appropriate for qualitative methodologies: definition of a research question and determination of a theoretical framework, selection of a qualitative approach, research ethics, development of data collection tools, collection of data, use of data organization software, vertical and horizontal analysis, submission of a final report.

**SOC7150 INTERETHNIC RELATIONS: CRITICAL EXAMINATION OF THEORIES AND RESEARCH** (3cr.)
Principal sociological theories in interethnic relations, and the use of these theories in the analysis of the social structure of a number of multiethnic societies, especially Canada.

**SOC7151 RESEARCH SEMINAR IN INTERETHNIC RELATIONS** (3cr.)
Overview and assessment of the main research findings in the area.

**SOC7156 GENDER RELATIONS AND INTERETHNIC RELATIONS** (3cr.)
Examination of modes of differentiation according to gender, ethnicity, and race in contemporary societies and of the theoretical linkages among them.
SOC7160 DEVELOPMENT: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)

SOC7161 RESEARCH SEMINAR IN DEVELOPMENT (3cr.)
Evaluation of research in the area.

SOC7166 DEVELOPMENT AND GENDER RELATIONS (3cr.)
Deconstruction of the concepts of gender and development. International power relations and gender. Women in the global South and their theorizing of gender relations.

SOC7170 POLITICAL SOCIOLOGY: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)
In depth examination of the main concepts of political sociology such as power, the state, social classes, civil society, democracy, political space, political culture, and citizenship.

SOC7171 RESEARCH SEMINAR IN POLITICAL SOCIOLOGY (3cr.)
Overview and assessment of the main research findings in the area.

SOC7175 GENDER DIFFERENCES IN POLITICAL SOCIOLOGY (3cr.)
Examination of the notion of gender difference, in relation, for example, to citizenship, the private/public divide, political representation, women's rights, kinship, and power.

SOC7930 LECTURE DIRIGÉE/DIRECTED STUDIES (3cr.)
Cours individuel ayant pour objectif d'approfondir les connaissances de l'étudiant dans un domaine particulier ou de lui permettre de se familiariser avec un nouveau domaine. Le sujet est déterminé et développé en consultation avec le professeur responsable et en conformité avec les directives du département. Le travail remis dans ce cours doit être différent de ce qui a pu être soumis dans d'autres cours, y compris le projet de thèse ou de mémoire, le mémoire ou la thèse. Il y a une limite d'un cours de lectures dirigées par étudiant. Prérequis : moyenne de A-, permission du comité des études supérieures en sociologie. / Individual course aimed at deepening a student's knowledge of a particular area or at gaining knowledge of a new area. The topic is selected and developed in consultation with the supervising professor in accordance with departmental guidelines. The work submitted for this course must be different from that submitted for other courses, including the thesis or research proposal, the master's research paper or the thesis. Maximum of one directed readings course per student. Prerequisite: average of A-; permission of the Sociology Graduate Studies Committee.

SOC7938 MÉMOIRE / RESEARCH PAPER (6cr.)
Mémoire d'une cinquantaine de pages préparé sous la direction d'un ou deux membres du corps professoral choisis en accord avec la personne responsable des études supérieures. Mémoire noté par un total de deux membres du corps professoral dont les personnes qui en ont assumé la direction. Dans les cas où le mémoire n'est dirigé que par une seule personne, il sera noté par cette personne et un autre membre du corps professoral. Le mémoire doit être terminé en un maximum de quatre sessions consécutives. Noté : S/NS / Fifty-page research paper prepared under the direction of one or two professors chosen in consultation with the supervisor of graduate studies in sociology. Graded by two professors, either the two co-supervisors, or if there is only one, by the supervisor and another professor. The research paper must be completed in at most four consecutive sessions. Graded: S/NS.

SOC7990 THESIS OR RESEARCH PAPER PROPOSAL
Rédaction d'un projet de thèse ou de mémoire. Soumission du projet au comité de thèse ou de mémoire. Noté : S (satisfaisant) / NS (non satisfaisant). / Drafting of a thesis or a research paper proposal. Submission of proposal to the thesis or research paper committee. Graded: S (Satisfactory) / NS (Not satisfactory).

SOC7999 THÈSE DE MAÎTRISE / MASTER'S THESIS

SOC8510 SÉMINAIRE DE DOCTORAT (3cr.)
Le séminaire aborde une thématique sociologique contemporaine qui touche plusieurs champs de la discipline. La thématique est abordée dans ses dimensions théoriques, méthodologiques et/ou épistémologiques de même que par le biais des enjeux de recherche qu'elle soulève. Séminaire s'échelonnant de septembre à avril.

SOC8511 SÉMINAIRE AVANCÉ DE RECHERCHE SOCIOLOGIQUE (3cr.)
Le séminaire aborde certaines préoccupations fondamentales de la discipline, dont le raisonnement sociologique et les méthodes de travail essentielles pour mener à bien des recherches doctorales. Il comporte également un travail collectif sur les projets de thèse. Séminaire s'échelonnant de septembre à avril.

SOC9910 EXAMEN DE SYNTHÈSE DE DOCTORAT / PHD COMPREHENSIVE EXAMINATION
L'examen de synthèse, administré par un comité d'examen, consiste en un travail écrit portant sur chacune de deux questions qui ciblent des domaines sociologiques distincts. Il comporte également une épreuve orale. L'inscription à SOC9910 se fait normalement à la troisième session. L'examen est noté S/NS. The comprehensive exam, administered by the examination committee, consists of a written essay on each of two questions, which targets distinct sociological domains. It also includes an oral exam. Registration in SOC9910 is normally done in the third session. Graded S/NS.

SOC9930 PROJET DE THÈSE DE DOCTORAT / PHD THESIS PROPOSAL
Préparation, supervisée par le directeur ou la directrice de thèse, du projet de thèse, qui doit être approuvé par le comité de thèse. Noté S/NS. / Preparation, under the direction of the thesis supervisor, of the thesis proposal and submission for approval by the thesis committee. Graded S/NS.
**Spanish**

The Department of Modern Languages and Literatures offers the degrees of Master of Arts (MA) and Doctor of Philosophy (PhD) in Spanish. The objective of the program is to provide advanced training in the literatures and cultures of Spain and Latin America, as well as in Hispanic linguistics, benefiting from the theoretical and comparative research interests of the professors of the department.

For more information, visit the website of the Department of Modern Languages and Literatures.

The Department participates in a collaborative program in Medieval and Renaissance Studies at the MA level and in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see admission requirements.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

- Master of Arts Spanish
- Master of Arts Spanish Specialization in Medieval and Renaissance Studies
- Doctorate in Philosophy Spanish
- Doctorate in Philosophy Spanish Specialization in Canadian Studies

**Admission**

Admission to the graduate program in Spanish is governed by the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Be the holder of a bachelor’s degree with a specialization, or a major in Spanish (or equivalent) with a minimum average of 70% (B).
- Students without full background preparation may be asked to complete a preliminary period of study before being admitted to the program. Students will be expected to have some knowledge of the following general areas:
  - a) Spanish Peninsular Literature: Medieval and Golden Age periods; nineteenth, twentieth, and twenty-first centuries.
  - b) Spanish-American-Literature: the colonial period, the nineteenth, twentieth, and twenty-first centuries.
  - c) General and/or Hispanic linguistics: descriptive grammar, morphosyntax, methodology of teaching foreign languages, sociolinguistics, language contact, translation.
- It is desirable that students know both official languages (English and French). They must possess a good written and oral command of Spanish, since most courses are taught in Spanish.
- Wherever possible, candidates for admission to the program should be interviewed by a professor or professors assigned by the program.
- Once students are admitted to the program, their progress will be monitored by a director of studies assigned by the program.

**Collaborative programs**

The Spanish section of the Department of Modern Languages and Literatures is a participating unit in the collaborative program in Medieval and Renaissance Studies (master’s level only). This program has been established for students wishing to enrich their training in Spanish by including an interdisciplinary component in Medieval and Renaissance Studies. The specific requirements of the collaborative program include two core courses in medieval studies and a thesis on a topic related to Medieval and Renaissance Studies.

Students should indicate in their initial application for admission to the master’s program in Spanish that they wish to be accepted into the collaborative program.

For further details, see the description of this program posted on the FGPS website.
**Program Requirements**

All students begin by enrolling in the MA with research paper. Students may apply for admission into the other option at the end of their first session or at the beginning of their second session. For details concerning the procedures to be followed when submitting a thesis topic, please consult the director of graduate studies.

**Master's degree with thesis option**

- Successful completion of ESP5901 (or equivalent course determined by the Graduate Studies Committee).
- Successful completion of 9 credits at the 5000 level or above.*
- Presentation and defense of a thesis (ESP7999) based on original research carried out under the direct supervision of a faculty member. The thesis should be between 80 and 120 pages in length.

*Students enrolled in the MA with thesis option must fulfill the 9 credit requirement by completing at least 3 credits (one course) from the three lists below:

**Peninsular literature and culture:**
ESP5901, ESP5912, ESP5914, ESP5918, ESP5920, ESP5922, ESP5924, ESP5957, ESP7901, ESP7902.

**Spanish American literatures and cultures:**
ESP5901, ESP5930, ESP5932, ESP5934, ESP5957, ESP7903.

**Hispanic Linguistics:**
ESP5947, ESP5948, ESP5949, ESP5950, ESP7905, ESP7916, LIN5303, LIN5315, LIN5317, LIN5318, LIN7901, LIN7320, LIN7925.

NOTE: A student can choose to write the thesis in English, French or Spanish. When registering for the thesis, the student must notify the director of graduate studies, in writing, of the language chosen. This choice will be subject to departmental approval. A student who receives permission to write the thesis in Spanish will be expected to be able to defend it in English or in French.

**Master's degree with research paper**

- Successful completion of 18 credits at the 5000 level or above, including one compulsory course ESP5901 (or equivalent course determined by the Graduate Studies Committee).*
- Successful completion of a research paper (ESP7997).

*Students enrolled in the MA with research paper option must fulfill the following requirements while completing the 18 credits:

Students specializing in Peninsular literature and culture must complete 6 credits selected from each of the following areas: Peninsular literature and culture, Spanish American literatures and cultures, and Hispanic linguistics.

Students specializing in Spanish American literatures and cultures must complete at least 6 credits selected from each of the following areas: Peninsular literature and culture, Spanish American literatures and cultures, and Hispanic linguistics.

Students specializing in Hispanic Linguistics must complete 6 credits in Hispanic Linguistics, 6 credits in an area related to their Research Paper, and 6 credits selected from following two areas: Peninsular literature and culture and Spanish American literatures and cultures.

Courses must be selected from each of the following lists:

**Peninsular literature and culture:**
ESP5901, ESP5912, ESP5914, ESP5918, ESP5920, ESP5922, ESP5924, ESP5957, ESP7901, ESP7902.

**Spanish American literatures and cultures:**
ESP5901, ESP5930, ESP5932, ESP5934, ESP5957, ESP7903.

**Hispanic Linguistics:**
ESP5947, ESP5948, ESP5949, ESP5950, ESP7905, ESP7916, LIN5303, LIN5315, LIN5317, LIN5318, LIN7901, LIN7320, LIN7925.

NOTE: The research paper will be evaluated by both the supervisor and a second reader.

**Collaborative program in Medieval and Renaissance Studies**

Students in a collaborative program must complete the requirements of their primary program and those of the collaborative program. One of the two 3-credit courses in Medieval and Renaissance Studies (MDV5100 or MDV5500) will be counted towards the requirements of the primary program. Consequently, students in the specialization will have only one extra course to take.

The requirements of the collaborative program are as follows:
Two compulsory courses:

- MDV5100 Medieval and Renaissance Studies Research Methods and Tools (3cr.)
  
  OR

- MDV5500 Méthodes et outils de recherche des études médiévales et de la Renaissance (3cr.)

  AND

- MDV5900 Séminaire de recherche interdisciplinaire / Interdisciplinary Research Seminar (3cr.)

Students must complete the two compulsory courses before they register for the major research paper or thesis.

A thesis or major research paper on a topic related to Medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the major research paper or thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners (or one examiner of the major research paper) must be a member of the collaborative program.

In both cases, the title of the degree will indicate the discipline of the participating unit with the specification "specialization in Medieval and Renaissance Studies."

**Duration of program**

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

**Residence**

All full-time students must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

Courses offered in a given year are listed in the Student Handbook (available at the Department). All courses listed, with the exception of ESP 7997, 7999, 9998 and 9999, are worth three credits. They normally require 30 hours of class time and last one session.

All courses are given in Spanish.

**ESP5901 MÉTHODOLOGIES DE LA RECHERCHE LITTÉRAIRE ET INTERCULTURELLE / METHODOLOGIES OF LITERARY AND INTERCULTURAL RESEARCH (3cr.)**

Survol des fondements théoriques nécessaires pour mener des recherches en littératures et cultures. / Overview of the theoretical basis for research in the fields of literatures and cultures. *Exclusion: LCM5901*

**ESP5912 ASPECTS DE LA LITTÉRATURE ESPAGNOLE I / ASPECTS OF SPANISH LITERATURE I (3cr.)**

Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

**ESP5914 ASPECTS DE LA LITTÉRATURE ESPAGNOLE II / ASPECTS OF SPANISH LITERATURE II (3cr.)**

Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

**ESP5918 ASPECTS DE LA LITTÉRATURE ESPAGNOLE III / ASPECTS OF SPANISH LITERATURE III (3cr.)**

Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

**ESP5920 ASPECTS DE LA LITTÉRATURE ESPAGNOLE IV / ASPECTS OF SPANISH LITERATURE IV (3cr.)**

Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

**ESP5922 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICAINE I / ASPECTS OF SPANISH-AMERICAN LITERATURE I (3cr.)**

Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

**ESP5924 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICAINE II / ASPECTS OF SPANISH-AMERICAN LITERATURE II (3cr.)**

Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.
ESP5930 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICaine III / ASPECTS OF SPANISH-AMERICAN LITERATURE III (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5932 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICaine IV / ASPECTS OF SPANISH-AMERICAN LITERATURE IV (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5934 ASPECTS DE LA LITTÉRATURE HISPANique I / ASPECTS OF HISPANIC LITERATURE I (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5947 ASPECTS DE LA LINGUISTIQUE HISPANique I / ASPECTS OF HISPANIC LINGUISTICS I (3cr.)

ESP5948 ASPECTS DE LA LINGUISTIQUE HISPANique II / ASPECTS OF HISPANIC LINGUISTICS II (3cr.)

ESP5949 ASPECTS DE LA LINGUISTIQUE HISPANique III / ASPECTS OF HISPANIC LINGUISTICS III (3cr.)

ESP5950 ASPECTS DE LA LINGUISTIQUE HISPANique IV / ASPECTS OF HISPANIC LINGUISTICS IV (3cr.)

ESP5957 ASPECTS DE LA THÉORie DE LA LITTÉRATURE I / ASPECTS OF THE THEORY OF LITERATURE I (3cr.)

ESP5962 SÉMINAIRE SPÉCIAL I / SPECIAL SEMINAR I (3cr.)

ESP5963 SÉMINAIRE SPÉCIAL II / SPECIAL SEMINAR II (3cr.)

ESP5972 ÉTUDES DIRIGÉES I / DIRECTED STUDIES I (3cr.)

ESP5974 ÉTUDES DIRIGÉES II / DIRECTED STUDIES II (3cr.)

ESP6972 ÉTUDES DIRIGÉES / DIRECTED STUDIES (3cr.)

ESP7901 ASPECTS DE LA LITTÉRATURE ESPAGNOLE V / ASPECTS OF SPANISH LITERATURE V (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP7902 ASPECTS DE LA LITTÉRATURE HISPANique II / ASPECTS OF HISPANIC LITERATURE II (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP7903 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICaine V / ASPECTS OF SPANISH-AMERICAN LITERATURE V (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP7905 ASPECTS DE LA LINGUISTIQUE HISPANique / ASPECTS OF HISPANIC LINGUISTICS (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP7916 SÉMINAIRE DE RECHERCHE EN LINGUISTIQUE HISPANique / RESEARCH SEMINAR IN HISPANIC LINGUISTICS (3cr.)
Séminaire de recherche sur certains sujets dans des domaines spécifiques avec accent sur la participation de l'étudiant. Travaux écrits. / Seminars on research topics in specific areas with emphasis on student participation. Written assignments.

ESP7920 SÉMINAIRE SPÉCIAL / SPECIAL SEMINAR (3cr.)
Ce cours offre un code de séminaire flexible pour certains domaines de compétences particuliers des professeurs, surtout les professeurs invités. / This course offers a flexible seminar code for some special areas of expertise of professors, particularly invited professors.

ESP7997 MÉMOIRE DE MAÎTRISE / MA RESEARCH PAPER
ESP7999 THÈSE DE MAÎTRISE / MA THESIS

ESP8910 SÉMINAIRE DE RECHERCHE DOCTORALE / DOCTORAL RESEARCH SEMINAR (3cr.)
Séminaire de recherche sur certains sujets dans des domaines spécifiques avec accent sur la participation de l'étudiant. Travaux écrits. / Seminars on research topics in specific areas with emphasis on student participation. Written assignments.

ESP9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

ESP9999 THÈSE DE DOCTORAT / PhD THESIS
Prérequis : ESP 9998 / Prerequisite: ESP 9998
Depending on their research project, students could take some of the following courses offered by the Department of Linguistics, provided they meet the prerequisites or obtain permission of the instructor.

LIN5303 SOCIOLINGUISTICS I (3cr.)
Survey of recent and classical literature on variationist sociolinguistics, and the development of skills to locate, extract and interpret variable phenomena in spontaneous speech.

LIN5315 PHONOLOGY (3cr.)
Basic phonological concepts; current problems in phonological research; the goals of phonological theory; fundamentals of theoretical and experimental phonology.

LIN5317 SYNTAX I (3cr.)
Current aspects and goals of syntactic research. Development of contemporary syntactic concepts.

LIN5318 SEMANTICS I (3cr.)
Introduction to formal semantics with emphasis on the composition of meaning; research goals in formal semantics and overview of some current research questions.

LIN7320 SECOND LANGUAGE ACQUISITION I (3cr.)
Second language acquisition, concentrating on theoretical, experimental and methodological issues.

LIN7901 PSYCHOLINGUISTIQUE I / PSYCHOLINGUISTICS I (3cr.)

LIN7923 LINGUISTIQUE APPLIQUÉE À L’ENSEIGNEMENT DES LANGUES SECONDES / LINGUISTICS APPLIED TO SECOND LANGUAGE TEACHING (3cr.)

LIN7925 PROBLÈMES THÉORIQUES EN LINGUISTIQUE APPLIQUÉE / THEORETICAL ISSUES IN APPLIED LINGUISTICS (3cr.)

Speech-Language Pathology

La Faculté des sciences de la santé offre des programmes menant au diplôme d’études supérieures en études auditives-verbales et au grade de maîtrise ès sciences de la santé (M.Sc.S.) en audiology et en orthophonie. Le programme de maîtrise a pour objectif de former des professionnels de la santé capables de travailler en français en Ontario. Les candidats devront posséder une connaissance des principes fondamentaux de la psychologie et de la linguistique et recevront une formation hautement spécialisée dans le domaine des troubles de la communication.

Le volet audiology vise à former des cliniciens capables de faire des évaluations poussées des troubles du système auditif périphérique et central. La formation en audiology couvrira les domaines du diagnostic auditologique, de la réadaptation auditive, de la pédoaudiologie, de l’audiologie en milieu de travail, et de l’audiologie pour personnes âgées.

Le volet orthophonie vise à former des cliniciens capables de faire des analyses et d’intervenir dans les cas de troubles du langage et de la parole, tels que des troubles de voix et de résonance, du bégaiement, de la dysphagie, des troubles de communication d’origine neurologique, et des troubles du développement du langage chez l’enfant.

Le programme d’audiologie et d’orthophonie offre deux volets d’études de deuxième cycle, soit l’audiologie et l’orthophonie, comprenant certains cours en commun.


Le programme à l’Université d’Ottawa est contingenté et requiert six sessions d’études à temps plein y compris les stages et l’externat de 300 heures. Les stages obligatoires au programme peuvent s’effectuer dans le sein des hôpitaux, des conseils scolaires, et des centres de réadaptation.
Les buts du programme sont la formation de professionnels de la santé et la poursuite de recherches en orthophonie et en audiologie, de façon à fournir des services en priorité à la population francophone. La maîtrise de la langue française étant l’outil nécessaire à la pratique de la profession, la langue première d’enseignement est le français. Aussi, à moins de permission de la part d’un responsable de cours, il est exigé que les travaux écrits, y compris les examens, soient rédigés en français et que la langue d’usage de l’étudiant soit le français. Les stages de formation clinique se font dans les deux langues.

Le programme est régi par les règlements généraux de la Faculté des études supérieures et postdoctorales (FÉSP).

**Consortium national de formation en santé pour Francophones (CNFS)**

Le CNFS est un organisme panafricain où le financement est assuré par Santé Canada. Il regroupe dix institutions d’enseignement postsecondaire offrant des programmes d’études en français dans différentes disciplines de la santé. Il vise à faciliter l’accès à des études en sciences de la santé et en médecine à des étudiants provenant de milieux francophones en contexte minoritaire. Le CNFS a permis l’ajout de places supplémentaires en audiologie/orthophonie pour des francophones issus des provinces autres que le Québec et l’Ontario. Les étudiants ainsi accueillis dans le cadre du CNFS sont fortement encouragés à faire la majorité de leurs stages cliniques dans leur province ou territoire d’origine ou encore dans un autre milieu francophone en contexte minoritaire.

**Programs**

Master of Health Sciences Speech-Language Pathology

**Admission**

**Pour les deux volets (audiologie et orthophonie)**

Il faut :

- Détient un baccalauréat de spécialisation (ou l’équivalent) avec une moyenne d’au moins B (70%).
- Avoir une excellente connaissance du français écrit et parlé. Il faut aussi être capable de communiquer oralement en anglais et de comprendre des articles scientifiques rédigés dans cette langue. Afin d’évaluer ces compétences linguistiques, des tests de français et (ou) d’anglais, sont exigés. Les coûts des tests de compétences linguistiques devront être assumés par le candidat.
- Avoir obtenu un minimum de 3 crédits en statistiques de niveau intermédiaire ou en méthodes quantitatives (par exemple PSY 2116/2516). Ces crédits ne sont pas inclus dans le nombre de crédits mentionné aux points b) ci-dessous.
- Avoir obtenu un minimum de 3 crédits en physiologie ou en anatomie humaine (par exemple PSY 2301/2701 Fondements biologiques). Ces crédits ne sont pas inclus dans le nombre de crédits mentionné aux point b) ci-dessous.
- Avoir obtenu 3 crédits en acoustique ou en analyse du son ou de la parole (par exemple HSS 2525).
- Passer une entrevue personnelle : Les candidats jugés admissibles devront passer une entrevue avec les représentants du programme de maîtrise.

**Pour le volet orthophonie**

Il faut de plus :

a) Avoir obtenu un minimum de 9 crédits en sciences linguistiques* comprenant :

- 3 crédits en phonétique générale (LIN 1320/1720**) ou en phonétique-phonologie.
- 3 crédits en syntaxe (LIN 2310/2710) ou en morphologie (LIN 3328/3728) ou en morphosyntaxe.
- 3 crédits pertinents de niveau avancé au 1er cycle en linguistique, de préférence en sémantique, acquisition du langage, bilinguisme, neurolinguistique ou psycholinguistique.

b) Avoir obtenu 3 crédits en psychologie du développement de l’enfant (PSY 2105/2505) ou en psychologie du développement normal au cours de la vie.

*Il est entendu que ces crédits doivent être reconnus comme des crédits en étude du langage dans le cadre de la linguistique contemporaine, et non en étude d’une langue particulière, de la littérature, de la rédaction, de la culture, ou du folklore, peu importe le département dans lequel ils ont été suivis.

**Les cotes de cours entre parenthèses représentent des équivalents à l’Université d’Ottawa, et sont donnés à titre d’exemples pour aider le candidat dans son choix de cours.

**Pour le volet audiologie**

Il faut de plus :

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a) Avoir obtenu un minimum de 3 crédits pertinents en sciences linguistiques*, de préférence en phonétique générale (LIN 1320/1720**) ou en phonétique-phonologie.

b) Avoir obtenu un minimum de 3 crédits en psychologie dans un domaine pertinent (par exemple : développement de l’enfant (PSY 2105/2505), vieillissement (PSY 3128/3528), perception (PSY 3108/3508)).

* Il est entendu que ces crédits doivent être reconnus comme des crédits en étude du langage dans le cadre de la linguistique contemporaine, et non en étude d’une langue particulière, de la littérature, de la rédaction, de la culture, ou du folklore, peu importe le département dans lequel ils ont été suivis.

**Les cotes de cours entre parenthèses représentent des équivalents à l’Université d’Ottawa et sont donnés à titre d’exemples pour aider le candidat dans son choix de cours.

N.B. Des connaissances en linguistique, en psychologie ou en biologie humaine au-delà des exigences minimales décrites ci-dessus sont souhaitables. De même, le Comité d’admission sera bien disposé à l’égard des dossiers qui démontrent une familiarité avec la discipline proposée.

Cours de conversation anglaise

Pour préparer les étudiants à passer leurs stages en milieu bilingue, l’École des sciences de la réadaptation offre un cours de conversation anglaise (REA5940) qui peut être recommandé ou exigé selon la compétence linguistique du candidat.

Program Requirements

Exigences de la maîtrise

- Deux cours communs obligatoires pour le volet audiology et le volet orthophonie (total : 6 crédits)
  ORA5520 FONDEMENTS SCIENTIFIQUES DE LA RECHERCHE EN AUDILOGIE ET EN ORTHOPHONIE (3cr.)
  ORA5530 SÉMINAIRE OU TRAVAIL DIRIGÉ (COURS FACULTATIF) (3cr.)
- Des cours obligatoires spécifiques à chaque volet
  - En audiology (total : 48 crédits)
    ORA5511 SCIENCES DE L’OUÏE (3cr.)
    ORA5515 PÉDOAUDILOGIE I (3cr.)
    ORA5521 RÉADAPTATION AUDILOGIQUE AUPRÈS DE L’ADULTE (3cr.)
    ORA5541 PRATIQUE AUDILOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES I (3cr.)
    ORA5542 PRATIQUE AUDILOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES II (3cr.)
    ORA5551 PSYCHOACOUSTIQUE DE L’OREILLE ENDOMMAGÉE ET PHARMACOLOGIE (3cr.)
    ORA6510 CONCEPTS D’ORTHOPHONIE PERTINENTS À L’AUDILOGIE (3cr.)
    ORA6515 PÉDOAUDILOGIE II (3cr.)
    ORA6520 ÉVALUATION AUDILOGIQUE I (3cr.)
    ORA6521 AIDES AUDITIVES I (3cr.)
    ORA6522 INSTRUMENTATION EN AUDILOGIE (3cr.)
    ORA6523 ÉVALUATION AUDILOGIQUE II (3cr.)
    ORA6541 ÉVALUATIONS ÉLECTROPHYSIOLOGIQUES (3cr.)
    ORA6542 AIDES AUDITIVES II (3cr.)
    ORA6544 AIDES AUDITIVES III (3cr.)
    ORA6550 LE BRUIT ET L’AUDILOGIE (3cr.)
  - En orthophonie (total : 48 crédits)
    ORA5512 SCIENCES DE LA PAROLE APPLIQUÉES À L’ORTHO phonIE (3cr.)
    ORA5513 ANATOMIE ET PHYSIOLOGIE APPLIQUÉES À L’ORTHO phonIE (3cr.)
    ORA5522 TROUBLES DE LA COMMUNICATION LIES AUX TROUBLES D’AUDITION (3cr.)
    ORA6710 CONCEPTS D’AUDILOGIE PERTINENTS À L’ORTHO phonIE (3cr.)
    ORA6713 TROUBLES DÉVELOPPEMENTAUX DU LANGAGE EN PETITE ENFANCE (3cr.)
    ORA6721 TROUBLES DÉVELOPPEMENTAUX DES SONS DE LA PAROLE (3cr.)
    ORA6723 TROUBLES DÉVELOPPEMENTAUX DU LANGAGE EN MILIEU SCOLAIRE (3cr.)
    ORA6724 APHASIES (3cr.)
    ORA6741 TROUBLES ACQUIS DE LA PAROLE (3cr.)
    ORA6742 TROUBLES DE LA FLUIDITÉ (3cr.)
    ORA6743 TROUBLES DE LA VOIX (3cr.)
    ORA6744 TROUBLES DE LA COMMUNICATION DES CLIENTÈLES SPÉCIFIQUES (3cr.)
    ORA6745 SUPPLÉANCE À LA COMMUNICATION ORALE ET ÉCRITE (3cr.)
    ORA6746 DÉVELOPPEMENT ET FONCTIONNEMENT TYPIQUES DE LA COMMUNICATION ET DE LA DÉGLUTITION (3cr.)
    ORA6752 TROUBLES DE LA DÉGLUTITION ET ALIMENTATION (3cr.)
    ORA6753 TROUBLES COGNITIVO-LINGUISTIQUES ACQUIS (3cr.)
  - Deux séminaires en matière de pratique professionnelle
La réussite dans les cours de pratique professionnelle, les stages, l'externat et le projet de recherche est obligatoire. Ces cours, qui ne portent pas de note alphanumérique, seront notés S (satisfaisant) ou NS (non satisfaisant).

Il est entendu que le stage en audiologie comprendra des expériences en clinique d'orthophonie et que le stage en orthophonie comprendra des expériences en clinique d'audiologie.

**Courses**

La réussite dans les cours de pratique professionnelle, les stages, l'externat et le projet de recherche est obligatoire. Ces cours, qui ne portent pas de note alphanumérique, seront notés S (satisfaisant) ou NS (non satisfaisant).

Il est entendu que le stage en audiologie comprendra des expériences en clinique d'orthophonie et que le stage en orthophonie comprendra des expériences en clinique d'audiologie.

**Cours en commun**

**ORA5517 PRATIQUE PROFESSIONNELLE EN AUDIOLOGIE ET EN ORTHOPHONIE** (3cr.)
Préparation aux rôles professionnels de l'audiologiste et de l'orthophoniste en milieux cliniques.

**ORA5519 STAGE I**
Préparation théorique et pratique aux stages cliniques. Observation hebdomadaire pendant 5 semaines de différents milieux de travail en audiologie et en orthophonie sous supervision directe 100% du temps.

**ORA5520 FONDEMENTS SCIENTIFIQUES DE LA RECHERCHE EN AUDIOLOGIE ET EN ORTHOPHONIE** (3cr.)
Étude appliquée des fondements scientifiques de la recherche clinique en audiologie et en orthophonie.

**ORA5529 STAGE II**
Initiation aux clientèles et aux rôles professionnels en audiologie et en orthophonie sous supervision directe au moins 80% du temps. Stage en bloc d’une durée de 20 jours permettant d’accumuler entre 25 et 40 heures cliniques. Préalable : ORA5519 (Concomitant : 24 crédits de cours ORA).

**ORA5539 ÉTUDE ET RECHERCHE** (3cr.)
Présentation et discussion d'un thème contemporain relativement à l'étude des troubles d'audition ou à l'étude des troubles de la parole et du langage. (Ce cours, destiné aux étudiants souhaitant approfondir un sujet particulier, est un cours supplémentaire au programme.)

**ORA5545 PROJET DE RECHERCHE** (3cr.)
Expérience de recherche en audiologie et en orthophonie sous la supervision d'un membre du corps professoral. Concomitant : ORA5520

**ORA5549 STAGE III**
Approfondissement des connaissances et des compétences en lien avec les clientèles et les rôles professionnels en audiologie et en orthophonie sous supervision directe entre 50% et 80% du temps. Stage en bloc d’une durée de 25 jours permettant d’accumuler entre 50 et 75 heures cliniques. Préalable : ORA5529 (Concomitant : 39 crédits de cours ORA).

**ORA5559 STAGE IV**
Approfondissement des connaissances et des compétences en lien avec les clientèles et les rôles professionnels en audiologie et en orthophonie sous supervision directe entre 25 % et 50 % du temps. Stage bihebdomadaire d'une durée de 12 semaines permettant d'accumuler entre 75 et 100 heures cliniques. Préparation à l'entrée en pratique des professions d’orthophoniste et d’audiologiste. Préalable : ORA5549 (Concomitant : 51 crédits de cours ORA)
ORAS660 EXTERNAT
Consolidation des connaissances et des compétences en lien avec les clientèles et les rôles professionnels en audiologie et en orthophonie sous supervision directe au maximum 25% du temps. Stage en bloc d’une durée de 50 jours permettant d’accumuler entre 100 et 150 heures cliniques et menant à l’autonomie professionnelle. (Préalables : ORA5559 et 54 crédits de cours ORA).

REA5940 CONVERSATION ANGLAISE POUR LES STAGES EN RÉADAPTATION/ENGLISH CONVERSATION FOR CLINICAL PLACEMENTS IN REHABILITATION
Cours visant la préparation des étudiants en réadaptation pour l’intervention ayant lieu en anglais : relation d’aide, entretien initial, consentement aux soins, évaluation, intervention, congé et rédaction de notes de dossier à l’aide de la méthode SOAP (Subjective, Objective, Assessment, Plan). La terminologie spécifique aux différents domaines de la réadaptation est abordée. Noté (S) satisfaisant ou (NS) non satisfaisant. Ce cours est réservé aux étudiants inscrits à l’un des programmes de maîtrise professionnels de l’École des sciences de la réadaptation. Il ne peut compter parmi les crédits requis pour le programme mais il pourra être imposé comme exigence additionnelle à l’admission. / Course aimed at preparing students to converse effectively with English-speaking colleagues and clients. Topics will include English terms and dialogue related to forming a therapeutic relationship, the initial interview, obtaining informed consent, assessment, intervention, discharge and the charting of notes using the SOAP (Subjective, Objective, Assessment, Plan) method. Specific rehabilitation terminology will be presented. Graded (S) satisfactory or (NS) non satisfactory. This course is reserved for students registered in one of the professional master’s programs within the School of Rehabilitation Sciences. Cannot be counted towards the credits required for the student's program but may be specified as an additional requirement at admission.

ORA6500 SÉMINAIRE DE PRATIQUE FACTUELLE EN AUDIOLOGIE ET ORTHOPHONIE (3cr.)
Étude appliquée de la pratique fondée sur les faits scientifiques en audiologie et en orthophonie. Préalable : ORA5520

REA6547 SANTÉ ET RÉADAPTATION AU TRAVAIL (1.5cr.)

Cours en audiologie

ORA5511 SCIENCES DE L'OUIÈ (3cr.)

ORA5515 PÉDOAUDILOGIE I (3cr.)
Acquérir une connaissance des techniques de détection précoce et des méthodes d’évaluation de l’audition ainsi que des techniques d’intervention audiologique auprès de l’enfant Préalable : ORA6521) (Concomitant : ORA6541)

ORA5521 RÉADAPTATION AUDIOLOGIQUE AUPRÈS DE L’ADULTE (3cr.)
Planifier et réaliser les étapes inhérentes au processus de réadaptation permettant de pallier aux conséquences des troubles du système auditif chez l’adulte. (Préalables: ORA 5511 et ORA 6521)

ORA5541 PRATIQUE AUDIOLOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES I (3cr.)
Évaluation et approches de réadaptation pour les troubles du traitement auditif et pour les problèmes audiologiques liés au vieillissement (Préalables : ORA5551 et ORA6523)

ORA5542 PRATIQUE AUDIOLOGIQUE AUPRÈS DES POPULATIONS PARTICULIÈRES II (3cr.)
Évaluation et approches de réadaptation pour l’acouphène, l’hyperacousie et les troubles du système vestibulaire. (Préalables : ORA5551 et ORA6523)

ORA5551 PSYCHOACOUSTIQUE DE L’OREILLE ENDOMMAGÉE ET PHARMACOLOGIE (3cr.)
Physiologie du système auditif périphérique endommagé. Phénomènes psychoacoustiques de l'audition altérée. Pharmacologie et ototoxicité. (Préalables : ORA5511, ORA6520 et ORA6521)

ORA6510 CONCEPTS D'ORTHOPHONIE PERTINENTS À L'AUDIOLOGIE (3cr.)
Une introduction aux troubles de la parole et du langage chez l’enfant et l’adulte, leurs caractéristiques et leurs effets sur la communication.

ORA6515 PÉDOAUDILOGIE II (3cr.)

ORA6520 ÉVALUATION AUDIOLOGIQUE I (3cr.)
Planifier et réaliser les étapes inhérentes au processus d’évaluation permettant d’identifier et de comprendre un problème du système auditif périphérique (oreille externe, moyenne et interne), et de mesurer les progrès effectués suite à une intervention le cas échéant.

ORA6521 AIDES AUDITIVES I (3cr.)
Étude des dimensions acoustiques et électroacoustiques des systèmes d'amplification et des technologies pour personnes ayant une déficience auditive.
**ORA6522 INSTRUMENTATION EN AUDIOLOGIE** (3cr.)

**ORA6523 ÉVALUATION AUDIOLOGIQUE II** (3cr.)
Principes avancés d'évaluation de troubles audiologicals chez des populations avec dysfonction auditive périphérique et centrale. (Préalables : ORA5511, ORA6520 et ORA6522)

**ORA6541 ÉVALUATIONS ÉLECTROPHYSIOLOGIQUES** (3cr.)
Étude des fondements des réponses neurophysiologiques du système auditif et de l'importance clinique des potentiels évoqués du tronc cérébral et des émissions otolitho-acoustiques pour l'évaluation audiological. Introduction aux potentiels évoqués de latence courte, moyenne, longue et réponses corticales. *Préable : ORA5511*

**ORA6542 AIDES AUDITIVES II** (3cr.)
Méthodes de sélection, d’ajustement, de vérification et de validation des appareils auditifs. *Préable : ORA6521*

**ORA6544 AIDES AUDITIVES III** (3cr.)
Étude des systèmes d’amplification implantables et hybrides pour personnes ayant une déficience auditive. (Préalables : ORA5515, ORA6523 et ORA6542)

**ORA6550 LE BRUIT ET L’AUDIOLOGIE** (3cr.)
Effets psychologiques et physiologiques du bruit, inventaire des réglementations, normes et solutions aux problèmes de bruit. L’audiologiste en tant que consultant en milieu environnemental, industriel, professionnel et scolaire. (Préalables: ORA6522 et ORA6523)

**Cours en orthophonie**

**ORAS512 SCIENCES DE LA PAROLE APPLIQUÉES À L’ORTHOPHONIE** (3cr.)
Étude approfondie de la production (respiration, phonation, articulation, résonance, prosodie et fluidité) et de la perception (traitement auditif) de la parole.

**ORAS513 ANATOMIE ET PHYSIOLOGIE APPLIQUÉES À L’ORTHOPHONIE** (3cr.)
Étude appliquée de l'anatomie, de la physiologie, et de la neurologie de la communication, de la déglutition et de l'audition.

**ORAS522 TROUBLES DE LA COMMUNICATION LIÉS AUX TROUBLES D’AUDITION** (3cr.)
Étude avancée de l’évaluation(12,23),(996,958) et de l’intervention des difficultés de communication des individus ayant une perte auditive périphérique ou neurosensorielle ou encore un trouble de traitement auditif. (Préalables : ORA6710, ORA6713, ORA6721, ORA6723, ORA6724, ORA6743 et ORA6753)

**ORAS6710 CONCEPTS D’AUDIOLOGIE PERTINENTS À L’ORTHOPHONIE** (3cr.)

**ORAS6713 TROUBLES DÉVELOPPEMENTAUX DU LANGAGE EN PETITE ENFANCE** (3cr.)
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés développementales du langage oral et écrit chez les enfants d’âge préscolaire. (Préalables : ORA5513 et ORA6746) *Concomitants : ORA6721 et ORA6723*

**ORAS6721 TROUBLES DÉVELOPPEMENTAUX DES SONS DE LA PAROLE** (3cr.)
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés développementales des sons de la parole pendant les périodes préscolaire et scolaire. (Préalables: ORA 5512, ORA5513 et ORA6746) *Concomitants : ORA6713 et ORA6723*

**ORAS6723 TROUBLES DÉVELOPPEMENTAUX DU LANGAGE EN MILIEU SCOLAIRE** (3cr.)
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés développementales du langage oral et écrit chez les jeunes d’âge scolaire. (Préalables : ORA 5513 et ORA6746) *Concomitants : ORA6721 et ORA6713*

**ORAS6724 APHASIES** (3cr.)
Étude approfondie de l’évaluation et du traitement des difficultés acquises du langage oral et écrit reliées à l’aphasie. (Préalables : ORA 5513 et ORA6746) *Concomitants : ORA6741 et ORA6753*

**ORAS6741 TROUBLES ACQUIS DE LA PAROLE** (3cr.)
Étude approfondie de l’évaluation et du traitement des difficultés acquises de la parole. (Préalables: ORA5513, ORA5512 et ORA6746) *Concomitants : ORA6724 et ORA6753*

**ORAS6742 TROUBLES DE LA FLUIDITÉ** (3cr.)
Étude approfondie de la prévention, de l'évaluation et du traitement des difficultés de la fluidité. (Préalables: ORA5512 et ORA5513)

**ORAS6743 TROUBLES DE LA VOIX** (3cr.)
Étude approfondie de la prévention, de l’évaluation et du traitement des difficultés de la phonation et de la résonance. (Préalables : ORA5512, ORA5513 et
Programs

**Systems Science**

The Systems Science Program provides qualified students with the opportunity for master's-level study in a broad range of areas that emphasize transdisciplinary work in the context of general systems analysis. The emphasis in Systems Science is on the development of analytical and integration skills for use in the resolution of complex applied problems that require a broad-based perspective.

Many professors in Information Technology and Engineering, Mathematics and Statistics, Administration, Economics, and other disciplines are active in the Systems Science program as instructors, student advisers and thesis directors. Others are interested in ongoing Systems Science activities including the seminar series, and Systems Science applications days. Their areas of research, both theoretical and applied, span a wide variety of fields in operations research, deterministic and probabilistic modelling, optimization, computer science, information systems, control, and economic modelling.

**General Information**

The graduate program in System Science is an interdiscipliary program specially designed for those who are interested in the analysis and modelling (mathematical and computer) of natural and man-made systems. It provides the professional with skills and knowledge required to understand, control, predict and optimize behaviour in a variety of fields from engineering and computer science to management and applied economics. The program is supervised by a Committee composed of representatives from the Department of Economics, the School of Information Technology and Engineering, the Telfer School of Management, and the Department of Mathematics and Statistics.

You are invited to consult the site www.systems-science.uottawa.ca for additional information about the Program.

The Program offers streams leading to three different credentials: a graduate diploma; a master's in Systems Science; an MSc. To accommodate part-time students, the core courses are usually offered in the late afternoon or evening.

Systems Science is a participating unit in the collaborative program in Environmental Sustainability (at the master's level).

Most of the courses in the graduate programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The program is governed by the *general regulations* of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

- Graduate Diploma Systems Science
- Master of Science Systems Science
- Master of Science Systems Science Specialization in Environmental Sustainability
- Master of Systems Science
Admission

A four-year undergraduate degree in Computer Science, Economics, Engineering, Mathematics, Operations Research, Science or a related area with at least a "B" average is required for admission to the Program.

Undergraduate courses in probability, linear algebra, differential equations and computer programming are prerequisites for the core courses of the Program. Details regarding the level and content of prerequisite courses are included in the information package which is sent to all applicants. If a student lacks any of these courses, he will normally be required to complete them as a condition of admission. Entering students who lack the required undergraduate preparation may be permitted to enter a qualifying program.

Admission is offered either on a full- or part-time basis. Students admitted full-time to the master's are required to register full-time for three sessions. Specific admission requirements are listed at the beginning of the description of each stream.

Students should specify on the application form whether they are applying for the graduate diploma, the MSc in systems science or the master's in systems science.

Students are normally admitted initially to the graduate diploma and are admitted to the master's only upon successful completion of the core courses and a positive recommendation from the program committee.

No equivalencies or advanced standing are granted. A student who has already successfully completed some of the compulsory credits, may be allowed to replace those credits with elective credits. For details, see the general regulations of the FGPS, section B 2.7 c).

Applicants to the master's in systems science are invited to include with their application a letter of intent stating their motivation for studying systems science and outlining their preferences for key areas of study in the program. They must clearly select the program without thesis on their application form.

Language Requirements

Candidates who have not graduated from a French-speaking or an English-speaking university must pass the computerized Test of English as a Foreign Language (TOEFL), or equivalent, before admission. For additional information, please click on “Apply Now” or visit the website: http://www.etudesup.ualtedu.ca/Default.aspx?tabid=1624.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Program Requirements

MSc (Systems Science)

All students must complete the following:

Core courses (15 credits):

Four among the following five courses:

SYS5100 SYSTEMS ENGINEERING (3cr.)
SYS5110 FOUNDATIONS OF MODELLING AND SIMULATION (3cr.)
SYS5120 APPLIED PROBABILITY (3cr.)
SYS5130 SYSTEMS OPTIMIZATION AND MANAGEMENT (3cr.)
SYS5140 ECONOMIC SYSTEM DESIGN (3cr.)

and

SYS5160 SYSTEMS INTEGRATION (3cr.)

One elective course (3cr.)

SYS7990 MASTER'S THESIS PROPOSAL
SYS7999 MASTER'S THESIS

The regulations for the thesis and for the selection of elective courses are given below.

Master's thesis proposal (SYS7990)

Candidates registered for the MSc degree must submit to the program committee, by the middle of their third session of registration in the MSc program, a clearly defined research proposal that has been approved by their thesis director. Approval of the proposal must normally be obtained by the end of the session. A student must register in the Master's Thesis (SYS7999) in the session immediately following the approval of the proposal. A student whose proposal is not approved on the first attempt may be permitted to submit a second proposal. Failure to obtain approval following the second submission will lead to withdrawal from the MSc program. Students required to withdraw from the MSc but who have successfully completed all the core courses are eligible to receive the graduate diploma.
**Thesis committee**
Upon submission, the completed thesis will be examined by a committee of at least two professors who are members of the Faculty of Graduate and Postdoctoral Studies.

**Master's of systems science (30 credits)**
All students must complete 30 credits as follows:

Core courses (15 credits):

Four among the following five courses:

- SYS5100 SYSTEMS ENGINEERING (3cr.)
- SYS5110 FOUNDATIONS OF MODELLING AND SIMULATION (3cr.)
- SYS5120 APPLIED PROBABILITY (3cr.)
- SYS5130 SYSTEMS OPTIMIZATION AND MANAGEMENT (3cr.)
- SYS5140 ECONOMIC SYSTEM DESIGN (3cr.)

and

SYS5160 SYSTEMS INTEGRATION (3cr.)

Five elective courses (15 cr.)

See “Elective Courses” within the course list for the regulations for the selection of elective courses.

Students enrolled in the Master's who have successfully completed the core courses (15 credits) and who are not continuing in the Program, may be awarded the Graduate Diploma in Systems Science.

**Collaborative program in Environmental Sustainability (with thesis)**
The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. Additional credits are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Environmental Sustainability seminar (EVD5100 or EVD5500, 3 credits).
- Presentation and defence of a thesis on a topic in environmental sustainability based on research carried out under the supervision of a professor who is a member of the student’s primary program and/or of the collaborative program. The Collaborative Program Committee determines whether or not the topic of the thesis is appropriate for the designation “Specialization in Environmental Sustainability.” At least one of the thesis examiners must be a member of the Environmental Sustainability collaborative program.

The Department may require students to take additional courses, depending on their backgrounds.

**Duration of program**

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

**Minimum standards**
The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

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**Core Courses**

**SYS5100 SYSTEMS ENGINEERING** (3cr.)
Controllability and observability, Euler-Lagrange equations, Pontryagin maximum principle, dynamic programming, linear quadratic regulator problem, matrix Ricatti differential equations and properties of their solution, design of optimal regulator based on steady state solution of the Ricatti differential equation, time optimal control, LaSalle bang-bang principle, applications to motor speed control, satellite attitude control, etc. **Prerequisites:** CSI1100 and MAT2341 and (MAT 2324 or MAT 2331) and MAT2371 and MAT2375.

**SYS5110 FOUNDATIONS OF MODELLING AND SIMULATION** (3cr.)
Fundamental aspects of systems modelling and the simulation process. Elements of continuous system simulation. Issues relating to the numerical solution of ordinary differential equations. Elements of discrete event simulation Generation of random numbers and variates. Simulation validation and quality assurance. Introduction to simulation languages. **Prerequisites:** CSI1100 and MAT2341 and (MAT2324 or MAT 2331) and MAT2371 and MAT2375.

**SYS5120 APPLIED PROBABILITY** (3cr.)
Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration. In the case of ART5900, students may elect to substitute a fourth-year History and Theory of Art course specified by the Visual Arts Department.

Theory Courses

Courses (24 credits), 6 courses while registered in the master's and 2 while registered in the PhD.

Elective Courses

The following lists of elective courses are provided as suggested programs of study in key areas of Applied Systems Science. Course descriptions may be found in the listing of the academic unit concerned.

ADM = Administration; CSI = Computer Science; ECO = Economics; ELG = Electrical Engineering; EMP = Engineering Management; GEG = Geography; MAT = Mathematics; MCG = Mechanical Engineering; SYS = Systems Science

AND

SYS5160 SYSTEMS INTEGRATION (3cr.)
Planning, design of complex systems from continuous to discrete time. Synthesis of systems methodology. State estimation. Parameters indentification. Discretization and stochastic effects. Dynamic, logic control. Modelling, discrete event, simulation examples. Prerequisites: Two of the following: SYS 5100, SYS 5110, SYS 5120, SYS 5130, SYS 5140. Prerequisites: Four of the following: SYS5100, SYS5110, SYS5120, SYS5130, SYS5140.

The following lists of elective courses are provided as suggested programs of study in key areas of Applied Systems Science. Course descriptions may be found in the listing of the academic unit concerned.

ADM = Administration; CSI = Computer Science; ECO = Economics; ELG = Electrical Engineering; EMP = Engineering Management; GEG = Geography; MAT = Mathematics; MCG = Mechanical Engineering; SYS = Systems Science

Courses last one session and carry 3 credits, unless otherwise noted. The courses listed below are not necessarily offered each year. Students are asked to confer with their academic advisers concerning their area of choice and selection of elective courses, which may have codes related to other academic units of the University, e.g. BIO = Department of Biology, SEG = School of Information Technology and Engineering.

Note on prerequisite courses: It is the students' responsibility to verify that they have the prerequisites for the elective courses that they wish to take. After consultation with the academic adviser, they may be required to obtain permission from the professors teaching these courses.

GNGS121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNGS122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

Software Engineering


CS5110 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
Minimum Standards

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either

TRA5941 ADVANCED TRANSLATION FROM SPANISH INTO ENGLISH

Additional requirements

Doctorate in Philosophy Translation Studies

compulsory course (THO 6399 or THO 6378).

Study of a particular issue, author, or trend in contemporary Eastern Christian theology, e.g. modern philosophical theology (for example, consciousness.

Paul University:

directorial process in which they have participated. Graded: S/NS

THE5952 ANÁLISIS DE LA PREPRODUCCIÓN / FORMAL PREPRODUCTION ANALYSIS

production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5901 PRODUCCIÓN I / PRODUCCIÓN I

Adviser in a professional theatre.

Advanced academic research and writing skills; commonly used in theatre studies – archivial research, collection of pertinent data, forms of

THE6999 TESIS DE MAESTRÍA / MASTER'S THESIS

proposal is not accepted may submit and present a second proposal in the following session. Failure to obtain approval on the second attempt

defensa puede a presentar un proyecto a la session suivante. Si le projet n'est pas approuvé lors de la deuxième soumission, la note « non

dramatique, une étude de la place qu'elle tient dans l'œuvre de l'auteur, une proposition détaillée de la mise en scène, en plus d'une bibliographie

presenta aux étudiants dans le cadre de leur production. Pour la liste des problèmes à traiter, veuillez vous référer à THE 5931 Séminaire I. / presentan

problemas a tratar serán cortados de los siguientes y varían de una session a

Encadré par un professeur ou un metteur en scène professionnel, chaque étudiant étudia et dirigia une pièce en un acte ou une longue scène tirée

The dramatic text as a point of departure for a theatrical performance. The art of dramaturgy considered as the analysis of the poetics of

MAT = Mathematics; MCG = Mechanical Engineering; SYS = Systems Science

The following lists of elective courses are provided as suggested programs of study in key areas of Applied Systems Science. Course descriptions may be found

systems and economic systems simulation and behavior. Soft systems thinking. Examples from other fields of application will be reviewed from an

program, a clearly defined research proposal that has been approved by their thesis director. Approval of the proposal must normally be obtained

SYS7999 TESIS DE MAESTRÍA

their application form.

courses and a positive recommendation from the program committee.

Master of Science Systems Science Specialization in Environmental Sustainability

Master of Systems Science

Admission

A ... two failing grades (equivalent to six credits), or who fails the same

course twice, is required to withdraw.

Courses

Any four (4) other appropriate graduate courses in Translation Studies or from other graduate programs. For courses in other

Elective seminars or courses (9 cr.)

TRA6902 DISCURSO Y TRADUCCIÓN / DISCOURSE AND TRANSLATION (3cr.)

Prerequisite: a four-year undergraduate degree in computer science, computer engineering, or software engineering.

CS5112 (COMP 5310) SOFTWARE USABILITY (3cr.)

Design principles and metrics for usability. Qualitative and quantitative methods for the evaluation of software system usability: Heuristic evaluation, usability
testing, usability inspections and walkthroughs, cognitive walkthroughs, formal usability experimentation. Ethical concerns when performing studies with test

CS5125 SIMULACIÓN

Topics in modelling and simulation within the context of both discrete and continuous systems. Estimation of model parameters. Experiment design and statistical

analysis of simulation results. Distributed simulation. Stiffness and discontinuity handling in continuous system simulation. Artificial Intelligence in modelling and

simulation. Validation and quality assurance of simulation models. Prerequisite: CS4124 or permission of the instructor.

CS5180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)

A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern

matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive systems. Assignments will be both (a)

programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special

topics in current A.I. journals.

CS5307 EXPERT SYSTEMS

Survey of some landmark expert systems; types of architecture and knowledge representation; inferencing techniques; approximate reasoning; truth

maintenance; explanation facilities; knowledge acquisition. A project to implement a small expert system will be assigned.

CS5386 (COMP 5505) NATURAL LANGUAGE PROCESSING (3cr.)

Definitions, applications, challenges, lexicons, thesauri, corpora and other linguistic resources. Morphological analysis; tagging. Selected syntactic theories: phrase

structure grammars, unification-based grammars. Parsing techniques: chart, deterministic parsing, logic grammars. Selected semantic representations: logic,

logical forms, conceptual graphs, Element of semantic and pragmatic analysis: reference, scope, focus. Elements of statistical language and text

mining. Introduction to corpus linguistics. Term projects, one on syntax and one on semantics, will be done in Prolog and logic grammars. Prerequisite: CS4106 or permission of the instructor

Communication Systems

ADM6270 SYSTEMS FOR ELECTRONIC COMMERCE

ADM6271 BUSINESS TELECOMMUNICATIONS SYSTEMS (1.5cr.)

Concepts of voice, data, image and video communications and their integration into local and long distance networks. Business communication systems examples.

CS5169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)

Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer,Media Access Control,

Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery,


(Cannot be combined for credit with ELG 6168)

CS5174 (COMP 5604) VALIDATION METHODS FOR DISTRIBUTED SYSTEMS (3cr.)

Review of formal specification and description techniques for distributed and open systems. Verification techniques. Correctness proofs. Verification of general

ELG5103 OPTICAL COMMUNICATIONS SYSTEMS (3cr.)
Optical communication system concepts and basic characteristics. Optical Transmitters. Optical detection. Optical noise sources and their mathematical models. Non-coherent (direct) detection: system model, direct detection of intensity modulation, application of photo-multiplication, optimal post-detection processing, and subcarrier systems. Coherent detection: heterodyne receivers, the field matching problem and receiver performance. Optical binary digital system, single-mode binary and heterodyne binary systems. Block coded digital optical communication systems: PPM, PAM, PSK, and FSK signalling. Integration of device technology and system architecture. Selected topics in optical communications and networking. Prerequisites: ELG 5119, and ELG 5375 or the equivalents. Prerequisites: ELG5119, and ELG5375, or the equivalents.

ELG5119 (EACJ 5109) STOCHASTIC PROCESSES (3cr.)

ELG5122 (EACJ 5202) MODELLING, ANALYSIS AND PERFORMANCE EVALUATION IN COMPUTER COMMUNICATIONS (3cr.)
Network performance issues and their mathematical analysis techniques. Intermittently available server model, probing and tree search, delay cycle, switch/network topology and reliability. Analysis of controlled and random access methods, routing allocation/control, topological design. Selected topics from current literature on various network applications. Precludes additional credit for ELG 7186 (EACJ 5606). Prerequisites: ELG 5120 (EACJ 5200), ELG 5374 (EACJ 5607), or SYSC 5201 (ELG 6121), or the equivalents. Prerequisites: ELG5120 (EACJ5200), ELG5374 (EACJ5607), or SYSC 5201 (ELG6121), or the equivalents.

ELG5125 (EACJ 5205) QUALITY OF SERVICE MANAGEMENT FOR MULTIMEDIA APPLICATIONS (3cr.)
Design principles: layering, protocols, interface; models for open distributed processing; real-time requirement; request-response and stream processing, real-time scheduling, design for performance and scalability; other quality of services issues; user perspective versus system performance parameters, cost/performance trade-off, negotiations; adaptive and mobile applications; examples of multimedia applications and protocols. Prerequisite: ELG 5374 (EACJ 5607) or SYSC 5201 (ELG 6121) or equivalent.

ELG5180 (EACJ 5704) ADVANCED DIGITAL COMMUNICATIONS (3cr.)
Techniques and performance of digital signalling and equalization over linear bandlimited channels with additive Gaussian noise. Fading multipath channels: diversity concepts, modelling and error probability performance evaluation. Synchronization in digital communications. Spread spectrum in digital transmission over multipath fading channels. Precludes additional credit for SYSC 5605. Prerequisite: SYSC 5504 or ELG 5375 or the equivalent.

ELG5375 (EACJ 5506) PRINCIPLES OF DIGITAL COMMUNICATION (3cr.)
Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Analysis of digital data transmission techniques for additive Gaussian noise channels. Efficient modulation and coding for reliable transmission. Spread spectrum and line coding techniques. Prerequisite: ELG 5119 or SYSC 5503, or the equivalent (may be taken concurrently).

ELG5376 (EACJ 5507) DIGITAL SIGNAL PROCESSING (3cr.)

ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3cr.)

ELG5382 (EACJ 5108) SWITCHING AND TRAFFIC THEORY FOR INTEGRATED BROADBAND NETWORKS (3cr.)
Principles of switching theory. Asynchronous Transfer Mode switching architectures. Principle of teletraffic engineering. Queueing theory and performance evaluation techniques applied to the study of computer network architectures. Current topics in computer network modelling analysis and traffic control for high-speed multimedia networks. Prerequisite: ELG 5374 (EACJ 5607) or ELG 6121 (SYSC 5201), or the equivalent. Co-requisite: ELG 5119 (EACJ 5109) or ELG 6133 (SYSC 5503) or ELG 6103 (SYSC 5003), or the equivalent.

Information Systems
ADM6272 PLANNING AND DEVELOPMENT OF INFORMATION SYSTEMS
ADM6273 INFORMATION SYSTEMS FOR DECISION-MAKING

CSI5115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
The dimensional and multidimensional data models for data warehousing. Data dependencies and decompostition. Structure and use of data definition and
manipulation languages. Database economics, engineering, deployment and evolution. Issues in integrity, security, the Internet and distributed databases.

Relationships to decision support systems. Prerequisite: CSI3317 or equivalent

CSI5180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)
A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive systems. Assignments will be both (a) programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special topics in current A.I. journals.

CSI5386 (COMP 5505) NATURAL LANGUAGE PROCESSING (3cr.)
Definitions, applications, challenges, lexicons, thesauri, corpora and other linguistic resources. Morphological analysis; tagging. Selected syntactic theories; phrase structure grammars, unification-based grammars. Parsing techniques: chart, deterministic parsing, logic grammars. Selected semantic representations: logic, logical forms, conceptual graphs. Element of semantic and pragmatic analysis: reference, scope, focus. Elements of statistical language processing and text mining. Introduction to corpus linguistics. Term projects, one on syntax and one on semantics, will be done in Prolog and logic grammars. Prerequisite: CSI4106 or permission of the instructor

CSI5387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)

ELG5170 (EACJ 5501) INFORMATION THEORY (3cr.)
Measure of information: entropy, relative entropy, mutual information, asymptotic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capacity; random coding bound, reliability function, Blahut-Arimoto algorithm, Gaussian channels, colored Gaussian noise and “water-filling”; Rate distortion theory; Network information theory. Prerequisite: ELG 5119 (EACJ 5109) or SYSC 5503 (ELG 5119) or the equivalent.

Production Management
ADM6280 CURRENT PRACTICES IN OPERATIONS MANAGEMENT (1.5cr.)

ADM6281 SUPPLY CHAIN MANAGEMENT (1.5cr.)
Introduction to supply chain management; overview of its role in the organization as an operational, a strategic, and a competitive tool; role of information systems and technology in supply chain management; managing the flow of materials, and inventory management across the supply chain; developing and maintaining supply chain relationships; future challenges including sharing risks in inter-organizational relationships, managing the global supply chain and design for supply chain management. Prerequisite: MBA 5380 or equivalent for MBA students or EMP 5101 for EMP students.

ADM6282 INTRODUCTION TO QUALITY MANAGEMENT (1.5cr.)

ADM6283 QUALITY MANAGEMENT TECHNIQUES AND IMPLEMENTATION

EMP5169 ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

EMP5179 MANUFACTURING SYSTEMS ANALYSIS (3cr.)

MCG5159 (MAAJ 5509) ADVANCED PRODUCTION PLANNING AND CONTROL (3cr.)

MCG5169 (MAAJ 5609) ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)
modelling in engineering systems. Human unreliability data banks. Reliability of information and communication systems.

**MCG5179 (MAAJ 5709) MANUFACTURING SYSTEM ANALYSIS** (3cr.)

**Corporate Managerial Modelling**
**ADM6200 PHYSICIAN SKILLS DEVELOPMENT (PART I)**
This longitudinal course introduces the student to interviewing skills with an emphasis on establishing good communication between the physician and the patient, effective history taking and physical examination. Small group sessions occur with tutors, and students have a first exposure to clinical settings.

**ADM6201 FORECASTING FOR MANAGEMENT II**

**ADM6262 TECHNOLOGY IN THE NATIONAL AND INTERNATIONAL ENVIRONMENTS** (1.5cr.)

**ADM6263 TECHNOLOGY ADAPTATION AND INNOVATION IN A CORPORATE ENVIRONMENT** (1.5cr.)

**ADM6264 TECHNOLOGY R & D** (1.5cr.)

**ADM6265 HIGH-TECH ENTREPRENEURSHIP**

**ADM6284 MANAGING TECHNOLOGICAL RISK** (1.5cr.)

**MAT5307 (MATH 5804) TOPICS IN OPERATIONS RESEARCH** (3cr.)

**Environmental Economic Systems**
Environmental Economic Systems examines the impact of management decision making on the ecosystem. This study program is carried out in conjunction with several University departments and the Institute for Research on the Environment and Economy (IREE). Students in this area are invited to attend the IREE's regular seminars, and to participate in workshops as part of their systems study in this area.

**ECO6143 (ECON 5803) ECONOMICS OF NATURAL RESOURCES** (3cr.)

**ECO6151 (ECON 5804) ECONOMICS OF THE ENVIRONMENT** (3cr.)
Theory of environmental regulation, including command and control, incentive based mechanisms, effects of market structure, and interactions with pre-existing taxes. Valuation of non-marketed goods, including existence value, contingent valuation, hedonic price methods, health impacts, irreversibility, and recreational benefits. Prerequisite: ECO6150 or the permission of the Department.

**ECO6143 (ECON 5803) ECONOMICS OF NATURAL RESOURCES** (3cr.)

**GEG5102 Restructuring and Globalisation**
Advanced analysis of the global systems and their consequences at the international, national, regional and intra-urban scales.

**GEG6101 DATA ANALYSIS AND MODELLING** (3cr.)
Techniques of analysis of empirical data: quantitative, semi-quantitative and qualitative. Multivariate and time-series data analysis.

**GEG6103 SPATIAL DATA ANALYSIS** (3cr.)
Visualisation and analysis of spatial data: point-pattern analysis, spatial interpolation and estimation, spatial autocorrelation. Analysis of spatial interaction and spatio-temporal dynamics.

**General Codes – Systems Science**
**SYS5180 TOPICS IN SYSTEMS SCIENCE** (3cr.)
Theory Courses
The program is bilingual and covers a variety of artistic practices, from photography and media arts to sculpture, painting and drawing, video work on the languages of their choice provided that at least one of the languages is French or English, and that the STI can find an eligible co-terminology or lexicography file, or research paper). The student's choice must be approved by the STI. To meet this requirement, students may "Admission."

The doctoral program will focus on:

1. Students register for the fifth session in the second year in order to complete their post-production analysis (THE6001), and the directing seminar. Adviser in a professional theatre.

Programs

Master of Arts Theatre

Master of Arts Theatre Specialization in Medieval and Renaissance Studies

Admission

Admission to the graduate programs in Theatre is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

All applicants must be able to understand, speak and write proficiently either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have the right to produce their work, their research paper, their thesis, and to answer examination questions in French or in English.

Admission requirements for the MA program:
- An honours bachelor’s degree (or equivalent) with a specialization or major in Theatre or related discipline;
  OR
  An honours bachelor’s degree (or equivalent) in another discipline, with a minor in Theatre and two or more years of relevant experience;
  OR
  An honours bachelor’s degree (or equivalent) in another discipline, with three or more years of relevant experience.
- A minimum admission average of 70% (B), calculated in accordance with FGPS guidelines.

Documents required:

To view the list of required documents, click on "apply now" at the top of this page.

Collaborative Program in Medieval and Renaissance Studies at the Master’s Level

The Department of Theatre is a participating unit in the collaborative program in Medieval and Renaissance Studies at the Master’s level. This program has been established for students wishing to enrich their training in theatre by including an interdisciplinary component in Medieval and Renaissance Studies. The specific requirements of the collaborative program include two core courses in medieval studies and a thesis on a topic related to Medieval and Renaissance Studies.

Students must apply for acceptance in the Medieval and Renaissance Studies collaborative program at the same time as they apply for admission to the Master’s program in theatre.

For further details, please consult the Medieval and Renaissance Studies program on the FGPS website.

Program Requirements

Candidates pursue individualized research in areas of interest that may include dramaturgy, theory of performance, theatre criticism or history of theatre.

The requirements of the MA in theatre program are as follows:

Four core courses (12cr.)

THE5110 METHODOLOGY (3cr.)
THE5120 EPISTEMOLOGY OF THEATRE STUDIES (3cr.)
THE5130 DRAMATURGY (3cr.)
THE5140 THEORY OF PERFORMANCE (3cr.)

One elective seminar or course (3 cr.)

The elective seminar or course can be taken either within or outside the Department of Theatre. It allows students to take advantage of the wide range of theatre-related expertise available in departments throughout the Faculty of Arts and elsewhere at the University of Ottawa, particularly, but not exclusively, in literature and language, in fine arts, in history and in communication. The choice of elective is subject to the approval of the program director. Students are responsible for ensuring that they have any prerequisites that the course may require.

THE6990 Thesis proposal
THE6999 Master’s thesis (12cr.)

Collaborative program in Medieval and Renaissance Studies

Students in the program must complete the requirements of their primary program and those of the collaborative program.

The requirements are:

Four compulsory courses of three credits each offered by the Department of Theatre (12cr.):

THE5110 METHODOLOGY (3cr.)
THE5120 EPISTEMOLOGY OF THEATRE STUDIES (3cr.)
THE5130 DRAMATURGY (3cr.)
THE5140 THEORY OF PERFORMANCE (3cr.)

Two compulsory courses in the Collaborative Program in Medieval and Renaissance Studies (6cr.):

MDV5100 MEDIEVAL AND RENAISSANCE STUDIES RESEARCH METHODS AND TOOLS (3cr.)
MDV5900 SÉMINAIRE DE RECHERCHE INTERDISCIPLINAIRE / INTERDISCIPLINARY RESEARCH SEMINAR (3cr.)

THE6990 Thesis Proposal
THE6999 Thesis

Students must complete the two compulsory MDV courses before they register to the thesis.
A thesis on a topic related to medieval and Renaissance studies; the proposed topic must be approved by the program committee of the participating unit and the committee of the collaborative program. The supervision of the thesis must be carried out by a professor approved by the collaborative program committee. At least one of the two thesis examiners must be a member of the collaborative program.

The title of the degree will indicate MA in theatre with "specialization in Medieval and Renaissance Studies."

**Duration of program**

Full-time MA students are expected to complete all program requirements within two years of initial registration. The maximum time permitted is four years from the date of the initial registration.

**Residence**

All students admitted full-time must complete a minimum of three sessions of full-time registration.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal or the thesis must withdraw from the program.

**Courses**

**THE5110 METHODOLOGY (3cr.)**

Advanced academic research and writing skills; commonly used in theatre studies – archival research, collection of pertinent data, forms of empirical research, conceptual research, etc. – practical exercises leading to the students' successful writing of academic papers, conference presentations, and an MA thesis paper.

**THE5120 EPISTEMOLOGY OF THEATRE STUDIES (3cr.)**

Philosophical and sociological theories generated by a range of disciplines – from literature to political science – as applied to theatre studies, as well as theories generated within the field of theatrical studies as such. Review of the theoretical writings available to the contemporary scholar, and articulation of a theoretical framework for the students' own research. Students will also be required to situate their own research within the broader context of today's epistemologies.

**THE5130 DRAMATURGY (3cr.)**

The dramatic text as a point of departure for a theatrical performance. The art of dramaturgy considered as the analysis of the poetics of dramatic text as well as the study of its structural specificities and norms. Major elements of, and theories related to, new play development, both in a historical perspective as well as a conceptual one. Acquisition of the skills necessary for pursuing a career as a Dramaturge or a Literary Adviser in a professional theatre.

**THE5140 THEORY OF PERFORMANCE (3cr.)**

Examination of a range of performance forms that define contemporary practice including performance art, fine art, film, site-specific theatre and cyber-spectacle. Exercises in academic and professional writing for the theatre. Major elements of performance studied both in historical and conceptual perspectives.

**THE5901 PRODUCTION I / PRODUCTION I (3cr.)**

Encadré par un professeur ou un metteur en scène professionnel, chaque étudiant effectue une série d'exercices sur la mise en scène et travaille des scènes posant un problème spécifique de mise en scène afin de développer ses habiletés pratiques ainsi que ses capacités d'analyse. Noté : S/NS // Students, under the supervision of faculty members, or a professional director, undertake a series of directing exercises and problem scenes designed to develop specific practical and analytical skills. Graded: S/NS.

**THE5902 PRODUCTION II / PRODUCTION II (3cr.)**

Encadré par un professeur ou un metteur en scène professionnel, chaque étudiant étudie et dirige une pièce en un acte ou une longue scène tirée d'une pièce. / Students research and direct a one-act play or an extended scene from a full-length play under the guidance of a professor or professional director.

**THE5903 PRODUCTION III / PRODUCTION III (3cr.)**

Encadré par un professeur ou un metteur en scène professionnel, chaque étudiant étudie et dirige une pièce en un acte ou une longue scène tirée d'une pièce. / Students research and direct a one-act play or an act from a full-length play with the guidance of a professor or professional director.

**THE5931 SÉMINAIRE I / GRADUATE DIRECTING SEMINAR I (3cr.)**

Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Les problèmes à traiter seront choisis parmi les suivants et varieront d'une session à l'autre : les traditions françaises et anglaises de la mise en scène; du texte à la scène; les collaborations au théâtre; les méthodologies de la mise en scène; le théâtre et les conventions; le théâtre et les autres arts; le théâtre et ses publics. La description du séminaire est disponible plusieurs mois à l'avance au Département. / Seminar focusing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. Topics will vary from session to session and will be chosen from among the following: the French and English traditions of directing; from text to stage; theatrical collaboration; approaches to directing; theatrical conventions; theatre.
and the other arts; and the theatre and its audiences. A description of the specific seminar topic is available several months in advance from the Department.

THE5932 SÉMINAIRE II / GRADUATE DIRECTING SEMINAR II (3cr.)
Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Pour la liste des problèmes à traiter, veuillez vous référer à THE 5931 Séminaire I. / Seminar focussing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5933 SÉMINAIRE III / GRADUATE DIRECTING SEMINAR III (3cr.)
Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Pour la liste des problèmes à traiter, veuillez vous référer à THE 5931 Séminaire I. / Seminar focussing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5934 SÉMINAIRE IV / GRADUATE DIRECTING SEMINAR IV (3cr.)
Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Pour la liste des problèmes à traiter, veuillez vous référer à THE 5931 Séminaire I. / Seminar focussing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5952 ANALYSE FORMELLE DE LA PRÉ-PRODUCTION / FORMAL PRE-PRODUCTION ANALYSIS (3cr.)
Les étudiants doivent préparer une analyse détaillée de la pièce retenue pour leur production finale comprenant une analyse historique et dramatique, une étude de la place qu’elle tient dans l’oeuvre de l’auteur, une proposition détaillée de la mise en scène, en plus d’une bibliographie critique des travaux qui se rapportent à la pièce et à la production. / Students prepare a substantial analysis of the play chosen for their final production, including a historical and dramatic analysis, a study of the play’s place within the author’s oeuvre, a production history and a detailed production concept, as well as a critical bibliography of works pertaining to the play and to the production.

THE6001 PRODUCTION FINALE / FINAL PRODUCTION (6cr.)
L’étudiant dirige une pièce. Après la production finale, l’étudiant présente une analyse de la préparation, des répétitions, de la représentation et de la réception de son spectacle. / Students direct a full-length play. After the production they will submit a post-production analysis of the preparation, rehearsal, performance and reception of the play.

THE6991 STAGE / DIRECTING PRACTICUM (3cr.)
Chaque étudiant fait un stage à titre d’observateur auprès d’un metteur en scène aguerri dirigeant une production professionnelle. À la fin du stage, l’étudiant présente un rapport détaillé et une analyse du processus de mise en scène auquel il a participé. Noté : S/NS / Students observe a senior director mount a professional production. At the conclusion of the production, the student will submit a detailed record and analysis of the directorial process in which they have participated. Graded: S/NS

THE6990 PROJET DE THÈSE / THESIS PROPOSAL
Les étudiants doivent s’inscrire à THE6990 au plus tard au cours de la deuxième session d’inscription au programme et avoir terminé le cours à la fin de la troisième session. Dans le cadre de ce cours, les étudiants effectuent des lectures intensives d’ouvrages dramaturgiques et théoriques directement reliés à leur domaine de recherche et rédigent leur projet de thèse sous la direction de leur directeur de thèse. Le projet de thèse doit être défendu devant le Comité des études supérieures et le directeur de thèse. L’étudiant dont le projet n’est pas accepté lors d’une première défense peut à nouveau présenter un projet à la session suivante. Si le projet n’est pas approuvé lors de la deuxième soumission, la note « non satisfaisant » sera attribuée pour le projet et l’étudiant sera retiré du programme. Le cours est noté S (satisfaisant) ou NS (non satisfaisant). / Students must enroll in THE6990 no later than the 2nd session of registration in the program and complete it by the end of the third session. They read works, both dramaturgical and theoretical, directly related to their thesis topic, and prepare their thesis proposal under the guidance of their thesis adviser. The proposal must be defended before the Graduate Studies Committee and the student’s supervisor. A student whose proposal is not accepted may submit and present a second proposal in the following session. Failure to obtain approval on the second attempt leads to a grade of “not satisfactory” for the proposal and results in compulsory withdrawal from the program. The course is evaluated on an S (Satisfactory) / NS (Non satisfactory) basis.

THE6999 THÈSE DE MAÎTRISE / MASTER’S THESIS (12cr.)
La thèse peut prendre l’une des formes suivantes :

La thèse de type traditionnel consiste en un travail de recherche appuyé d’une analyse documentaire et des théories et des méthodes d’analyse critique pertinentes au sujet traité (25,000 mots);

Le second type de thèse comprend deux parties : une œuvre de création et une analyse du processus de création. Le projet de création doit s’appuyer sur une hypothèse de recherche. Le document d’analyse doit décrire les antécédents historiques principaux relatifs au projet et présenter une synthèse des théories esthétiques à l’appui du projet de création (12,500 mots).

Dans les deux cas, la thèse doit correspondre aux standards de la FÉSP. On consultera en particulier la section G des règlements généraux de la FÉSP et le guide Préparer sa thèse ou son mémoire. Préalable : THE6990. / 

The thesis can take one of two forms:

The traditional form involves research work supported by a review of the literature, critical analysis and synthesis (25,000 words);

The second form includes two parts: a creative project and an analysis of the creative process for that project. The project must be based on a
research question. The analytical document must demonstrate knowledge of the historical antecedents and synthesize the aesthetic theories underpinning the creative project (12,500 words).

In both cases, the thesis must meet the standards specified by the FGPS. For details consult section G of the general regulations of the FGPS and the guide Preparing a Thesis or a Research Paper. Prerequisite: THE6990.

Theatre (Directing)

The Department of Theatre offers two graduate programs, one leading to a Master of Arts (MA) in Theatre, and the other to a Master of Fine Arts (MFA) in Theatre with specialization in Directing.

The Master of Arts (MA) in theatre (with thesis) focuses on the field of theatre theory and dramaturgy. The objective of this program is to bridge theoretical and practical approaches to the study of theatre by encouraging dialogue and understanding between practitioners and theoreticians. The program enables students to broaden their academic scope with regard to the epistemological and interdisciplinary specificities of theatre as an art form and as a discipline of study; it encourages the analysis of the Western world’s principal theatrical traditions from various discursive perspectives; it fosters a greater understanding of Canada’s two principal theatrical traditions and helps develop scholarly discourse in regards to each.

The Master of Fine Arts (MFA) in directing focuses on the practice and theory of directing. It allows students to develop their skills in the art of directing, and offers the unique opportunity to study both English and French theatre practices and traditions in a bilingual and bicultural setting. The program is designed to prepare students to work as directors in both the professional and academic theatre.

Both programs are offered full-time and extend over two years. They can be pursued in English and in French.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Fine Arts in Theatre Directing

Admission

Admission to the graduate program in Theatre is governed by the “General Regulations” of the Faculty of Graduate and Postdoctoral Studies (FGPS).

All applicants must be able to understand speak and write proficiently either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the General Regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Admission requirements for the MFA program:

- A bachelor’s degree with a specialization or a major, or the equivalent, in Theatre with a minimum average of 75% (B+) in the last two years and a 70 % (B) average overall;
- A solid background in the literature, theory and history of the theatre;
- A working knowledge of how theatre is done, including an understanding of the basic techniques of acting, production and theatre administration;
- Experience and a demonstrable skill and talent for theatre directing;
- Some successful pursuit of theatre work beyond the university setting;
- Proficiency in one of the two official languages and at least a passive knowledge of the other; a passive knowledge implies the ability to follow courses in both official languages, and to appreciate the English and French theatrical traditions, culture and practice.

Documents Required

To view the list of required documents, go to “Apply now” at the top of this page.
Program Requirements

Degree Requirements

The program combines two compulsory courses, production courses, directing seminars, and a practicum where students observe a senior director mount a production in a professional theatre. Students must undergo a diagnostic examination upon entry into the program.

A TOTAL OF 39 CREDITS ARE REQUIRED AS FOLLOWS:

Compulsory Courses (6 cr.)

THE5130 DRAMATURGY (3cr.)
THE5140 THEORY OF PERFORMANCE (3cr.)

Production Courses (18 cr.)

THE5901 PRODUCTION I / PRODUCTION I (3cr.)
THE5902 PRODUCTION II / PRODUCTION II (3cr.)
THE5903 PRODUCTION III / PRODUCTION III (3cr.)
THE5952 ANALYSE FORMELLE DE LA PRÉ-PRODUCTION / FORMAL PRE-PRODUCTION ANALYSIS (3cr.)
THE6001 PRODUCTION FINALE / FINAL PRODUCTION (6cr.)

Seminars (12 cr.)

THE5931 SÉMINAIRE I / GRADUATE DIRECTING SEMINAR I (3cr.)
THE5932 SÉMINAIRE II / GRADUATE DIRECTING SEMINAR II (3cr.)
THE5933 SÉMINAIRE III / GRADUATE DIRECTING SEMINAR III (3cr.)
THE5934 SÉMINAIRE IV / GRADUATE DIRECTING SEMINAR IV (3cr.)

Directing Practicum (3 cr.)

THE6901 STAGE / DIRECTING PRACTICUM (3cr.)

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Duration of the Program

The requirements of the program must be fulfilled within two years (five sessions of full time registration).

1. Students register for the fifth session in the second year in order to complete their post-production analysis (THE6001), and the directing practicum (THE6901).

Courses

THE5110 METHODOLOGY (3 cr.)
Advanced academic research and writing skills; commonly used in theatre studies – archival research, collection of pertinent data, forms of empirical research, conceptual research, etc. – practical exercises leading to the students’ successful writing of academic papers, conference presentations, and an MA thesis paper.

THE5120 EPISTEMOLOGY OF THEATRE STUDIES (3 cr.)
Philosophical and sociological theories generated by a range of disciplines – from literature to political science – as applied to theatre studies, as well as theories generated within the field of theatrical studies as such. Review of the theoretical writings available to the contemporary scholar, and articulation of a theoretical framework for the students’ own research. Students will also be required to situate their own research within the broader context of today’s epistemologies.

THE5130 DRAMATURGY (3 cr.)
The dramatic text as a point of departure for a theatrical performance. The art of dramaturgy considered as the analysis of the poetics of dramatic text as well as the study of its structural specificities and norms. Major elements of, and theories related to, new play development, both in a historical perspective as well as a conceptual one. Acquisition of the skills necessary for pursuing a career as a Dramaturge or a Literary Adviser in a professional theatre.

THE5140 THEORY OF PERFORMANCE (3 cr.)
Examination of a range of performance forms that define contemporary practice including performance art, fine art, film, site-specific theatre and cyber-spectacle. Exercises in academic and professional writing for the theatre. Major elements of performance studied both in historical and conceptual perspectives.
THE5901 PRODUCTION I / PRODUCTION I (3cr.)
Encadré par un professeur ou un metteur en scène professionnel, chaque étudiant effectue une série d'exercices sur la mise en scène et travaille des scènes posant un problème spécifique de mise en scène afin de développer ses habiletés pratiques ainsi que ses capacités d'analyse. Noté : S/NS // Students, under the supervision of faculty members, or a professional director, undertake a series of directing exercises and problem scenes designed to develop specific practical and analytical skills. Graded: S/NS

THE5902 PRODUCTION II / PRODUCTION II (3cr.)
Encadré par un professeur ou un metteur en scène professionnel, chaque étudiant étudie et dirige une pièce en un acte ou une longue scène tirée d'une pièce. / Students research and direct a one-act play or an extended scene from a full-length play under the guidance of a professor or professional director.

THE5903 PRODUCTION III / PRODUCTION III (3cr.)
Encadré par un professeur ou un metteur en scène professionnel, chaque étudiant étudie et dirige une pièce en un acte ou une longue scène tirée d'une pièce. / Students research and direct a one-act play or an act from a full-length play with the guidance of a professor or professional director.

THE5931 SÉMINAIRE I / GRADUATE DIRECTING SEMINAR I (3cr.)
Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Les problèmes à traiter seront choisis parmi les suivants et varieront d'une session à l'autre : les traditions françaises et anglaises de la mise en scène; du texte à la scène; les collaborations au théâtre; les méthodologies de la mise en scène; le théâtre et les conventions; le théâtre et les autres arts; le théâtre et ses publics. La description du séminaire est disponible plusieurs mois à l'avance au Département. / Seminar focussing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5932 SÉMINAIRE II / GRADUATE DIRECTING SEMINAR II (3cr.)
Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Pour la liste des problèmes à traiter, veuillez vous référer à THE 5931 Séminaire I. / Seminar focussing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5933 SÉMINAIRE III / GRADUATE DIRECTING SEMINAR III (3cr.)
Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Pour la liste des problèmes à traiter, veuillez vous référer à THE 5931 Séminaire I. / Seminar focussing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5934 SÉMINAIRE IV / GRADUATE DIRECTING SEMINAR IV (3cr.)
Séminaire portant sur un aspect spécifique du processus de mise en scène et permettant des échanges fructueux relatifs aux problèmes qui se présentent aux étudiants dans le cadre de leur production. Pour la liste des problèmes à traiter, veuillez vous référer à THE 5931 Séminaire I. / Seminar focussing on a selected aspect of the directorial process and providing a forum for the discussion of problems and issues encountered in production work. For a list of topics, please refer to THE 5931 Graduate Directing Seminar I.

THE5952 ANALYSE FORMELLE DE LA PRÉ-PRODUCTION / FORMAL PRE-PRODUCTION ANALYSIS (3cr.)
Les étudiants doivent préparer une analyse détaillée de la pièce retenue pour leur production finale comprenant une analyse historique et dramatique, une étude de la place qu'elle tient dans l'œuvre de l'auteur, une proposition détaillée de la mise en scène, en plus d'une bibliographie critique des travaux qui se rapportent à la pièce et à la production. / Students prepare a substantial analysis of the play chosen for their final production, including a historical and dramatic analysis, a study of the play's place within the author's oeuvre, a production history and a detailed production concept, as well as a critical bibliography of works pertaining to the play and to the production.

THE6001 PRODUCTION FINALE / FINAL PRODUCTION (6cr.)
L'étudiant dirige une pièce. Après la production finale, l'étudiant présente une analyse de la préparation, des répétitions, de la représentation et de la réception de son spectacle. / Students direct a full-length play. After the production they will submit a post-production analysis of the preparation, rehearsal, performance and reception of the play.

THE6901 STAGE / DIRECTING PRACTICUM (3cr.)
Chaque étudiant fait un stage à titre d'observateur auprès d'un metteur en scène aguerri dirigeant une production professionnelle. À la fin du stage, l'étudiant présente un rapport détaillé et une analyse du processus de mise en scène auquel il a participé. Noté : S/NS / Students observe a senior director mount a professional production. At the conclusion of the production, the student will submit a detailed record and analysis of the directorial process in which they have participated. Graded: S/NS

THE6990 PROJET DE THÈSE / THESIS PROPOSAL
Les étudiants doivent s'inscrire à THE6990 au plus tard au cours de la deuxième session d'inscription au programme et avoir terminé le cours à la fin de la troisième session. Dans le cadre de ce cours, les étudiants effectuent des lectures intensives d'ouvrages dramaturgiques et théoriques directement reliés à leur domaine de recherche et rejoignent leur projet de thèse sous la direction de leur directeur de thèse. Le projet de thèse doit être défendu devant le Comité des études supérieures et le directeur de thèse. L'étudiant dont le projet n'est pas accepté lors d'une première défense peut à nouveau présenter un projet à la session suivante. Si le projet n'est pas approuvé lors de la deuxième soumission, la note « non satisfaisant » sera attribuée pour le projet et l'étudiant sera retiré du programme. Le cours est noté S (satisfaisant) ou NS (non satisfaisant). /
Students must enroll in THE6990 no later than the 2nd session of registration in the program and complete it by the end of the third session. They read works, both dramaturgical and theoretical, directly related to their thesis topic, and prepare their thesis proposal under the guidance of their thesis advisor. The proposal must be defended before the Graduate Studies Committee and the student’s supervisor. A student whose proposal is not accepted may submit and present a second proposal in the following session. Failure to obtain approval on the second attempt leads to a grade of “not satisfactory” for the proposal and results in compulsory withdrawal from the program. The course is evaluated on an S (Satisfactory) / NS (Non satisfactory) basis.

THE6999 THÈSE DE MÂTRISE / MASTER’S THESIS (12cr.)
La thèse peut prendre l’une des formes suivantes :

La thèse de type traditionnel consiste en un travail de recherche appuyé d’une analyse documentaire et des théories et des méthodes d’analyse critique pertinentes au sujet traité (25,000 mots);

Le second type de thèse comprend deux parties : une œuvre de création et une analyse du processus de création. Le projet de création doit s’appuyer sur une hypothèse de recherche. Le document d’analyse doit décrire les antécédents historiques principaux relatifs au projet et présenter une synthèse des théories esthétiques à l’appui du projet de création (12,500 mots).

Dans les deux cas, la thèse doit correspondre aux standards de la FÉSP. On consultera en particulier la section G des règlements généraux de la FÉSP et le guide Préparer sa thèse ou son mémoire. Préalable : THE6990. / The thesis can take one of two forms:

The traditional form involves research work supported by a review of the literature, critical analysis and synthesis (25,000 words);

The second form includes two parts: a creative project and an analysis of the creative process for that project. The project must be based on a research question. The analytical document must demonstrate knowledge of the historical antecedents and synthesize the aesthetic theories underpinning the creative project (12,500 words).

In both cases, the thesis must meet the standards specified by the FGPS. For details consult section G of the general regulations of the FGPS and the guide Preparing a Thesis or a Research Paper. Prerequisite: THE6990.

Theology

By virtue of the federation of Saint Paul University with the University of Ottawa, the Faculty of Theology of Saint Paul University offers graduate programs leading to the degrees conferred jointly by the senates of both universities.

Other graduate theology programs within the sole jurisdiction of the Senate of Saint Paul University are also offered; their description and requirements can be found in the calendar of the Faculty of Theology.

The Faculty of Theology offers the following programs whose degrees are conferred jointly by the senates of the University of Ottawa and Saint Paul University:

- Graduate Diploma in Contemplative Theology and Spiritual Mentorship;
- Master of Arts in Theology;
- PhD in Theology;
- Master of Pastoral Theology;
- Doctor of Ministry;
- Master of Religious Education.

Master’s program

The MA program in Theology is intended for candidates who already have a good basic formation in Theology, with courses in various areas of Theology such as systematic theology, history, biblical studies, ethics and spirituality. It is designed to allow these students to gain greater familiarity with the various research methods in Theology, and to begin a specialization in a particular area, while promoting an integration of the theological formation already acquired. The program prepares students to teach at undergraduate level, to undertake doctoral studies in Theology, and to assume diverse leadership responsibilities in institutions or organizations requiring a formation in religious studies or theology.

Doctoral program

The doctoral program in Theology is intended to promote the acquisition of a high level of intellectual autonomy and expertise in an area of research. As well, applicants are expected to contribute to the progress of knowledge in their discipline or area of study by presenting original research in the form of a doctoral dissertation. Moreover, the program aims to form qualified persons for university research and teaching or for other activities that require advanced specialization in our disciplines and areas of study.

Doctoral candidates can best benefit from the resources of the faculty by defining their thesis projects in view of the areas of competence of faculty members.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.
Programs

Master of Arts Theology

Doctor of Ministry

Doctorate in Philosophy Theology

Admission

To be admitted to the MA program, the candidate must:

- hold an honours bachelor’s degree (60 credits in theology) or its equivalent, with a minimum 70 per cent (B) average; a candidate who holds an honours bachelor’s degree, with a minimum 70 per cent (B) average but who has completed less than 60 credits in theology (or their equivalent) will be required to do a Qualifying Year prior to enrolment in graduate courses;
- have an active knowledge of either English or French;
- have a basic knowledge (Level 1 - Introduction) of Hebrew and of Greek, if he or she wants to do a thesis in biblical studies.

The grade conferred is a Master’s of Arts Theology (MATH)

Program Requirements

Master of Arts with Major Research Paper

ALL AREAS OF STUDY WITH THE EXCEPTION OF EASTERN CHRISTIAN STUDIES

The MA(Th) degree consists of 27 credits (7 courses and a research paper 6cr.).

Seven courses as follows:

- Four Foundation courses:
  - 1 course from the following:
    - THO6310 THEOLOGICAL HERMENEUTICS (3cr.)
    - THO6354 RELIGIOUS EXPERIENCE (3cr.)
    - THO6355 THEOLOGY AND CULTURE (3cr.)
  - 1 course from the following:
    - THO6317 THE FORMATION OF THE BIBLICAL TEXT (3cr.)
    - THO6318 THE INTERPRETATION OF BIBLICAL TEXTS (3cr.)
  - 1 course from the following:
    - THO6333 METHODS AND APPROACHES IN CONTEMPORARY ETHICS (3cr.)
    - THO6334 ISSUES AND DEBATES IN CONTEMPORARY ETHICS (3cr.)
  - 1 course from the following:
    - THO6354 RELIGIOUS EXPERIENCE (3cr.)
    - THO6358 SPIRITUALITY: METHODS; RELATIONSHIPS WITH THE HUMAN SCIENCES (3cr.)
    - THO6359 COMPARATIVE STUDY OF SPIRITUAL TRADITIONS (3cr.)

- One methodology course (THO6399 METHODOLOGIES IN THEOLOGY, 3cr.)

- Two courses to be chosen in consultation with the student’s research director (who will be from the student’s chosen area of study) and with the director of Graduate Studies from:
  - the other THO courses above;
  - graduate courses offered by the Faculties of Canon Law, Human Sciences, Philosophy (Saint Paul University);
  - courses offered in the context of the MPTh programme (Faculty of Theology);
  - graduate courses offered in the University of Ottawa.

THO6998 MÉMOIRE / RESEARCH PAPER (6cr.)

Students are required by the end of the program to demonstrate competency in at least one modern or ancient language as required for research in their area of study. In the case of modern languages, students will be evaluated for reading and oral comprehension; in the case of ancient languages, students will be evaluated for reading comprehension only. (Anglophone students intending to apply for admission to the PhD
program of the Faculty are encouraged to ensure that they have passive competency in French by the end of their MA program.)

EASTERN CHRISTIAN STUDIES

Consists of 27 credits (6 courses, synthesis exam (3cr.), research paper (6cr.)).

- Two foundation courses (6 credits) from:
  THO6375 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN CHURCH HISTORY (3cr.)
  THO6376 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN SPIRITUALITY (3cr.)
  THO6377 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL HISTORY (3cr.)
  THO6382 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN THEOLOGY (3cr.)
  THO6388 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL THEOLOGY (3cr.)
  THO6397 FOUNDATIONAL TEXTS IN EAST-WEST ECUMENISM (3cr.)

- One methodology course (THO6378 RESOURCES AND METHODS FOR THE STUDY OF EASTERN CHRISTIANITY, 3cr.)

- Two other courses (6 credits) from the following:
  THO6352 STUDIES IN EASTERN CHRISTIANITY (3cr.)
  THO6379 ISSUES IN EASTERN CHRISTIAN HERMENEUTICS & EXEGESIS (3cr.)
  THO6380 PATRISTIC THEOLOGY (3cr.)
  THO6381 CONTEMPORARY EASTERN THEOLOGY (3cr.)
  THO6382 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN THEOLOGY (3cr.)
  THO6387 ISSUES IN EASTERN CHRISTIAN LITURGICAL HISTORY (3cr.)
  THO6392 THE HISTORY OF EASTERN CHRISTIAN INSTITUTIONS, MOVEMENTS, PERSONS (3cr.)
  THO6393 METHODOLOGICAL ISSUES IN EASTERN CHURCH HISTORY (3cr.)
  THO6398 INTER-RELIGIOUS ISSUES AND THE CHRISTIAN EAST (3cr.)

or from the following Foundational courses that have not been taken under (1) above:

THO6375 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN CHURCH HISTORY (3cr.)
THO6376 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN SPIRITUALITY (3cr.)
THO6377 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL HISTORY (3cr.)
THO6382 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN THEOLOGY (3cr.)
THO6388 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL THEOLOGY (3cr.)
THO6397 FOUNDATIONAL TEXTS IN EAST-WEST ECUMENISM (3cr.)

- One course from outside the area of study (3cr.)

- THO6998 MÉMOIRE / RESEARCH PAPER (6cr.)

- THO6997 EXAMEN DE SYNTHÈSE DE M.A. EN CHRISTIANISME ORIENTAL / MA SYNTHESIS EXAMINATION IN EASTERN CHRISTIAN STUDIES (3cr.)

Master of Arts with Thesis

The MA with thesis degree consists of 5 courses (15 credits) and a thesis.

ALL AREAS OF STUDY WITH THE EXCEPTION OF EASTERN CHRISTIAN STUDIES

Five courses as follows:

- Four Foundation courses:
  - 1 course from the following:
    THO6310 THEOLOGICAL HERMENEUTICS (3cr.)
    THO6354 RELIGIOUS EXPERIENCE (3cr.)
    THO6355 THEOLOGY AND CULTURE (3cr.)
  - 1 course from the following:
    THO6317 THE FORMATION OF THE BIBLICAL TEXT (3cr.)
    THO6318 THE INTERPRETATION OF BIBLICAL TEXTS (3cr.)
  - 1 course from the following:
    THO6333 METHODS AND APPROACHES IN CONTEMPORARY ETHICS (3cr.)
    THO6334 ISSUES AND DEBATES IN CONTEMPORARY ETHICS (3cr.)
  - 1 course from the following:
Students are required by the end of the program to demonstrate competency in at least one modern or ancient language as required for research in their field. In the case of modern languages, students will be evaluated for reading and oral comprehension; in the case of ancient languages, students will be evaluated for reading comprehension only. (Anglophone students intending to apply for admission to the PhD program of the Faculty are encouraged to ensure that they have passive competency in French by the end of their MA program.)

EASTERN CHRISTIAN STUDIES

The thesis option is not offered in this area of study.

Fast-track from MA to PhD program

Students enrolled in the MA program may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- achievement of an A- average in the last two years of undergraduate studies;
- completion of at least four graduate courses (12 credits) with a grade of A- or better in each;
- satisfactory progress in the thesis program;
- written recommendation by the supervisor;
- approval by the graduate studies committee.

The student must request permission to fast-track during the fourth session of registration or earlier and must register in the PhD in the fifth session at the latest. Following the transfer, all of the requirements of the doctoral program must be met.

Transfer from MA with thesis to MA with research paper

Students in either the MA (with thesis) or MA (with research paper) may transfer between the two options and qualify for the MA as long as all degree requirements are completed.

Duration of program

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

THO6310 THEOLOGICAL HERMENEUTICS (3cr.)
Principles and history of interpretation in theology. Recent developments and debates. The role of classic texts and the question of historical consciousness.

THO6317 THE FORMATION OF THE BIBLICAL TEXT (3cr.)

THO6318 THE INTERPRETATION OF BIBLICAL TEXTS (3cr.)
Principles and methods of interpretation. History of interpretation: the Church Fathers, Middle Ages, the Reformation, 19th and 20th centuries.

THO6333 METHODS AND APPROACHES IN CONTEMPORARY ETHICS (3cr.)
Hermeneutical questions and methodological foundations of contemporary ethical reflection analysed from a theological perspective.

THO6334 ISSUES AND DEBATES IN CONTEMPORARY ETHICS (3cr.)
Analyses, from a theological perspective, of major issues and debates characterizing ethical research in its present context.

THO6352 STUDIES IN EASTERN CHRISTIANITY (3cr.)
Investigation of a particular issue, author, or trend related to any aspect of Eastern Christianity not foreseen by the other courses.

THO6354 RELIGIOUS EXPERIENCE (3cr.)
Faith and experience. The Mystery of God. Interpretations and expressions of the experience of God.
THO6355 THEOLOGY AND CULTURE (3cr.)
The relationship between faith and culture; contemporary issues, questions and challenges. The contextual nature of theology.

THO6358 SPIRITUALITY: METHODS; RELATIONSHIPS WITH THE HUMAN SCIENCES (3cr.)
Analysis of the methods used in the theological study of spirituality. Spirituality in relation to the human sciences.

THO6359 COMPARATIVE STUDY OF SPIRITUAL TRADITIONS (3cr.)
Comparative theological study of one or more Christian spiritual traditions and one or more spiritual traditions within other religions to highlight their views of the world, human reality and salvation.

THO6375 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN CHURCH HISTORY (3cr.)
In-depth reading, analysis and evaluation of key historical source material from the fourth century to the present.

THO6376 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN SPIRITUALITY (3cr.)
In-depth reading, analysis and evaluation of basic spiritual classics of Eastern Christianity from the fourth century to the present.

THO6377 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL HISTORY (3cr.)
In-depth reading, analysis and evaluation of basic sources that illustrate the evolution of Eastern Christian worship from the fourth century to the present.

THO6378 RESOURCES AND METHODS FOR THE STUDY OF EASTERN CHRISTIANITY (3cr.)
An examination of various research tools related to Eastern Christianity and religion in general. An overview of key methods in Eastern Christian exegesis, theology, liturgy, spirituality and Church history and their interface with modern and classical Western approaches.

THO6379 ISSUES IN EASTERN CHRISTIAN HERMENEUTICS & EXEGESIS (3cr.)
Study of a particular issue, author, or trend in the hermeneutics and exegesis of the Eastern Churches, e.g. particularities of the Greek, Syriac, or Slavonic versions and their distinctive canons; worship as hermeneutical matrix; scripture and tradition in Eastern Christian reflection; extra-biblical texts; the development of modern Orthodox hermeneutics in dialogue with Western text criticism and methods.

THO6380 PATRISTIC THEOLOGY (3cr.)
Examination of a particular issue, author, or trend in Eastern Patristic theology, e.g. Greek, Byzantine, Syriac, Coptic or Armenian sources; or the twentieth-century neo-patristic synthesis.

THO6381 CONTEMPORARY EASTERN THEOLOGY (3cr.)
Study of a particular issue, author, or trend in contemporary Eastern Christian theology, e.g. modern philosophical theology (for example, sophiology), and systematics and/or moral theology of the Greek, Russian, Ukrainian, Melkite and Romanian schools in particular; or the systematics and/or moral reflection of non-Byzantine theologians.

THO6382 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN THEOLOGY (3cr.)
In-depth reading, analysis and evaluation of basic texts that have helped shape Eastern Christian theology from the third century to the present.

THO6387 ISSUES IN EASTERN CHRISTIAN LITURGICAL HISTORY (3cr.)
Study of a particular issue, author, or trend relating to the history of the Constantinopolitan, Armenian, Alexandrian, West Syrian or East Syrian worship traditions and their offshoots, e.g. historical and structural analyses of Eastern patristic sources, Church Orders, euchologies, typica and other worship books; chant traditions, execution, environment; cultural factors conditioning these traditions.

THO6388 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL THEOLOGY (3cr.)
In-depth reading, analysis and evaluation of basic texts from the fourth century to the present.

THO6392 THE HISTORY OF EASTERN CHRISTIAN INSTITUTIONS, MOVEMENTS, PERSONS (3cr.)
Historical analysis of Eastern Christian institutions, movements or persons in the early, “medieval,” or modern periods of one or several of the various Eastern Churches, e.g. pre- and post- Nicene developments; Byzantium; pre-Ephesian and pre-Chalcedonian Churches; the Slavic missions and Kyivan Rus’; the Turkocrateia and subsequent liberation; later Rus’ Christianity; the Tsarist era; modern persecution; the Eastern Christian “diapora.”

THO6393 METHODOLOGICAL ISSUES IN EASTERN CHURCH HISTORY (3cr.)
Investigation of a particular issue, author, or trend related to the periodization, historiography or methodology in general of Eastern Christian history.

THO6397 FOUNDATIONAL TEXTS IN EAST-WEST ECUMENISM (3cr.)
In-depth reading, analysis and evaluation of key documents that have shaped East-West rapprochement from 1902 to the present.

THO6398 INTER-RELIGIOUS ISSUES AND THE CHRISTIAN EAST (3cr.)
Examination, from the perspective of the Eastern Churches, of a particular issue, author, or trend relating to dialogue between Christianity and other religions, e.g. Islamic-Christian encounters in the Middle-East, the Balkans and the former USSR; Slavic Christian-Jewish interaction; Buddhist-Eastern Christian monastic contacts.

THO6399 METHODOLOGIES IN THEOLOGY (3cr.)
A study of methodologies found in different theological fields. Introduction to the diverse resources available for theological research. Preparation of a master’s research paper.
The Department of Visual Arts.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either Mémoire d'environ 40 pages portant sur une question choisie en consultation avec le directeur. Noté S/NS par le directeur et un autre professeur.

TRA6920 ÉTUDES DIRIGÉES III / GUIDED RESEARCH III

A commented translation of not less than 5000 words, the exact length to be stipulated by the STI depending on the nature and difficulty of the translation.

Master of Arts Translation Studies

Languages

The School of Translation and Interpretation (STI) offers graduate programs leading to the degrees of Master of Arts in Translation Studies (MA), Master in Conference Interpreting (MCI) and Doctor of Philosophy (PhD) in Translation Studies.

Master's program

The master's program in Translation is intended to develop research capability in various fields of translation, as well as to provide advanced training in areas such as terminology, computerized translation or translation teaching. It is desirable that students have practical experience in translation before entering the program.

This program consists of compulsory and optional seminars and courses, followed by a basic or applied research requirement. It may be undertaken full-time or part-time.

Not all seminars and courses are offered every year. Students will be notified at registration of which ones are available during the current year.

Doctoral program

The primary objective of the doctoral program in translation studies is to produce qualified scholars in the field for academic teaching and research.

The doctoral program will focus on:

- Theories, history and pedagogy of translation as inter-lingual and intercultural communication.
- Lexicology, terminology, and technologies as applied to translation.

Since translation is interdisciplinary, the doctoral program may collaborate with disciplines in other units such as Law, English, Canadian Studies, French, Modern Languages and Literatures, Linguistics, Philosophy, as well as the School of Information Technology and Engineering (SITE). However, the administration of the program is the sole responsibility of the School of Translation and Interpretation.

This full-time program consists of four courses, a comprehensive exam, and a thesis.

The department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see "Admission."

Languages

Most seminars are bilingual, that is, they may be conducted in French or English. The student's research may be conducted not only on French and English, but also on a third language, subject to the conditions stipulated under "Additional Requirements".

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs
Admission

Applicants should have an honours BA in Translation, or equivalent. Applicants who do not have an honours degree in Translation may in suitable cases be recommended by the STI for admission to a qualifying program. Such applicants are usually honours graduates in another subject field.

N.B. Honours BA implies four years of university studies.

Admission procedure

Applications for admission are reviewed by the Graduate Studies Committee of the School of Translation and Interpretation, and must also meet the general requirements of the Faculty of Graduate and Postdoctoral Studies of the University. In addition to completing our on-line application and paying the application fee to the Ontario Universities’ Application Centre, students must also assemble all relevant documentation and forward the complete application package to the director of the School of Translation and Interpretation. Applications will not be processed without the application fee and the complete file.

Entrance examination

The STI may, at its discretion, require applicants to pass an entrance examination. The examination is compulsory for applicants to the qualifying program.

Qualifying program

Those students whose first degree is not in Translation, and likewise, those who do not already have previous translating experience, or those whose knowledge of either English or French is inadequate, will be required to do a qualifying program of one or two sessions according to their needs, to bring them up to the level expected of graduates with an honours BA in Translation. A minimum average mark of 70 per cent (B) is required for admission to the master’s program proper.

Transfer from master’s to PhD

In exceptional circumstances, it is possible to transfer from the MA program at the School of Translation and Interpretation (STI) directly into the PhD program under the following conditions:

- Completion of the 3 mandatory MA courses, plus one more MA course, with a grade of A in each course;
- Completion of a 40-page research paper (TRA7998) under the supervision of a professor who is the potential PhD thesis supervisor;
- Written recommendation for transfer from the supervisor of the paper and from the Graduate Studies Committee.

The transfer must take place within sixteen months of initial registration in the master’s. Students permitted to transfer will complete a total of 8 courses (24 credits), 6 courses while registered in the master’s and 2 while registered in the PhD. Following transfer, the following requirements must be met: 2 courses (6 credits), the comprehensive exam, the thesis proposal and the thesis.

Program Requirements

Basic research option: MA with thesis

- 18 course credits
  - Compulsory seminars (9 cr.)
    - TRA5902 THÉORIES DE LA TRADUCTION / THEORIES OF TRANSLATION (3cr.)
    - TRA5906 LANGUE ET TRADUCTION / LANGUAGE AND TRANSLATION (3cr.)
    - TRA6902 DISCOURS ET TRADUCTION / DISCOURSE AND TRANSLATION (3cr.)
  - Elective seminars or courses (9 cr.)
    - Any three (3) other appropriate graduate courses in Translation Studies or from other graduate programs. For courses in other graduate programs, approval of the Director of graduate studies for the School of Translation and Interpretation and of the other
unit is mandatory. Students are responsible for ensuring that they have any prerequisites.

Note 1: A maximum of one workshop may be taken during the entire program.

Note 2: A maximum of one guided research course may be taken during the entire program.

- Thesis

TRA7999 RECHERCHE ET THÈSE DE MAÎTRISE / THESIS RESEARCH (MA)

Applied research option: MA with major research paper

- 21 course credits
  - Compulsory seminars (9 cr.)
    
    TRA5902 THÉORIES DE LA TRADUCTION / THEORIES OF TRANSLATION (3cr.)
    TRA5906 LANGUE ET TRADUCTION / LANGUAGE AND TRANSLATION (3cr.)
    TRA6902 DISCOURS ET TRADUCTION / DISCOURSE AND TRANSLATION (3cr.)
  - Elective seminars or courses (12 cr.)

Any four (4) other appropriate graduate courses in Translation Studies or from other graduate programs. For courses in other graduate programs, approval of the Director of graduate studies for the School of Translation and Interpretation and of the other unit is mandatory. Students are responsible for ensuring that they have any prerequisites.

Note 1: A maximum of one workshop may be taken during the entire program.

Note 2: A maximum of one guided research course may be taken during the entire program.

- One research paper, chosen from among the following three options:

  TRA7995 TRADUCTION COMMENTÉE / COMMENTED TRANSLATION (6cr.)
  TRA7996 FICHIER TERMINOLOGIQUE OU LEXICOGRAPHIQUE COMMENTÉ / COMMENTED TERMINOLOGY OR LEXICOGRAPHY FILE (6cr.)
  TRA7997 MÉMOIRE / RESEARCH PAPER (6cr.)

Additional requirements

Basic research or applied research requirement

Students may choose one of two options: basic research option (thesis) or applied research option (commented translation, commented terminology or lexicography file, or research paper). The student’s choice must be approved by the STI. To meet this requirement, students may work on the languages of their choice provided that at least one of the languages is French or English, and that the STI can find an eligible co-director who knows the other language.

Basic research option (for this option, an oral defence is required)

TRA7999 RECHERCHE ET THÈSE DE MAÎTRISE / THESIS RESEARCH (MA)

For the thesis regulations, please consult the general regulations of the Faculty of Graduate and Postdoctoral Studies.

Applied research option (for this option, an oral defence is not required)

A commented translation of not less than 5000 words, the exact length to be stipulated by the STI depending on the nature and difficulty of the text. The translation must be preceded by an introduction describing the text, the motivation for translating it and the translation approach used. It must be accompanied by a commentary demonstrating that the student has acquired the relevant theoretical and methodological background knowledge.

or

Compilation of a term, lexeme or phrase file in two or more languages. The file must cover at least 15 concepts or 20 vocabulary items. It must be preceded by an introduction describing the motivation for the work, the methodology used and the subject field of the concepts or the vocabulary. It must be accompanied by a commentary demonstrating that the student has acquired the relevant theoretical and methodological background knowledge.

MA concentration in “literary translation”

- 18 course credits
  - Compulsory seminars (12 cr.)
    
    TRA5902 THÉORIES DE LA TRADUCTION / THEORIES OF TRANSLATION (3cr.)
    TRA5906 LANGUE ET TRADUCTION / LANGUAGE AND TRANSLATION (3cr.)
    TRA6902 DISCOURS ET TRADUCTION / DISCOURSE AND TRANSLATION (3cr.)
    TRA5912 TRADUCTION LITTÉRAIRE / LITERARY TRANSLATION (3cr.)
  - Elective seminars or courses (6 cr.)
Any two (2) other appropriate graduate courses in Translation Studies or from other graduate programs. For courses in other graduate programs, approval of the Director of graduate studies for the School of Translation and Interpretation are responsible for ensuring that they have any prerequisites.

MA students planning to write a thesis must register the subject of the thesis and the name of the professor who has agreed to supervise their work before they begin their third session of studies.

1. The thesis can consist of a traditional research project, according to the rules established at the STI, or it can be a literary translation.
2. If the thesis is a literary translation, it must reflect on the practice of literary translation, and consist of two parts which can take different forms; these two parts are of equal importance but need not be the same length:
   - a translation of a text not previously published in translation: a collection of poetry, a collection of short stories, a novel, a play; a retranslation is possible, with special permission;
   - a critical reflection on this translation, including but not limited to a discussion of translation theories, questions of aesthetics and stylistics, technical problems, questions of form and genre, etc.; this analysis must show solid theoretical understanding of translation and the specific issues raised by the text in question and include the necessary references to relevant secondary texts on literary translation, literary theory, etc.
3. The thesis must satisfy the usual criteria: originality, adequate treatment of the subject, solid methodology, etc. The length of the thesis will vary according to the difficulty of the text and the methodological and theoretical issues encountered.

Duration of the program

The topic of the thesis or applied research paper must be registered by the end of the second session of studies. All degree requirements must be completed within four years from the date of initial registration (not including any qualifying program).

- **Full-time**
  Basic research and applied research options: three sessions in residence, followed by a further period for completion of the research or applied research requirements, during which residence is not required.
- **Part-time**
  Basic research and applied research options: four consecutive sessions (excluding the summer sessions) for completion of the seminars, followed by a further period for completion of the research requirement.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

**TRA5901 HISTOIRE DE LA TRADUCTION / HISTORY OF TRANSLATION** (3cr.)

**TRA5902 THÉORIES DE LA TRADUCTION / THEORIES OF TRANSLATION** (3cr.)

**TRA5903 INFORMATIQUE ET TRADUCTION / COMPUTERS AND TRANSLATION** (3cr.)

**TRA5905 LEXICOLOGIE, TERMINOLOGIE ET DOCUMENTATION / LEXICOLOGY, TERMINOLOGY AND DOCUMENTATION** (3cr.)

**TRA5906 LANGUE ET TRADUCTION / LANGUAGE AND TRANSLATION** (3cr.)

**TRA5909 PÉDAGOGIE DE LA TRADUCTION / DIDACTICS OF TRANSLATOR TRAINING** (3cr.)

**TRA5912 TRADUCTION LITTÉRAIRE / LITERARY TRANSLATION** (3cr.)

**TRA5913 ADAPTATION / ADAPTATION** (3cr.)

**TRA5916 ATELIER DE TRADUCTION I / TRANSLATION WORKSHOP I** (3cr.)

**TRA5917 ATELIER DE TRADUCTION II / TRANSLATION WORKSHOP II** (3cr.)
TRA5918 ATELIER DE TRADUCTION III / TRANSLATION WORKSHOP III (3cr.)

TRA5930 ÉTUDES DIRIGÉES II / GUIDED RESEARCH II (3cr.)

TRA5941 ADVANCED TRANSLATION FROM SPANISH INTO ENGLISH (3cr.)

TRA5942 TRADUCTION AVANCÉE DE L'ESPAGNOL VERS LE FRANÇAIS (3cr.)

TRA6902 DISCOURS ET TRADUCTION / DISCOURSE AND TRANSLATION (3cr.)

TRA6903 TRADUCTION AUTOMATIQUE / MACHINE TRANSLATION (3cr.)
Préalable: TRA 5903 ou permission du professeur. / Prerequisite: TRA 5903 or permission of the professor.

TRA6905 LEXICOLOGIE, TERMINOLOGIE APPLIQUÉE / APPLIED LEXICOLOGY AND TERMINOLOGY (3cr.)
Préalable: TRA 5905 ou permission du professeur. / Prerequisite: TRA 5905 or permission of the professor.

TRA6906 TRADUCTION TECHNIQUE ET SPÉCIALISÉE / TECHNICAL AND OTHER SPECIALIZED TRANSLATION (3cr.)

TRA6907 THÉORIE DE L'INTERPRÉTATION / THEORY OF INTERPRETATION (3cr.)

TRA6908 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)

TRA6911 MÉTHODOLOGIE DE LA RECHERCHE TRADUCTOLOGIQUE / RESEARCH METHODS IN TRANSLATION STUDIES (3cr.)

TRA6920 ÉTUDES DIRIGÉES III / GUIDED RESEARCH III (3cr.)

TRA6930 ÉTUDES DIRIGÉES IV / GUIDED RESEARCH IV (3cr.)

TRA6941 ADVANCED TRANSLATION FROM ENGLISH INTO SPANISH (3cr.)

TRA6942 TRADUCTION AVANCÉE DU FRANÇAIS VERS L'ESPAGNOL (3cr.)

TRA6980 SÉMINAIRE DE RECHERCHE I / RESEARCH SEMINAR I (3cr.)

TRA6981 SÉMINAIRE DE RECHERCHE II / RESEARCH SEMINAR II (3cr.)

TRA6982 SÉMINAIRE DE RECHERCHE III / RESEARCH SEMINAR III (3cr.)

TRA6983 SÉMINAIRE DE RECHERCHE IV / RESEARCH SEMINAR IV (3cr.)

TRA6984 COURANTS ACTUELS EN TRADUCTOLOGIE I / DEVELOPMENTS IN TRANSLATION STUDIES I (3cr.)
Exploration des plus récents développements en traductologie dans la double optique des sciences humaines et des études interculturelles. / An intercultural and humanities-based perspective on contemporary trends in Translation Studies.

TRA6985 COURANTS ACTUELS EN TRADUCTOLOGIE II / DEVELOPMENTS IN TRANSLATION STUDIES II (3cr.)
Perspectives actuelles en études traductologiques : aspects terminologiques, lexicologiques, technologiques et domaines connexes. / Trends in Translation Studies, with a focus on developments in terminology, lexicology; technology and related fields.

TRA7995 TRADUCTION COMMENTÉE / COMMENTED TRANSLATION (6cr.)

TRA7996 FICHIER TERMINOLOGIQUE OU LEXICOGRAPHIQUE COMMENTÉ / COMMENTED TERMINOLOGY OR
LEXICOGRAPHY FILE (6cr.)

TRA7997 MÉMOIRE / RESEARCH PAPER (6cr.)
Mémoire d’environ 40 pages portant sur une question choisie en consultation avec le directeur. Noté S/NS par le directeur et un autre professeur du programme. / Research paper approximately 40 pages in length, focusing on a Translation Studies question chosen in consultation with the supervisor. Graded S/NS by the supervisor and another professor in the program.

TRA7998 TRAVAIL DE RECHERCHE / RESEARCH PAPER (6cr.)

TRA7999 RECHERCHE ET THÈSE DE MAÎTRISE / THESIS RESEARCH (MA)

TRA9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

TRA9999 THÈSE DE DOCTORAT / DOCTORAL THESIS

Visual Arts

The University of Ottawa’s Department of Visual Arts offers a graduate program leading to the degree of Master of Fine Arts (MFA).

The program is bilingual and covers a variety of artistic practices, from photography and media arts to sculpture, painting and drawing, video and installation art. Students take an in-depth look at theories informing contemporary art and image culture, and can choose to pursue either an interdisciplinary studio approach or to specialize in a single medium. In accordance with University of Ottawa policy, students may choose to complete written assignments, examinations, and studio critiques in either English or French.

The program is two years in length and is offered on a full-time basis only.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Fine Arts Visual Arts

Admission

Applicants to the program are required to have a bachelor’s degree in Visual Arts (either a BFA, or a BA with major or specialization in Visual Arts), with a minimum B+ (75%) average in the last two years of study and an overall B (70%) average. Candidates with an honours bachelor’s degree in another discipline may be accepted if they submit a portfolio of exceptional quality.

To be eligible, the candidate should have:

- a portfolio that demonstrates significant artistic accomplishment and potential;
- a solid background in the history and theory of art, with a particular emphasis on contemporary art and art discourse, as demonstrated by the student having completed at least 12 credits of art history and theory courses at the undergraduate level, with at least nine of those credits in contemporary art.*
- at least a basic technical grounding in the visual and multi-media disciplines in which they will be working during their time in the program, as shown by the admission portfolio and/or undergraduate studies;
- proficiency in one of the two official languages (English or French) and at least a passive knowledge of the other official language, that is, the ability to read and understand it;
- proof, as demonstrated by their portfolio and exhibition records, that they have been capable of sustaining an artistic practice for at least two years since completing undergraduate studies. This regulation may be waived for older students with outstanding records of artistic accomplishment.

* The Admissions Committee may, when recommending admission, add up to two undergraduate art history and theory courses to the normal requirements of the master’s.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.
Program Requirements

A total of 42 credits is required:

Studio Courses (18 credits)

Theory Courses (12 credits)

ART5900 STAGE PROFESSIONNEL / PROFESSIONAL INTERNSHIP (T) (3cr.)
ART5971 ART ET THÉORIES CULTURELLES / ART AND CULTURAL THEORY (T) (3cr.)
ART6972 L’ŒUVRE ET SA MÉDIATION / ART AND ITS MEDIATION (T) (3cr.)
ART6973 L’ŒUVRE MISE EN CONTEXTE THÉORIQUE / THE WORK OF ART IN CONTEXT (T) (3cr.)

In the case of ART5900, students may elect to substitute a fourth-year History and Theory of Art course specified by the Visual Arts Department, or a graduate theory course in another graduate program, subject to the approval of the course professor and the Graduate Program Director of the Visual Arts Department.

Preparation for Thesis Presentation (12 credits)

A detailed description of the program, and of the guidelines for studio courses and the thesis preparation, can be found on the website of the Department of Visual Arts.

Duration of the Program

Students are expected to complete all requirements within two years. The thesis must be submitted within four years of the date of initial registration in the program.

Residence

The program extends over six sessions (two years) of full-time study. The student’s time in the program culminates in the preparation of a professional-level Thesis Presentation.

Minimum Standards

The minimum passing grade in all courses is C+. A student who receives two failing grades (equivalent to six credits), or who fails the same course twice, is required to withdraw.

Courses

S = Studio Courses
T = Theory Courses

1st year (Fall Session)

ART5961 ATELIER INTÉGRÉ I / INTEGRATED STUDIO I (S) (3cr.)
Pratique en atelier sous la direction d'un professeur. Participation régulière à des critiques, à des discussions de groupe à partir de lecture et de présentations d’artistes et de théoriciens invités, de visites d'expositions, et ce, afin d'acquérir une compréhension élargie des pratiques artistiques contemporaines et des questions soulevées par le travail personnel des étudiants. / Studio practice under the guidance of a professor. Participation in regular critiques, group discussions based on readings and presentations by visiting lecturers and visits to exhibitions, in order to develop a wide-ranging understanding of contemporary artistic practice and of issues arising within individual student work.

ART5971 ART ET THÉORIES CULTURELLES / ART AND CULTURAL THEORY (T) (3cr.)
Étude des principaux courants de la pensées contemporains et de leur impact sur les productions et les théories artistiques : le structuralisme, le poststructuralisme, les théories postmodernes, postcolonialistes, féministes, etc. / Study of the principal modes of contemporary thought including structuralism, poststructuralism, postmodernism, postcolonialism, feminism etc., and examination of their impact on artistic production and theory.

Winter Session

ART5962 ATELIER INTÉGRÉ II / INTEGRATED STUDIO II (S) (3cr.)
Pratique en atelier sous la direction d'un professeur. Participation à des critiques, à des discussions de groupe à partir de lecture et de présentations d’artistes et de théoriciens invités et à de visites d'expositions, afin d'acquérir une compréhension élargie des pratiques artistiques contemporaines et des questions soulevées par le travail personnel des étudiants. / Studio practice under the guidance of a professor. Participation in critiques, group discussions based on readings and presentations by visiting lecturers and visits to exhibitions, in order to develop a wide-ranging understanding of contemporary artistic practice and of issues...
arising within individual work.

The student will choose one course among:

**ART5900 STAGE PROFESSIONNEL / PROFESSIONAL INTERNSHIP (T) (3cr.)**
Stage dans un musée, une galerie, un conseil de recherche, un établissement d’archives ou autre site approuvé. Évalué par un professeur basé sur le rapport écrit final de l’étudiant situant son expérience de stage professionnel dans un contexte théorique. Noté S/NS. Durée : 150 heures. Préalable : une solide connaissance théorique en art contemporain et en pratique d’exposition et approbation écrite du programme. / Internship at a museum, gallery, research council, archives site or other approved location. Evaluated by a professor based on the student’s final written report, situating their professional internship experience within a theoretical framework. Graded S/NS. Duration: 150 hours. Prerequisite: A strong theoretical foundation in contemporary art and exhibition practice and written approval from the program.

or

a fourth-year History and Theory of Art course specified by the Visual Arts Department (3cr.)

or

A graduate theory course in another graduate program.

The choice must be approved by the course professor and the Graduate Program Director of the Visual Arts Department.

**Spring Session**

**ART5063 ATELIER INDÉPENDANT / INDEPENDENT STUDIO (S) (3cr.)**
Pratique en atelier avec un projet d’initiative personnelle, sous la direction du professeur. Les étudiants doivent faire approuver leur proposition de projet au début de la session. À la fin de la session, ils présentent leur projet complété devant un jury de professeurs réguliers. / Self-directed studio practice under the guidance of a professor. Students must have their project proposal approved at the beginning of the session and, at the end of the session, they must present their completed project to a jury of regular professors.

**2nd year (Fall Session)**

**ART6964 PRATIQUE AVANCÉE EN ATELIER I / ADVANCED STUDIO I (S) (3cr.)**
Pratique en atelier avec présentations individuelles et critiques, lectures et recherches personnelles. Approfondissement de l’expérience artistique de l’étudiant et de sa connaissance du contexte contemporain dans lequel se situe sa propre production artistique. / Studio practice with individual presentations and critiques, independent readings and research. Development of student artistic practice as well as of knowledge of the contemporary context within which the student’s own artistic work is situated.

**ART6972 L’ŒUVRE ET SA MÉDIATION / ART AND ITS MEDIATION (T) (3cr.)**
Étude des différents modes de diffusion des œuvres d’art et de l’analyse de leur impact sur l’interprétation : la mise en exposition, la documentation, la diffusion dans les médias écrits, visuels et électroniques. / The mechanisms and processes for the distribution of works of art and their impact on viewer reception and interpretation: exhibitions, archives, documentation; the diffusion of art through print, visual and electronic media.

**Winter Session**

**ART6965 PRATIQUE AVANCÉE EN ATELIER II / ADVANCED STUDIO II (S) (3cr.)**
Pratique en atelier avec présentations individuelles et critiques, lectures et recherches personnelles. Les étudiants approfondissent leur expérience artistique et leur connaissance du contexte contemporain dans lequel se situent leurs propres œuvres artistiques. / Studio practice with individual presentations and critiques, independent readings and research. Development of student artistic practice as well as of knowledge of the contemporary context within which the student’s own artistic work is situated.

**ART6973 L’ŒUVRE MISE EN CONTEXTE THÉORIQUE / THE WORK OF ART IN CONTEXT (T) (3cr.)**
Mise en contexte des productions artistiques des étudiants en regard des pratiques artistiques contemporaines ; analyse de leurs enjeux théoriques. Chaque étudiant travaillera le texte qui devra accompagner sa présentation de thèse. / Examination of students’ artistic production within the context of contemporary artistic practice and theory. Each student will work on the Support Paper to accompany their Thesis Presentation.

**Spring Session**

**ART7999 PRÉSENTATION DE THÈSE / THESIS PRESENTATION (S) (12cr.)**
Guidé par leur directeur de thèse, les étudiants préparent leur présentation de thèse et mettent au point la soutenance orale de la présentation. La présentation de thèse doit se tenir avant la fin de la dernière session d’inscription à ART 7999. Des renseignements détaillés sur la présentation de thèse sont disponibles sur le site web du programme. / Under the direction of their Thesis Supervisor, students will complete their Thesis Presentation, and finalize preparations for its oral defense. The Thesis Presentation must take place by the end of the final session of registration in ART 7999. Details on the thesis presentation are provided on the program website.
Women's Studies

The Institute of Feminist and Gender Studies offers a masters, a doctorate and a collaborative program (at the master's level) in women's studies. The objective of the MA program in women's studies is to encourage the acquisition of in-depth, plural, diversified, and heuristic knowledge of the different currents of feminist thought, including theoretical and methodological proposals. The program aims to develop an aptitude for research in the university or the community, while enriching the student's personal work through the supervised writing of a research paper or thesis.

The primary objective of the Doctoral program is to prepare candidates for a career in teaching and research. The program, however, also prepares candidates for other careers by giving them a comprehensive knowledge in feminist theory, methodology and analysis in a context that highlights the need for scholarship engaged with the realities of an increasingly transnational world. PhD graduates will have acquired and demonstrated their aptitude to produce scholarly work engaged with some of the most urgent issues in the global and local socio-political, cultural and economic landscape while identifying new directions for feminist scholarship and intervention.

The programs offer a specialization in one or the other of the following fields of research:

- Gender, Power and Representations

The field of Gender, Power and Representations examines gendered representations in such domains as literature, arts, communications, history, politics and the law (among others). Such scholarship interrogates commonplace understandings of masculinity and femininity and examines the ways in which sex and gender intersect with race, class, sexuality, ability and age. Focusing on the locations and forms of power with regard to the notions of "sex", "gender", "difference" and interlocking oppressions, this field also examines how these perspectives are created, inscribed, and regulated through various spheres of social and institutional activity in Canada and elsewhere in the world.

- Women, Rights and Citizenship in a Globalized World

The field of Women, Rights and Citizenship in a Globalized World explores scholarly and practice issues related to feminist gendered analyses of globalization and cosmopolitanism, citizenship and development, transnational migrations and activisms, as well as rights, social justice and health in an increasingly globalized world. The field responds to the need to examine the ways in which women are now located in a world characterized by a reordering of economic, political and cultural processes and a reconfiguration of the territorial and discursive boundaries of rights, justice, participation, and collective agency, as well as the implications of the intersections of gender with race, class, and sexuality in such analyses.

The programs are offered full-time and part-time. Courses are offered both in English and in French. In accordance with University of Ottawa regulations, students can write their papers, exams, and theses in the official language of their choice (either English or French). Students are encouraged to acquire at least a passive knowledge of the second official language before graduation.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Women's Studies

Doctorate in Philosophy Women's studies

Admission

Students holding an honours bachelor's degree with a specialization or major or equivalent from an accredited university in social sciences, health sciences, arts, education or law, with a minimum average of 70% (B), calculated in accordance with FGPS guidelines, and who have had an adequate background in women's studies (minimum of two undergraduate level courses or one Master's level course on women, gender, feminism, sexualities), are eligible for admission to the MA program. Students who do not have an adequate background may be eligible to our Special Policy for Admissions.

Language Requirements

Proficiency in either English or French is required. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

Program Requirements
A. MA with thesis

The requirements are as follows:

Two compulsory courses (6 credits):
FEM5103 FEMINIST METHODOLOGIES (3cr.)
FEM5300 FEMINIST THEORIES (3cr.)

Two other courses (at least one FEM course and one course from the list of approved elective courses)
Thesis Proposal (FEM6997)
A thesis (FEM7999).

After consultation with the thesis supervisor and during the first session of registration, students must present a thesis topic to the Women's Studies Graduate Committee for approval.

The master's thesis should be between 125 and 150 pages in length.

For information regarding the thesis, consult the guide "Preparing a Thesis or a Research Paper", accessible on the FGPS website (www.grad.uottawa.ca).

B. MA with research paper

The requirements are as follows:

Two compulsory core courses (6 credits):
FEM5103 FEMINIST METHODOLOGIES (3cr.)
FEM5300 FEMINIST THEORIES (3cr.)

Four electives from the list of elective courses in women's studies or related disciplines (12 cr.).
Research Paper (FEM6999)

The research paper topic must be approved by the supervisor, who is appointed by the graduate program director or a delegate. The research paper is evaluated on a Satisfactory/Not satisfactory (S/NS) basis by the supervisor and one other professor appointed by the graduate program director or a delegate.

The research paper should be between 50 and 60 pages in length.

For information regarding the research paper, consult the guide Preparing a Thesis or a Research Paper, accessible through the FGPS Website (www.grad.uottawa.ca).

Duration of the Program

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial registration in the program.

Residence

The residency requirement for students admitted on a full-time basis is three sessions.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

FEM5103 FEMINIST METHODOLOGIES (3cr.)
Methodologies developed in Women's Studies. Critical examination from both multidisciplinary and interdisciplinary perspectives. Prerequisite: Two undergraduate courses in Women’s Studies or the permission of the supervisor of graduate studies in Women’s Studies.

FEM5300 FEMINIST THEORIES (3cr.)
Approaches to contemporary feminist theory. Critical examination from both multidisciplinary and interdisciplinary perspectives. Prerequisite: Two undergraduate courses in Women’s Studies or the permission of the supervisor of graduate studies in Women’s Studies.
FEM6100 SPECIAL TOPICS IN WOMEN'S STUDIES (3cr.)

FEM6101 GENDER, POWER AND REPRESENTATIONS (3cr.)
This course analyses the diverse body of feminist scholarship theorizing conceptions of gender, power and representation. Examining the construction and representation of gender/sex differences, the course explores the power relations inherent in these representations, while also examining how gender roles and expectations are linked to representations of class, race, sexuality, age, nationality and ability. Prerequisites: FEM 5103 and FEM 5300

FEM6102 WOMEN, RIGHTS AND CITIZENSHIP IN A GLOBALIZED WORLD (3cr.)
This course examines women’s rights and citizenship; gender and development; and gender, migration and health in the context of globalization. Topics include the following: mainstreaming gender and health development; initiatives bringing feminist Southern voices across the world; health consequences of the massive incorporation of Third World women into a transnational labour force; women’s agency and resistance; social capital and pluralism in health services and health care. Prerequisites: FEM 5103 and FEM 5300

FEM6103 DIRECTED READINGS (3cr.)

FEM6900 THÈMES SPÉCIAUX EN ÉTUDES DES FEMMES / SPECIAL TOPICS IN WOMEN'S STUDIES (3cr.)

FEM6997 PROJET DE THÈSE DE MAÎTRISE / MASTER’S THESIS PROPOSAL
Préalables : FEM 5503, FEM 5700 et 6 crédits de la banque de cours au choix. / Prerequisites: FEM 5103, FEM 5300 and 6 credit from the list of electives.

FEM6998 MÉMOIRE / RESEARCH PAPER (6cr.)
Préalables : FEM 5503, FEM 5700 et 12 cr. de la banque de cours au choix. / Prerequisites: FEM 5103, FEM 5300 and 12 cr. from the list of electives.

FEM7999 THÈSE DE MAÎTRISE / MASTER’S THESIS (12cr.)
Préalable / Prerequisite: FEM 6997.

FEM8101 SEMINAR IN WOMEN’S STUDIES (3cr.)
This seminar deals with professional development (the preparation of grant applications, conference papers and articles), and reviews the central issues and debates of the discipline. Prerequisites: FEM 5103 and FEM 5300. Reserved for students registered in the PhD program in Women’s Studies.

FEM9997 PROJET DE THÈSE DE DOCTORAT / DOCTORAL THESIS PROPOSAL
Préalable / Prerequisite: FEM 9998.

FEM9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION
Préalables : FEM 5303, FEM 5700, FEM 6501 ou FEM 6502, et FEM 8501. / Prerequisites: FEM 5103, FEM 5300, FEM 6101 or FEM 6102, and FEM 8101.

FEM9999 THÈSE DE DOCTORAT / PhD THESIS
Préalable / Prerequisite: FEM 9997.

Electives
Each year a list of elective courses approved and offered for students in the program will be posted on the program’s website. Graduate courses other than those posted on the program website may be selected with the approval of the Women’s Studies Graduate Committee.

CRM6367 WOMEN AND CRIMINAL JUSTICE (3cr.)
Women as criminals and victims; the impact of the operation of the criminal justice system on women.

DCL5305 FEMINIST ANALYSIS OF LAW (3cr.)
Exploration of feminist perspectives, theories and themes and the application of these to particular problems or issues. Development of techniques for analyzing social meaning of law.

DCL5505 ANALYSE FÉMINISTE DU DROIT (3cr.)
Statut juridique, droits et obligations des femmes dans les domaines de la santé, de la famille, du travail, de la criminalité, de la fiscalité, du commerce, etc. Analyse critique du droit à partir d’une perspective féministe. Étude des différentes théories féministes du droit.

DCL5721 PERSPECTIVES FÉMINISTES DU DROIT (3cr.)

DCL7306 LEGAL PERSPECTIVES ON CYBERFEMINISM (3cr.)
This course analyzes issues relating to application of feminist principles to the legal regulation of communication technologies. Topics covered include the
gendered dynamics of networked capitalist society; women’s relationships with communication technologies; technology’s potential impact on equality for
women; and questions surrounding whether and how to legally regulate communication technologies.

FRA5502 LECTURES FÉMINISTES (3cr.)

HIS7331 SEMINAR ON THE HISTORY OF WOMEN AND GENDER (3cr.)

SOC7156 GENDER RELATIONS AND INTERETHNIC RELATIONS (3cr.)
Examination of modes of differentiation according to gender, ethnicity, and race in contemporary societies and of the theoretical linkages among them.

SOC7166 DEVELOPMENT AND GENDER RELATIONS (3cr.)
Deconstruction of the concepts of gender and development. International power relations and gender. Women in the global South and their theorizing of gender
relations.

SOC7176 GENDER DIFFERENCES IN POLITICAL SOCIOLOGY (3cr.)
Examination of the notion of gender difference, in relation, for example, to citizenship, the private/public divide, political representation, women’s rights, kinship,
and power.

SRS5106 GODDESSES AND WOMEN IN MYTH AND SYMBOL (3cr.)

SRS5912 LA FEMME ET LA TRADITION CHRÉTIENNE / WOMEN AND THE CHRISTIAN TRADITION (3cr.)

SRS7001 LA RELIGION DANS LA PENSEE FÉMINISTE CONTEMPORAINE / RELIGION AND CONTEMPORARY FEMINIST
THOUGHT (6cr.)

SVS5535 INTERVENTION FÉMINISTE ET SERVICE SOCIAL (3cr.)
Analyse des approches d'intervention auprès des femmes et applications en service social.

SVS6705 PROBLÉMATIQUE DE LA VIOLENCE ET INTERVENTION SOCIALE (3cr.)
Examen des problèmes liés à la violence au sein de la famille, compte tenu des personnes en cause. Stratégies d'intervention et évaluation de celles-ci.

SVS6706 FEMMES, SERVICE SOCIAL ET POLITIQUES SOCIALES (3cr.)
Promotion des femmes en milieu professionnel; impact des politiques sociales sur les femmes; étude des politiques en matière d'emploi : équité salariale,
discrimination et harcèlement sexuel.

The following courses may be taken if there is a women's studies, gender or feminist perspective to the course content. The approval of the Women's Studies
Graduate Studies Coordinator is required prior to registering to the course.

DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)

DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)

DCL5303 STUDIES IN LEGAL THEORY I (3cr.)
Survey of current theories of law. May be organized around a particular problem or writer or perspective. May include interdisciplinary materials.

DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I (3cr.)

EDU6651 ÉDUCATION À LA CITOYENNETÉ (3cr.)
Études des différentes approches théoriques et pratiques associées à la citoyenneté et leur lien avec les inégalités et la marginalisation sociales.

HIS7330 SEMINAR ON COMPARATIVE HISTORY (3cr.)

HIS7530 SÉMINAIRE EN HISTOIRE COMPARÉE (3cr.)
MUS6370 TOPICS IN MUSICOLOGY (3cr.)

MUS6930 SÉMINAIRE DE THÉORIE ET D'ANALYSE / SEMINAR IN THEORY AND ANALYSIS (3cr.)

Women's Studies (Collaborative)

The Institute of Feminist and Gender Studies offers a masters, a doctorate and a collaborative program (at the master's level) in women's studies. The Collaborative program in women's studies at the master's level is designed for students from selected disciplines in arts, education, health sciences, law, social sciences, and counselling and spirituality (Saint Paul University), who have an interest in women's studies. These students have the opportunity to combine advanced studies in their primary program with analyses from a women's studies perspective. The degree awarded is a master's degree in the primary program with a "specialization in Women's Studies".

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Participating programs

The following primary programs participate in the collaborative program in Women's Studies:

- MA in Counselling and Spirituality (Saint Paul University)
- MA in Criminology
- MA in Education
- MA in English
- MA in Globalization and International Development
- MA in History
- MA in Human Kinetics
- LLM in Law
- MA in Lettres françaises
- MA in Music
- MSc in Nursing
- MA in Philosophy
- MA in Political Science
- MA in Public Administration
- MA in Religious Studies
- MA in Sociology

Programs

Maîtrise ès arts Lettres françaises Spécialisation en études des femmes
Master of Arts Counselling and Spirituality Specialization in Women's Studies
Master of Arts Criminology Specialization in Women's Studies
Master of Arts Education Specialization in Women's Studies
Master of Arts English Literature Specialization in Women's Studies
Master of Arts Globalization and International Development Specialization in Women's Studies
Master of Arts History Specialization in Women's Studies
Master of Arts Human Kinetics Specialization in Women's Studies
Master of Arts Music Specialization in Women's Studies
Master of Arts Philosophy Specialization in Women's Studies
Master of Arts Political Science Specialization in Women's Studies
Master of Arts Public Administration Specialization in Women's Studies
Master of Arts Religious Studies Specialization in Women's Studies
Master of Arts Sociology Specialization in Women's Studies
Admission

To be accepted in the Collaborative program in women's studies at the master's level, applicants must first be accepted to the master's program in a participating program. Successful applicants will normally hold an honours degree or the equivalent and have a minimum average of 70 per cent (B). They must also have a background in women's studies, that is, a minimum of two undergraduate level courses or one graduate level course on women, gender, feminism or sexualities. Students who do not have an adequate background may be eligible to our Special Policy for Admissions.

Applications for admission to the Collaborative program in women's studies at the master's level are submitted at the same time as the application for admission to the Master's program of the relevant discipline. Only one application for admission is required for the collaborative Master's program. In exceptional cases, students could commence their specialization in women's studies in their second session of their primary program.

The letter of intention submitted with the application should include a clear account of the "women's studies" dimension in the proposed topic of research.

Language Policy

The courses offered by the Collaborative Master's program are given every year in English and in French. Please consult each participating program for their language requirements.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Program Requirements

Students admitted to the Collaborative program in women's studies at the master's level must meet the requirements for a master's degree in their primary program as well as the requirements of the women's studies program. Normally, the women's studies courses are recognized as partial fulfillment of the requirements of the student's primary program, in which case the passing grade in the relevant FEM course or courses is the same as that specified for the primary program.

The Women's Studies requirements are:

- Two compulsory courses:
  FEM5300 FEMINIST THEORIES (3cr.)
  FEM5103 FEMINIST METHODOLOGIES (3cr.)

Students must complete the two compulsory courses before their first registration for the major research paper or thesis.

- A thesis or major research paper on a topic related to women, gender, feminism or sexualities. The proposed topic must be approved by the Women's Studies Graduate Committee as well as by the student's primary program. The thesis or major research paper must demonstrate knowledge of feminist scholarship in the field or fields appropriate to the topic, and of feminist methodologies where applicable.

- The thesis supervisor must possess Women's Studies and/or feminist expertise. In the case of a major research paper, the supervisor should, ideally, possess Women's Studies and/or feminist expertise. If not, one of the readers must possess such expertise. Joint supervision by a professor from the participating unit and a professor chosen by the WSGC may be appropriate in some cases.

- Thesis or Major Research Paper Proposal: The thesis or major research paper proposal must be approved by the Women's Studies Graduate Committee as well as by the primary program. Usually the thesis or major research paper proposal is submitted to women's studies by the end of the third session of the first year of studies. For the primary programs that do not require a proposal, students must still submit a proposal to the Women's Studies Graduate Committee.

- Examiner or Reader: One of the examiners (for the thesis) or reader (for the major research paper) must be a person approved by the Women's Studies Graduate Committee.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Courses

FEM5103 FEMINIST METHODOLOGIES (3cr.)
Methodologies developed in Women's Studies. Critical examination from both multidisciplinary and interdisciplinary perspectives. Prerequisite: Two undergraduate courses in Women's Studies or the permission of the supervisor of graduate studies in Women's Studies.

**FEM5300 FEMINIST THEORIES** (3cr.)
Approaches to contemporary feminist theory. Critical examination from both multidisciplinary and interdisciplinary perspectives. Prerequisite: Two undergraduate courses in Women's Studies or the permission of the supervisor of graduate studies in Women's Studies.

**World Literatures and Cultures**

The Master of Arts in World Literatures and Cultures is the first and only program of its kind in Canada. This one-year MA brings together areas of study such as literature, film, media, sociolinguistics, gender, diasporas and minorities.

The program explores the comparative and interdisciplinary nature of world cultures and arts, both past and present. It draws upon the combined expertise of professors from the Department of Modern Languages and Literatures and from other departments in both the faculties of Arts and Social Sciences.

Discover how identities are shaped by cultural expressions in a national and transnational context. Explore the nature of representation and cultural diversity. Expand your intercultural knowledge in the dynamic setting of the nation’s capital.

The program is offered both full- and part-time. The two compulsory courses in the program are offered bilingually and the others are offered in rotation in French and in English. In accordance with the University of Ottawa regulation, students have the right to produce their work, their research papers or theses, and to answer examination questions in French or in English. The program is governed by the general framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).


**Programs**

**Master of Arts World Literatures and Cultures**

**Admission**

**To be considered for admission, applicants must:**

- Have a BA with honours or major in languages, literature, linguistics, translation, film studies, communication, international studies, intercultural studies, or in another related discipline;
- Have achieved a minimum average of 70% (B), calculated in accordance with FGPS guidelines;
- Have an active knowledge (proficiency in understanding, speaking and writing) of one of the two official languages (either English or French) and have at least a passive knowledge (ability to understand and read) of the other language.

Knowledge of a third language is strongly recommended. Applicants whose bachelor’s degree was obtained outside Canada from a university where the language of instruction was other than English or French must provide proof of their language proficiency. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

**Program Requirements**

- 6 compulsory credits (LCM5901, LCM5902)
- 12 optional LCM credits
- Research Paper (LCM6999)

One graduate course (3 credits) from another program may be permitted provided it is relevant to the research paper topic and approved by the program director.

**Duration of the Program**

Full-time students are expected to fulfill all requirements within one year. Part-time students can complete the program within two years. The maximum time permitted is four years from the date of initial registration in the program.

**Residence**
Students admitted full-time must register full-time for at least three sessions.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

**Courses**

Not all of the courses listed are given each year. The course is offered in the language in which it is described.

**Compulsory courses:**

**LCM5901 MÉTHODOLOGIES DE LA RECHERCHE LITTÉRAIRE ET INTERCULTURELLE / METHODOLOGIES OF LITERARY AND INTERCULTURAL RESEARCH (3cr.)**
Survol des fondements théoriques nécessaires pour mener des recherches en littératures et cultures. / Overview of the theoretical basis required for conducting research in the fields of literatures and cultures. Exclusion: ESP5901

**LCM5902 SÉMINAIRE DE RECHERCHE / RESEARCH SEMINAR (3cr.)**

**LCM6999 MÉMOIRE/RESEARCH PAPER (6cr.)**
Mémoire entre 40 et 50 pages préparé sous la direction d’un ou deux membres du corps professoral choisis en accord avec le directeur du programme. Mémoire noté S/NS par la(les) personne(s) qui l’a(l’ont) dirigé et un autre membre du corps professoral. Préalables : LCM5901, LCM5902. / Paper (40-50 pages) completed under the supervision of one or two professors selected in consultation with the program director. The research paper will be evaluated by the supervisor (and co-supervisor) and one other professor. Graded S/NS. Prerequisites : LCM5901, LCM5902.

**Optional courses:**

**LCM5100 INTERTEXTUALITY: LITERATURE AND THE ARTS (3cr.)**
Study of common discourses, threads and motives that occur in the literatures and arts of various countries, regions and across various historical periods. Comparative methodological approach to world cultures beyond the limitations of disciplinary, historical and national configurations.

**LCM5101 LESSER-USED AND MINORITY LANGUAGES AND LITERATURES (3cr.)**
Study of the situation (e.g. acculturation and assimilation issues; language as the expression of cultural identity), the relevance and the cultural impact of lesser-used and minority languages and literatures in international contexts, in the present and the past.

**LCM5102 EUROPE AND ITS OTHERS (3cr.)**
European culture and its encounters with the Other, both within and outside of Europe. Study of the creation of cultural, racial and gender stereotypes and hybridity in literature, film, the arts and the media in various geographic and historical contexts, including Canada.

**LCM5103 ORIENTALISM IN LITERATURE, CINEMA AND THE MEDIA (3cr.)**
Study of Orientalist discourses through post-colonial theories. Representations of the Orient and the Occident in literary and cinematic productions and the media.

**LCM5104 TOPICS IN WORLD LITERATURES (3cr.)**
Definitions and theories of world literature (Goethe’s Weltliteratur) as developed and applied in various cultures and during different historical periods. Study, in a comparative context, of major topics in world literatures from various countries and continents.

**LCM5105 TOPICS IN INTERNATIONAL CINEMA (3cr.)**
Study of film as a vehicle of national and transnational cultural identity; cinematographic representation, language, themes, topics and motives in an intercultural and comparative context.

**LCM5106 LANGUAGES IN CONTACT (3cr.)**
Study of a contact situation between two or more languages and of its social, historical and cultural impact.

**LCM5107 CULTURES IN THE DIASPORA (3cr.)**
The situation of linguistic and cultural survival, identity, production and interaction (literary, cinematic and other) in various diasporas, in Canada and/or selected regions in the world.

**LCM5301 SPECIAL TOPICS IN WORLD LITERATURES AND CULTURES I (3cr.)**
Comparative study of selected topics pertaining to at least two different cultures, literatures, and/or cinematographic and artistic traditions.
LCM5302 SPECIAL TOPICS IN WORLD LITERATURES AND CULTURES II (3cr.)
Comparative study of selected topics pertaining to at least two different cultures, literatures, and/or cinematographic and artistic traditions.
Advanced Materials and Manufacturing

Ottawa-Carleton Joint Program

Established in 1983, the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering (OCIMAE) combines the research strengths of the Department of Mechanical Engineering at the University of Ottawa and the Department of Mechanical and Aerospace Engineering at Carleton University. The Institute offers graduate programs leading to masters (MAsC / MEng) and doctoral (PhD) degrees in Mechanical Engineering and in Advanced Materials and Manufacturing.

Members of the Institute are engaged in six main research fields: thermal and fluid engineering; solid mechanics and design; materials and manufacturing; controls and robotics; biomedical engineering; and, aeronautical and space engineering. Additional information is posted in the departmental website.

Most of the requirements of these programs must be fulfilled in English. A very good knowledge of this language is therefore required.

The program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Programs

Master of Applied Science Advanced Materials and Manufacturing
Master of Engineering Advanced Materials and Manufacturing
Doctorate in Philosophy Advanced Materials and Manufacturing

Admission

Admission to the graduate program in advanced materials and manufacturing is governed by the general regulations of the Ottawa-Carleton Institute for Mechanical and Aerospace Engineering (OCIMAE) and by the general regulations of the FGPS.

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Applications are evaluated based on the following criteria:

- Be the holder of a master’s degree in mechanical or aerospace engineering (or the equivalent).
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as a thesis supervisor.

NOTE: Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Transfer from master’s to PhD

Students who have been permitted to transfer into the PhD program from a master’s program will require 27 course credits for the PhD.

NOTE: The examining board for doctoral theses will include professors from both departments and an external examiner who is a member of neither university.

Program Requirements
The following requirements must be met:

- 9 credits of graduate courses at the 5000 level or above approved by the Department;
- Participation in the Mechanical and Aerospace Engineering seminar series (MCG5990);
- Successful completion of a comprehensive examination (MCG9998);
- Presentation and defense of a thesis (MCG9999) based on original research carried out under the direct supervision of a faculty member of the Department.

**Duration of program**

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Minimum Standards**

The passing grade in all courses is B. Students who fail 6 credits, or whose research progress is deemed unsatisfactory are required to withdraw from the program.

**Residence**

As per FGPS regulations, all students must complete a minimum of six sessions of full-time registration at the beginning of the program. All requests for non-consecutive full-time study sessions will need to be approved by the FGPS. The program is intended for full-time students.

In the case of transfer students, the residency period is nine sessions from the initial registration in the master’s program.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Engineering. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

The thesis examining board may include members who are not part of the TAC.

**Courses**

In all programs, the student may choose graduate courses from either university with the approval of the Advisor or Advisory Committee. The available graduate courses are listed below. Course descriptions are to be found in the departmental section of the calendar concerned. All courses are of one session duration. Courses of each department are indicated by the prefix of the first number given as follows:

**MCG 5XXX Department of Mechanical Engineering, University of Ottawa**

**MAAJ XXXX Department of Mechanical and Aerospace Engineering, Carleton University**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**NGG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)**

Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

**NGG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)**

Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

**NGG5123 ENTERPRISE ARCHITECTURE (3cr.)**

Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

**Solid Mechanics and Materials**

**MCG5101 (MAAJ 5001) THEORY OF ELASTICITY (3cr.)**


**MCG5102 (MAAJ 5002) ADVANCED STRESS ANALYSIS (3cr.)**

Solutions to special beam problems including beams on elastic foundations, curved beams, multispans, etc., as well as some axisymmetric problems. The significance of assumptions is discussed and solution techniques including series solutions and energy methods are utilized.
MCG5103 (MAAJ 5003) THEORY OF PERFECTLY PLASTIC SOLIDS (3cr.)

MCG5104 (MAAJ 5004) THEORY OF PLATES AND SHELLS (3cr.)
A general coverage of various approaches to plate problems and the application of these methods to practical cases. A study of the theory of shells including deformation of shells without bending, stresses under various loading conditions, general theory of shells, shells forming surfaces of revolution.

MCG5105 (MAAJ 5505) CONTINUUM MECHANICS (3cr.)

MCG5106 (MAAJ 5906) ADVANCED TOPICS IN ELASTICITY (3cr.)

MCG5107 (MAAJ 5507) ADVANCED DYNAMICS WITH APPLICATIONS (3cr.)

MCG5108 (MAAJ 5908) FINITE ELEMENT ANALYSIS (3cr.)

MCG5109 (MAAJ 5909) ADVANCED TOPICS IN FINITE ELEMENT ANALYSIS (3cr.)

MCG5110 (MAAJ 5100) MICROMECHANICS OF SOLIDS (3cr.)

MCG5114 (MAAJ 5104) ANALYSIS AND DESIGN OF PRESSURE VESSELS (3cr.)

MCG5117 (MAAJ 5107) INTRODUCTION TO COMPOSITE MATERIALS (3cr.)

MCG5118 (MAAJ 5108) INTRODUCTION TO PLASTICITY (3cr.)

MCG5119 (MAAJ 5109) FRACTION MECHANICS (3cr.)

MCG5126 (MAAJ 5206) DEFORMATION OF MATERIALS (3cr.)
The deformation and fracture properties of metals, ceramics and polymers. Introduction to dislocation theory. Rheological models. Analysis and interpretation of constant strain rate, constant stress and stress relaxation tests in terms of the material structure.

MCG5129 (MAAJ 5209) HOT WORKING OF METALS (3cr.)
High temperature mechanical properties in metals. Types of recovery, recrystallization and precipitation in metals and their effects on hot strength and structure. Hot rolling of metals. Selection of rolling schedules. Influence of as-rolled structures on room temperature tensile and fracture stresses, impact strength.

MCG5137 (MAAJ 5307) SPECIAL STUDIES IN SOLID MECHANICS AND MATERIALS (3cr.)
MCG5138 (MAAJ 5308) ADVANCED TOPICS IN MECHANICAL ENGINEERING (3cr.)

MCG5144 SUPERALLOYS AD CERAMIX-METAL MATRIX COMPOSITES (3cr.)
Manufacture and properties of superalloys and ceramic-metal matrix composites used in aerospace, turbine, mining and energy applications. Powder metallurgy, phase diagrams, mechanical alloying, deformation, creep, fatigue, fracture mechanics, wear and corrosion. Physics-based modelling of materials’ strength including the contribution of solid solution, precipitation and ceramic particle strengthening as a function of application temperature.

MCG5180 (MAAJ 5800) FIBRE COMPOSITE MATERIALS (3cr.)
Computer-automated manufacturing techniques. Advanced topics in composite design: lamination theory, Interlaminar stresses and free edge effects, lamina and laminate failure theories. Principles of non-destructive testing. Individual projects involving the design, manufacturing and testing of a fibre composite component or material. Limited enrolment. Prerequisite: MCG 5117 (MAAJ 5107) or permission of the Institute.

MCG5181 (MAAJ 5801) ADVANCED VIBRATIONS (3cr.)
Kinematics of vibrations, the single degree of freedom system, without and with damping, two degrees of freedom, several degrees of freedom, vibration of shafts, critical speeds, complex presentation, influence coefficients, matrix method, stability of solution, approximate methods.

MCG5182 (MAAJ 5802) THEORY OF ELASTIC INSTABILITY (3cr.)

MCG7355 SPECIAL TOPICS IN ADVANCED MATERIALS (3cr.)
Topics that may be covered include the following: nanocrystalline and amorphous materials; metals and ceramic-metal composites; functional materials; fibre-based engineering materials.

Thermofluids

MCG5111 (MAAJ 5101) GAS DYNAMICS (3cr.)

MCG5131 (MAAJ 5301) HEAT TRANSFER BY CONDUCTION (3cr.)

MCG5132 (MAAJ 5302) HEAT TRANSFER BY CONVECTION (3cr.)

MCG5133 (MAAJ 5303) HEAT TRANSFER BY RADIATION (3cr.)

MCG5134 (MAAJ 5304) HEAT TRANSFER WITH PHASE CHANGE (3cr.)

MCG5136 (MAAJ 5306) SPECIAL STUDIES IN FLUID MECHANICS AND HEAT TRANSFER (3cr.)

MCG5141 (MAAJ 5401) STATISTICAL THERMODYNAMICS (3cr.)

MCG5151 (MAAJ 5501) LAMINAR FLOW THEORY (3cr.)
Derivation and exact solutions of the Navier-Stokes equations. Low Reynolds number flows, Stokes flow. Oseen flow, lubrication theory. Laminar boundary layers. Introduction to hydrodynamic stability.

MCG5152 (MAAJ 5502) THEORY OF TURBULENCE (3cr.)
Review of the basic theories and experimental results of turbulent flow. Universal equilibrium theory, locally isotropic theories, isotropic turbulence,

MCG5155 (MAAJ 5505) INVISCID FLOW THEORY (3cr.)

MCG5156 (MAAJ 5506) MEASUREMENT IN FLUID MECHANICS (3cr.)

MCG5157 (MAAJ 5507) NUMERICAL COMPUTATION OF FLUID DYNAMICS AND HEAT TRANSFER (3cr.)

MCG5158 (MAAJ 5508) INDUSTRIAL FLUID MECHANICS (3cr.)
Application of simple flows to analysis of more complex systems. Pipe and duct systems, flow separation and control, aerosols, separation of particulates from flow, cavitation, unsteady flow.

MCG5161 (MAAJ 5601) ENVIRONMENTAL ENGINEERING (3cr.)

MCG5191 (MAAJ 5901) COMBUSTION IN PREMIXED SYSTEMS (3cr.)
Stoichiometry, thermo-chemistry, ignition, flame propagation, flame stabilization, diffusion flames, turbulent combustion, modelling.

MCG5192 (MAAJ 5902) COMBUSTION IN DIFFUSION SYSTEMS (3cr.)
Gaseous jet flames, combustion of liquid droplets, atomization, spray flames, coal combustion, fluidized bed combustion.

Design - Manufacturing - Industrial Engineering

MCG5115 (MAAJ 5105) NON-LINEAR OPTIMIZATION (3cr.)

MCG5159 (MAAJ 5509) ADVANCED PRODUCTION PLANNING AND CONTROL (3cr.)

MCG5168 (MAAJ 5608) INDUSTRIAL ORGANIZATION (3cr.)

MCG5169 (MAAJ 5609) ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

MCG5170 (MAAJ 5700) COMPUTER-AIDED DESIGN (3cr.)
The design process. Structure of computer-aided drafting software. Analysis and optimization software. Software integration. Parametric design. Major group design project which integrates concepts from all major areas of mechanical engineering. Exclusion: May not be taken for credit with MCG4322.

MCG5171 (MAAJ 5701) APPLIED RELIABILITY THEORY (3cr.)

MCG5172 (MAAJ 5702) INTRODUCTION TO MANAGEMENT OF AUTOMATION (ROBOTICS AND NUMERICAL CONTROLS) (3cr.)

MCG5173 (MAAJ 5703) SYSTEMS ENGINEERING AND INTEGRATION (3cr.)
Introduction to modelling methods employed for the planning and design of sub-systems and complex systems. Discrete and continuous time, lumped and distributed parameters models. State estimation. Parameters identification. Discretization and stochastic effects. Technological systems modelling and simulation examples.
MC#5176 (MA# 5706) INDUSTRIAL CONTROL SYSTEMS (3cr.)
Concept, analysis and design of classical and modern industrial control systems. Computer based control systems for robotics, automation, manufacturing and instrumentation applications. Design project of industrial control and automation systems. Not accessible to students who have taken MCG 4108.

MC#5177 (MA# 5707) ROBOT MECHANICS (3cr.)
Robotics overview. Transformations. Basics of robot kinematics, statics and dynamics. Introduction to practical robots, control and programming. Project in analysis, design or application of manipulators. Not accessible to students who have taken MCG 4132.

MC#5178 (MA# 5708) ADVANCED TOPICS IN CAD/CAM (3cr.)
Overview of totally integrated CAD/CAM systems. Details of design and manufacturing software tools. Methods of linking design and manufacturing tools to form an integrated CAD/CAM system. Students will undertake projects which will provide them with a "hands-on" experience.

MC#5179 (MA# 5709) MANUFACTURING SYSTEM ANALYSIS (3cr.)

MC#5184 MECHATRONICS (3cr.)
Models for passive and active components for electro-mechanical systems. Network representation of signals and energy transmission and conversion. Selection of sensors and actuators for the control of mechanical systems. Modelling and simulation for the design of mixed dynamic systems. Precludes additional credit for MCG 4136.

MC#5185 (MA# 5805) MULTIVARIABLE DIGITAL CONTROL (3cr.)

MC#5186 (MA# 5806) NON-LINEAR DISCONTINUOUS DYNAMICS AND CONTROL (3cr.)

General Course Codes

MC#5900 SÉMINAIRE DE M.A.Sc. / MSc SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars and to make one presentation. Graded S/NS.

MC#5947 SÉMINAIRE DE MAÎTRISE EN INGÉNIERIE / MASTER OF ENGINEERING SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. Les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS (Satisfaisant/Non Satisfaisant). // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars. Graded S/NS (Satisfactory/Non Satisfactory).

MC#6999 PROJET / PROJECT (6cr.)
Projet en génie mécanique ou en matériaux avancés et fabrication dirigé par un professeur approuvé par le directeur des études supérieures et donnant lieu à la rédaction d’un rapport approfondi (30-40 pages approx). Noté S (satisfaisant) ou NS (non satisfaisant) par le directeur du projet et un autre professeur nommé par le directeur des études supérieures en génie mécanique. Le projet est normalement complété en une session d’études à temps plein. Préalable : approbation du directeur des études supérieures en génie mécanique. / Project in mechanical engineering or in advanced materials and manufacturing supervised by a professor approved by the director of graduate studies and leading to the writing of an in-depth report (approx. 30-40 pages). Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the director of graduate studies in Mechanical Engineering. The project can normally be completed in one session of full-time study. Prerequisite: approval of director of graduate studies in Mechanical Engineering.

MC#7999 THÈSE DE MAÎTRISE / MA Sc THESIS

MC#8990 SÉMINAIRE DE DOCTORAT / PhD SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins quinze séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 15 seminars and make one presentation. Graded S/NS.

MC#8999 PRÉPARATION DU PROJET DE THÈSE DE DOCTORAT / PREPARATION FOR PhD THESIS PROPOSAL
À la suite de la réussite à l'examen de synthèse, inscription requise de tous les candidats au docteurat jusqu'à ce que le projet de thèse soit accepté par le Comité consultatif. // Following completion of the comprehensive examination, registration required for all PhD candidates until the thesis proposal is accepted by the Advisory Committee.
Department of Mechanical and Aerospace Engineering Carleton University

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings, please consult the Registration Instructions and Class Schedule booklet published in the summer. Carleton University course numbers (in parentheses) follow the University of Ottawa course number.

MCG5121 (MECH 5106) SPACE MISSION ANALYSIS AND DESIGN (3cr.)
Review of solar system and space exploration. Space mission design and geometry. Analysis of orbit design, transfers, interplanetary trajectories. Effect of environment on spacecraft design. Space propulsion and launch vehicle design. Launch sequence, windows, cost. Reusable launch systems. Also offered at the undergraduate level, with different requirements, as AERO 4802.

MCG5122 (MECH 5202) SMART STRUCTURES (3cr.)

MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS (3cr.)
Essential microstructural features of metals and alloys; crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

MCG5300 (MECH 5000) FUNDAMENTALS OF FLUID DYNAMICS (3cr.)
Differential equations of motion. Viscous and inviscid regions. Potential flow: superposition; thin airfoils; finite wings; compressibility corrections. Viscous flow: thin shear layer approximation; laminar layers; transition; turbulence modelling. Convective heat transfer: free versus forced convection; energy and energy integral equations; turbulent diffusion. Also offered at the undergraduate level, with different requirements, as AERO 4302, for which additional credit is precluded.

MCG5301 (MECH 5001) THEORY OF VISCOUS FLOWS (3cr.)
Navier-Stokes and boundary layer equations; mean flow equations for turbulent kinetic energy; integral formulations. Stability, transition, turbulence, Reynolds stresses; separation. Calculation methods, closure schemes. Compressibility, heat transfer, and three-dimensional effects.

MCG5303 (MECH 5003) INCOMPRESSIBLE NON-VISCOUS FLOW (3cr.)
The fundamental equations and theorems for non-viscous fluid flow; solution of two-dimensional and axisymmetric potential flows; low-speed airfoil and cascade theory; wing lifting-line theory; panel methods.

MCG5304 (MECH 5004) COMPRESSIBLE NON-VISCOUS FLOW (3cr.)
Steady isentropic, frictional, and diabatic flow; shock waves; irrotational compressible flow, small perturbation theory and similarity rules; second-order theory and unsteady, one-dimensional flow.

MCG5308 (MECH 5008) EXPERIMENTAL METHODS IN FLUID MECHANICS (3cr.)
Fundamentals of techniques of simulation of fluid dynamic phenomena. Theoretical basis, principles of design, performance and instrumentation of ground test facilities. Applications to aerodynamic testing.

MCG5309 (MECH 5009) ENVIRONMENTAL FLUID MECHANICS RELATING TO ENERGY UTILIZATION (3cr.)
Characteristics of energy sources and emissions into the environment. The atmosphere; stratification and stability, equations of motion, simple winds, mean flow, turbulence structure and dispersion near the ground. Flow and dispersion in groundwater, rivers, lakes and oceans. Physical and analytical modelling of environmental flows.

MCG5310 (MECH 5100) PERFORMANCE AND ECONOMICS OF AIRCRAFT (3cr.)
Aircraft performance analysis with emphasis on factors affecting take-off, landing and economic performance; high lift schemes; operating economics.

MCG5311 (MECH 5101) DYNAMICS AND AERODYNAMICS OF FLIGHT (3cr.)
Static stability theory. Euler's equations for rigid body motion; the linearized equations of motion; stability derivatives and their estimation. Longitudinal and lateral dynamic response of an aircraft to control and disturbance. Also offered at the undergraduate level, with different requirements, as AERO 4308, for which additional credit is precluded.

MCG5314 (MECH 5104) GROUND TRANSPORTATION SYSTEMS AND VEHICLES (3cr.)
Performance characteristics, handling and directional stability, ride comfort and safety of various types of ground vehicle systems including road vehicles, terrain-vehicle systems, guided transport systems, and advanced ground transport technology.

MCG5315 (MECH 5105) ORBITAL MECHANICS AND SPACE CONTROL (3cr.)
Orbital dynamics and perturbations due to the Earth's figure, the sun, and the moon with emphasis on mission planning and analysis. Rigid body dynamics applied to transfer orbit and on-orbit momentum management and control of spacecraft. Effects of flexible structures on a spacecraft control system.

MCG5317 (MECH 5107) EXPERIMENTAL STRESS ANALYSIS (3cr.)

MCG5321 (MECH 5106/MECH 5201) METHODS OF ENERGY CONVERSION (3cr.)
Technical, economic and environmental aspects of present and proposed large-scale systems of energy conversion.

MCG5330 (MECH 5300) ENGINEERING ACOUSTICS (3cr.)
Review of acoustic waves in compressible fluids; acoustic pressure, intensity and impedance; physical interpretation and measurement; transmission through media; layers, in-homogeneous media, solids; acoustic systems; rooms, ducts, resonators, mufflers, properties of transducers; microphones, loudspeakers, computational acoustics.

MCG5331 (MECH 5301) AEROACOUSTICS (3cr.)
The convected wave equation; theory of subsonic and supersonic jet noise; propeller and helicopter noise; fan and compressor noise; boundary layer noise, interior noise; propagation in the atmosphere; sonic boom; impact on environment.

MCG5332 (MECH 5302) INSTRUMENTATION TECHNIQUES (3cr.)
An introduction for the non-specialists to the concepts of digital and analog electronics with emphasis on data acquisition, processing and analysis. Topics covered include operational amplifiers, signal processing, digital logic systems, computer interfacing, noise in electronic systems. Hands-on sessions illustrate theory and practice.

MCG5334 (MECH 5304) COMPUTATIONAL FLUID DYNAMICS OF COMPRESSIBLE FLOWS (3cr.)
Solution techniques for parabolic, elliptic and hyperbolic equations developed for problems of interest to fluid dynamics with appropriate stability considerations. A staged approach to solution of full Euler and Navier-Stokes equations is used. Grid generation techniques appropriate for compressible flows are introduced.

MCG5344 (MECH 5400) GAS TURBINE COMBUSTION (3cr.)
This course covers two major topics: combustion fundamentals and gas turbine combustor design. Combustion fundamentals include fuel evaporation, chemistry of combustion, chemical kinetics and emission formation and introduction to computational combustion modeling. Combustor design addresses the interrelationship between operational requirements and combustion fundamentals. Precludes additional credit for MECH 5800 (MCG 5480) when MECH 5800 was offered with this topic.

MCG5341 (MECH 5401) TURBOMACHINERY (3cr.)
Types of machines. Similarity: performance parameters; characteristics; cavitation. Velocity triangles. Euler equation: impulse and reaction. Radial pumps and compressors: analysis, design and operation. Axial pumps and compressors: cascade and blade-element methods; staging; off-design performance; stall and surge. Axial turbines. Current design practice. Also offered at the undergraduate level, with different requirements, as MECH 4305, for which additional credit is precluded.

MCG5342 (MECH 5402) GAS TURBINES (3cr.)

MCG5343 (MECH 5403) ADVANCED THERMODYNAMICS (3cr.)
The course covers three major topics: review of fundamentals from a consistent viewpoint, properties and equations of state, and applications and special topics. The third topic includes an introduction to statistical thermodynamics.

MCG5347 (MECH 5407) CONDUCTIVE AND RADIATIVE HEAT TRANSFER (3cr.)
Analytical, numerical and analog solutions to steady-state and transient conduction heat transfer in multi-dimensional systems. Radiative heat exchange between black, grey, non-grey diffusive and specular surfaces, including effects of athermanous media.

MCG5348 (MECH 5408) CONVECTIVE HEAT AND MASS TRANSFER (3cr.)
Analogy between heat, mass and momentum transfer. Forced and free convection relations for laminar and turbulent flows analytically developed where possible and otherwise deduced from experimental results, for simple shapes and in heat exchangers. Mass transfer theory and applications.

MCG5350 (MECH 5500) ADVANCED VIBRATION ANALYSIS (3cr.)
General theory of discrete multi-degree-of-freedom vibrating systems. Emphasis on numerical techniques of solving complex vibrating systems, with selected applications from aeronautical, civil, and mechanical engineering.
MCG5125 (MECH 5501) ADVANCED DYNAMICS (3cr.)
Developing and applying the governing equations of motion for discrete and continuous mechanical systems. Includes Newton-Euler and Lagrangian formulations; classical and finite element approaches for continuous systems; and linear stability, frequency response, and propagation solution methods. Precludes additional credit for MECH 5500.

MCG5352 (MECH 5502) OPTIMAL CONTROL SYSTEMS (3cr.)

MCG5353 (MECH 5503) ROBOTICS (3cr.)
The history of and introduction to robotics methodology. Robots and manipulators; homogeneous transformation, kinematic equations, solving kinematic equations, differential relationships, motion trajectories, dynamics. Control; feedback control, compliance, servomotors, actuators, external and internal sensors, grippers and vision systems. Microprocessors and their application to robot control. Programming.

MCG5354 (MECH 5504) GUIDANCE, NAVIGATION AND CONTROL (3cr.)

MCG5355 (MECH 5505) STABILITY THEORY AND APPLICATIONS (3cr.)
Fundamental concepts and characteristics of modern stability definitions. Sensitivity and variational equations; linear variational equations; phase space analysis; Lyapunov's direct method. Autonomous and nonautonomous systems; stability in first approximation; the effect of force type on stability; frequency method.

MCG5356 (MECH 5506) NEURO AND FUZZY CONTROL (3cr.)

MCG5124 (MECH 5507) ADVANCED KINEMATICS (3cr.)
Algebraic-geometry applications: kinematic calibration of serial and in-parallel robots; kinematic synthesis of planar, spherical, spatial mechanisms. Various DH-parametrisations, Jacobian formulations. Topics in: projective geometry; Cayley-Klein geometries; Plücker line coordinates; Gröbner bases; Grassmannians; kinematic mapping; Burmester theory. Emphasis on practical applications.

MCG5361 (MECH 5601) CREATIVE PROBLEM SOLVING AND DESIGN (3cr.)
Problem-solving processes and how they can be applied in engineering design. Emphasis on learning methodologies rather than accumulating information. Techniques can be successfully applied in any engineering specialty. (Also offered as IDES 5301)

MCG5362 (MECH 5602) FAILURE PREVENTION (FRACTURE MECHANICS AND FATIGUE) (3cr.)
Design of engineering structures to ensure against failure due to fatigue or brittle fracture. Nature of fatigue and brittle fracture; selection of suitable material, geometry, and inspection procedures for the load and environmental conditions.

MCG5364 (MECH 5604) COMPUTATIONAL METALLURGY (3cr.)

MCG5381 (MECH 5603) LIGHTWEIGHT STRUCTURES (3cr.)

MCG5365 (MECH 5605) FINITE ELEMENT ANALYSIS I (3cr.)
An introduction to the finite element methodology, with emphasis on applications to heat transfer, fluid flow and stress analysis. The basic concepts of Galerkin's method, interpolation, numerical integration, and isoparametric elements are taught using simple examples.

MCG5366 (MECH 5606) FINITE ELEMENT ANALYSIS II (3cr.)
Time marching heat flow problems with linear and nonlinear analysis. Static plasticity. Time-dependent deformation problems; viscoplasticity, viscoelasticity, and dynamic analysis. Isoparametric elements and numerical integration are used throughout.

MCG5367 (MECH 5607) THE BOUNDARY ELEMENT (BEM) METHOD (3cr.)
Integral equations. The BEM for potential theory and for elastostatics in two-dimensions. Boundary elements and numerical integration schemes. Practical applications.
MCG5369 (MECH 5701) METALLIC PHASES AND TRANSFORMATIONS (3cr.)
Thermodynamics of crystals, phase diagrams, principles of alloy phases, thermal analysis. Transformation rate and mechanisms. Short and long range diffusional transformations; diffusionless transformations. Phase transformations in engineering systems. Prerequisites: MCG2361/MCG2761 or MCG2142/MCG2542 (MAAE 2700 or the equivalent).

MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS (3cr.)
Essential microstructural features of metals and alloys; crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

MCG5345 (MECH 5700) SURFACES AND COATINGS (3cr.)
Surface characteristics of solid materials and surface degradation/failure mechanisms including wear, fretting, oxidation, corrosion, and erosion are introduced. Coating methods including PVD, CVD, laser, thermal spray and electrochemical deposition are discussed in the context of failure prevention measures.

MCG5374 (MECH 5704) INTEGRATED MANUFACTURING CIMS (3cr.)
Topics essential to CIMS including computer graphics, geometric modelling, numerically controlled machining, and flexible manufacturing. The fundamental data structures and procedures for computerization of engineering design, analysis and production. Also offered at the undergraduate level, with different requirements, as MECH 4704, for which additional credit is precluded.

MCG5375 (MECH 5705) CAD/CAM (3cr.)

MCG5480 (MECH 5800) SPECIAL TOPICS IN MECHANICAL AND AEROSPACE ENGINEERING (3cr.)
In-depth study of a topic in Mechanical and Aerospace Engineering.

MCG5489 (MECH 5801) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)
Topics will vary from year to year.

MCG5483 (MECH 5802) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5488 (MECH 5803) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5482 (MECH 5805) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5486 (MECH 5806) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5487 (MECH 5807) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5398 (MECH 5908) INDEPENDENT ENGINEERING STUDY (3cr.)
Students pursuing a master's degree by course work carry out an independent study, analysis, and solution of an engineering problem or design project. The results are given in the form of a written report and presented at a departmental seminar. Carried out under the general direction of a faculty member.

Other Courses of Particular Interest

Biomedical Engineering

BMG5300 (BIOM 5300) MODELLING OF RUBBER-LIKE ENGINEERING MATERIALS AND BIOLOGICAL SOFT TISSUES (3cr.)
Overview of the analytical and computational tools necessary for modelling rubber-like engineering materials and soft biological tissues: continuum mechanics for finite deformations, specific hyper-elastic constitutive equations, material characterization and finite element implementation. Ad-hoc review of physiology and microstructure of biological materials.

BMG5319 INTRODUCTION TO MICROFLUIDICS (3cr.)
Physics of liquid transport in micro-fabricated systems including physics at the microscale, hydrodynamics of microfluidic systems, diffusion mixing, introduction to microfabrication, examples of microfluidics devices and Micro PIV techniques, project. Prerequisites: MCG3143 or MCG3341/MCG3741 or equivalent. Strong background in fluid mechanics. Experience with computer-based projects (CAD, Matlab, CFD).
Chemical Engineering

CHG8188 POLYMER PROPERTIES AND CHARACTERIZATION (3cr.)
Polymer properties are described and discussed in the context of their nature, source and means of measurement. Chemical and microstructural properties; physical states and transitions; thermal properties; mechanical properties and viscoelasticity models; degradation and stability; surface, electrical and optical properties, polymer additives; structure-property relationships.

Civil and Environmental Engineering

CVG7120 (CIVE 5101) INTRODUCTORY ELASTICITY (3cr.)

CVG7121 (CIVE 5102) ADVANCED ELASTICITY (3cr.)

CVG7122 (CIVE 5103) FINITE ELEMENT METHODS IN STRESS ANALYSIS (3cr.)

CVG7126 (CIVE 5204) BEHAVIOUR AND DESIGN OF STRUCTURAL STEEL MEMBERS (3cr.)

CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)

CVG7141 (CIVE 5602) ADVANCED METHODS IN COMPUTER-AIDED DESIGN (3cr.)

Mathematics and Statistics

MATH 4806, MATH 5806

Physics

PHYS 4407, PHYS 5101

Systems and Computer Engineering

ELG6101 (SYSC 5001) SIMULATION AND MODELLING

ELG6104 (SYSC 5004) OPTIMIZATION FOR ENGINEERING APPLICATIONS (3cr.)
Introduction to algorithms and computer methods for optimizing complex engineering systems. Includes linear programming, networks, nonlinear programming, integer and mixed-integer programming, genetic algorithms and search methods, and dynamic programming. Emphasizes practical algorithms and computer methods for engineering applications.

ELG6105 (SYSC 5005) OPTIMIZATION THEORY AND METHODS

ELG6141 (SYSC 5401) ADAPTIVE CONTROL (3cr.)

ELG6142 (SYSC 5402) ADVANCED DYNAMICS WITH APPLICATIONS TO ROBOTICS (3cr.)

ELG6152 (SYSC 5502) ADVANCED LINEAR SYSTEMS (3cr.)
ELG6153 (SYSC 5503) STOCHASTIC PROCESSES (3cr.)
Basic concepts of randomness, as applied to communications, signal processing, and queuing systems; probability theory, random variables, stochastic processes; random signals in linear systems; introduction to decision and estimation; Markov chains and elements of queuing theory. Exclusion: ELG 5119.

Engineering Management

EMP5145 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
2-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach. Case studies and application project.

Biochemistry

The Department of Biochemistry, Microbiology and Immunology located in the Faculty of Medicine offers graduate programs leading to the master's (MSc) and doctoral (PhD) degrees in Biochemistry.

The programs prepare candidates for a variety of careers in teaching and research both within and outside of academia. Graduate students are actively involved in laboratory research, course work, and presentation of research seminars. Thus, they acquire autonomy in conducting research and in preparing publications. The programs create a stimulating and challenging environment which will allow students to achieve excellence in research. Graduates of the programs must demonstrate research skills and credibility as professionals in their area of research.

Members of the Department are involved in three main research fields: general biochemistry, molecular biology, and, nutrition and metabolism. Further information is posted on the departmental website.

The Department is a participating unit in the following collaborative programs: the Bioinformatics program (at the master’s level), the Human and Molecular Genetics program (at the master’s and doctoral levels), and the Pathology and Experimental Medicine program (at the master’s and doctoral levels).

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Biochemistry and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Biochemistry

Master of Science Biochemistry Specialization in Bioinformatics

Master of Science Biochemistry Specialization in Human and Molecular Genetics

Master of Science Biochemistry Specialization in Pathology and Experimental Medicine

Doctorate in Philosophy Biochemistry

Doctorate in Philosophy Biochemistry Specialization in Human and Molecular Genetics

Doctorate in Philosophy Biochemistry Specialization in Pathology and Experimental Medicine

Admission

Admission to the graduate program in Biochemistry is governed by the general regulations of the FGPS.

To be considered for admission, applicants must:

• Hold a master’s degree in science (or equivalent) with a minimum average of 75% (B+).
• Demonstrate aptitude for research either through completion of a master’s degree, or the writing of research reports, or abstracts or other documents demonstrating research skills.
Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with their work.
Provide a statement of purpose indicating their academic interests, career goals and other factors relevant to their choice of research area.
Identify at least one professor who is willing and available to act as thesis supervisor.
Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The Department may require students to take additional courses depending on their backgrounds.

Transfer from master’s to PhD

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Maintain an A- average during their graduate studies and in the last two years of undergraduate studies.
- Complete all the core courses required for the M.Sc.
- Demonstrate a satisfactory progress in the research program.
- Provide a written recommendation by the thesis supervisor.
- Provide a written recommendation by the Departmental Graduate Studies Committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met. Following transfer, all of the requirements of the doctoral program must be met.

Collaborative program in Human and Molecular Genetics

The Department of Biochemistry, Microbiology and Immunology is a participating unit in the collaborative program in Human and Molecular Genetics (master’s and doctoral levels). Students should indicate in their initial application for admission that they wish to be accepted into this program. The thesis director must be a member of the collaborative program. For further details, see the description of the Human and Molecular Genetics program posted on the FGPS website.

Collaborative program in Pathology and Experimental Medicine

The Department of Biochemistry, Microbiology and Immunology is a participating unit in the collaborative program in Pathology and Experimental Medicine (master’s and doctoral levels). Students should indicate in their initial application for admission that they wish to be accepted into this program. The thesis director must be a member of the collaborative program. For further details, see the description of the Pathology and Experimental Medicine program posted on the FGPS website.

Program Requirements

PhD in Biochemistry

The requirements for the PhD in Biochemistry are as follows:

- Successful completion of compulsory course MEDS166 Professionalism and Professional Skills.
- Six credits from BCH 8000-level courses or from other approved graduate courses in related disciplines approved by the Department.
- Enrolment in the seminar course BCHR366, which involves the presentation of a seminar and regular attendance at the departmental seminars.
- Successful completion of a comprehensive examination (BCH9998).
- Successful presentation and defense of a thesis (BCH9999) based on original research carried out under the direct supervision of a faculty member of the Department.

NOTE: The Department may require students to take additional courses depending on their backgrounds.

Collaborative program in Human and Molecular Genetics

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

- Six credits of courses, three credits of which must be from the student’s primary program and three of which must be HMG credits.
- Enrolment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Comprehensive examination as required by the primary program.
- Successful presentation of one research seminar to the primary program prior to thesis submission.
- Successful presentation and defence of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Course selection is subject to the approval of the HMG program director.
Collaborative program in Pathology and Experimental Medicine

The requirements of both the primary program and those of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Successful preparation and defense of a thesis under the supervision of a professor who is a member of the Pathology and Experimental Medicine program. The thesis must be relevant to the focus of the Pathology and Experimental Medicine program. At least one of the examiners must be a member of the Pathology and Experimental Medicine collaborative program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

Residence

All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial date of registration in the master’s program.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be form the Faculty of Medicine. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

The thesis examining board may include members who are not part of the TAC.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory will be withdrawn from the program.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**BCH5101 ANALYSIS OF -OMICS DATA** (3cr.)
Theoretical and practical aspects of various methods currently used to analyze the plethora mountain of -omics data. Methods: sequence alignment and database searches; sequence analysis and bioinformatics of gene regulation; DNA microarray and sequencing technologies to identify transcription factor binding sites; analysis of proteomics data; statistical analysis of preprocessed gene expression and protein/metabolite abundance data; epidemiology applications. Critical reading of the literature and strategies for making informed choices of methods for the analysis of students’ own data. Prerequisites: BCH4933, BCH3170.

**BCH5366 MSc SEMINAR** (3cr.)
Attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Biochemistry. Students must present at least one poster and one oral presentation during the course of their program. Graded S/NS

**BCH7999 RECHERCHE POUR LA THÈSE DE MAÎTRISE / MSC THESIS RESEARCH**
À l’intention des étudiants faisant de la recherche en vue de l’obtention de la maîtrise. Les étudiants doivent soumettre au Département un plan détaillé de la recherche qu’ils se proposent de faire. Ils doivent rencontrer leur comité consultatif de thèse au moins une fois par année et soumettre un rapport de progrès au Département. / For students doing research leading to the master’s degree. Students must ensure that a detailed outline of their proposed research is on file with the Department. They must meet at least once per year with their thesis advisory committee and submit a progress report to the Department.

**BCH8101 PHYSICAL AND CHEMICAL METHODS IN BIOCHEMISTRY** (3cr.)
Current applications of physical and chemical methods to the study of macromolecule structure-function relationships.

**BCH8102 SELECTED TOPICS IN PROTEIN STRUCTURE AND FUNCTION** (3cr.)
An advanced study of recent literature dealing with structure-function relationships in selected proteins.

**BCH8103 ADVANCED TOPICS IN GENE EXPRESSION AND PROTEIN SYNTHESIS (3cr.)**
An advanced study of the recent literature dealing with the chemistry, metabolism and function of nucleic acids, the biosynthesis of proteins, biochemical and genetic control mechanisms, genetic engineering and the control of gene expression. Offered every second year in alternation with BCH8105. Prerequisite: BPS 4101 or equivalent with the permission of the instructor.

**BCH8104 ADVANCED TOPICS IN CELL REGULATION (3cr.)**
An advanced study of recent literature dealing with signal transduction processes and the regulation of metabolism, cell proliferation and differentiation. Prerequisites: Offered in alternate years.

**BCH8105 ADVANCED TOPICS IN MOLECULAR BIOLOGY OF HUMAN DISEASES (3cr.)**
Topics will be selected and representative of current developments in the field. The course consists of a repeated series of a 3 hour lecture by an expert in the field one week, followed by student presentations, discussions and critique of assigned papers on that topic the following week. Topics on selected diseases will focus on various aspects of cancer, apoptosis, disease gene identification and gene therapy. In the past these topics have included the molecular aspects of various cancers, spinal muscular atrophy, tissue regeneration, the discovery of disease genes, infectious disease (HIV) and gene therapy. Students will write a grant proposal and participate in mock grant review panels. Depending on enrolment, the course may be limited to HMG students only. Prerequisite: Permission of the HMG program director.

**BCH8106 ADVANCED TOPICS IN NUTRITION AND REGULATION OF METABOLISM (3cr.)**
An advanced study of the recent literature dealing with metabolism, nutrition and metabolic control theory, with emphasis on both whole body and cell metabolism in metabolic and nutritional disorders such as obesity and non-insulin-dependent diabetes mellitus (NIDDM).

**BCH8107 ADVANCED TOPICS IN STRUCTURE AND FUNCTION OF PLASMA LIPOPROTEINS (3cr.)**
Recent advances in our knowledge of the plasma lipoproteins with a special emphasis on their role in the etiology of atherosclerosis. The subject will be introduced by an overview of the general structural properties of lipoproteins which will be followed by detailed discussion of the structure, metabolism and genetics of the apolipoproteins, the proteins and enzymes that modify lipoproteins and cell surface lipoprotein receptors. Other topics will include cholesterol homeostasis, plasma cholesterol transport and disorders of lipoprotein metabolism.

**BCH8108 ADVANCED METHODS OF MACROMOLECULAR STRUCTURE DETERMINATION (3cr.)**
A detailed examination of modern methods used to determine the structures of proteins, nucleic acids, and carbohydrates. May include X-ray crystallography, electron diffraction, nuclear magnetic resonance, and other spectroscopic methods.

**BCH8109 ADVANCED TOPICS IN CELL DEATH (3cr.)**
Molecular mechanisms of cell death. Particular attention to be paid to role of aberrant cell death in human disease. Offered in the Fall of odd numbered years.

**BCH8110 ADVANCED TOPICS IN SYSTEMS BIOLOGY (3cr.)**
Recent advances in genomics, proteomics, bioinformatics, and neuroinformatics including functional and chemical genomics, RNA analyses, microarrays, mass spectrometry, and neural imaging. Course requirements include student presentations and writing a mock research proposal based on Canadian Institutes of Health Research (CIHR) guidelines. Limited enrollment. Offered in alternate years with BCH 8101 Physical and Chemical Methods in Biochemistry. Prerequisite: Permission of the program director.

**BCH8111 CHROMOSOME AND CHROMATIN BIOLOGY (3cr.)**
Higher order chromosome structure and chromatins remodeling and their impact on regulation of gene expression, DNA replication, repair and recombination, and chromosome segregation. Histone modifications and nucleosome positioning and their influence on higher order chromosome structure. Importance of chromosome and chromatin in the context of the cell cycle, development, and disease. Critical reading of the literature on chromosome and chromatin biology.

**BCH8114 ADVANCED TOPICS IN THE CELL CYCLE (3cr.)**
Mechanisms of cell cycle regulation. Model systems critical to deciphering the cell cycle in eukaryotes: budding and fission yeast, Xenopus laevis egg extracts, Aspergillus nidulans, Drosophila melanogaster, sea urchin and mouse oocytes and cultured vertebrate cells. Overview of the prokaryotic cell cycle.

**BCH8116 MODEL ORGANISMS AND SYSTEMS BIOLOGY (3cr.)**
Utilization of model organisms in the development and advancement of the systems biology field. Particular attention will be paid to the use of organisms such as Saccharomyces cerevisiae as a model platform for cell cycle progression/cancer. Other models may also be included. The basics of the technology will be discussed along with the application of technology to complex biological questions, in particular relating to the cell cycle. Course offered in alternate years.

**BCH8117 ADVANCED TOPICS RELATING TO THE CELL CYTOSKELETON AND MEMBRANES (3cr.)**
Advanced study of recent literature dealing with the mammalian cellular cytoskeleton and membrane with an emphasis on the regulation of cell motility, adhesion and cell division.

**BCH8134 STRUCTURE AND EXPRESSION OF EUKARYOTIC AND PROKARYOTIC GENOMES (3cr.)**
Sequencing of eukaryote and prokaryote genomes with emphasis on recent technologies, sequence alignments and databases and assembly of genomes from massively parallel sequencing data. Focus on mapping studies, including linkage disequilibrium-based genome-wide association study (GWAS), to characterize functional variants associated with complex traits. Analysis and structure of microbial metagenomes from environmental and human habitats, including structure-function analysis of microbial communities, microbiota-human disease correlations, and molecular phylogeny. Genome expression, including measures of RNA transcripts and proteins and statistical analysis of data. Combination of various -omics data to understand gene-environment interactions.
BCH8165 SPECIAL TOPICS IN BIOCHEMISTRY I (3cr.)
A survey of recent advances in selected areas of biochemistry.

BCH8166 Special Topics in Biochemistry II (3cr.)
A survey of recent advances in selected areas of biochemistry.

BCH8310 CURRENT TOPICS IN RNA MOLECULAR BIOLOGY (3cr.)
Properties, mechanisms associated with regulation and the functions of RNAs and Ribonucleoprotein (RNPs) as well as RNA organisms. Current knowledge on RNA expression (synthesis, processing, transport and localization), the structure-function relationship and molecular mechanisms associated with RNAs and RNA genomes, RNA in evolution and in the origin of life, and RNA as therapeutic agents. Prerequisites: BCH/BIO 3570-3170 or equivalent with the permission of the program director. Exclusion: CMM 8310.

BCH8366 PhD SEMINAR (3cr.)
Attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Biochemistry. Students will present a poster in their first and every alternate year, and an oral presentation the second and every alternate year until they have permission to write their thesis. Graded S/NS

BCH9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)
À l’intention des étudiants inscrits au programme de Ph.D. L’inscription à ce cours est limitée à trois sessions consécutives. / For students enrolled in the doctoral program. Enrolment in this course is limited to three consecutive academic sessions.

BCH9999 RECHERCHE POUR LA THÈSE DE DOCTORAT / DOCTORAL THESIS RESEARCH
À l’intention des étudiants faisant de la recherche en vue de l’obtention du doctorat. Les étudiants doivent soumettre au Département un plan détaillé de la recherche qu’ils se proposent de faire. Ils doivent rencontrer leur comité consultatif de thèse au moins une fois par année et soumettre un rapport de progrès au Département. / For students doing research leading to the doctoral degree. Students must ensure that a detailed outline of their proposed research is on file with the Department. They must meet at least once per year with their thesis advisory committee and submit a progress report to the Department.

CMM5315 CELLULAR AND MOLECULAR BASIS OF CARDIOVASCULAR FUNCTION/DYSFUNCTION (3cr.)
Mechanism of failing heart and cardiovascular system, its associated functions and associated conditions. Therapies for restoring function. Topics include: regulation of heart development, cell signaling, cellular and molecular mechanisms of atherosclerosis and heart disease, hormonal regulation, hypertension, bioenergetics, cardiovascular genomics and genetics, cell therapy, and regenerative medicine.

HMG8106 CLINICAL CYTOGENOMICS (3cr.)
Comprehensive review of the basic principles and technologies in cytogonomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

Biology

Ottawa–Carleton Joint Program

Established in 1984, the Ottawa–Carleton Institute of Biology (OCIB) combines the research strengths of the University of Ottawa and Carleton University. The Institute offers graduate programs leading to the master's (MSc) and doctoral (PhD) degrees in Biology.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in three main research fields: cell and molecular biology; ecology, behaviour and systematics; and, physiology and biochemistry. Additional information is posted in the departmental website.

The Institute is a participating unit in the collaborative programs in Bioinformatics (at the master’s level), in Chemical and Environmental Toxicology (at the master’s and doctoral levels), in Environmental Sustainability (at the master’s level) in Bioinformatics, and in Science, Society and Policy (at the master’s level).
The doctoral program participates in the Combined Program for Degrees in Medicine and Philosophy (MD / PhD). For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

**Programs**

Master of Science Biology

Master of Science Biology Specialization in Bioinformatics

Master of Science Biology Specialization in Chemical and Environmental Toxicology

Master of Science Biology Specialization in Environmental Sustainability

Master of Science Biology Specialization in Science, Society and Policy

Doctorate in Philosophy Biology

Doctorate in Philosophy Biology Specialization in Chemical and Environmental Toxicology

**Admission**

Admission to the graduate program in Biology is governed by the general regulations of the Ottawa-Carleton Institute of Biology (OCIB) and by the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Be the holder of a master's degree in Biology (or equivalent) with a minimum average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

**Transfer from master’s to PhD**

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Completion of two graduate courses (6 credits) with a grade of A- or better in each; successful completion of the BIO5900 seminar course (over two sessions with one presentation required).
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the thesis advisory committee.
- Approval by the graduate studies committee.

If the student meets the requirements, the transfer must take place within sixteen months of initial registration in the master's. Please note that the minimal admission average requirements for the doctoral program must also be met. Following transfer, all the requirements of the doctoral program must be met (see the section on “PhD Requirements”.)

**Collaborative programs**

The Department of Biology is a participating unit in the collaborative programs in Bioinformatics (master's level only), in Chemical and Environmental Toxicology (master's and PhD levels), in Environmental Sustainability (master's level only) and in Science, Society and Policy (master's level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative
Program Requirements

Biology PhD

The following requirements must be met:

- Six credits of graduate courses at the 5000 level or above in biology or in related disciplines approved by the Department of Biology.
- Successful completion of a comprehensive examination (BIO9998) within twelve months of the initial admission into the program.
- Enrolment in the seminar course (BIO8900) which involves the presentation of seminars and the regular attendance at the seminars presented by the Department.
- Presentation and successful defence of a thesis (BIO9999) based on original research carried out under the direct supervision of a faculty member of the Department.

The Department may require students to take additional courses depending on their backgrounds.

Collaborative Program in Chemical and Environmental Toxicology

The student must fulfill both the requirements of the primary degree program, and the requirements of the collaborative program. The credits completed for the specialization count also towards the primary degree. If the seminar course was completed for the master’s specialization, the second requirement below does not apply.

The following requirements must be met:

- 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
- Enrollment in the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defense of a thesis in toxicology based on an original research carried out under the supervision of a faculty member participating in the chemical and environmental toxicology collaborative program.
- The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

The Department may require students to take additional courses depending on their backgrounds.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

Residence

All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial registration in the program.

Minimum standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), or the thesis proposal, or the comprehensive exam, or whose progress is deemed unsatisfactory must withdraw from the program.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will consist of a minimum of three members, including the thesis supervisor, and two of whom must be full time, adjunct, or cross-appointed professors in the OCIR.

One of the members of the committee, in addition to the thesis supervisor, must have expertise in the field of the student’s thesis research. To provide outside perspective, one of the members should be from a different research group. The members of the committee should be chosen by the supervisor in consultation with the student and approved by the director of the Graduate Studies Program.

The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

The thesis examining board may include members who are not part of the TAC.

Courses
Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**BIO5101 (BIOL 5001) TOPICS IN BIOTECHNOLOGY** (3cr.)
A course concerned with the utilization of biological substances and activities of cells, genes and enzymes in manufacturing, agricultural and service industries. A different topic will be selected each year. **Prerequisite: A course in cell physiology or biochemistry, or permission of instructor.**

**BIO5102 (BIOL 5605) ADVANCED FIELD ECOLOGY** (3cr.)
Field experience in a new environment (e.g. local, national, international) to learn about ecological processes (note – extra fees associated with course).

**BIO5103 (BIOL 5003) ADVANCED BIOCHEMISTRY** (3cr.)
Advanced topics in biochemistry: the chemical structure and function of biological macromolecules, biochemical thermodynamics, metabolism, photosynthesis, lipids and membranes.

**BIO5104 ADVANCES IN APPLIED BIOCHEMISTRY** (3cr.)
Contemporary methods of recombinant DNA technology proteins and protein characterization, including advanced techniques in proteomics.

**BIO5105 (BIOL 5801) ADVANCED NEUROETHOLOGY** (3cr.)
A comparative and evolutionary approach to studying neural mechanisms underlying animal behaviour, including genetic, neural and hormonal influences on behaviour. **Prerequisites: BIOL 3305 and BIOL 3601 or equivalents and registration in a graduate program, or written permission of the department.**

**BIO5106 (BIOL 5506) BIOINFORMATICS** (3cr.)
Major concepts and methods of bioinformatics. Topics may include, but are not limited to genetics, statistics and probability theory, alignments, phylogenetics, genomics, data mining, protein structure, cell simulation and computing.

**BIO5111 BIOPHYSICAL TECHNIQUES** (3cr.)
Theory and application of current biochemical/biophysical instrumentation and techniques including X-ray crystallography, nuclear magnetic resonance spectrometry, infrared, circular dichroism and fluorescence spectroscopy, isothermal titration and differential scanning calorimetry.

**BIO5121 ADVANCES IN PROTEIN ENGINEERING** (3cr.)
Theory, development and current techniques of protein and enzyme engineering. Topics to be discussed may also include applications in biotechnology, nanotechnology and new frontiers in basic and applied research.

**BIO5302 (BIOL 5105) METHODS IN MOLECULAR GENETICS** (3cr.)
Theory and associated applications of emerging methods in molecular genetics, including information gathered from large-scale genome-wide analysis and protein-protein interaction data, and how this information can advance understanding of cell biology. **Prerequisites: Graduate standing and permission of the department.**

**BIO5303 BIOLOGICAL SCIENCE IN PRACTICE** (3cr.)
Cross-cutting skills and issues in common to all biological disciplines. Key perspectives on philosophy of science, practical approaches to scientific publication and peer-review, data analysis and presentation, scientific inference, and technical writing will be provided through discipline-specific examples and associated practical work.

**BIO5305 (BIOL 5407) BIOSTATISTICS I** (3cr.)
Application of statistical analyses to biological data. Topics include ANOVA, regression, GLMs, and may include loglinear models, logistic regression, general additive models, mixed models, bootstrap and permutation tests. **Prerequisites: Graduate standing, courses in elementary ecology and statistics and permission of the department.**

**BIO5306 (BIOL 5409) MODELLING FOR BIOLOGISTS** (3cr.)
Use and limitations of mathematical and simulation modelling approaches for the study of biological phenomena.

**BIO5308 (BIOL 5106) LABORATORY TECHNIQUES IN MOLECULAR GENETICS** (3cr.)
Laboratory course designed to give students practical experience in recent important techniques in molecular genetics. **Prerequisites: Graduate standing and permission of the department.**

**BIO5310 ADVANCED EVOLUTIONARY BIOLOGY** (3cr.)
Advances in micro-and macroevolution including the mechanisms both driving and constraining evolutionary change, phylogenetic relationships, patterns of evolutionary change at the molecular or phenotypic level, and evolutionary theory and techniques as applied to these areas.

**BIO5311 ADVANCED EVOLUTIONARY ECOLOGY** (3cr.)
The ecological causes and consequences of evolutionary change, focussing on how the ecological interactions among organisms and their biotic and abiotic environments shape the evolution of phenotypic and species diversity.

**BIO5312 PRINCIPLES AND METHODS OF BIOLOGICAL SYSTEMATICS** (3cr.)
BIO5314 ADVANCES IN AQUATIC SCIENCES (3cr.)
Advanced theoretical and applied aquatic sciences including current topics in limnology and oceanography (e.g. impacts of climate change, invasive species, and atmospheric pollution) with implications for lake, river, coastal and wetland management.

BIO5318 BIOSTATISTICS II (3cr.)
Application of multivariate methods to biological data, including methods such as discriminant functions analysis, cluster analysis, MANOVA, principal components analysis.

BIO5320 ADVANCES IN CONSERVATION BIOLOGY (3cr.)
Interdisciplinary exploration of the science of scarcity and diversity in a human dominated world.

BIO5321 EVOLUTIONARY GENETICS (3cr.)
Genetic mechanisms and processes responsible for variation and evolutionary change in natural populations. Topics may include population and quantitative genetics as applied to protein and genome evolution, molecular phylogenies, DNA sequences in population biology, and the evolution of multigene families.

BIO5900 SÉMINAIRE DE MAÎTRISE / MSc SEMINAR (1cr.)
Obligatoire à la maîtrise. L'obtention de crédit est fondée sur la présentation d'un séminaire jugé satisfaisant par le personnel et sur la participation à l'ensemble du cours. / Compulsory for all MSc students. For credit, each student must present one seminar judged to be satisfactory by the staff and must participate in the course as a whole.

BIO6103 SPECIAL TOPICS IN NEUROSCIENCE (3cr.)
An in-depth study of current topics in neuroscience. Course content varies yearly and has recently included cognitive neuroscience, neuropharmacology, neurodegeneration, and behavioural medicine. (Also listed as PSYC 6300).

BIO6303 ADVANCED SEMINAR IN NEUROSCIENCE (3cr.)
A seminar focusing on the active research areas and interests of faculty, guest lecturers and graduate students, and on trends in diverse areas of neuroscience. (Also listed as PSYC 6200).

BIO6304 TECHNIQUES IN NEUROSCIENCE (3cr.)
Completion of a research project carried out under the supervision of a neuroscience faculty member. The student will learn a new neuroscience technique and apply it to a research objective. May be repeated for different projects. (Also listed as PSYC 6204).

BIO6305 ADVANCED SEMINAR IN NEUROSCIENCE (3cr.)
A comprehensive pro-seminar series, covering issues ranging from cellular and molecular processes through to neural systems and behaviours as well as psychopathology. (Also listed as PSYC 6203). Precludes additional credit for BIOL 6303.

BIO8102 (BIOL 5502) SPECIAL TOPICS IN BIOLOGY (3cr.)
Selected aspects of specialized biological subjects not covered by other graduate courses.

BIO8104 SELECTED TOPICS IN BIOLOGY III (3cr.)
Lectures and/or seminars dealing with current advances in a selected area or branch of biology, not covered by other graduate courses.

BIO8105 ADVANCES IN APPLIED ECOLOGY (3cr.)
The application of ecological and evolutionary principles in addressing resource management challenges and environmental problems.

BIO8108 (BIOL 6505) ADVANCED TOPICS IN DEVELOPMENT (3cr.)
Recent advances in developmental biology. Topics may include embryonic induction, regulation of morphogenesis and differentiation, mechanisms of regional specification and pattern formation, and developmental genetics. Offered in alternate years. (Offered in alternate years).

BIO8109 (BIOL 6001) ADVANCED MOLECULAR BIOLOGY (3cr.)
In-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins.

BIO8116 (BIOL 6002) ADVANCES IN PLANT MOLECULAR BIOLOGY (3cr.)
Use of molecular genetics in general plant biology and the contribution of plant genomics to our understanding of plant metabolism, plant development, and plant interactions with the environment at the molecular, genome, and cellular levels. Prerequisite: BIO8109/61.601F1 and this course normally will be offered together in the same year but only in alternate years.

BIO8117 (BIOL 6201) ADVANCED CELL BIOLOGY I (3cr.)
Recent advances in cell biology, including such topics as membranes, signaling, the cytoskeleton and control of the cell cycle. Prerequisite: BIO8118/61.622W1 and this course normally will be offered together in the same year but only in alternate years.

BIO8118 (BIOL 6202) ADVANCED CELL BIOLOGY II (3cr.)
Topics for discussion may include the following: the structure, composition and three-dimensional organization of the nucleus, mechanisms and regulation of genome replication, structural organization of transcription. Nuclear reorganization during gamete development, fertilization, viral infection and the miotic cell cycle. Normally offered in alternate years. Prerequisite: BIO8117/61.621F1 and this course normally will be offered together in the same year but only in alternate years.
BIO8120 DIRECTED STUDIES IN BIOLOGY (3cr.)
One-on-one instruction in selected aspects of specialized biological subjects not covered by other graduate courses. Students may not take this course from their thesis supervisor(s), and are limited to one directed studies course per program.

BIO8122 (BIOL 5307) ADVANCED INSECT BIOLOGY (3cr.)
Overview of the biological processes that allow insects to function in their environments and to overcome the constraints and limitations that the environment places on them. Prerequisite: In addition to the course material, students will write two terms papers (Alternate years).

BIO8162 (BIOL 5402) ADVANCED ENDOCRINOLOGY (3cr.)
Major topics in comparative endocrinology: understanding the structure, function and evolution of vertebrate endocrine systems, including endocrine disruption. Prerequisite: An undergraduate Endocrinology course (BIO4127 or equivalent).

BIO8204 ECOLOGY SEMINAR (3cr.)

BIO8301 (BIOL 5201) EVOLUTIONARY BIOINFORMATICS (3cr.)
Fundamental concepts in molecular evolution and hands-on experience with computer analysis of DNA sequences. Topics may include molecular sequence databases, multiple alignments and phylogenetic trees. Prerequisite: Graduate standing plus basic courses in genetics and evolution; permission of the department.

BIO8302 (BIOL 5202) TOPICS IN EVOLUTIONARY GENETICS (3cr.)
A lecture/seminar course on the genetic mechanisms and forces responsible for variation and evolutionary change in natural populations. Topics to include protein and genome evolution, molecular phylogenies, DNA sequences in population biology, and the evolution of multigene families. Prerequisite: Graduate standing plus basic courses in genetics and evolution; permission of the department (alternate years).

BIO8303 (BIOL 5203) ADVANCED MICROSCOPY (3cr.)
Development of the practical skills of microscopy through original research and supporting theory lectures. Prerequisite: Open to 4th year and graduate students with consent of the instructor.

BIO8306 (BIOL 5508) ADVANCED TOPICS IN ECOLOGY (3cr.)
Recent developments in population, community and/or ecosystem ecology.

BIO8320 (BIOL 6300) ADVANCED PLANT BIOLOGY (3cr.)
Recent developments in plant biology. Topics may include plant anatomy, systematics, evolution, genetics, ecology, ethnobotany, cell biology, and/or biotechnology. Prerequisite: Biology 61.425 and Biology 61.426/427, or permission of the department.

BIO8361 (BIOL 6304) ADVANCED ANIMAL PHYSIOLOGY (3cr.)
Recent advances in animal physiology, emphasizing comparative, evolutionary and environmental approaches.

BIO8365 (BIOL 5802) ADVANCED BEHAVIOURAL ECOLOGY (3cr.)
Recent advances in behavioural ecology including topics such as the evolution of tactics and strategies of group living, foraging, anti-predation, resource use and defence, cooperation, reproduction, and parental care.

BIO8510 THÈMES CHOISIS EN BIOLOGIE (3cr.)
Aspects de sujets biologiques spécialisés qui ne sont pas couverts dans d'autres cours d'études supérieures.

BIO8900 SÉMINAIRE DE DOCTORAT / PhD SEMINAR (2cr.)
Obligatoire au doctorat. L'obtention de crédit est fondée sur la présentation de deux séminaires jugés satisfaits par le personnel et sur la participation à l'ensemble du cours. / Compulsory for all PhD students. For credit, each student must present two seminars judged to be satisfactory by the staff and must participate in the course as a whole.

BIO8910 SPECIAL TOPICS IN BIOLOGY / THÈMES CHOISIS EN BIOLOGIE (3cr.)
Aspects de sujets biologiques spécialisés qui ne sont pas couverts dans d'autres cours d'études supérieures. Prérequis : connaissance passive de l'anglais. / Selected aspects of specialized biological subjects not covered by other graduate courses. Prerequisite: Passive knowledge of French.

BIO8938 (BIOL 6404) INTERACTIONS ENTRE PLANTES ET ANIMAUX / PLANT ANIMAL INTERACTIONS (3cr.)
Les substances métaboliqiques secondaires des plantes et leur rôle en tant que phytorépresseurs ou phagostimulants pour les animaux et en tant qu’agents antifongiques ou allelopathiques. On discutera de la co-évolution des plantes et des organismes phytophages (insectes et mammifères) et des dimensions physiologique et écologique de cette relation / Secondary metabolites of plants and their role as attractants or antifeeders to animals and as allelopathic or antifungal agents. Emphasis will be placed on co-evolution of plants and phytophagous organisms such as insects and mammals, and the ecological and physiological dimensions of this relationship (alternate years).

BIO9104 (BIOL 6403) ECOTOXICOLOGY (3cr.)
Advances in ecotoxicology with emphasis on the biological effects of contaminants. The potential for biotic perturbation resulting from chronic and acute exposure of ecosystems to selected toxicants will be covered along with the methods, pesticide, herbicide and pollutant residue analysis and the concept of bound residues. (Also listed as CHEM 5705 / CHM 9109/TOX9104. Prerequisite: BIO9101/CHM8156 (BIOL6402/CHM5708)

BIO9105 (BIOL 6405) SEMINAR IN TOXICOLOGY (3cr.)
Highlights current topics in toxicology. The student will prepare a seminar and submit a report on the seminar topic. Student, faculty and invited seminar speakers. (Also listed as CHM8167/TOX 9105/CHM5805).
BIO9301 (BIOL 5306) PHOTOBIOLOGY
The interaction of light and living organisms. Topics include an introduction to photochemistry and the detailed study of such topics as photosynthesis, vision, photosensitivity and photoperiodism.

BIO9301 (BIOL 5306) PHOTOBIOLOGY
The interaction of light and living organisms. Topics include an introduction to photochemistry and the detailed study of such topics as photosynthesis, vision, photosensitivity and photoperiodism.

BIO7999 (BIOL 5909) THÈSE DE MAÎTRISE / MSc THESIS

BIO9101 (BIOL 6402) PRINCIPLES OF TOXICOLOGY
Basic theorems of toxicology with examples of current research problems. The concepts of exposure, hazard and risk assessment will be defined and illustrated with experimental material from some of the more dynamic areas of modern research. (Also listed as CHEM 5708/CHEM8156/TOX8156).

BIO9998 Examen de synthèse / Comprehension Examination

BIO9999 (BIOL 6909) THÈSE DE DOCTORAT / PhD THESIS

BNF5107 APPLIED BIOINFORMATICS (3cr.)
Computational knowledge discovery in and the dynamic nature of cellular networks. Includes, but is not limited to, knowledge representation, large scale data integration, data mining and computational systems biology.

ESG5310 COMMUNITY OUTREACH AND MEDIA RELATIONS IN THE SCIENCES (3cr.)
Lectures and an outreach practicum that aim to develop skills to effectively communicate complex scientific concepts to the public, to interact with news media, and to become effective mentors. Graded S/NS. Cannot be counted towards the credits required for the student’s degree program unless explicitly permitted by the student’s program. Prerequisite: Permission of the program director.

TOX8157 CHEMICAL TOXICOLOGY (3cr.)
Advanced course in chemical toxicology dealing with both chemical hazards and exposure. Overview of empirical data relating to the toxicity of various classes of chemicals for test organisms, followed by study of toxicity at the cellular level, including studies of interactions between toxic substances and enzymatic systems. Data applicable to the interpretation and monitoring of WHMIS health regulations. Initial events in enzyme induction and mutagenesis. Study of predictive capabilities in the areas of structure-activity relationships and mechanisms of enzyme induction, followed by assessment of mechanisms of exposure to toxic chemicals.

TOX9106 (BIOL 6406) GENETIC TOXICOLOGY (3cr.)
Topics in mutagenesis and DNA repair, including spontaneous and induced mutagenesis, genetic toxicology testing, the genetics and biochemistry of replication, DNA repair and recombination, and the role of mutagens in the development of genetic disease and cancer.

Canadian Studies (Collaborative)
Because of its strength in relevant areas, its bilingual character and its location in the national capital, the University of Ottawa is uniquely positioned to offer a collaborative program leading to a specialization in Canadian Studies at the doctoral level. The program is especially designed for doctoral students in selected programs in the humanities and the social sciences who wish to enrich their training in a particular discipline by including an interdisciplinary component. The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Participating academic units
Fourteen academic units collaborate in this program:

- Education
- English
- Geography
- History
- Human Kinetics
- Lettres françaises
- Linguistics
- Philosophy
- Political Science
- Psychology
- Religious Studies
- Sociology
- Spanish
Translation Studies

Please refer to the Faculty of Graduate and Postdoctoral Studies (FGPS) website for more information on the graduate programs of these units.

Programs

Doctorat en philosophie Lettres françaises Spécialisation en études canadiennes
Doctorate in Philosophy Education Specialization in Canadian Studies
Doctorate in Philosophy English Literature Specialization in Canadian Studies
Doctorate in Philosophy Geography Specialization in Canadian Studies
Doctorate in Philosophy History Specialization in Canadian Studies
Doctorate in Philosophy Human Kinetics Specialization in Canadian Studies
Doctorate in Philosophy Linguistics Specialization in Canadian Studies
Doctorate in Philosophy Philosophy Specialization in Canadian Studies
Doctorate in Philosophy Political Science Specialization in Canadian Studies
Doctorate in Philosophy Psychology Specialization in Canadian Studies
Doctorate in Philosophy Religious Studies Specialization in Canadian Studies
Doctorate in Philosophy Sociology Specialization in Canadian Studies
Doctorate in Philosophy Spanish Specialization in Canadian Studies
Doctorate in Philosophy Translation Studies Specialization in Canadian Studies

Admission

Admission to the collaborative program in Canadian Studies at the doctoral level is determined by the coordination committee and will normally take place before the end of the first year of registration in the doctoral program. Students must meet the following conditions to be accepted:

- Registration in the doctoral program of one of the participating units.
- Registration in, or successful completion of, at least one course with Canadian content in the participating unit where the student is registered.
- Selection of the thesis topic with Canadian content. The coordination committee will determine, in consultation with the thesis director, if the Canadian content of the thesis meets the requirements of the collaborative program.

The title of the degree will in each case specify the discipline of the participating unit with specialization in Canadian Studies.

Language Requirements

Students should be able to understand and read both official languages of Canada in order to participate in the bilingual interdisciplinary seminar CDN6910.

Program Requirements

The proposed topic must be approved by both the participating unit and the Canadian Studies Graduate Committee. At least one of the examiners of the thesis must be a person chosen in consultation with the executive committee of the Institute of Canadian and Aboriginal Studies.

Students enrolled in the collaborative program will be asked to meet both the requirements of their primary program and those of the collaborative program. The requirements of the collaborative program will serve as partial fulfilment of the requirements of their primary program.

The specific requirements of the collaborative program include the following:
Submission and successful defence of a thesis on a Canadian topic in the participating unit.

Before registering in CDN 6520, students must check to see whether this course can replace a three credit course in their primary program. CDN 6520 is offered only in French.

**Residence**

As per FGPS regulations, all students must complete a minimum of six sessions of full-time registration at the beginning of the program. All requests for non-consecutive full-time study sessions will need to be approved by the FGPS. The program is intended for full-time students.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

**Courses**

**CDN6520 SÉMINAIRE SUR LA FRANCOPHONIE CANADIENNE (3cr.)**
Séminaire sur des thèmes se rapportant à la francophonie canadienne, particulièrement les francophones vivant en situation minoritaire.

**CDN6910 SÉMINAIRE EN ÉTUDES CANADIENNES / SEMINAR IN CANADIAN STUDIES (3cr.)**
Séminaire interdisciplinaire bilingue sur des sujets se rapportant au Canada. Les thèmes seront choisis en consultation avec les unités participantes, en tenant compte du nombre d'étudiants, de l'orientarion de leur recherches et celles des unités participantes. / Bilingual interdisciplinary seminar on issues related to the study of Canada. Topics to be selected in consultation with participating units, taking into consideration the number of students, their research interests and those of the participating units.

**Canon Law**

The Faculty of Canon Law of Saint Paul University offers programs leading to the Graduate Diplomas in Canon Law (GDCL), in Ecclesiastical Administration (GDEA) and in Canonical Practice (GDCP), and to the Master of Canon Law (MCL) and the Doctor of Philosophy in Canon Law (PhD(CL)). These degrees are conferred jointly by the Senates of the University of Ottawa and Saint Paul University under the terms of the federation agreement between them.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa, which are posted on the FGPS website. The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.

**Programs**

Graduate Diploma Canon Law

Master of Canon Law

Doctorate in Philosophy Canon Law

**Admission**

- The MCL degree, obtained with an average of A- (80%) or its equivalent.
- Three letters of reference from persons who have been involved academically with the applicant during their master's program in canon law, either as dean, chairperson, professor or research supervisor. In addition, a letter of permission from the applicant's bishop (for secular clergy) or superior (for members of institutes of consecrated life or societies of apostolic life).
- A curriculum vitae highlighting the applicant's prior experience in canon law, if applicable
- Excellent knowledge of English or French, and a passive knowledge of the other language.
- Knowledge of Latin.
Program Requirements

The civil Doctorate in Canon Law (PhD) is a research degree which consists of six credits of course work, a comprehensive examination, a thesis proposal and the writing and defense of a doctoral thesis. Three of the credits are compulsory. The other three credits may either be taken in another graduate course in canon law offered by Saint Paul University or, with the approval of the Dean of the Faculty of Canon Law, the credits can come from a graduate course offered elsewhere in a field related to the student’s research. No equivalencies are granted. Course work, the comprehensive examination and the thesis proposal, must be completed within the first four sessions of registration in the doctoral program. Any exceptions need approval from the Dean of the Faculty of Canon Law.

Courses

- Compulsory Course
  
  DCA8981 LECTURE DE SOURCES CANONIQUES LATINES / READINGS IN LATIN CANONICAL SOURCES (3cr.)

- Elective Courses (3cr.)
  
  Students can select their elective course either from among the graduate courses offered by the Faculty of Canon Law, or from another faculty or university, with the approval of the Dean of the Faculty of Canon Law.

- Comprehensive Examination (DCA9998)
  
  Before the thesis is submitted for evaluation, the student must pass a comprehensive examination on ten topics approved by the Dean of the Faculty of Canon Law; the list of topics will have been prepared by the student in consultation with the dissertation supervisor. A student who fails this comprehensive examination is permitted to repeat it once. A second failure leads to withdrawal from the program.

- Thesis Proposal (DCA9997)
  
  Within the first four sessions of doctoral studies, the student must submit a thesis proposal in writing. This proposal will be examined by a special committee established and chaired by the Dean of the Faculty of Canon Law. The final approval of the thesis proposal, and the appointment of the supervisor, are the responsibility of the Dean of the Faculty of Canon Law.

- Thesis (DCA9999)
  
  The student must write, submit, and successfully defend a dissertation of at least 200 pages in length. This dissertation must constitute a significant contribution to knowledge, embody the results of original research and analysis, and be of such quality as to merit publication.

Duration of the program

The normal duration of the program is four years. The maximum time allowed for fulfilling all requirements, including the submission of the final copy of the thesis, is within six years from the time of initial registration in the doctoral program, whether or not a leave of absence has been taken during that time.

Residence

Students must register full-time for a minimum of six sessions, normally at the beginning of the program.

Minimum standards

If a student fails a compulsory course, it must be repeated. If a student fails an elective course, it may be repeated or, with the approval of the Dean of the Faculty of Canon Law, it may be replaced by another course.

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, the comprehensive exam, the thesis, or whose progress is deemed unsatisfactory will be withdrawn from the program.

Courses

DCA5103 UNIVERSAL AND SUPRA DIOCESAN CHURCH STRUCTURES (3cr.)

Supreme authority of the Church: Roman Pontiff, College of Bishops and Ecumenical Council. Synod of Bishops, College of Cardinals, Roman Curia, legates. Groupings of particular Churches: ecclesiastical provinces and regions, metropolitans, particular councils (plenary and provincial), conferences of bishops. (cc. 330-367; 431-459)

DCA5127 PARTICULAR CHURCHES (3cr.)

DCAG128 SANCTIFYING OFFICE (3cr.)

DCAG129 GENERAL NORMS (3cr.)

DCAG130 MATRIMONIAL LAW (3cr.)

DCAG131 CHRISTIAN FAITHFUL (3cr.)

DCAG132 ADMINISTRATIVE INSTITUTES (3cr.)
General decrees and instructions. Singular administrative acts: singular decrees and precepts, rescripts, privileges, dispensations. Ecclesiastical offices. Presentation and drafting of singular and general decrees, precepts, and rescripts for routine and exceptional matters. Practical application: internal and external diocesan structures, sacraments, finances, civil law. (cc. 29-93, 145-183) [Previously: DCA 5306, DCA 6322]

DCAG133 PROCEDURES I (3cr.)
Trials in general. Competent forum. Different grades and kinds of tribunals: first instance, second instance, tribunals of the Apostolic See. Discipline to be observed in tribunals: duties of judges and tribunal ministers, order of adjudication, time limits and delays, place of the trial, persons to be admitted to the court, manner of preparing and keeping the acts. Parties in a case. Actions and exceptions. Oral contentious process. (cc. 1400-1500, 1656-1677)

DCAG134 EASTERN CANON LAW (3cr.)

DCAG135 MATRIMONIAL JURISPRUDENCE (3cr.)
Study of jurisprudence focusing on the grounds of nullity of matrimonial consent, with special focus on the jurisprudence of the Roman Rota. [Previously: DCA 6321]

DCAG136 INTRODUCTION TO CANON LAW (3cr.)
Methodology for canonical research and writing. History of canonical sources. History of canonical institutions.

DCAG137 TEACHING OFFICE (1.5cr.)

DCAG138 SPECIAL MATRIMONIAL CASES AND PROCEDURES (1.5cr.)
Separation of the spouses with the dissolution of the marriage bond (dissolution of ratified and non-consommated marriages, dissolution in virtue of the Pauline privilege, dissolution in favour of the fault). Separation of the spouses with the bond remaining. Convalidation of marriage. Procedure in presumed death of a spouse. (cc. 1141-1165, 1692-1707) [Previously: DCA 5133]

DCAG139 INSTITUTES OF CONSECRATED LIFE AND SOCIETIES OF APOSTOLIC LIFE (3cr.)
Common norms. Religious institutes: religious houses, governance of institutes, admission of candidates and formation of members, obligations and rights of the institutes and of their members, apostolate of institutes, separation of members from the institute, religious who are bishops, conferences of major superiors. Secular institutes. Societies of apostolic life. (cc. 573-633; 641-717, 719-740, 742-746)

DCAG139A CHURCH LAW AND PASTORAL MINISTRY (3cr.)
Theological reflection on and practical application of Canon Law to some areas of pastoral ministry, specifically marriage and reconciliation.

DCAG139B DIRECTED STUDIES I (3cr.)

DCAG139C DIRECTED STUDIES II (3cr.)

DCAG139D DIRECTED STUDIES III (3cr.)

DCAG140 SELECTED TOPICS IN CANON LAW
Study of a particular topic in Canon Law. Graded S/NS.
DCA5304 COMPARATIVE PARTICULAR LAW (3cr.)
Comparative study of the development of particular canon law at the level of conferences of bishops.

DCA6112 ADMINISTRATIVE PROCEDURES (3cr.)

DCA6115 TEMPORAL GOODS (3cr.)

DCA6114 PROCEDURES II (3cr.)

DCA6115 PENAL LAW (3cr.)

DCA6116 FOUNDATIONS OF CANON LAW (3cr.)
Theology of Law. Philosophy of Law. Elements of Roman Law. Previously: DCA6415

DCA6117 INSTITUTES OF LAW (3cr.)
An introduction to the juridical system of civil law (common law). A comparison of selected themes of civil law to principles established by canon law. An examination of the tension between Church and State, with an analysis of civil law court judgments. Previously: DCA6415.

DCA6301 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6302 SPECIAL PROBLEMS IN CANON LAW II (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6315 LITURGICAL LAW OUTSIDE THE CODE (3cr.)
Selected Praenotanda of liturgical books and post-Code legislation on the Liturgy.

DCA6316 THE LAITY AND THE POWER OF GOVERNANCE IN THE CHURCH (3cr.)
Collaboration of the lay faithful in the exercise of the power of governance: law, theory, and practice.

DCA6321 SEMINAR ON TRIBUNAL PRACTICE (3cr.)

DCA6363 SPECIAL PROBLEMS IN CANON LAW III (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6364 SPECIAL PROBLEMS IN CANON LAW IV (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6365 SPECIAL PROBLEMS IN CANON LAW V (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6366 SPECIAL PROBLEMS IN CANON LAW VI (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6367 SPECIAL PROBLEMS IN CANON LAW VII (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6395 RESEARCH SEMINAR (3cr.)
Research on a particular canonical subject resulting in its presentation to the seminar group and director, and in submission of a written project.
DCA6396 SELECTED TOPICS IN CANON LAW I (3cr.)

DCA6397 SELECTED TOPICS IN CANON LAW II (3cr.)

DCA6398 SELECTED TOPICS IN CANON LAW III (3cr.)

DCA6921 LATIN CANONIQUE / CANONICAL LATIN (3cr.)
Etude du droit ecclésiastique de niveau avancé. Traduction de textes canoniques: Codex iuris canonici, Codex canonum ecclesiarium orientalium, autres sources canoniques. (Préalables : DCA 3509 ou une connaissance équivalente au jugement du doyen de la Faculté du droit canonique; connaissance passive de l’anglais.) / Advanced level of ecclesiastical Latin. Translation of canonical texts: Codex iuris canonici, Codex canonum ecclesiarium orientalium, other canonical sources. Prerequisite: DCA 3109 or equivalent knowledge in the judgment of the Dean of the Faculty of Canon Law; passive knowledge of French

DCA6922 STAGE EN MILIEU DE TRAVAIL / FIELD PRACTICUM (3cr.)
Stage supervisé de pratique canonique d’une durée de six semaines (minimum 18 h/semaine) dans un milieu de travail approuvé. L’évaluation de l’étudiant est fondée sur les résultats du rapport écrit et l’évaluation du superviseur de stage. / A six-week (minimum 18 hours per week) supervised internship in canonical practice at an approved site. Assessment based on a written report as well as the evaluation of the internship supervisor.

DCA6961 VOYAGE DE FORMATION À LA CURIE ROMAINE / STUDY VISIT TO THE ROMAN CURIA (1.5cr.)
Séminaire sur la Curie romaine comprenant des échanges sur les lieux avec le personnel de congrégations romaines, tribunaux et conseils pontificaux. (Prérequis : Connaissance passive de l’anglais.) / Seminar on the Roman Curia involving on-site interchange with personnel from a variety of Roman congregations, tribunals, and pontifical councils. Prerequisite: passive knowledge of French

DCA6962 QUESTIONS SPÉCIALES RELATIVES À LA VIE CONSCARÉE / SPECIAL ISSUES IN CONSECRATED LIFE (1.5cr.)
Séminaire sur des questions juridiques et canoniques concernant la vie consacrée, en particulier dans le contexte canadien. Comprend la session d’été « Formation légale pour le leadership des instituts religieux » et la rédaction d’un travail de recherche. (Inscription limitée. Préalables : DCA 5603, ou connaissances jugées équivalentes par le doyen de la Faculté du droit canonique; connaissance passive de l’anglais.) / Seminar on legal and canonical issues concerning consecrated life, especially in the context of Canada. Includes the summer session: “Legal Education for Leadership of Religious Institutes” and the submission of a research paper. (Restricted Registration. Prerequisite: DCA 5203 or equivalent knowledge as determined by the Dean of the Faculty of Canon Law; passive knowledge of French)

DCA8101 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA8175 POWER OF GOVERNANCE (3cr.)
Certain particular or specialized questions related to the concept or to the exercise of power of governance in the Church.

DCA8176 JURISPRUDENCE (3cr.)
Matrimonial or administrative jurisprudence in specialized areas of interest.

DCA8396 DOCTORAL DIRECTED STUDIES I (3cr.)

DCA8397 DOCTORAL DIRECTED STUDIES II (3cr.)

DCA8398 DOCTORAL DIRECTED STUDIES III (3cr.)

DCA8981 LECTURE DE SOURCES CANONIQUES LATINES / READINGS IN LATIN CANONICAL SOURCES (3cr.)
Interprétation des sources canoniques dans la version originale latine. (Préalables : DCA 6921 ou une connaissance jugée équivalente par le doyen de la Faculté du droit canonique; connaissance passive de l’anglais) / Interpreting canonical sources in the original Latin. (Prerequisites: DCA 6921 or equivalent knowledge in the judgment of the Dean of the Faculty of Canon Law; passive knowledge of French)

DCA9997 PROJET DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL

DCA9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION

DCA9999 THÈSE DE DOCTORAT / PhD THESIS

**Cellular and Molecular Medicine**
The Department of Cellular and Molecular Medicine is located in the Faculty of Medicine and offers graduate programs leading to the degrees of Master of Science (MSc) and Doctor of Philosophy (PhD) in Cellular and Molecular Medicine.

The programs prepare candidates for a variety of careers in teaching and research both within and outside of academia. During training, the student will develop a critical approach to published work and to his own work. Graduates acquire an excellent knowledge of their chosen field and a general understanding of the areas related to their own particular research project. They must demonstrate research skills and credibility as professionals in their area of research.

Most research groups in the Department are part of a research centre. These centres include the Centre for Neuromuscular Disease, the Kidney Research Centre, and the Centre for Research in Biopharmaceuticals. Members of the Department are involved in three main research fields: growth and development, pharmacology, and physiology. Further information is posted on the departmental website.

The Department is a participating unit in the collaborative programs in Bioinformatics (at the master's level), in Human and Molecular Genetics (at the master's and doctoral levels), and in Pathology and Experimental Medicine (at the master's and doctoral levels).

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Cellular and Molecular Medicine and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

### Programs

#### Master of Science Cellular and Molecular Medicine

- Master of Science Cellular and Molecular Medicine Specialization in Bioinformatics
- Master of Science Cellular and Molecular Medicine Specialization in Human and Molecular Genetics
- Master of Science Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine

- Doctorate in Philosophy Cellular and Molecular Medicine
- Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Human and Molecular Genetics
- Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine

### Admission

Admission to the graduate program in cellular and molecular medicine is governed by the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Be the holder of a master's degree in science (with a background in biology, biochemistry, human kinetics, pharmacology, physiology or biopharmaceutical sciences) with a minimum average of B+ (75%) calculated in accordance with the FGPS guidelines.
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

### Transfer from the master's to PhD

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Successful completion of the seminar and all the core courses required for the master's program.
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.
The Department of Chemistry is one of the participating units in the collaborative programs in Chemical and Environmental Toxicology, biocorrosion, bioleaching, Nitrogen fixation, Genetic engineering. Kinetics of bioreactions, growth and product formation. Batch and continuous bioprocesses. Mass and heat transfer in bioreactors. Novel adsorption of single fluids and mixtures. Diffusion in porous media and rate processes in adsorbers. Adsorber dynamics: bed profiles and 

**Collaborative program in Human and Molecular Genetics at the doctoral level**

The Department of Molecular and Cellular Medicine is a participating unit in the collaborative program in Human and Molecular Genetics at the master’s and doctoral levels. This program has been established for students wishing to include an interdisciplinary component in Human and Molecular Genetics as part of their degree in Cellular and Molecular Medicine.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Human and Molecular Genetics program.

**Collaborative program in Pathology and Experimental Medicine at the doctoral level**

The Department of Molecular and Cellular Medicine is a participating unit in the collaborative program in Pathology and Experimental Medicine at the master’s and doctoral levels. This program has been established for students wishing to include an interdisciplinary component in Pathology and Experimental Medicine as part of their degree in Cellular and Molecular Medicine.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Pathology and Experimental Medicine program.

**Program Requirements**

**PhD in Cellular and Molecular Medicine**

- Successful completion of compulsory course MED8166 *Professionalism and Professional Skills*.
- Six credits of graduate courses including at least 3 credits selected from CMM courses, approved by the Department.
- Enrollment in the seminar course (CMM8225), which involves the presentation of a seminar and regular attendance at the approved departmental seminars.
- Successful completion of a comprehensive examination (CMM9998) in the form of either a defended MRC-style grant application or an oral examination on selected topics within the field.
- Presentation of the thesis research (CMM9999) in the departmental seminar series.
- Presentation and defense of a thesis (CMM9999) based on original research carried out under the direct supervision of a research faculty member in the Department.

**Collaborative program in Human and Molecular Genetics**

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

- Six credits of courses, three credits of which must be from the student’s primary program and three of which must be HMG credits.
- Enrollment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Presentation and successful defence of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Master’s candidates intending to transfer directly to the doctoral program must meet the conditions set by their primary program.

Course selection is subject to the approval of the HMG program director.

**Collaborative program in Pathology and Experimental Medicine**

The requirements of both the primary program and those of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Successful completion of the Comprehensive Examination as required by the respective primary program.
- Preparation and defense of a thesis under the supervision of a professor who is a member of the Pathology and Experimental Medicine program. The thesis must be relevant to the focus of the Pathology and Experimental Medicine program. At least one of the examiners...
must be a member of the Pathology and Experimental Medicine collaborative program.

**Duration of program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

**Residence**

All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial date of registration in the master’s program.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Medicine. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defence.

The thesis examining board may include members who are not part of the TAC.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**CMM5001 THE PATHOLOGICAL BASIS OF DISEASE (3cr.)**

Introductory Course for Non-Medical Graduate Students in the Life Sciences. This course will consist of a brief introduction to pathology describing the manifestation of disease at the macroscopic and microscopic level. This will be followed by (i) A description of various types of microscopy and methodology. (ii) Concepts in flow cytometry, tissue/cell fractionation. (iii) Histo-/cytochemistry and immunohisto-/cytochemistry. (iv) Normal cells and tissues. (v) Organs. (vi) The general pathology of cells and tissues including hypertrophy, aplasia, atrophy, hyperplasia, metaplasia, dysplasia, neoplasia, storage diseases, extracellular space pathologies, necrosis and apoptosis. Blood vessel and cardiac pathologies will be covered as well as concepts in neuropathology, organ/system specific pathologies and genetic diseases.

**CMM5105 INTRODUCTION TO CANCER BIOLOGY (3cr.)**

An introduction to the biology of cancer. Major topics in cancer biology include the following: tumor suppression/oncogenes; apoptosis in cancer; cell immortalization and senescence; genomic instability; multistep tumorigenesis/inflammation in cancer; biology of angiogenesis; rational therapies.

**CMM5111 COMPUTATIONAL CELL BIOLOGY (3cr.)**

Emphasis is on providing students with the background knowledge and the tools needed to develop and analyze models of cellular processes. Topics include modelling enzyme kinetics, signal transduction pathways, and gene regulatory networks, using differential equations, nonlinear dynamics, and stochastic processes. Prerequisite: permission of program director and course coordinator.

**CMM5302 COMPREHENSIVE PHARMACOLOGY I (3cr.)**

Extensive coverage of pharmacodynamics, pharmacokinetics, and the pharmacology of the autonomic and central nervous system. Students cannot obtain credit for both CMM 5301 and CMM 5302.

**CMM5303 COMPREHENSIVE PHARMACOLOGY II (3cr.)**

Extensive coverage of the pharmacology of antibiotic and anti-inflammatory drugs, of chemotherapeutic agents, and of the cardiovascular and gastro-intestinal systems. Students cannot obtain credit for both CMM 5301 and CMM 5303.

**CMM5304 INTRODUCTION TO DEVELOPMENTAL BIOLOGY (3cr.)**

Concepts in development and signalling pathways during development including formation of the germ layers; establishment of the body axis and principles of segmentation; patterning and homeobox genes; neurogenesis; axonal and neuronal guidance; stem cell concepts; germ cells; animal models in developmental biology.

**CMM5311 PHYSIOLOGY AND PATHOPHYSIOLOGY OF ENERGY METABOLISM AND MUSCLE FUNCTIONS (3cr.)**

Advanced comprehensive training in mammalian and human physiology with emphasis on pathophysiology. Topics include: neural and endocrine control of the hypothalamus-hypophysis axis; role of pancreas, adipose tissue and skeletal muscle in carbohydrate and lipid metabolism; cellular and molecular aspects of muscle contraction and fatigue in cardiac and skeletal muscle.

**CMM5313 PHYSIOLOGY AND PATHOPHYSIOLOGY OF THE REPRODUCTIVE, RENAL AND GASTROINTESTINAL SYSTEMS (3cr.)**
Advanced comprehensive training in mammalian and human physiology with emphasis on pathophysiology. Topics covered include reproductive physiology, molecular and bulk transport processes in the renal system, enteric control of the gastrointestinal tract.

**CMM5315 CELLULAR AND MOLECULAR BASIS OF CARDIOVASCULAR FUNCTION/DYSFUNCTION** (3cr.)
Mechanism of failing heart and cardiovascular system, its associated functions and associated conditions. Therapies for restoring function. Topics include: regulation of heart development, cell signaling, cellular and molecular mechanisms of atherosclerosis and heart disease, hormonal regulation, hypertension, bioenergetics, cardiovascular genomics and genetics, cell therapy, and regenerative medicine.

**CMM5326 EXPERIMENTAL PREPARATIONS AND ANIMAL MODELS** (3cr.)
Applied and theoretical course intended to give the potential researcher basic surgical skills. Lectures followed by demonstrations and/or practical exercises.

**CMM5341 STEM CELLS** (3cr.)
Topics in stem cell biology which will include an in-depth look at the properties of embryonic and adult stem cell populations, tissue-specific stem cells (muscle, skin, neural, etc), differentiation and reprogramming, the stem cell niche, induced pluripotent stem cells, and therapeutic advances using stem cell therapy.

**CMM5360 Imaging in Cell Biology** (3cr.)
Microscopy, biological imaging, and image generation. Overviews of common transmitted light, electron microscopic and epifluorescent techniques. Discussion of enhanced fluorescence microscopy and live cell imaging techniques, including image acquisition, processing and analysis with focus on quantitative and ethical issues.

**CMM5372 CELL SIGNALLING AND HORMONE ACTION** (3cr.)
Topics will include the major cell signaling pathways and the action of steroid and non-steroid hormones. These signaling pathways will be discussed in the context of biological function and pharmacology.

**CMM7301 DIRECTED STUDIES** (3cr.)
A program of study designed for a given student according to the student's educational requirements.

**CMM7999 THÈSE DE MAÎTRISE / MSc THESIS**

**CMM8103 EPITHELIAL CELL POLARITY** (3cr.)
Cell polarity with emphasis on tight junctions and Claudins (tight junction molecules). Topics include: the molecular basis of cell polarity and permeability barrier during development, organogenesis and disease including inflammatory disease and cancer.

**CMM8105 ADVANCED TOPICS IN CANCER BIOLOGY** (3cr.)
Advanced study of recent developments in the field of cancer biology with emphasis on cellular and molecular aspects. Specific topics to be covered include: angiogenesis, apoptosis, cancer genetics, cell signaling, genetic instability, oncogenes and tumour suppressors.

**CMM8300 SPECIAL TOPICS IN REPRODUCTIVE AND DEVELOPMENTAL BIOLOGY** (3cr.)
In-depth study of current topics in reproductive and developmental biology, with emphasis on state-of-the-art molecular and cell biology techniques as well as their applications to reproductive diseases. Topics may include assisted reproductive technologies, embryonic stem cells, contraception, endocrine disruptors, reproductive toxicology, and transgenics.

**CMM8310 CURRENT TOPICS IN RNA MOLECULAR BIOLOGY** (3cr.)
Properties, mechanisms associated with regulation and the function of RNAs and Ribonucleoprotein (RNP) as well as RNA organisms. Current knowledge on RNA expression (synthesis, processing, transport and localization), the structure-function relationship and molecular mechanisms associated with RNAs and RNA genomes, RNA in evolution and in the origin of life, and RNA as therapeutic agents. Prerequisites: BCH/BIO 3570-3170 or equivalent with the permission of the program director. Exclusion: BCH 8310.

**CMM8311 CURRENT TOPICS IN TRANSCRIPTIONAL REGULATION** (3cr.)
Topics will include chromatin structure and its impact on gene expression, protein-DNA interactions, the assembly of transcriptional complexes, and the control of gene expression in mammalian systems.

**CMM8324 SEMINARS I**
Compulsory for one year for all students enrolled in the master's program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series.

**CMM8325 SEMINARS II**
Compulsory for all students enrolled in the doctorate program. Presentation of two seminars or one seminar and one poster required during the year as well as regular attendance at the departmental seminar series.

**CMM8340 NEUROMUSCULAR FUNCTION AND DYSFUNCTION** (3cr.)
Topics to be covered include factors controlling muscle - and synapse-specific gene expression, regulation of myogenesis and muscle cell growth, formation of the neuromuscular junction, motor neuron - muscle interactions, the role of the cytoskeleton in organization of post-synaptic domains, functional role of ion channels in muscle, molecular genetics of neuromuscular disease. Prerequisite: CMM5340.

**CMM8341 CELL STRESS** (3cr.)
Topics will include cellular responses to cell stress and will include hypoxia, oxidative stress, ER stress, autophagy, apoptosis and aging.
CMM8345 SPECIAL TOPICS IN GASTROENTEROLOGY (3cr.)
Lectures, tutorials and seminar-discussion sessions, designed to provide advanced training in gastrointestinal function. Emphasis on pathophysiological mechanisms.

CMM8350 ION CHANNELS: CELLULAR AND MOLECULAR ASPECTS OF MEMBRANE FUNCTIONS (3cr.)
A study of the diversity, molecular structure, structure-function relationship, electrophysiological characteristics and physiological roles of different ion channels in excitable and non-excitatory cells. The channels that are studied include the sodium, potassium, calcium and chloride channels.

CMM8355 RENAL PHYSIOLOGY (3cr.)
Lecture and seminar course with emphasis on electrolyte transport. Topics to include: detailed structure and function of nephron segments. Localization of primary and secondary active transport carriers, theories of autoregulation, hormone action in the kidney, drug action in the kidney, and regulation of renal vascular resistance.

CMM9908 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAM (PhD)

CMM9999 THÎSE DE DOCTORAT / PhD THESIS

HMG8106 CLINICAL CYTOGENOMICS (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

MED8106 PROFESSIONALISM AND PROFESSIONAL SKILLS
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master's or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

Chemical and Environmental Toxicology (Collaborative)

The Institute

The Ottawa-Carleton Institute combines the research strength of the University of Ottawa and Carleton University. The Institute offers graduate programs leading to the master's (MSc) and doctoral (PhD) degrees in several fields (biology, chemistry, Earth sciences, etc.).

General information

Toxicology is the study of effects of toxic substances on living systems. These toxic substances can either be organic or inorganic, synthetic or natural materials. Environmental toxicology further extends to aspects of chemical transport, fate, persistence and biological accumulation of toxic substances and their effects at the population and community levels. While individual researchers usually specialize in a particular area, toxicologists today must be able to appreciate significant research in other fields and therefore require an understanding of the basic principles of other disciplines. To meet this challenge the University of Ottawa and Carleton University offer a joint collaborative program leading to a master of science or a PhD degree with specialization in chemical and environmental toxicology.

This Ottawa-Carleton collaborative program in Chemical and Environmental Toxicology is intended to augment the research and training available to students through the individual supporting institutes.

The program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Participating units

The primary participating units are:

- The Ottawa-Carleton Institute of Biology (OCIB), the joint graduate program of the departments of Biology at the University of Ottawa and Carleton University.
- The Ottawa-Carleton Institute of Chemistry (OCIC), the joint graduate program of the departments of Chemistry at the University of
The Department may impose additional requirements depending on the student's academic background.

Programs

Master of Science Biology Specialization in Chemical and Environmental Toxicology
Master of Science Chemistry Specialization in Chemical and Environmental Toxicology
Master of Science Earth Sciences Specialization in Chemical and Environmental Toxicology
Doctorate in Philosophy Biology Specialization in Chemical and Environmental Toxicology
Doctorate in Philosophy Chemistry Specialization in Chemical and Environmental Toxicology

Admission

Admission to the collaborative program in chemical and environmental toxicology is governed by the general regulations of the Ottawa-Carleton Institute and by the general regulations of the FGPS.

Candidates must indicate in their admission form that they wish to be accepted in the collaborative program.

All applicants must be able to understand, speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the "Admission" section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Applications are evaluated based on the following criteria:

- Be admitted in one of the programs participating in the collaborative program of the Institute.
- Complete a relevant introductory course in toxicology, either:
  (i) prior to admission to the collaborative program in chemical and environmental toxicology; Or
  (ii) While registered in the program by taking one of the two introductory courses (CHM8156 or BIO9104).
- Provide a confidential letter of recommendation from a professor who is willing and available to act as thesis supervisor.
- Be sponsored into the collaborative program by a faculty member, normally the thesis supervisor, who must be appointed, cross-appointed or stand as an adjunct at one or more of the participating units.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Program Requirements

The following requirements must be met:

- 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
- Enrollment in the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defense of a thesis in toxicology based on an original research carried out under the supervision of a faculty member participating in the chemical and environmental toxicology collaborative program.

The Department may require students to take additional courses depending on their backgrounds.

NOTE: The student must fulfill both the requirements of the primary degree program, and the requirements of the collaborative program. The credits completed for the specialization count also towards the primary degree. Additional credits are not required. If the seminar course was completed for the master's specialization, the second requirement above does not apply.

Duration of the Program
Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Minimum Standards**

The passing grade in all courses is B. Students who fail two courses, the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

**Residence**

All students must complete a minimum of six sessions of full-time registration at the beginning of the program. All requests for non-consecutive full-time study sessions will need to be approved by the FGPS.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The committee's membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors who are available to offer the student support and direction during the thesis work. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Science. The TAC is responsible for guiding the student throughout the program.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**TOX8156 PRINCIPLES OF TOXICOLOGY (3cr.)**
The basic theorems of toxicology with examples of current research problems. The concepts of exposure, hazard and risk assessment will be defined and illustrated with experimental material from some of the more dynamic areas of modern research.

**TOX8157 CHEMICAL TOXICOLOGY (3cr.)**
Advanced course in chemical toxicology dealing with both chemical hazards and exposure. Overview of empirical data relating to the toxicity of various classes of chemicals for test organisms, followed by study of toxicity at the cellular level, including studies of interactions between toxic substances and enzymatic systems. Data applicable to the interpretation and monitoring of WHMIS health regulations. Initial events in enzyme induction and mutagenesis. Study of predictive capabilities in the areas of structure-activity relationships and mechanisms of enzyme induction, followed by assessment of mechanisms of exposure to toxic chemicals.

**TOX9104 ECOTOXICOLOGY (3cr.)**
Selected topics and advances in ecotoxicology with emphasis on the biological effects of contaminants. The potential for biotic perturbation resulting from chronic and acute exposure of ecosystems to selected toxicants will be covered along with the methods pesticide, herbicide and pollutant residue analysis and the concept of bound residues.

**TOX9105 SEMINAR IN TOXICOLOGY (3cr.)**
A one-session course in seminar format highlighting current topics in toxicology. The student will present a seminar and submit a report on the seminar topic. Student, faculty and invited seminar speakers.

**TOX9106 (BIOL 6406) GENETIC TOXICOLOGY (3cr.)**
Topics in mutagenesis and DNA repair, including spontaneous and induced mutagenesis, genetic toxicology testing, the genetics and biochemistry of replication, DNA repair and recombination, and the role of mutagens in the development of genetic diseases and cancer.

**BIO5103 (BIOL 5003) ADVANCED BIOCHEMISTRY (3cr.)**
Advanced topics in biochemistry: the chemical structure and function of biological macromolecules, biochemical thermodynamics, metabolism, photosynthesis, lipids and membranes.

**BIO5305 (BIOL 5407) BIOSTATISTICS I (3cr.)**
Application of statistical analyses to biological data. Topics include ANOVA, regression, GLMs, and may include loglinear models, logistic regression, general additive models, mixed models, bootstrap and permutation tests. Prerequisites: Graduate standing, courses in elementary ecology and statistics and permission of the department.

**BIO5306 (BIOL 5409) MODELLING FOR BIOLOGISTS (3cr.)**
Use and limitations of mathematical and simulation modelling approaches for the study of biological phenomena.
**BIO8109 (BIOL 6001) ADVANCED MOLECULAR BIOLOGY (3cr.)**
In-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins.

**BIO8116 (BIOL 6002) ADVANCES IN PLANT MOLECULAR BIOLOGY (3cr.)**
Use of molecular genetics in general plant biology and the contribution of plant genomics to our understanding of plant metabolism, plant development, and plant interactions with the environment at the molecular, genome, and cellular levels. Prerequisite: BIO8109/BIOL 601F1 and this course normally will be offered together in the same year but only in alternate years.

**BIO8162 (BIOL 5402) ADVANCED ENDOCRINOLOGY (3cr.)**
Major topics in comparative endocrinology: understanding the structure, function and evolution of vertebrate endocrine systems, including endocrine disruption. Prerequisite: An undergraduate Endocrinology course (BIO4127 or equivalent).

**BIO8306 (BIOL 5508) ADVANCED TOPICS IN ECOLOGY (3cr.)**
Recent developments in population, community and/or ecosystem ecology.

**BIO8307 (BIOL 5509) ADVANCED TOPICS IN ECOLOGY II (3cr.)**
Lectures, seminars and discussions on current literature on experimental approaches, concepts and findings in population and community ecology, ecosystem and landscape ecology and biostatistics. Course content to complement that of BIO 8306/BIOL 5508; not necessary to take the two in a particular order.

**BIO8365 (BIOL 5802) ADVANCED BEHAVIOURAL ECOLOGY (3cr.)**
Recent advances in behavioural ecology including topics such as the evolution of tactics and strategies of group living, foraging, anti-predation, resource use and defence, cooperation, reproduction, and parental care.

**CHM8126 (CHEM 5303) BIOORGANIC CHEMISTRY (3cr.)**
Overview of recent developments in the mechanistic understanding of selected enzyme-catalyzed reactions. Topics include Cytochrome P450, methane monoxygenase, biotin and lipoic acid biosynthesis, methyl transfer, Vitamin B12, lipoxygenase, prostaglandin synthase; etc. Emphasis will be placed on biotransformations which are relatively poorly understood from a mechanistic point of view.

**CHM8322 (CHEM 5203) TOPICS IN COORDINATION CHEMISTRY (1.5cr.)**
Brief introduction to basic concepts in coordination chemistry. Topics to include the following: carbon dioxide fixation, dinitrogen fixation, activation, olefin metathesis, nature of the M-M bond.

**CHM8327 (CHEM 5005) PHYSICAL ORGANIC CHEMISTRY (1.5cr.)**
Hammet functions, transition state energies, stereochemistry of organic compounds, and mechanisms of organic reactions and their determination.

**CHM8329 (CHEM 5402) MEDICINAL CHEMISTRY (1.5cr.)**
Preparation of drugs, their mode of action, their use in treating of disease. Evolution of medicine due to chemistry. Discussion of metabolic pathways and their modification to control and/or circumvent disease.

**CHM8331 (CHEM 5300) PHYSICAL CHEMISTRY OF BIOLOGICAL MACROMOLECULES (1.5cr.)**
Focus on how the application of physical techniques normally applied to small molecules, can be used to study macromolecular structure and function of DNA and proteins. Examples of applications to include: kinetics, electrochemistry, equilibria phenomena (thermodynamics).

**CHM8332 (CHEM 5301) ELECTROCHEMICAL PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)**
Description of theory accounting for the generation of membrane potentials. Application to the generation of nerve impulses.

**CHM8333 (CHEM 5302) SURFACE PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)**
Description of theory of surface tension phenomena in aqueous systems. Discussion of effects of cell and macromolecular structures in biological systems.

**CHM8348 (CHEM 5500) ANALYTICAL INSTRUMENTATION (1.5cr.)**
Principles of modern electronics, devices and instruments. Measurement of photonic and electrochemical signals. Conditioning of signals for feedback control and microcomputer interfacing. Computational data analysis techniques such as simplex optimization. Applications in chemical analysis include amperometric detector for capillary electrophoresis, and surface plasmon resonance immunosensor.

**CHM8349 (CHEM 5304) FREE RADICALS IN CHEMISTRY AND BIOLOGY (1.5cr.)**
Oxidative stress induced by free radicals plays a significant role in most fatal and chronic diseases. The chemistry of bio-radicals will be described and related to pathobiological processes such as lipid peroxidation and atherosclerosis, protein nitration and cross linking, and DNA scission.

**CHM8352 (CHEM 5501) ANALYTICAL APPROACH TO CHEMICAL PROBLEMS (1.5cr.)**
Case study of analytical approach to various chemical problems in agricultural, biochemical, environmental, food processing, industrial, pharmaceutical and material sciences. Analytical methods include capillary electrophoresis, chemiluminescence, Fourier transform infrared spectroscopy, inductively coupled plasma emission spectroscopy, mass spectrometry, biochemical sensors, and fiber optics for remote sensing.

**CHM8353 (CHEM 5502) TRACE AND ULTRATRACE ANALYTICAL CHEMISTRY (3cr.)**
Criteria for evaluation and selection of analytical techniques and methods. Electroanalytical techniques. Simultaneous and sequential multielement determination. Atomic absorption, atomic emission and atomic fluorescence spectrometry, using optical spectrometric and mass-
spectrometric determination. Applications of these techniques at trace and ultratrace levels in complex matrices.

**CHM8354 (CHEM 5503) CHEMICAL SPECIATION IN THE NATURAL ENVIRONMENT (3cr.)**
Evaluation of analytical techniques and their capability for quantitative determination of chemical species (as opposed to total element-determination) in the natural environment. Electrochemical techniques for determination of chemical speciation of nutrient and toxicant elements present in the natural environment.

**GEOG136 (ERTH 5306) PALEOBIOLOGY (3cr.)**
Selected topics in paleobiology of micro- and macro-invertebrates and vertebrates. Topics include extinctions, micro- and macro-evolutionary processes, long-term trends and cycles in the Phanerozoic, and functional morphology, as well as application of invertebrates to biostratigraphy, paleoceanography and paleolimnology.

**GEOG141 (GEOL 5401) PERMAFROST HYDROLOGY AND INVESTIGATIVE METHODS**
An examination of groundwater flow in permafrost regions. The importance of groundwater in the formation of various types of ground ice, and the effect of groundwater flow on permafrost distribution.

**GEOG142 (GEOL 5402) ENVIRONMENTAL GEOSCIENCE (3cr.)**
A study-seminar course in which students will examine, in depth, certain environmental problems, including geological hazards, mineral and energy consumption and environmental degradation. The relation between development and the environment will be considered. Students will prepare a report and present a seminar on a subject of their choice, and will participate in a research project centered in the Ottawa area.

**GEOG143 (GEOL 5403) ENVIRONMENTAL ISOTOPES AND GROUNDWATER GEOCHEMISTRY (3cr.)**
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radiocarbon, and exotic radioisotopes (e.g. 36Cl, 39Ar, 85Kr). Low temperature aqueous geochemistry and mineral solubility with emphasis on the carbonate system. Some applications to paleoclimatology will be discussed. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO 4342) or equivalent.

**GEOG147 (ERTH 5407) GEOCHEMISTRY OF NATURAL WATERS (3cr.)**
Aqueous speciation, solubility of metals, minerals and gas, reaction kinetics and equilibria. Chemistry and dynamics of groundwaters and hydrothermal fluids.

**GEOG153 (ERTH 5503) COMPUTER TECHNIQUES IN THE EARTH SCIENCES (3cr.)**
A practical course in the application of computer techniques in the acquisition and interpretation of geoscientific data. Topics will be selected from the following: remote sensing and geographic information systems; geostatistical analysis techniques; analysis and modelling of geoscientific data. Prerequisite: Permission of the Institute.

**GEOG163 (ERTH 5603) STABLE ISOTOPE GEOCHEMISTRY (3cr.)**

**Chemical Engineering**

The Department of Chemical and Biological Engineering located in the Faculty of Engineering offers graduate programs leading to the degrees of Master of Applied Science (MASC), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Chemical Engineering.

The Department is one of the participating units in the collaborative program in Science, Society and Policy (master's level only).

The main objective of the master's programs is to refine the skills and research expertise of the students by expanding their specialized knowledge of chemical engineering primarily achieved through course work, research seminars, and technical training.

The PhD program prepares candidates for a career in teaching, research and/or development. Graduates are expected to have acquired autonomy in conducting research, preparing scholarly publications, and promoting chemical engineering.

Members of the Department are involved in four main research fields: materials development; process engineering; clean technologies and renewable energy; and, biomedical engineering. Further information is posted on the departmental website.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**
Master of Applied Science Chemical Engineering
Master of Applied Science Chemical Engineering Specialization in Science, Society and Policy
Master of Engineering Chemical Engineering
Doctorate in Philosophy Chemical Engineering

Admission

Admission to the graduate program in Chemical Engineering is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

To be considered for admission, applicants must:

- Hold a master's degree in chemical engineering (with thesis or equivalent in terms of scholarly publications) with a minimum average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.
- Be proficient (understand, speak and write) in English. Most of the courses are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The Department may require students to take additional courses depending on their backgrounds preparation.

Transfer from master’s to PhD

Students registered in the MAsc program may transfer to the PhD program, without having to write a master's thesis, provided they meet the following conditions:

- Have been registered full-time in the MAsc program for at least one year;
- Completed four graduate courses (12 credits) with an average of at least 80% (A-);
- Written recommendation by the supervisor and by the graduate studies committee;
- Successfully completed of a minimum of 9 credits in chemical engineering.

The transfer must take place within sixteen months of initial registration in the master’s.

Program Requirements

The requirements of this program are as follows:

- A minimum of 10 course credits (including CHG 8301S Seminar II) above the level of the master of applied science. All courses, except with permission of the Department, must be in chemical engineering.
- A minimum of nine sessions of full-time research from the baccalaureate of applied science and six sessions of full-time research from the master of applied science.
- An oral or written comprehensive examination must be done within 18 months of registration to be allowed to proceed further with research.
- A thesis incorporating the results of original research.
- A final oral examination on the thesis.

Transfer from master’s to PhD

The transfer must take place within sixteen months of initial registration in the master’s. Following the transfer, all of the normal requirements of the doctoral program must be met: a minimum number of 21 credits of graduate coursework (master’s 12 credits and PhD 9 credits); the seminar CHG8102; a comprehensive exam successfully completed within twelve months of transfer; and a thesis.

Duration of program

Students are expected to fulfill all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students fast-tracked from the master’s to the doctorate.
**Residence**

Students must register full-time for a minimum of six sessions, normally at the beginning of the program. In the case of transfer to the PhD, the residency period is nine full-time sessions from the time of initial registration in the program.

**Minimum standards**

The passing grade in all courses is B. Students who fail 6 credits, the thesis proposal, the comprehensive exam, the thesis, or whose progress is deemed unsatisfactory must withdraw from the program.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Engineering.

**Courses**

Not all of the following courses are necessarily given each year. Attendance at courses is compulsory.

**CHG6000 RAPPORT EN GÉNIE CHIMIQUE / CHEMICAL ENGINEERING REPORT** (6cr.)

**CHG7999 THÈSE DE M.Sc.A. / MA.Sc. THESIS**

**CHG8101 SEMINAR I**

**CHG8102 SEMINAR II**

**CHG8110 FLUID MECHANICS** (3cr.)
Stream function, circulation and vorticity, form drag and drag coefficients, equations of motion, boundary layer theory, modern theory of turbulent motion, flow in porous media, non-Newtonian flow.

**CHG8115 HEAT TRANSFER I** (3cr.)
The general law of heat conduction. Steady and unsteady heat conduction in solids with or without internal heat sources. Radiant heat transmission.

**CHG8116 ADVANCED TRANSPORT PHENOMENA** (3cr.)
Advanced study of momentum, heat and mass transfer relevant to chemical engineering and also to areas such as environmental engineering, medicine and other scientific disciplines. Review of the analogy between mass, momentum and thermal transport and, in particular, of the physical principles and mathematical foundations required for the analysis of fluid flow, heat transfer and mass transfer, and of the advanced methods for the analysis of transport problems. Main emphasis on formulation of a given physical problem in terms of appropriate conservation equations, and obtaining an understanding of the associated physical phenomena. Use of many chemical engineering applications to illustrate the various principles.

**CHG8120 RHEOLOGY AND POLYMER PROCESSING** (3cr.)

**CHG8123 CHEMICAL ENGINEERING THERMODYNAMICS I** (3cr.)

**CHG8132 (ENVE 5105) ADSORPTION SEPARATION PROCESSES** (3cr.)

**CHG8141 SPECIAL DIRECTED STUDIES I** (3cr.)

**CHG8143 SPECIAL DIRECTED STUDIES II** (3cr.)
CHG8145 SPECIAL DIRECTED STUDIES III (3cr.)

CHG8153 (ENVJ5500) STATISTICAL MODELLING AND CONTROL OF DYNAMIC PROCESSES (3cr.)

CHG8157 STRATEGIES FOR ENGINEERING PROCESS ANALYSIS (3cr.)
Statistical experimental design and analysis techniques for industrial and laboratory investigations are presented. Topics include: the nature and analysis of process variation, comparisons of two or more processes, empirical modelling of processes, applications of factorial and fractional factorial designs, mixture designs, response surface methodologies and empirical optimization techniques. Prerequisite: MAT 2377 or equivalent, or permission of the instructor.

CHG8158 (ENVJ5504) POROUS MEDIA (3cr.)

CHG8161 CHEMICAL REACTION ENGINEERING (3cr.)
Kinetics of chemical reactions and its application to chemical engineering problems. Rate expressions and heterogeneous kinetics. Preparation and evaluation of catalyst activity. Promoters and poisons. Physical properties and transfer of mass and energy in porous catalysts. Interpretation of kinetic data and determination of mechanisms of catalyzed reactions.

CHG8175 MATERIAL TRANSPORT (3cr.)

CHG8181 (ENVJ5501) BIOCHEMICAL ENGINEERING (3cr.)

CHG8186 (ENVJ5506) MODELLING OF STEADY-STATE PROCESSES (3cr.)
A comprehensive examination of techniques for building and analyzing process models is made. Topics include: linear least squares estimation, non-linear least squares estimation, multiresponse parameter estimation, error in variables estimation, hetroesedasticity, design of experiments for precise parameter estimation and model discrimination.

CHG8187 INTRODUCTION TO POLYMER REACTION ENGINEERING (3cr.)

CHG8188 POLYMER PROPERTIES AND CHARACTERIZATION (3cr.)
Polymer properties are described and discussed in the context of their nature, source and means of measurement. Chemical and microstructural properties; physical states and transitions; thermal properties; mechanical properties and viscoelasticity models; degradation and stability; surface, electrical and optical properties, polymer additives; structure-property relationships.

CHG8189 CHEMICAL ENGINEERING ANALYSIS (3cr.)
Treatment and interpretation of experimental data. Formulation of ordinary and partial differential equations for the solution of problems arising in chemical engineering. Emphasis will be on problems requiring numerical techniques with examples taken from fluid flow, heat transfer and mass transfer. Selection of boundary conditions.

CHG8191 SELECTED TOPICS CHEM ENGINEER (3cr.)
Discussion of recent progress in chemical engineering.

CHG8192 (ENVJ5502) MEMBRANE APPLICATIONS IN ENVIRONMENTAL ENGINEERING (3cr.)
Course emphasizing the applications of membrane separation processes in the resolution of various environmental problems. Applications of reverse osmosis, ultrafiltration and pervaporation to the treatment of industrial waste waters. Applications of membrane gas and vapor permeation to the removal of pollutants from air. Discussion of fundamentals underlying each separation process.

CHG8194 (ENVJ5504) MEMBRANE SEPARATION PROCESSES (3cr.)
Advanced topics of membrane separations including reverse osmosis, ultrafiltration, gas separation, non-aqueous liquid separation, and membrane applications in biotechnology. The course involves problem solving in membrane transport, membrane design, and membrane process design.

CHG8195 (ENVJ5505) ADVANCED NUMERICAL METHODS IN TRANSPORT PHENOMENA (3cr.)
Survey course of numerical methods for solving linear and non-linear ordinary and partial differential equations. Techniques reviewed include Runge-Kutta and predictor-corrector methods, shooting techniques, control volume discretization methods and finite elements. Example
problems from the field of transport phenomena.

CHG8196 (ENV1507) INTERFACIAL PHENOMENA IN ENGINEERING (3cr.)
Interfacial tension and interfacial free energy; contact angles; spreading of liquids; wetting of surfaces; experimental techniques. Interfacial tension of mixtures; Gibbs equation; absorbed and insoluble monolayers; properties of monolayers and films. Electrical phenomena at interfaces; the electrical double layer; zeta-potential; electrokinetic phenomena (electrophoresis, electro-osmosis, streaming potential); surface conductance. Dispersed systems; formation and practical uses of emulsions; spontaneous emulsification; flocculation.

CHG8198 (ENV0503) REVERSE OSMOSIS (3cr.)

CHG9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)

CHG9999 THÈSE DE DOCTORAT / DOCTORAL THESIS

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Chemistry

Ottawa-Carleton Joint Program

Established in 1981, the Ottawa-Carleton Chemistry Institute (OCCI) combines the research strengths of the University of Ottawa and Carleton University. The institute offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in Chemistry.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in the following research fields: inorganic chemistry; organic chemistry; theoretical chemistry; biological chemistry; analytical chemistry; and, physical chemistry. Additional information is posted in the departmental website.

The Institute is a participating unit in the collaborative program in chemical and environmental toxicology at the master’s and doctoral levels.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

Programs

Master of Science Chemistry

Master of Science Chemistry Specialization in Chemical and Environmental Toxicology

Master of Science Chemistry Specialization in Science, Society and Policy

Doctorate in Philosophy Chemistry
Admission

Admission to the graduate program in Chemistry is governed by the general regulations of the Ottawa-Carleton Institute for Chemistry (OCIC) and by the general regulations of the FGPS.

To be considered, applicants must:

- Be the holder of a master's degree in Chemistry (or equivalent) with a minimum admission average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Transfer from master's to PhD

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Completion of four graduate courses (6 credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met.

Collaborative programs

The Department of Chemistry is one of the participating units in the collaborative programs in Chemical and Environmental Toxicology (master’s and PhD levels) and in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

Program Requirements

The following requirements must be met:

- 6 credits of graduate courses at the 5000 level or above in chemistry or in related disciplines approved by the Department of Chemistry.
- CHM8257 Seminar, which involves the presentation of a seminar and the regular attendance at the departmental seminar series.
- CHM9998 Comprehensive Exam, which must be completed within twelve months of initial registration in the program.
- CHM8958 Thesis Proposal, which must be completed before the end of the sixth session of registration in the program.
- CHM9999 PhD Thesis. Presentation and successful defence of a thesis based on original research carried out under the direct supervision of a faculty member of the Department.

The Department may impose additional requirements depending on the student's academic background.

Collaborative Program in Chemical and Environmental Toxicology

The student must fulfill both the requirements of the primary degree program, and the requirements of the collaborative program. The credits completed for the specialization count also towards the primary degree. If the seminar course was completed for the master's specialization, the second requirement below does not apply.

The following requirements must be met:

- 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
- Enrollment in the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
- Presentation and defense of a thesis in toxicology based on an original research carried out under the supervision of a faculty member.
participating in the chemical and environmental toxicology collaborative program.

The Department may require students to take additional courses depending on their backgrounds.

Transfer from Master’s to PhD Program

Following the transfer, all of the requirements of the doctoral program must be met: a total number of twelve credits of graduate coursework (MSc+PhD); the seminar (CHM8257); the comprehensive examination (CHM9998); the thesis proposal (CHM8958) and the thesis (CHM9999).

Duration of the Program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

Residence

Students must register full-time for a minimum of six sessions. In the case of transfer to the PhD from the master’s, the residency period is nine full-time sessions from the time of initial registration.

Minimum Standards

The passing grade in all courses is 70% (B). Students who fail two courses, the thesis proposal, the comprehensive exam, or whose research progress is deemed unsatisfactory are required to withdraw from the program.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

CHM7999 (CHEM 5909) THÈSE DE MAÎTRISE / MSc THESIS

CHM8256 (CHEM 5801) SEMINAR I

CHM8257 (CHEM 5802) SEMINAR II

CHM8301 (CHEM 5001) ANALYTICAL MASS SPECTROMETRY (1.5cr.)
The principles of ion sources and mass spectrometers will be described, together with their applications to problems in chemistry and biochemistry. Introduction to the chemistry gaseous ions. Ion optics. Special emphasis on interpreting mass spectra.

CHM8302 (CHEM 5902) ADVANCED TOPICS IN INORGANIC CHEMISTRY (1.5cr.)
Topics of current interest in inorganic chemistry. Variable content from year to year.

CHM8303 (CHEM 5204) DESCRIPTIVE ORGANO METALLIC CHEMISTRY (1.5cr.)
Review of basic concepts of M-C bonds and of the preparation and reactivity of transition and non-transition metal organometallic species. Brief discussion of the most important catalytic processes (e.g. Ziegler-Natta, Fisher-Tropsch, catalytic hydrogenation and hydroformilation).

CHM8304 (CHEM 5901) ADVANCED TOPICS IN ORGANIC CHEMISTRY (1.5cr.)
Topics of current interest in organic chemistry. Variable content from year to year.

CHM8305 (CHEM 5400) SYNTHESIS METHODS (1.5cr.)
Discussion of modern reactions and reagents and their development. Modern methods such as Evans enolates, catalytic processes, organometallic methods. Combination of methods for the preparation of complex molecules and building blocks.

CHM8307 (CHEM 5205) IONS AND IONIC PROCESSES IN CHEMISTRY (1.5cr.)
Properties of water, hydration of ions, ionic interaction, colloidal and polymeric electrolytes. Ionization processes in solution.

CHM8308 (CHEM 5002) MULTINUCLEAR MAGNETIC RESONANCE SPECTROSCOPY (1.5cr.)

CHM8309 (CHEM 5903) ADVANCED TOPICS IN PHYSICAL / THEORETICAL CHEMISTRY (1.5cr.)
Topics of current interest in physical/theoretical chemistry. Variable content from year to year.
CHM8310 (CHEM 5007) INTRODUCTION TO PHOTOCHEMISTRY (1.5cr.)
Basic principles of photochemistry including selection rules, energy transfer processes and the properties of excited state reactions. Lasers and their applications to measurements of the dynamics of elementary reactions.

CHM8311 (CHEM 5008) ADVANCED AND APPLIED PHOTOCHEMISTRY (1.5cr.)

CHM8312 (CHEM 5507) APPLICATIONS OF THERMOCHEMISTRY TO CHEMICAL PROBLEMS (1.5cr.)
Measurement of and interrelationship between molecular, radical and ionic enthalpies and their relevance to bond strengths and chemical reactivity.

CHM8313 (CHEM 5508) ION STRUCTURES IN ORGANIC CHEMISTRY (1.5cr.)
Examination of the significance of structure on the generation and behaviour of organic cations and anions in gaseous and condensed phases.

CHM8314 (CHEM 5504) SURFACE CHEMISTRY ASPECTS OF ELECTROCHEMICAL SCIENCE (1.5cr.)

CHM8315 (CHEM 5505) ELECTROCHEMICAL SURFACE SCIENCE (1.5cr.)
Introduction to advanced in-situ techniques in electrochemistry: Scanning probe microscopy, Raman, infrared and laser spectroscopy. Prerequisite: CHM 8314, 8714.

CHM8316 (CHEM 5506) SURFACE CHEMISTRY (1.5cr.)
Adsorption phenomena and isotherms, surface areas of solids. Modern techniques in surface chemistry and surface science such as electron diffraction, Auger electron spectroscopy, photoelectron spectroscopy, electron energy loss spectroscopy, infrared and Raman spectroscopy. Current new techniques.

CHM8317 (CHEM 5104) IONIC REACTION INTERMEDIATES (1.5cr.)
Generation of ionic reaction intermediates in the condensed phase and their characterization by experimental techniques. Includes carbocations, zwitterionic intermediates.

CHM8318 (CHEM 5103) FREE RADICALS (1.5cr.)
Photochemical generation of free radical reaction intermediates in the condensed phase. Techniques to be explored include laser flash photolysis, pulse radiolysis, esr, CIDNP and matrix isolation.

CHM8319 (CHEM 5403) TOTAL SYNTHESSES (1.5cr.)
Discussion on philosophy and strategy development for complex syntheses, along with modern reagents and reactions that have shortened classical routes and lead to more efficient and atom economy.

CHM8320 (CHEM 5405) PERICYCLIC AND STEREOELECTRONIC EFFECTS (1.5cr.)
Pericyclic reactions, facial selectivity, stereoelectronic effects in carbohydrates and related acetal cleavage. Applications to complex synthetic problems.

CHM8321 (CHEM 5201) SOLID STATE CHEMISTRY (1.5cr.)
Thermodynamic and kinetic aspects of solid state synthesis. Characterization of solids. Chemical and physical properties of solids that may include aspects of intercalation reactions, ionic conductors, glasses, electronic, magnetic optical and physical/mechanical properties.

CHM8322 (CHEM 5203) TOPICS IN COORDINATION CHEMISTRY (1.5cr.)
Brief introduction to basic concepts in coordination chemistry. Topics to include the following: carbon dioxide fixation, dinitrogen fixation, activation, olefin metathesis, nature of the M-M bond.

CHM8323 (CHEM 5600) QUANTUM MECHANICAL METHODS THEORY (1.5cr.)
Examination of the theory behind quantum mechanical methods (HF, MP2, CI, DFT). Semi-empirical.

CHM8324 (CHEM 5601) QUANTUM MECHANICAL METHODS APPLICATIONS (1.5cr.)
Practical applications of methods taught in CHM 8323 such as thermochemistry, reaction pathway moelung, structure predictions. Prerequisite: CHM 8323 or 8723.

CHM8325 (CHEM 5003) SOLID STATE NMR SPECTROSCOPY (1.5cr.)
Brief introduction to solid state NMR spectroscopy. Topics include dipolar coupling interactions, chemical shielding anisotropy, the quadrupolar interaction and averaging techniques such as magic angle spinning.

CHM8326 (CHEM 5004) NMR SPECTROSCOPY (1.5cr.)
Advanced NMR techniques for both proton and carbon spectra, various decoupling and related experiments. Interpretation of NOSY, COSY and related data.

CHM8327 (CHEM 5005) PHYSICAL ORGANIC CHEMISTRY (1.5cr.)
Hammet functions, transition state energies, stereochemistry of organic compounds, and mechanisms of organic reactions and their

alignment and probabilistic models), genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell.

may include: computational geometry algorithms for cancer treatment, medical imaging, spatial data compression algorithms, dynamic programming for DNA

Methods for software correctness. Applications in program verification, mobile code safety, and protocol verification.

CSI5185 (COMP 5107) STATISTICAL AND SYNTACTIC PATTERN RECOGNITION

communication, queuing theory, routing, fault-tolerance, and advanced topics on high-speed networks, ATM, mobile wireless networks, and optical networks.

fields such as Computer-Aided Design and Manufacturing, Cartography, Materials Science, and Geometric Network Design.

Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including

Advanced object-oriented software engineering, in particular the issues of reuse and testing. Sample topics include: interaction modeling; class and cluster

Design and evaluation of security and privacy software with particular attention to human factors and how interaction design impacts security. Topics include

Developed a high degree of comfort with the various concepts and theories related to media studies.

observations, life stories, focus groups, surveys, etc.)

CMN5900 ÉTUDES DIRIGÉES EN COMMUNICATION / DIRECTED STUDIES IN COMMUNICATION

Contemporary approaches to international communication. The role of traditional and emerging media, international institutions, governmental

CMN5132 THEORIES AND EFFECTS OF THE MEDIA

Key researchers. Role of theories in understanding communication challenges faced by contemporary organizations. Issues related to

Without having to write the thesis provided the following conditions are met:

CMG5123 ENTERPRISE ARCHITECTURE

and advanced anaerobic processes used for treatment of municipal and industrial wastewaters. Topics to include microbiology and biochemistry fundamentals,

CVG7151 (CIVE 5305) TRAFFIC ENGINEERING

CVG7143 (CIVE 5605) DESIGN OF STEEL BRIDGES

CVG7130 (CIVE 5208) ADVANCED REINFORCED CONCRETE

Study of the elastic and inelastic response of reinforced concrete structures under monotonic and cyclic loading. Methods for predicting structural behaviour of

CVG7101 (CIVE 5300) ADVANCED SOIL MECHANICS I

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee's membership will be

GNG5123 ENTERPRISE ARCHITECTURE

Principles of modern electronics, devices and instruments. Measurement of photonic and electrochemical signals. Conditioning of signals for feedback control

CHM8282 (CHEM 5401) APPLICATIONS OF ORGANOMETALLIC CHEMISTRY TO SYNTHESIS (1.5cr.)

Study of organometallic methods, many of which have become catalytic and involve metals such as Cu, Pd, Pt, Mo, Cr, Ru. Various applications to be discussed including Stille coupling, Heck reaction, ring closing metathesis.

CHM8299 (CHEM 5402) MEDICINAL CHEMISTRY (1.5cr.)

Preparation of drugs, their mode of action, their use in treating disease. Evolution of medicine due to chemistry. Discussion of metabolic pathways and their modification to control and/or circumvent disease.

CHM8300 (CHEM 5404) HETEROCYCLIC COMPOUNDS AND ANTIBIOTICS (1.5cr.)

Focus on heterocycles. Reactivity of these heterocycles and their use for drugs and applications for the total synthesis particularly of alkaloids. Extensive examination of carbohydrate chemistry and other important oxygen heterocycles.

CHM8301 (CHEM 5300) PHYSICAL CHEMISTRY OF BIOLOGICAL MACROMOLECULES (1.5cr.)

Focus on how the application of physical techniques normally applied to small molecules, can be used to study macromolecular structure and function of DNA and proteins. Examples of applications to include: kinetics, electrochemistry, equilibria phenomena (thermodynamics).

CHM8302 (CHEM 5301) ELECTROCHEMICAL PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)

Description of theory accounting for the generation of membrane potentials. Application to the generation of nerve impulses.

CHM8303 (CHEM 5302) SURFACE PHENOMENA IN BIOLOGICAL SYSTEMS (1.5cr.)

Description of theory of surface tension phenomena in aqueous systems. Discussion of effects of cell and macromolecular structures in biological systems.

CHM8304 (CHEM 5009) NOVEL ORGANIC AND INORGANIC MOLECULES AND RADICALS (1.5cr.)

Topics to include neutralization-reionization techniques as well as flash pyrolysis and matrix isolation studies.

CHM8305 (CHEM 5006) IONIC PROCESSES IN THE ATMOSPHERE AND INTERSTELLAR SPACE (1.5cr.)

Discussion on the importance of ionic reactions in the upper atmosphere and in the interstellar medium. Study of dynamics of ion-molecule reactions and of experimental and theoretical approaches used for studying them.

CHM8306 (CHEM 5604) NON-EQUILIBRIUM KINETICS (1.5cr.)

Gas phase chemical kinetics of elementary and complex reaction mechanisms, as seen from a microscopic viewpoint. Unimolecular and bimolecular reactions under conditions of non-Boltzmann energy distributions. Consequences for combustion and atmospheric chemistry, as well as for fundamental kinetics.

CHM8307 (CHEM 5605) NON-LINEAR CHEMICAL KINETICS (1.5cr.)

Principles of non-linear dynamics as applied to very complex chemical reaction mechanisms containing feed-back processes. Monotonic, oscillatory, and chaotic dependence of concentrations on time. Gas phase and liquid phase reactions.

CHM8308 (CHEM 5100) UNIMOLECULAR REACTION DYNAMICS: EXPERIMENT AND THEORY (1.5cr.)

Presentation of the theoretical models that have been developed for the understanding of unimolecular reactions, focussing on statistical theories such as RRKM theory. Experimental techniques for exploring the kinetics and mechanism of unimolecular reactions, including mass spectrometry, coincidence spectroscopy and ZEKE spectroscopy.

CHM8309 (CHEM 5105) HETEROGENEOUS CATALYSIS (1.5cr.)

Principles of catalytic reactions and topics in modern applications of catalysis. Bonding of substrates on surfaces; cluster-surface analogy; ensemble requirements; mechanisms of catalysis on metal and metal oxide surfaces.

CHM8310 (CHEM 5106) ORGANOTRANSITION METAL CATALYSIS: E-H BOND ACTIVATION (1.5cr.)

Focus on the catalytic activation of E-H bonds by soluble organometallic complexes. Examples to include hydrogenation, hydrosilation and hydroboration catalysis, hydroamination and hydrophosphinination.

CHM8311 (CHEM 5107) TRANSITION-METAL CATALYZED POLYMERIZATION (1.5cr.)

Recent developments in polymerization catalysis via transition metal complexes, including insertion, metathesis, and atom-transfer polymerization. Brief overview of relevant concepts in polymer chemistry (e.g. molecular weight, polydispersity, living polymerization, the glass transition).

CHM8312 (CHEM 5200) CLAY MINERALS CHEMISTRY (1.5cr.)


CHM8313 (CHEM 5202) CHEMISTRY OF THE MAIN GROUP ELEMENTS (1.5cr.)

Fundamental and applied aspects of main group element chemistry. Topics may include non-metal chemistry, main group organometallic chemistry, application of main group element compounds to 3 uses of main group element compounds in synthesis.

CHM8314 (CHEM 5602) COMPUTATIONAL APPROACHES IN MEDICINAL CHEMISTRY (1.5cr.)

Theory and application of methods used in the pharmaceutical industry including molecular mechanics.

CHM8315 (CHEM 5603) MOLECULAR ENERGY TRANSFER (1.5cr.)
Principles of energy transfer during non-reactive molecular collisions as deduced from experiment and theory, mostly in the gas phase. Translational, rotational, vibrational and electronic energies are discussed.

**CHM8505 SYNTHÈSE ORGANIQUE (1.5cr.)**
Stratégies de synthèse complexes. Réactifs et réactions permettant des synthèses simplifiées et plus efficaces.

**CHM8508 SPECTROCOPIE PAR RÉSONANCE MAGNÉTIQUE MULTINUCLÉAIRE (1.5cr.)**

**CHM89g8 PROJET DE RECHERCHE / RESEARCH PROPOSAL**
Préparation d'un projet de recherche, sans rapport avec le sujet de thèse, à soutenir oralement devant un comité d'examen. L'étudiant doit démontrer sa capacité à défendre et justifier le mérite scientifique, la méthodologie, l'importance et la nouveauté du projet. Il doit réussir ce cours dans l'année qui suit la réussite de l'examen général. Les étudiants dont les résultats ne seraient pas satisfaisants peuvent se réinscrire une fois et doivent alors réussir en une session / Preparation of a research project, unrelated to the thesis topic, to be defended orally before an examining committee. Student required to demonstrate the ability to defend and justify the scientific merit, methodology, importance, and novelty of the project. Must be completed within one year of passing the comprehensive examination. Students who fail this activity may re-register for it once and must then successfully complete it within one session.

**CHM99g8 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION**

**CHM9999 (CHEM 6909) THÈSE DE DOCTORAT / PhD THESIS**

**PHY1310 (PHYJ 5001) EXPERIMENTAL CHARACTERIZATION TECHNIQUES IN MATERIALS SCIENCE, PHYSICS, CHEMISTRY, AND MINERALOGY (3cr.)**
Survey of experimental techniques used in materials science, condensed matter physics, solid state chemistry, and mineralogy to characterize materials and solid substances. Diffraction (X-ray diffraction, neutron diffraction...). Spectroscopy (infra-red spectroscopy, Raman spectroscopy, nuclear magnetic resonance, Mössbauer spectroscopy, electron spin resonance...). Microscopy and imaging (scanning electron microscopy, transmission electron microscopy, optical microscopy, magnetic resonance imaging...). Other analytic techniques (thermal analysis, wet chemistry, bulk thermodynamic properties, linear response and de susceptibility...).

**Courses offered at Carleton University**

**CHM5105 (CHEM5905) RADIOCHEMISTRY (3cr.)**
A study of nuclear stability and decay; chemical studies of nuclear phenomena. Application of radioactivity. Prerequisites: permission of the Department.

**CHM8104 (CHEM 5904) SCIENTIFIC DATA PROCESSING AND EVALUATION (3cr.)**
Optimization of scientific measurements, calibration, uni-variate and multi-variate analysis of scientific data, 'intelligent' spreadsheets for scientific data processing and presentation, noise reduction using spreadsheets, correction for signal drifts; examples from chemistry, spectroscopy and other scientific disciplines. Prerequisites: CHEM 4301 or CHM 4315 or permission of the Department.

**CHM8126 (CHEM 5303) BIOORGANIC CHEMISTRY (3cr.)**
Overview of recent developments in the mechanistic understanding of selected enzyme-catalyzed reactions. Topics include Cytochrome P450, methane monoxygenase, biotin and lipoic acid biosynthesis, methyl transfer, Vitamin B12, lipoxigenase, prostaglandin synthase; etc. Emphasis will be placed on biotransformations which are relatively poorly understood from a mechanistic point of view.

**CHM8134 (CHEM 5407) SPECTROSCOPY FOR ORGANIC CHEMISTS (3cr.)**
Analysis of proton NMR spectra. Fourier transform 13C NMR, strategies for structure elucidation, relaxation times, two-dimensional NMR. Aspects of mass spectrometry.

**CHM8150 (CHEM5009) SPECIAL TOPICS IN MOLECULAR SPECTROSCOPY (3cr.)**
Topics of current interest in molecular spectroscopy. In past years, the following areas have been covered: Electronic spectra of diatomic and triatomic molecules and their interpretation using molecular orbital diagrams; Raman and resonance Raman spectroscopy; symmetry aspects of vibrational and electronic levels of ions and molecules in solids in the presence of weak and strong resonant laser radiation.

**CHM8156 (CHEM 5708) PRINCIPLES OF TOXICOLOGY (3cr.)**
The basic theorems of toxicology with examples of current research problems. The concepts of exposure, hazard and risk assessment will be defined and illustrated with experimental material from some of the more dynamic areas of modern research.

**CHM8157 (CHEM 5709) CHEMICAL TOXICOLOGY (3cr.)**
Advanced course in chemical toxicology dealing with both chemical hazard and exposure. Overview of the empirical data relating to the toxicity of various classes of chemicals to test organisms, followed by the study of toxicity at the cellular level, including studies of interactions between toxic substances and...
enzymatic systems. Data applicable to the interpretation and monitoring of the new WHMIS health regulations. Initial events in enzyme induction and mutageneisis. Study of predictive capabilities in the areas of structure-activity relationships and mechanisms of enzyme induction are considered, followed by an assessment of mechanisms of exposure to toxic chemicals.

CHM8158 (CHEM5900) DIRECTED SPECIAL STUDIES (3cr.)
Under unusual circumstances and with the recommendation of the research supervisor, it is possible to engage in a directed study on a topic of particular value to the student. This may also be used for credit if there are insufficient course offerings in a particular field of chemistry.

CHM8164 (CHEM 5406) ORGANIC POLYMER CHEMISTRY (3cr.)
Basic principles of industrial and synthetic polymers. Polymerization and polymer characterization. Selected topics to cover some important polymers with emphasis on the synthesis, commodity plastics, engineering thermoplastics and specialty polymers. Students should have a basic knowledge of organic reaction mechanisms and stereochemistry. Previously offered at University of Ottawa. Revised description and prerequisites. Prerequisites: CHM3120, CHM4120, CHM4125, equivalent. or A basic knowledge of organic reaction mechanisms and stereochemistry.

CHM8167 (CHEM 5805) SEMINAR IN TOXICOLOGY (3cr.)
A one-session course in seminar format highlighting current topics in toxicology. The student will present a seminar and submit a report on the seminar topics. Student, faculty and invited seminar speakers.

CHM8181 (CHEM 5101) CHEMICAL PHYSICS OF ELECTRON-MOLECULE COLLISIONS (3cr.)
Basic classical scattering theory and quantum mechanical scattering theory. Experimental aspects, such as electron optics, electron gun fundamentals, energy analyzers and electron detectors. Applications to the understanding of the chemistry of materials.

CHM8346 (CHEM 5102) SUPERCritical FLUIDS (1.5cr.)
Fundamental and practical aspects of the uses of supercritical fluids in the chemistry laboratory. Thermodynamic treatment of high pressure multicomponent phase equilibria, transport properties, solubilities, supercritical fluid extraction and chromatography for analytical purposes, reactions in supercritical fluids, equipment considerations, new developments.

CHM8347 (CHEM 5309) ELECTRON TRANSFER: THEORY AND EXPERIMENT (1.5cr.)
The development of classical, semi-classical and quantum mechanical electronic transfer models is described. In addition, the course will examine recent experimental results and the application of electron transfer theory to biological systems.

CHM8348 (CHEM 5500) ANALYTICAL INSTRUMENTATION (1.5cr.)
Principles of modern electronics, devices and instruments. Measurement of photonic and electrochemical signals. Conditioning of signals for feedback control and microcomputer interfacing. Computational data analysis techniques such as simplex optimization. Applications in chemical analysis include amperometric detector for capillary electrophoresis, and surface plasmon resonance immunosensor.

CHM8349 (CHEM 5304) FREE RADICALS IN CHEMISTRY AND BIOLOGY (1.5cr.)
Oxidative stress induced by free radicals plays a significant role in most fatal and chronic diseases. The chemistry of bio-radicals will be described and related to pathobiological processes such as lipid peroxidation and atherosclerosis, protein nitration and cross linking, and DNA scission.

CHM8350 (CHEM 5408) INTRODUCTION TO POLYMER STRUCTURE AND MORPHOLOGY (1.5cr.)
Flexible and rigid rod polymers: effect of molecular constitution and conformation; examples of various polymer architectures and function; the amorphous state and glass transition; the crystalline state: typical crystal structures of polymers; polymorphism; crystallinity and long spacing. Thermal and solvent-induced crystallization; Lamellar and Spherulitic morphology.

CHM8355 (CHEM5000) TRACE ELEMENTAL ANALYSIS USING INDUCTIVELY COUPLED PLASMA EMISSION (ICP-ES) AND MASS SPECTROMETRY (ICP-MS) (1.5cr.)
ICP-ES/MS techniques are among the most powerful tools presently available for elemental analysis for a wide range of interests such as environmental, geological and biological applications. The fundamentals, state of the art instrumentation, applications, existing challenges, and new research and developments will be covered.

CHM8351 (CHEM 5409) MORPHOLOGY OF POLYMERS AND COMPOSITES (1.5cr.)
Liquid crystalline state of polymers; morphology of block copolymers and polymer blends; plasticizers and fillers for tailoring properties; depression of glass transition and melting temperature; phase stability of polymer composites; mechanical properties; self assembled systems; polymer nano-composites for electronic devices; common experimental techniques.

CHM8352 (CHEM 5501) ANALYTICAL APPROACH TO CHEMICAL PROBLEMS (1.5cr.)
Case study of analytical approach to various chemical problems in agricultural, biochemical, environmental, food processing, industrial, pharmaceutical and material sciences. Analytical methods include capillary electrophoresis, chemiluminescence, Fourier transform infrared spectroscopy, inductively coupled plasma emission spectroscopy, mass spectrometry, biochemical sensors, and fiber optics for remote sensing.

CHM8353 (CHEM 5502) TRACE AND ULTRATRACE ANALYTICAL CHEMISTRY (3cr.)
Criteria for evaluation and selection of analytical techniques and methods. Electroanalytical techniques. Simultaneous and sequential multielement determination. Atomic absorption, atomic emission and atomic fluorescence spectrometry, using optical spectrometric and mass- spectrometric determination. Applications of
these techniques at trace and ultratrace levels in complex matrices.

**CHM8354 (CHEM 5503) CHEMICAL SPECIATION IN THE NATURAL ENVIRONMENT** (3cr.)
Evaluation of analytical techniques and their capability for quantitative determination of chemical species (as opposed to total element-determination) in the natural environment. Electrochemical techniques for determination of chemical speciation of nutrient and toxicant elements present in the natural environment.

**CHM8356 (CHEM5308) PHYSICAL METHODS IN INORGANIC CHEMISTRY** (1.5cr.)
The characterization of inorganic materials and coordination complexes by electronic absorption and electron paramagnetic spectroscopies, temperature and field dependent magnetic susceptibilities, and crystallography will be examined.

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**Civil Engineering**

**Ottawa-Carleton Joint Program**

Established in 1984, the Ottawa-Carleton Institute of Civil Engineering (OCICE) combines the research strengths and resources of the Departments of Civil and Environmental Engineering at Carleton University with that of the Department of Civil Engineering at the University of Ottawa.

The Institute offers graduate programs leading to the degrees of Master of Applied Science (MASc), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Civil Engineering.

The Institute is one of the participating units in the collaborative program in Science, Society and Policy (master's level only).

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in six main research fields: environmental engineering; fire safety engineering; geotechnical engineering; structural engineering; transportation engineering; and, water resources engineering. Additional information is posted in the departmental website.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

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**Programs**

- Master of Applied Science Civil Engineering
- Master of Applied Science Civil Engineering Specialization in Science, Society and Policy
- Master of Engineering Civil Engineering
- Doctorate in Philosophy Civil Engineering

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**Admission**

Admission to the graduate programs in Civil Engineering is governed by the general regulations of the Ottawa-Carleton Institute of Civil Engineering (OCICE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold a master’s degree with thesis in civil engineering, or in the sub-disciplines normally considered to be part of civil engineering.
- Demonstrate strong research performance.
- Provide at least two confidential letters of recommendation from professors who are familiar with the applicant’s work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

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**Transfer from master’s to PhD**
Students in a master’s program who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of 5 graduate courses (15 credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation from the supervisor and the thesis advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met. Following transfer, all the requirements of the doctoral program must be met.

**Program Requirements**

The PhD degree requires successful completion of the following:

- 12 course credits.
  - In the case of transfer from the MASc to the PhD, students must complete 27 credits master’s (15cr.) and PhD (12cr.) combined.
- CVG8566 Doctoral Seminar in Civil Engineering.
- CVG9998 Comprehensive Examination.
- CVG9999 Presentation and defense of a thesis based on original research carried out under the direct supervision of a research faculty member in the Department.

**Duration of the program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

**Residence**

All students must successfully complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the time of the initial registration in the program.

**Minimum Standards**

The passing grade in all courses is B. Students who fail 6 credits, the thesis proposal, the comprehensive exam, the thesis, or whose progress is deemed unsatisfactory must withdraw from the program.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Engineering. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

The thesis examining board may include members who are not part of the TAC.

**Courses**

Graduate courses are listed below, grouped by areas of research.

Course codes in parentheses are for Carleton University.

Not all of the following courses are necessarily given each year.

**Geotechnical Engineering**

**CVG5100 (CIVJ 5000) DEEP FOUNDATIONS** (3cr.)
Deep foundation types in North American practice (driven or bored piles, and slurry trench techniques); axial and lateral capacity and settlement analysis for single piles and pile groups; field inspection methods; pile dynamics; performance and analysis of static test loading.

**CVG5106 (CIVJ 5006) SITE IMPROVEMENTS** (3cr.)
Description, design procedures and usage of current site improvement techniques, including preloading, earth reinforcement, dynamic consolidation, vibrocompaction, blasting densification, lime treatment, drains, and geotechnical fabrics.
CVG5161 (CIVJ 5106) MECHANICS OF UNSATURATED SOILS (3cr.)
Introduction to unsaturated soils, phases of an unsaturated soil, phase properties and relations, stress state variables for saturated and unsaturated soils. Measurement of soil suction; theory of soil suction, capillarity, measurements of total suction and matric suction. Flow Laws: flow of water and measurement of permeability, shear strength theory: history, failure envelope for unsaturated soils, triaxial and direct shear tests, typical results, simple testing procedures, volume change behavior including expansive soils behavior. Soil-water characteristic curve: its behavior and use in predicting the engineering properties of unsaturated soils, practical applications of the principles of unsaturated soils.

CVG5175 NUMERICAL METHODS FOR GEOTECHNICAL ENGINEERS (3cr.)
Non-linear analysis of stresses and deformations using the effective stress concept; analysis of consolidation using the excess pore water pressure concept; flow through porous media; finite element, discrete element and finite difference methods; applications to foundations of structures, retaining walls, dams, tunnels, pipelines, human-made and natural slopes in rock and soil.

CVG5178 (CIVJ 5108) ICE MECHANICS (3cr.)
Ice conditions in the Arctic; ice physics; classification of ice; mechanical properties of ice; mathematical modelling of creep and fracture behaviour of ice; offshore structures in arctic environments; ice forces acting on structures; ice induced vibrations; iceberg impact loads; physical modelling of ice-structure interaction; ice as a construction material; case histories.

CVG7100 (CIVE 5209) CASE STUDIES IN GEOTECHNICAL ENGINEERING (3cr.)

CVG7101 (CIVE 5300) ADVANCED SOIL MECHANICS I (3cr.)

CVG7102 ADVANCED SOIL MECHANICS II (3cr.)

CVG7103 (CIVE 5303) PAVEMENTS AND MATERIALS (3cr.)

CVG7104 (CIVE 5500) EARTH RETAINING STRUCTURES (3cr.)

CVG7105 (CIVE 5501) FOUNDATION ENGINEERING (3cr.)

CVG7106 (CIVE 5502) IN SITU METHODS IN GEOMECHANICS (3cr.)

CVG7107 (CIVE 5503) NUMERICAL METHODS IN GEOMECHANICS (3cr.)

CVG7108 (CIVE 5504) SEEPAGE AND WATER FLOW THROUGH SOILS (3cr.)

Structural Engineering
CVG5142 (CIVJ 5201) ADVANCED STRUCTURAL DYNAMICS (3cr.)
Dynamic behaviour of civil engineering structures under excitations due to earthquakes, wind, waves, etc. Advanced methods in dynamic analysis of structures. Prediction of structural response. Design considerations.

CVG5143 (CIVJ 5202) ADVANCED STRUCTURAL STEEL DESIGN (3cr.)
Analysis of thin-walled beams, design applications including members under combined forces, analysis and design of beams under non-uniform torsion, limit state design methodology, comparative study of modern structural steel standards, formulating elastic and plastic interaction relations for members under combined forces, designing columns, beams, beam columns, for cross-sectional strengths, local buckling and global stability considerations, design of bracing systems.

CVG5144 (CIVJ 5300) ADVANCED REINFORCED CONCRETE (3cr.)

CVG5145 (CIVJ 5203) THEORY OF ELASTICITY (3cr.)
Stress-strain relations. Theories of plane stress and plane strain. Use of stress functions, energy and variational methods in the analysis of elastostatic problems.

CVG5146 (CIVJ 5302) NUMERICAL METHODS OF STRUCTURAL ANALYSIS (3cr.)
Numerical procedures and methods of successive approximations for the solution of structural problems. Virtual work, principles of minimum potential and
complementary energy. Applications of variation and finite difference techniques to the solutions of complicated problems in beams, plates and shells.

CVG5147 (CIVJ 5204) THEORY OF PLATES AND SHELLS (3cr.)
Stress distribution in flat plates of various shapes. Large deflection theory, numerical methods. Membrane theory, bending theory for cylindrical shells, bending theory for shells of revolution.

CVG5148 (CIVJ 5304) PRESTRESSED CONCRETE DESIGN (3cr.)

CVG5149 (CIVJ 5304) STRUCTURAL STABILITY (3cr.)
Elastic, inelastic, and torsional buckling of columns, beam column behaviour, plane and space frame stability, lateral torsional buckling of beams, global buckling of truss systems, plate and shell buckling, local buckling in tubulars, use of energy methods, matrix analysis, and finite element analysis in modeling stability problems, bracing requirements, standard provisions and design considerations in structural stability.

CVG5150 (CIVJ 5206) ADVANCED CONCRETE TECHNOLOGY (3cr.)
Cement: types, hydration, physical properties; aggregate: classification, grading, properties; fresh concrete: influence of basis constituents and admixtures on workability, mixing, placing; strength of hardened concrete; nature of strength, influence of constituents, curing methods; durability; chemical attack, frost action, thermal effects; elasticity, shrinkage and creep; special concrete: lightweight, high density; mix design; approaches, weigh batching, volume proportioning, special mixes; field and laboratory test methods.

CVG5151 STRUCTURAL DESIGN IN TIMBER (3cr.)
Characteristic values for timber and engineered wood products, modification factors used in design; design of members subjected to compression, bending, bi-axial bending and combined bending and axial loading; design of curved glued laminated beams, lateral design for wind and seismic loading; connection design.

CVG5153 (CIVJ 5209) WIND ENGINEERING (3cr.)
The structure and climate of wind; wind loading on structures; wind induced dynamic problems of structures; environmental aerodynamics; dispersion of pollutant; analysis of wind data; experimental investigations.

CVG5154 (CIVJ 5308) RANDOM VIBRATION (3cr.)

CVG5155 (CIVJ 5306) EARTHQUAKE ENGINEERING (3cr.)

CVG5156 (CIVJ 5301) FINITE ELEMENT METHODS I (3cr.)

CVG5157 (CIVJ 5303) FINITE ELEMENT METHODS II (3cr.)

CVG5158 (CIVJ 5307) ELEMENTS OF BRIDGE ENGINEERING (3cr.)
Introduction; limit state design; highway bridge design loads; analysis and design of concrete decks; impact and dynamics; load capacity rating of existing bridges and construction in cold climate.

CVG5159 (CIVJ 5309) LONG SPAN STRUCTURES (3cr.)

CVG7109 (CIVE 5505) GEOTECHNICAL EARTHQUAKE ENGINEERING (3cr.)

CVG7120 (CIVE 5101) INTRODUCTORY ELASTICITY (3cr.)

CVG7121 (CIVE 5102) ADVANCED ELASTICITY (3cr.)
CVG7122 (CIVE 5103) FINITE ELEMENT METHODS IN STRESS ANALYSIS (3cr.)

CVG7123 (CIVE 5104) EARTHQUAKE ENGINEERING AND ANALYSES (3cr.)

CVG7124 (CIVE 5105) ADVANCED FINITE ELEMENT ANALYSIS IN STRUCTURAL MECHANICS (3cr.)

CVG7125 (CIVE 5203) THEORY OF STRUCTURAL STABILITY (3cr.)

CVG7126 (CIVE 5204) BEHAVIOUR AND DESIGN OF STRUCTURAL STEEL MEMBERS (3cr.)

CVG7127 (CIVE 5205) ANALYSIS OF ELASTIC STRUCTURES (3cr.)

CVG7128 (CIVE 5206) PRESTRESSED CONCRETE (3cr.)

CVG7129 ADVANCED STRUCTURAL DESIGN (3cr.)

CVG7130 (CIVE 5208) ADVANCED REINFORCED CONCRETE (3cr.)

CVG7131 (CIVE 5600) PROJECT MANAGEMENT (3cr.)

CVG7132 COMPUTER-AIDED DESIGN OF BUILDING STRUCTURES (3cr.)

CVG7137 DYNAMICS OF STRUCTURES (3cr.)

CVG7138 ENGINEERING MASONRY BEHAVIOUR AND DESIGN (3cr.)

CVG7139 BEHAVIOUR AND DESIGN OF STEEL STRUCTURES (3cr.)

CVG7140 (CIVE 5601) STATISTICS, PROBABILITIES AND DECISION-MAKING (3cr.)

CVG7141 (CIVE 5602) ADVANCED METHODS IN COMPUTER-AIDED DESIGN (3cr.)

CVG7142 ENGINEERING MANAGEMENT (3cr.)

CVG7143 (CIVE 5605) DESIGN OF STEEL BRIDGES (3cr.)

CVG7144 (CIVE 5606) DESIGN OF CONCRETE BRIDGES (3cr.)

CVG7145 (CIVE 5607) INTRODUCTION TO BRIDGE DESIGN (3cr.)

CVG7170 (CIVE 5609) FUNDAMENTALS OF FIRE SAFETY ENGINEERING (3cr.)

CVG7171 (CIVE 5610) FIRE DYNAMICS I (3cr.)
CVG7172 (CIVE 5613) FIRE DYNAMICS II (3cr.)

CVG7173 (CIVE 5611) PEOPLE IN FIRES (3cr.)

CVG7174 (CIVE 5612) FIRE MODELLING (3cr.)

CVG7175 (CIVE 5614) DESIGN FOR FIRE RESISTANCE (3cr.)

Transportation Engineering
CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)

CVG7151 (CIVE 5305) TRAFFIC ENGINEERING (3cr.)

CVG7152 (CIVE 5306) HIGHWAY MATERIALS (3cr.)

CVG7153 (CIVE 5307) URBAN TRANSPORTATION AND MANAGEMENT (3cr.)

CVG7154 (CIVE 5308) GEOMETRIC DESIGN (3cr.)

CVG7155 (CIVE 5309) TRANSPORTATION SUPPLY (3cr.)

CVG7156 (CIVE 5401) TRANSPORTATION ECONOMICS AND POLICY (3cr.)

CVG7158 (CIVE 5403) AIRPORT PLANNING (3cr.)

CVG7159 (CIVE 5402) TRANSPORTATION TERMINALS (3cr.)

Water Resources Engineering
CVG5111 (CIVJ 5501) HYDRAULIC STRUCTURES (3cr.)
Classification and function of hydraulic structures; analysis and design of hydraulic works for gravity dams, arch dams, earth fill and rock-fill dams; ancillary works including water intakes, various types of spillways, control structures, energy dissipation and stilling basin, bottom outlets. Advanced topic in channel design including transitions; hydraulic transients, free surface and free surge analysis; water towers and compensation basins; penstocks. Navigation locks. Coastal protection works and maritime structures.

CVG5120 (CIVJ 5506) WATER RESOURCES SYSTEMS (3cr.)
Conservation of water resources. Multi-purpose project planning: study of domestic and foreign water development projects. Techniques for simulation, optimization, linear and dynamic programming.

CVG5123 (CIVJ 5509) ADVANCED TOPICS IN HYDROLOGY (3cr.)
Selected topics of current interest in surface and groundwater hydrology.

CVG5124 (CIVJ 5605) COASTAL ENGINEERING (3cr.)
Key concepts in coastal engineering. Wave mechanics and coastal hydrodynamics, (2) sediment transport and coastal morphodynamics and (3) coastal structures and coastal zone management. Wave mechanics and coastal hydrodynamics to include small-amplitude wave theory, finite amplitude wave theories (Stokes, Cnoidal and solitary wave), wave generation, wave transformations, development and prediction, hydrodynamics of coastal circulation. Sediment transport and coastal morphodynamics to include: wave and current-induced sediment transport, coastal sediment processes, longshore and cross-shore beach morphologic transformations, etc. Coastal structures and coastal zone management to include: beach erosion control, coastal structures (dikes, breakwaters, groins, seawalls), beach nourishment, coastal pollution and control, nearshore area development.

CVG5125 (CIVJ 5601) STATISTICAL METHODS IN HYDROLOGY (3cr.)
Concepts of probability and random variables applied to hydrology. Statistical distributions, their approximation and analysis. Statistical inference, including tests of significance and estimation theory. Linear and multivariate correlation and regression techniques. Data generation and simulation techniques for design of water-resource systems. Introduction to hydrologic and meteorologic time series.

CVG5160 (CIVJ 5503) SEDIMENT TRANSPORT (3cr.)
An introduction to particle transport, with special emphasis on river engineering applications, including natural channel design. Sediment properties, initiation of motion, bed load, suspended load, fluvial dunes, alluvial channels, bank erosion and protection, natural channel design. Special topics include contaminated sediments, local scour, morphodynamic modelling, fluvial habitat.

CVG5162 (CIVJ 5504) RIVER HYDRAULICS (3cr.)
Advanced concepts of river hydraulics, with an emphasis on field measurement techniques and application of numerical models. Navier-Stokes equations, turbulence, flow resistance, numerical modelling of simplified momentum and continuity equations, field-based measurement and statistical analysis of velocity fields. Special topics include contaminant transport, morphodynamic modelling.

Environmental Engineering
CVG5130 (ENVJ 5900) WASTEWATER TREATMENT PROCESS DESIGN (3cr.)
The physical, chemical and biological processes involved in the treatment of domestic and industrial wastes. Waste characteristics, stream assimilation, biological oxidation, aeration, sedimentation, anaerobic digestion, sludge disposal.

CVG5132 (ENVJ 5901) UNIT OPERATIONS OF WATER TREATMENT (3cr.)
Unit operations and unit processes involved in the treatment of a water supply for various uses. Topics included are: water quality, water microbiology, sedimentation, chemical treatment, disinfection, water chemistry, flocculation.

CVG5133 (ENVJ 5906) SOLID WASTE DISPOSAL (3cr.)
Collection and disposal of solid wastes. Sanitary landfill, composting, incineration and other methods of disposal. Material and energy recovery.

CVG5134 (ENVJ 5907) CHEMICAL ANALYSIS FOR ENVIRONMENTAL ENGINEERING (3cr.)

CVG5137 (ENVJ 5905) WATER AND WASTEWATER TREATMENT PROCESS ANALYSIS (3cr.)
Mass balancing in complex systems. Reaction kinetics and kinetic data analysis: classical and computer based methods. Reactor design: ideal reactors and real reactors. Analysis of tracer tests. Interfacial mass transfer: common theories. Mass transfer models. Prerequisite: CVG 3132 or equivalent. Students with a Chemical Engineering background may not take this course for credit.

CVG5138 (ENVJ 5902) ADVANCED WATER TREATMENT (3cr.)
Scope, limitations and design procedures for water treatment processes for the removal of toxic and non-standard contaminants. Current water treatment problems and regulations, activated carbon treatment, ion exchange, disinfection practices and oxidation via advanced oxidation processes (ozonation and UV oxidation), iron and manganese removal, recent developments in coagulation, membranes, air stripping. Prerequisite: CVG 3132 or equivalent.

CVG5139 (ENVJ 5700) ENVIRONMENTAL ASSESSMENT OF CIVIL ENGINEERING PROJECTS (3cr.)
Procedures and methods for systematic evaluation of the environmental impact of civil engineering projects including wastewater disposal systems, solid waste disposal systems, and water resource development systems.

CVG5179 (ENVJ 5908) ANAEROBIC DIGESTION (3cr.)
Advanced theoretical, biological, and practical aspects of anaerobic digestion processes. Principles to be applied to the design and application of conventional and advanced anaerobic processes used for treatment of municipal and industrial wastewaters. Topics to include microbiology and biochemistry fundamentals, techniques for monitoring anaerobic digestion performance, municipal sludge stabilization, anaerobic composting, anoxic/anaerobic bioremediation, Andrew’s dynamic model. Design of the following: two-phase digestion; Downflow Stationary Fixed Film (DSFF) reactors; Upflow Anaerobic Sludge Blanket (UASB); Uplift Blanket Filter (UBF) reactors; and Anaerobic Sequencing Batch Reactors (ASBR).

CVG5180 (ENVJ 5909) BIOLOGICAL NUTRIENT REMOVAL (3cr.)
Advanced theoretical, biological, and practical aspects of biological nutrient removal (BNR) (nitrification, denitrification and excess biological phosphorus) processes. Principles to be applied to the design and application of conventional and advanced BNR processes used for treatment of municipal and industrial wastewaters. Topics as follows: microbiology and biochemistry fundamentals of BNR, nitrification process design of suspended growth and fixed film growth systems, denitrification process design of suspended growth and fixed film growth systems, excess biological phosphorus removal design including prefermentation. Design of 2,3,4 and 5 stage BNR systems. General activated sludge model and Simworks for BNR systems. Retrofit of exiting plants and pilot plant testing for BNR.

CVG5232 (ENVJ 5911) UNIT OPERATIONS OF WATER TREATMENT LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for particular applications, and b) design a full-scale facility. Conventional analytical techniques used in water treatment (pH, alkalinity, hardness, turbidity, color, spectrophotometric analysis). Process analysis techniques for process evaluation and scale-up including: zone sedimentation, batch flux settling tests, coagulation with iron and aluminum salts, flocculent sedimentation, filtration and fluidization, flotation. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5132.
CVG5238 (ENVJ 5912) ADVANCED WATER TREATMENT PROCESSES LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for the removal of toxic and non-standard contaminants, and b) design a full-scale facility. Tracer tests and none-ideal reactor behaviour, activated carbon adsorption equilibria and kinetics, aeration. Total organic carbon analysis, spectrophotometry. Process analysis, techniques for process evaluation and scale-up including: aeration, analysis of non-ideal flow conditions. Tracer study of three basins, adsorption isotherm tests, activated carbon mini-column tests, oxidation kinetic tests. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5138.

CVG7160 (ENVE 5001) BIOFILM PROCESSES IN WASTEWATER TREATMENT (3cr.)

CVG7161 (ENVE 5102) TRAFFIC RELATED AIR POLLUTION (3cr.)

CVG7162 (ENVE 5103) AMBIENT AIR QUALITY AND POLLUTION MODELLING (3cr.)

CVG7163 (ENVE 5302) CASE STUDIES IN HYDROGEOLOGY (3cr.)

CVG7164 (ENVE 5203) MULTIPHASE FLOW AND CONTAMINANT TRANSPORT MODELLING (3cr.)

Additionnales courses
CVG5112 (CIVJ 5502) COMPUTATIONAL HYDRODYNAMICS (3cr.)
Finite volume methods for advection, diffusion and shallow water equations using structured and unstructured grids, finite volume methods for incompressible Navier-Stokes equations (SIMPLE, SIMPLEC, PISO), error analysis: numerical diffusion and dispersion, truncation errors and Fourier analysis, introduction to turbulence modeling, introduction to methods for tracking free surfaces and moving bed introduction to other methods in hydrodynamics: finite element, finite difference, Chebyshev and Fourier spectra, semi Lagrangian and vortex methods in hydrodynamics.

CVG5311 BRIDGE DESIGN (3cr.)
Design of highway bridges according to the Canadian Highway Bridge Design Code (CHBDC). Comparisons with other bridge codes (e.g., the American Code - AASHTO, the European, the New Zealand, and the British bridge codes). The topics covered include the following: main structural components of highway bridges; types of highway bridges; serviceability and ultimate limit state design requirements; design loads (dead loads, traffic loads, seismic loads, and wind loads); load combinations; code specifications for loading due to traffic (design lane, characteristics of design truck, positions of design truck on bridge, etc.); dynamic effects due to traffic loads; practical approaches specified in CHBDC for determining forces and deflections in structural embays; principles of capacity design in highway bridges.

CVG5312 DURABILITY OF CONCRETE STRUCTURES (3cr.)
Properties of cementitious materials (constituents of concrete; hydration of cement; structure of hardened concrete; transport processes in concrete); deterioration of concrete (built-in problems; construction defects; cracking; dimensional stability; alkali-aggregate reaction; sulphate attack; corrosion of reinforcing steel; freezing-thawing cycles); (iii) evaluation of concrete structures (inspection; in-situ testing; laboratory testing); (iv) repair and maintenance of concrete (repair materials; repair procedures and techniques; prevention, protection and maintenance); and, (v) durability design (philosophy; modelling of deterioration processes; service life prediction; life-cycle cost analysis.)

CVG5313 SEISMIC ANALYSIS AND DESIGN OF CONCRETE STRUCTURES (3cr.)
Review of seismic hazards in Canada, building code provisions for earthquake loads, uniform hazard spectra, linear elastic modal response spectrum analysis, linear elastic time history analysis, equivalent static force procedure, advanced state-of-the-art nonlinear modeling techniques including the finite element method and fiber modeling, emerging methods such as performance-based earthquake engineering and displacement-based design, ductility concepts, plastic hinge formulations, capacity design philosophy for seismic resistance, seismic analysis and design of common seismic force resisting systems including slender and squat shear walls, moment resisting frames, coupled shear walls, and coupling beams, shear wall moment resisting frame interaction, and lessons learned from recent earthquakes.

CVG5314 GEOFTECHNICAL HAZARDS (3cr.)
Understanding of assessment, prevention, and mitigation of geotechnical hazards, overview of natural and man-made geo-hazards; concepts of hazards, disasters, vulnerability and risks; geotechnical hazards induced by problem soils; fundamentals, assessment, and mitigation; landslide hazards and risk assessment: fundamentals, solutions (prevention, stabilization) for landslides and slope instability; monitoring of landslides and slope; mining geotechnical hazards: hazards related to surface mining geotechnical facilities; hazards related to underground mining geotechnical facilities.

CVG5320 FIRE BEHAVIOUR OF MATERIALS (3cr.)
Fundamentals and scientific aspects of the behaviour of materials during fires and the fire hazards of materials. Topics to be covered include material specifications, thermal and mechanical properties, structural fire response, residual strength, failure criteria, mechanisms of flame retardancy, and standards and testing protocols.

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CVG5321 FINITE ELEMENTS IN FIELD PROBLEMS (3cr.)
Use of Galerkin and Ritz finite element formulation to solve one and two dimensional field problems, steady state and time-dependent phenomena involving potentials, heat transfer, fluid flow, diffusion, and dispersion with emphasis on practical applications. Prerequisite: Basic knowledge of third year-level undergraduate engineering mathematics. Exclusion: EVG7402 (ENVE 5402).

CVG5331 (ENVJ 5902) SLUDGE UTILIZATION AND DISPOSAL (3cr.)
Introduction to sludge processing technology and procedures to be used in the planning and design of sludge treatment processes. Evaluate the economics and performance of sludge unit process operations. Selection of methods for final disposition of sludge.

CVG5366 MASTER'S SEMINAR IN CIVIL ENGINEERING
Attendance and participation in the monthly seminar. All students must make one presentation and continue to attend throughout the program. Graded S/NS

CVG6000 RAPPORT EN GÉNIE CIVIL / CIVIL ENGINEERING REPORT (6cr.)

CVG6108 (CIVE 5906) DIRECTED STUDIES I (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG6109 (CIVE 5907) DIRECTED STUDIES II (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG 6301 to 6320 SPECIAL TOPICS IN CIVIL ENGINEERING (3 cr.)
CVG6108 (CIVE 5906) DIRECTED STUDIES I (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG6109 (CIVE 5907) DIRECTED STUDIES II (3cr.)
Special courses set up for one student on an exceptional basis. Limited to one in the Master's level and to two total Master's plus PhD.

CVG7999 THÈSE DE M.Sc.A. / MASc THESIS
Pour les étudiants qui écrivent leur thèse de maîtrise après avoir fait leur travail de recherche en laboratoire. / For students writing the Master's thesis after completion of laboratory research.

CVG8366 DOCTORAL SEMINAR IN CIVIL ENGINEERING
Attendance and participation in the monthly seminar. All students must make one presentation and continue to attend throughout the program. Graded S/NS

CVG9998 EXAMEN GÉNÉRAL DE DOCTORAT / COMPREHENSIVE EXAMINATION (PhD)

CVG9999 THÈSE DE DOCTORAT / PhD THESIS
Pour les étudiants qui rédigent leur thèse de doctorat après avoir fait leur travail de recherche en laboratoire. / For students writing their PhD thesis after completion of laboratory research.

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

**Communication**

The Department of Communication at the Faculty of Arts offers an MA program in Communication with thesis or with research paper, a Master of Communication (MC) by coursework to which a co-op option can be added, and a PhD in Communication.
The Department of Communication, in collaboration with the University of Ottawa's Co-op office, offers a co-op option to a limited number of students in the MC program. Students must request this option in their admission file. The co-op option provides the opportunity to acquire practical work experience by completing two one-session paid work placements.

The School is one of the participating units in the collaborative program in Science, Society and Policy (master's level only).

The PhD in Communication program is designed for students with academic and professional training.

The program focuses on two fields of research: media studies and organizational communication. The media studies field examines the content and the modes of operation of traditional and emerging media in their social, cultural, economic, political and regulatory contexts.

Organizational communication focuses on interpersonal and group interactions in the workplace; planning for internal and external communication in private, public, and nonprofit organizations; risk/crisis communication, public relations, ICT's uses within organizations, etc.

The program aims to develop in graduates the following skills:

- Evaluate critically the theories, concepts and assumptions underlying media studies or organizational communication with particular attention to their chosen research interest.
- Demonstrate an ability to identify and work with the varying epistemological traditions developed by French-speaking and English-speaking scholars in communication studies.
- Contribute to the development of skills, theories, approaches, and materials for both academics and professionals.
- Analyze data and communicate research results to diverse audiences, including scholars, policymakers, and professionals in communication studies.

The master’s programs are offered on a full-time or on a part-time basis. The PhD program is offered full-time. The master’s programs are offered in English and in French whereas the PhD program is offered in bilingual (English-French) format.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Communication

Master of Arts Communication Specialization in Science, Society and Policy

Master of Communication

Doctorate in Philosophy Communication

**Admission**

For an application to be considered, the applicant must:

- Hold a master's degree with thesis or research paper in communication, or in a related discipline.
- Have obtained a minimum average of 75% (B+) calculated according to the FGPS guidelines.
- Provide two confidential letters of recommendation.
- Provide a CV and a statement of interest outlining career goals.
- Provide the name of at least one faculty member of the program whose research interests match their own.
- Provide an outline of the proposed research project.

Candidates with a master's degree in a field related to communication and who have not taken any basic course in communication (i.e. theory or research) will have to fill this gap by completing one or two (undergraduate or master’s) courses prior to admission. To find out which courses to take, applicants should contact the Director of Graduate Studies in the Department of Communication.

**Language requirements**

This program is bilingual; students must take courses in English and courses in French. The program’s structure is such that 50% of courses are offered in English and 50% in French.

Applicants must demonstrate an active knowledge of either French or English and the ability to read and understand the other language. To demonstrate his/her active knowledge whether of French or English, the applicant must provide evidence that he/she has studied for at least three years (full-time) in a school, college or university in Canada or elsewhere, where the language of instruction is exclusively English or French; that his/her mother tongue is English or French; that he/she has at least one full year of professional work experience in English or in French. Candidates who are unable to provide satisfactory evidence of their proficiency in English and/or in French must complete one of the
following language tests and obtain the specified minimum grade:

- A minimum TOEFL score of 625 (5 in the written); a minimum score of 107 (24 in the written) in the IBT (Internet Based TOEFL).
- A minimum IELTS score of 7 (International English Language Testing System).
- An average score of 5 in listening/reading and a writing score of 4.5 in the CanTEST (for English) or TESTCan (for French), administered by the University of Ottawa.
- A minimum DALF (Diplôme approfondi de langue française) score C2.

The Admissions Committee reserves the right to interview candidates and impose a language test the outcome of which will determine whether the applicant must take a course in French or English (e.g. FLS2513/ESL2113) to enhance their competence.

Candidates should consult the “Admission” portal on the FGPS website for more complete information about the admission process and the documentation required.

**Transfer from master’s to PhD**

Students enrolled in the MA program in Communication at the University of Ottawa have the opportunity to go directly to the PhD program without having to write the thesis provided the following conditions are met:

- Have an average of A- in the last two years of undergraduate studies;
- Have successfully completed four courses of the MA program (12 credits) with an average of at least A-;
- Have shown satisfactory progress in their research;
- Have a letter of recommendation from the proposed doctoral thesis supervisor;
- Have the approval of the Graduate Studies Committee of the Department of Communication.

The student must make a written request to transfer to the PhD program no later than the beginning of the fourth session of enrolment and must enrol in the doctoral program in the fifth session at the latest. Once the transition is made, all the requirements of the doctoral program must be met. The total number of course credits required is 27 (12 at the master’s level, plus 15 at the doctoral level).

**Program Requirements**

The requirements of the PhD program include successful completion of 15 credits of coursework, a comprehensive exam, a thesis proposal and a thesis. Students must take at least one course in English and one in French.

**Courses**

The courses are offered either in French, or in English and not simultaneously in both languages.

- Compulsory Courses (12 credits):
  - CMN8101 RESEARCH METHODS I (3cr.)
  - CMN8102 RESEARCH METHODS II (3cr.)
  - CMN8902 SEMINAIRE DE DOCTORAT / DOCTORAL SEMINAR (3cr.)
  - One of the following courses:
    - CMN8111 THEORIES IN MEDIA STUDIES (3cr.)
  - CMN8112 ADVANCED THEORIES IN ORGANIZATIONAL COMMUNICATION (3cr.)

- Optional course (3 credits) to be selected from among the following:
  - CMN8130 SPECIAL TOPICS IN MEDIA STUDIES (3cr.)
  - CMN8131 SPECIAL TOPICS IN ORGANIZATIONAL COMMUNICATION (3cr.)

- With permission of the director of graduate studies, students may select an optional course from the general list of graduate courses in communication or from the graduate courses offered by another program.

- CMN9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

- The comprehensive exam allows the student to demonstrate the theoretical, methodological, and epistemological concepts in communication. It includes a written and an oral component. The examination must be taken in the fourth session. A student who fails must take the exam again in the next session. A second failure in either the written or the oral will result in a withdrawal from the program. Procedures for the comprehensive exam can be found under under “Graduate Student Guide” on the website of the Department of Communication.

- CMN9997 PROJET DE THESE / THESIS PROPOSAL

- The thesis proposal must be submitted to the thesis advisory committee for review and approval before the end of the sixth session. A student who fails may submit and defend it again in the next session. A second failure will result in a withdrawal from the program. In cases where the thesis research involves human subjects, approval of the Ethics Committee must be obtained prior undertaking any independent data collection.

- CMN9999 THÈSE DE DOCTORAT / PHD THESIS

**Duration of the program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of students fast-tracked from the master’s to the doctorate.
Residence

Students must complete a minimum of six sessions of full-time registration at the beginning of the program or nine sessions in the case of students fast-tracked from the master's.

Minimum standards

The passing grade in all courses is 70% (B). Students who fail two courses (equivalent to 6 credits), the comprehensive exam, the thesis proposal, the thesis or whose progress is deemed unsatisfactory must withdraw from the program.

Thesis Advisory Committee

Upon initial registration, an interim advisor is assigned to those students who do not already have a thesis supervisor. During the first session of registration, an advisory committee is set up in consultation with the student. The committee is composed of the thesis supervisor and three other professors, at least two of whom must be members of the Department of Communication. By the end of the first year, the composition of the committee must be confirmed and the thesis topic must be registered officially.

Courses

Please consult the schedule to know the courses offered at each session.

**CMN5100 RESEARCH METHODS** (3cr.)
Research design and methods relevant to the Master's thesis or research paper project.

**CMN5105 CONTEMPORARY COMMUNICATION ISSUES** (3cr.)
State of the art of the discipline. Exploration of major domains of communication research, along with contemporary issues being addressed by scholars in these fields of specialization.

**CMN5110 SOCIAL HISTORY OF COMMUNICATION TECHNOLOGIES** (3cr.)
Exploration of the social, political, economic, cultural and ethical ramifications of communication technologies as they have evolved over time. Relationship between innovation in new communication technologies and social and cultural change.

**CMN5115 COMMUNICATION ETHICS** (3cr.)
Emphasis on the significance of ethical principles and responsibilities of public communicators, as well as sanctions faced when communicators fail to uphold these principles. Critique of self-regulation of the media. Analysis of argumentation. Study of legal precedents with respect to defamation.

**CMN5120 PUBLIC COMMUNICATION CAMPAIGNS: THEORIES AND APPLICATIONS** (3cr.)
Theories and applications relevant to campaigns that promote issues and causes in the public interest. Strategies and techniques. Cases studies in the areas of health, environment, education and other public domains.

**CMN5130 DIVERSITY IN THE WORKPLACE: COMMUNICATION CHALLENGES** (3cr.)
Theories and pragmatics of intercultural communication as applicable to various forms of communication (verbal and nonverbal) between and among individuals of different ethnicities, races, cultures, age groups, sexual orientations, genders, classes, abilities, language, religion, and value orientations. Focused on workplace interactions.

**CMN5131 ORGANIZATIONAL COMMUNICATION THEORIES** (3cr.)
Different approaches (e.g., interactionist, narrative, critical) to organizational communication research, with a focus on benchmark studies and key researchers. Role of theories in understanding communication challenges faced by contemporary organizations. Issues related to communication networks, organizational learning, management of diversity, computerization of organizations, and management of risks, among others.

**CMN5132 THEORIES AND EFFECTS OF THE MEDIA** (3cr.)
Critique of traditional (e.g., cultivation, social learning, and dependency), interpretive (e.g., narrative and genre), and critical/cultural (e.g., political economy) theories of the mass media. Contemporary research directions in the field of mass and emerging communications. Study of the effects on audience behavior.

**CMN5133 HEALTH COMMUNICATION THEORIES** (3cr.)
Concepts, research, and theories regarding health communication issues at the micro level (e.g., interactions between patient and healthcare provider), mezzo level (e.g., role of information in healthcare organizations) and macro level (e.g., role of media in shaping public perceptions of health and illness). Qualitative, quantitative, and mixed-method research, with a stress on interdisciplinary approaches to healthcare communication and public health research.

**CMN5135 COMMUNICATION MANAGEMENT** (3cr.)
Role of communication in organizational development, team development, and corporate/institutional positioning. Internal and external communication in public and private organizations. Case studies of Canadian and international organizations.

**CMN5136 VIRTUAL WORK TEAMS** (3cr.)
The theoretical and practical issues raised by the integration of mediated and distance communication into the work place, including those specific to the functioning of virtual teams (e.g., E-leadership, cohesion, communication, and trust).

**CMN5140 COMMUNICATION, GLOBALIZATION AND CHANGE** (3cr.)
Impact of information and communication technologies and political, cultural, and global dynamics on organizations. Theoretical and critical reflections on the strategic management of change in organizations, the transformation of organizational cultures, and intervention practices. Case studies of hybrid cultures.

**CMN5141 GOVERNMENT COMMUNICATION** (3cr.)
Issues and concerns of particular relevance to the public service communication community. Preparation of a consultation report that focuses on a specific communication challenge faced by professional communicators.

**CMN5142 RISK AND CRISIS COMMUNICATION** (3cr.)
The role of communication in general—and mass media and the Internet in particular—in high risk situations such as conflict, war, disaster, emergency, and acts of terrorism (including biological threats) in a variety of cultural contexts. Characteristics of modern risk societies, risk identification and management, the relationship between risk and crisis communication, and crisis management strategies. Case studies.

**CMN5150 KNOWLEDGE MANAGEMENT** (3cr.)
Research directions in organizational learning, collective intelligence and information architecture, situated in the technical context of the general digitization of communication and the socio-cultural context of knowledge societies and human development policies. Interdisciplinary perspectives. Case studies from the work place, education, health, and cultural industries.

**CMN5155 ADVANCED RESEARCH IN TRADITIONAL AND EMERGING MEDIA** (3cr.)
Empirical and critical studies of traditional and emerging media in various social contexts: organizational, domestic, educational, etc. Emerging research trends (qualitative and quantitative).

**CMN5160 POLITICAL USES OF MEDIA** (3cr.)
Critical review of key aspects of contemporary theory, research, and practice in political communication. Uses of traditional and emerging media by governments, politicians, and civil society (NGOs, activist groups and citizens) to communicate with their publics, influence public and policy agendas, effect social and political change, monitor public opinion, manage their reputation, and/or build networks of resistance. Impact of changing communication technologies on government media relations. Case studies.

**CMN5161 CONSTRUCTION OF SOCIAL REALITY BY THE MEDIA** (3cr.)
Study of the media strategies that aim to create the verisimilitude of everyday life. Analysis of the contemporary production of authenticity (or its simulation) in media genres such as televised reality shows, mock news shows, cringe comedy, and polemical documentaries.

**CMN5165 NEW DIRECTIONS IN JOURNALISM** (3cr.)
Theoretical and empirical studies of recent trends and changes in journalistic practices. Impact of social, economic and technological factors on journalism (e.g., commoditization of information, concentration of ownership, and digital media convergence). New socio-critical practices. Audience research.

**CMN5170 INTERNATIONAL COMMUNICATION** (3cr.)
Contemporary approaches to international communication. The role of traditional and emerging media, international institutions, governmental agencies, and NGOs. Analysis of problems related to participatory communication and alternative models.

**CMN5190 MEDIA, IDENTITY AND DIVERSITY** (3cr.)
Study of identity issues as seen through the prism of the media and relating to ethnicities, races, cultures, age groups, sexual orientations, genders, classes, abilities, language, religion, and value orientations. Study of the representations and challenges posed by “otherness” and diversity in an era of globalization and accelerated circulation of information.

**CMN5195 SPECIAL TOPICS** (3cr.)
In-depth examination of a topic in Communication.

**CMN5195 SPECIAL TOPICS** (3cr.)
In-depth examination of a topic in Communication.

**CMN5900 ÉTUDES DIRIGÉES EN COMMUNICATION / DIRECTED STUDIES IN COMMUNICATION** (3cr.)
Étude d'une problématique particulière ou approfondissement de ses connaissances dans un domaine des communications. Le sujet de recherche est déterminé et développé en consultation avec le professeur responsable. Le projet doit être différent de ce qui a pu être soumis dans d'autres cours. Limite d'un cours d'études dirigées par étudiant. Préalable: Permission du Comité des études supérieures. / Opportunity to study an area of particular interest or to pursue an interest in greater depth. Research topic to be selected and developed in consultation with the supervising professor. Should not repeat work submitted in other courses. Maximum of one directed studies course per student. Prerequisite: Permission of the Graduate Studies Committee.

**CMN5995 THÈMES SPÉCIAUX EN COMMUNICATION/SPECIAL TOPICS IN COMMUNICATION** (3cr.)
Étude approfondie d’un sujet en communication. / In-depth examination of a topic in Communication.

**CMN6001 STAGE COOP I / CO-OP WORK TERM I** (6cr.)
Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable :
admission au régime coop. / Prerequisite: admission to the co-op option.

CMN6992 STAGE COOP II / CO-OP WORK TERM II (6cr.)
Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : CMN6001 / Prerequisite: CMN6001

CMN6990 PROPOSITION DE RECHERCHE / RESEARCH PROPOSAL
Rédaction d’une proposition de thèse ou de mémoire conformément aux lignes directrices du département de communication. La proposition doit comprendre une récension critique, préparée en consultation avec le directeur ou la directrice de thèse ou de mémoire, des principaux travaux consacrés au sujet. Il faut dédier la proposition devant un comité consultatif constitué de la directrice ou du directeur et d’un autre professeur (pour le mémoire) ou de deux autres professeurs (pour la thèse). L’étudiant doit normalement satisfaire à cette exigence en une session. Si la proposition n’est pas terminée et/ou acceptée lors de cette première inscription, l’étudiant pourra s’inscrire à nouveau à la session suivante pour la terminer et/ou la présenter une deuxième fois. Si la proposition n’est pas approuvée lors de la deuxième soumission, une note de « non satisfaisant » sera attribuée pour la proposition et un retrait du programme s’imposera. Le cours est noté S/NS. Préalable: CMN5500 / Preparation of an MA thesis or research paper proposal, based on guidelines established by the department of communication. The proposal should include a thorough and critical review of literature on the research topic, prepared in consultation with the supervisor of the thesis or research paper. The proposal must be defended before an advisory committee consisting of the supervisor and one other professor (research paper) or two other professors (thesis). Students must normally satisfy this requirement in one session. If the proposal is not completed and/or accepted during the first session of registration the student may register for it again the following session to complete and/or submit it a second time. Failure to obtain approval on the second attempt leads to a grade of “not satisfactory” for the proposal and a mandatory withdrawal from the program. Graded S/NS. Prerequisite: CMN5500.

CMN6998 MÉMOIRE / RESEARCH PAPER
Préalable : CMN 6990 / Prerequisite: CMN 6990

CMN6999 THÈSE DE MAÎTRISE / MASTER’S THESIS
Préalable : CMN 6990 / Prerequisite CMN 6990

CMN8101 RESEARCH METHODS I (3cr.)
Epistemology and research methods in communication studies. Critical analysis of the various epistemological stances in communication. Review of various intellectual tools with a view to gaining an in-depth understanding of the various steps involved in a communication research process (from the research question to the selection of a methodological approach). Review of various research techniques (interviews, observations, life stories, focus groups, surveys, etc.)

CMN8102 RESEARCH METHODS II (3cr.)
Review and in-depth examination of various steps in the analysis of qualitative and/or quantitative data (from the transcription/coding of data to their visualisation/presentation). Emphasis on methods of analysis specific to qualitative data (discourse analysis, conversation analysis, semiotic analysis, etc.) and/or quantitative data (descriptive analysis, computer-assisted data analysis, web cookies analysis, etc.). Students are also led to develop critical thinking on the use of different methods of analysis in the area of communication research, and ultimately to take a position with regards to them. Prerequisite: CMN8101 or CMN8501

CMN8111 THEORIES IN MEDIA STUDIES (3cr.)
In-depth investigation of the epistemological underpinnings of both classical and contemporary theories in media studies in order to explore the potential problematics related to the student’s research programme. One of the key aspects of this exercise in theoretical thinking consists in establishing a link among the different methodological approaches as well as with the research experience and expertise of the Department’s faculty members. Upon conclusion of the course, students will be in a position to grasp the theoretical specificities of the discipline and to have developed a high degree of comfort with the various concepts and theories related to media studies.

CMN8112 ADVANCED THEORIES IN ORGANIZATIONAL COMMUNICATION (3cr.)
In-depth investigation of the epistemological underpinnings of both classical and contemporary theories in organizational communication in order to explore the potential problematics related to the student’s research programme. One of the key aspects of this exercise in theoretical thinking consists in establishing a link among the different methodological approaches as well as with the research experience and expertise of the Department’s faculty members. Upon conclusion of the course, students will be able to grasp the theoretical specificities of the discipline and will have developed a high degree of comfort with the various concepts and theories related to organizational communication.

CMN8130 SPECIAL TOPICS IN MEDIA STUDIES (3cr.)
Advanced examination through reading, group research, and class discussion of a particular area in media studies.

CMN8132 SPECIAL TOPICS IN ORGANIZATIONAL COMMUNICATION (3cr.)
Advanced examination through reading, group research, and class discussion of a particular area in organizational communication.

CMN9998 SÉMINAIRE DE DOCTORAT / DOCTORAL SEMINAR (3cr.)
L’objectif de ce séminaire est de favoriser l’émergence d’une communauté de chercheurs au sein du programme de doctorat. Le séminaire sert de tribune aux étudiants, qui présent une première ébauche de leur projet de thèse, et il favorise les échanges de points de vue théoriques et méthodologiques au sein des deux volets du programme (études des médias et communication organisationnelle). / The objective of the seminar is to promote the emergence of a research community within the doctoral program. The seminar will be a forum where students will present and discuss a first draft of their thesis proposal. The seminar will encourage both theoretical and methodological exchanges in the two streams of the program (media studies and organizational communication).
Computer Science

Ottawa-Carleton Joint Program

Students may include courses from both universities in their programs, and may select a supervisor from either university, but they should apply to the university with which their supervisor is associated. Their study program is administered by the university at which they are enrolled and is subject to its regulations.

Students who wish to pursue studies in computer science leading to the degree of Master of Computer Science (MCS) or Doctor of Philosophy in Computer Science (PhD) can do so in joint programs offered by the School of Electrical Engineering and Computer Science (EECS) at the University of Ottawa and the School of Computer Science at Carleton University under the auspices of the Ottawa-Carleton Institute for Computer Science (OCICS). The Institute is responsible for supervising these programs and for providing a framework for interaction between the universities in graduate computer science education. In addition to the faculty members from the two computer science programs, the Institute also has members with computer science expertise from other departments. The program includes a co-op option.

The MCS program includes several options:

- Master's with thesis option
- Master's with thesis option, Accelerated Stream
- Master's with thesis option, co-op
- Master's, non-thesis option
- Master's, non-thesis option, co-op

The degree awarded is the Master of Computer Science (MCS). Requests for information and application forms should be sent to the graduate secretaries handling the admission process.

The School of Computer Science is a participating unit in the collaborative program in bioinformatics at the master's level.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

Programs

Master of Computer Science

Master of Computer Science Specialization in Bioinformatics

Doctorate in Philosophy Computer Science

Admission

A master's degree in Computer Science (with thesis or equivalent in terms of scholarly publications) with a minimum of B+ (75%) average is required for admission into the PhD program.

Students who are currently registered in the master's program may, in exceptional cases, be permitted to fast-track into the PhD program without writing a master's thesis. The conditions are specified in the section “Transfer from master's to PhD” below.
Transfer from master’s to PhD

To transfer to the PhD program without being required to write a master’s thesis, the following conditions must be met:

- Completion of 5 graduate courses (15 credits) with a minimum average of A- (80%).
- Satisfactory progress in the research program.
- Written recommendation from the supervisor and the thesis advisory committee.
- Approval by the graduate studies committee, the vice-dean (graduate studies in the faculty), and the FGPS.

The student must request permission to fast-track during the fourth session of registration or earlier and must be registered in the PhD program in the fifth or, at the latest, in the sixth session. Following transfer, all of the requirements of the doctoral program must be met. The total number of course credits required is 24 (15 at master’s level plus 9 at PhD level).

Note that students in the Accelerated Stream of the MCS are not eligible for fast-track to the PhD.

Program Requirements

The requirements of the PhD program are as follows:

- A minimum of 9 three-credit courses in at least three of the four areas below:
  - Software Engineering (category E)
  - Theory of Computing (category T)
  - Computer Applications (category A)
  - Computer Systems (category S)
- CSI9901 and CSI9902, which require registration and the presentation of two seminars prior to submission of the thesis.
- A comprehensive examination involving breadth and depth components (CSI9998).
- A written thesis proposal defended at an oral examination (CSI9997).
- A research thesis defended at an oral examination (CSI9999).

The admissions committee and the student’s advisory committee may impose additional requirements according to the student’s background and research topic.

Duration of the program

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

Residence

PhD candidates who were admitted with a master’s degree or who transfer to the PhD after completing the three sessions of residency at the master’s must spend at least six sessions in residence. Those admitted directly to the PhD from an honour’s baccalaureate must spend at least nine sessions in residence at the beginning of the program.

NOTE: Students who have been awarded a fellowship, scholarship or bursary for the purpose of studying on a full-time basis are required to maintain full-time registration for the period for which they hold the award.

Minimum standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

Thesis advisory committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Engineering. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

The thesis examining board may include members who are not part of the TAC.

Courses

Courses are grouped according to the following categories:
Software Engineering (code E in the course list)
- Database and Knowledge-based Systems; Software Engineering; Software Translator and Language Design.

Theory of Computing (code T in the course list)
- Theory of Databases; Principle of Protocols; Complexity Theory; Algebraic Algorithms; Combinatorial Algorithms; Number-Theoretic and Geometric Algorithms; Automata Theory and Formal Languages.

Computer Applications (code A in the course list)
- Artificial Intelligence; Computer Graphics; Modelling and Simulation; Numerical Analysis; Optimization.

Computer Systems (code S in the course list)
- Specialized Architectures; Signal, Image and Speech Processing; Distributed Computing; Local and Wide Area Networks; Office Information Systems.

Software Engineering (code E in the course list)
CSI5111 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)

CSI5112 (COMP 5207) SOFTWARE ENGINEERING (3cr.)
Topics of current interest in Software Engineering, such as software development systems, structured systems analysis and design, management of software, software tools, validation and verification, programming environments.

CSI5113 (COMP 5001) FOUNDATIONS OF PROGRAMMING LANGUAGES (3cr.)
Advanced study of programming paradigms from a practical perspective. Paradigms may include functional, imperative, concurrent, distributed, generative, aspect- and object-oriented, and logic programming. Emphasis on underlying principles. Topics may include: types, modules, inheritance, semantics, continuations, abstraction and reflection.

CSI5115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
The dimensional and multidimensional data models for data warehousing. Data dependencies and decompostition. Structure and use of data definition and manipulation languages. Database economics, engineering, deployment and evolution. Issues in integrity, security, the Internet and distributed databases. Relationships to decision support systems. Prerequisite: CSI3317 or equivalent

CSI5118 (COMP 5302) AUTOMATED VERIFICATION AND VALIDATION OF SOFTWARE (3cr.)
Topics in formal test derivation methods, test management, high-level, CASE-based verification and validation, data-flow & control-flow measures and metrics for assessing quality of designs and code, regression analysis & testing. Prerequisite: a four-year undergraduate degree in computer science, computer engineering, or software engineering.

CSI5122 (COMP 5301) SOFTWARE USABILITY (3cr.)
Design principles and metrics for usability. Qualitative and quantitative methods for the evaluation of software system usability: Heuristic evaluation, usability testing, usability inspections and walkthroughs, cognitive walkthroughs, formal usability experimentation. Ethical concerns when performing studies with test users. Economics of usability. Integration of usability engineering into the software engineering lifecycle.

CSI5134 (COMP 5004) FAULT TOLERANCE (3cr.)
Hardware and software techniques for fault tolerance. Topics include modeling and evaluation techniques, error detecting and correcting codes, module and system level fault detection mechanisms, design techniques for, fault-tolerant and fail-safe systems, software fault tolerance through recovery blocks, N-version programming, algorithm-based fault tolerance, checkpointing and recovery techniques, and survey of practical fault-tolerant systems.

CSI5135 (COMP5209) INFORMATION VISUALIZATION AND VISUAL ANALYTICS (3cr.)
Principles, techniques, technology and applications of information visualization for visual data analysis. Topics include human visual perception, cognitive processes, static and dynamic models of image semantics, interaction paradigms, big data visual analysis case studies.

CSI5136 (COMP5110) COMPUTER SECURITY AND USBABILITY (3cr.)
Design and evaluation of security and privacy software with particular attention to human factors and how interaction design impacts security. Topics include current approaches to usable security, methodologies for empirical analysis, and design principles for usable security and privacy.

CSI5153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line-analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/implementations.

CSI5154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic
techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

CS15314 (COMP 5104) OBJECT-ORIENTED SOFTWARE DEVELOPMENT (3cr.)

CS15111 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)

CS17161 (COMP 6603) ADVANCED TOPICS IN PROGRAMMING SYSTEMS AND LANGUAGES (3cr.)

CS17314 (COMP 6104) ADVANCED TOPICS IN OBJECT-ORIENTED SYSTEMS (3cr.)
Advanced object-oriented software engineering, in particular the issues of reuse and testing. Sample topics include: interaction modeling; class and cluster testing; traceability; design patterns and testing; the C++ standard template library. Students will carry out research.

ELG6111 (SYSC 5101) DESIGN OF HIGH-PERFORMANCE SOFTWARE (3cr.)
Designing software to demanding performance specifications. Design analysis using models of computation, workload, and performance. Principles to govern design improvement for sequential, concurrent and parallel execution, based on resource architecture and quantitative analysis. Prerequisites: Engineering SYSC 5704 and a course in software engineering; or the equivalent.

ELG6113 (SYSC 5103) SOFTWARE AGENTS (3cr.)
Agent-based programming; elements of distributed artificial intelligence; beliefs, desires and intentions; component-based technology; languages for agent implementations; ontologies; KQML; autonomy; adaptability; security issues; mobility; standards; agent design issues and frameworks; applications in telecommunications. Prerequisites: Knowledge of Java, C/C+ or Smalltalk.

ELG6115 (SYSC 5105) SOFTWARE QUALITY ENGINEERING AND MANAGEMENT (3cr.)
All aspects of software quality engineering. Software testing, at all stages of the software development and maintenance life cycle. Software reviews and inspections. Use of software measurement and quantitative modelling for the purpose of software quality control and improvement. Precludes additional credit for CS15111 (COMP 5501). Prerequisites: an undergraduate course in software engineering such as SYSC 4800 or SEG 3300, or equivalent, and basic statistics.

ELG6178 (SYSC 5708) DEVELOPMENT OF REAL-TIME AND DISTRIBUTED SOFTWARE WITH REUSABLE COMPONENTS (3cr.)
Advanced object-oriented design and programming of real-time and distributed systems using C++ and/or Java. Object-oriented features; inheritance, polymorphism, templates, exception handling. Concurrency issues. Design patterns and frameworks for distributed systems, with examples from communication applications. Design issues for reusable software. Prerequisites: Knowledge of C++ and/or Java, of operating system concepts, and permission of the Department.

Theory of Computing (code T in the course list)

CS15100 (COMP 5306) DATA INTEGRATION (3cr.)
Materialized and virtual approaches to integration of heterogeneous and independent data sources. Emphasis on data models, architectures, logic-based techniques for query processing, metadata and consistency management, the role of XML and ontologies in data integration; connections to schema mapping, data exchange, and P2P systems. Prerequisite: COMP 3005 or equivalent.

CS15101 (COMP 5307) KNOWLEDGE REPRESENTATION (3cr.)
KR is concerned with representing knowledge and using it in computers. Emphasis on logic-based languages for KR, and automated reasoning techniques and systems; important applications of this traditional area of AI to ontologies and semantic web. Prerequisites: COMP 1805 and COMP 3005, or equivalents.

CS15102 (COMP 5308) TOPICS IN MEDICAL COMPUTING (3cr.)
Introductory course on data structures, algorithms, techniques, and software development related to medical computing (in particular spatial modeling). Topics may include: computational geometry algorithms for cancer treatment, medical imaging, spatial data compression algorithms, dynamic programming for DNA analysis. Precludes additional credit for COMP 5900 section ‘Y’ offered 2001-2002 to 2005-2006 inclusive.

CS15110 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
Methodologies in formal software specification, development, and verification. The use of theorem proving, automated deduction, and other related formal methods for software correctness. Applications in program verification, mobile code safety, and protocol verification.

CS15121 (COMP 5408) ADVANCED DATA STRUCTURES (3cr.)
Simple methods of data structure design and analysis that lead to efficient data structures for several problems. Topics include randomized binary search trees, persistence, fractional cascading, self-adjusting data structures, van Emde Boas trees, tries, randomized heaps, and lowest common ancestor queries.
CSI5126 (COMP 5108) ALGORITHMS IN BIOINFORMATICS (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including alignment and probabilistic models); genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell.
Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI3105 or (in case of graduate students) permission of the instructor.

CSI5127 (COMP 5409) APPLIED COMPUTATIONAL GEOMETRY (3cr.)
Computer-based representation and manipulation of geometric objects. Design and analysis of efficient algorithms for solving geometric problems in applied fields such as Computer-Aided Design and Manufacturing, Cartography, Materials Science, and Geometric Network Design.

CSI5148 (COMP 5103) WIRELESS AD HOC NETWORKING (3cr.)

CSI5149 (COMP 5007) GRAPHICAL MODELS (3cr.)
Bayesian networks, factor graphs, Markov random fields, maximum a posteriori probability (MAP) and maximum likelihood (ML) principles, elimination algorithm, sum-product algorithm, decomposable and non-decomposable models, junction tree algorithm, completely observed models, iterative proportional fitting algorithm, expectation-maximization (EM) algorithm, iterative conditional modes algorithm, variational methods, applications. Precludes credit for ELG5131 (EAGJ5131) and ELG7177 (EACJ 5605). Prerequisite: Permission of the program director.

CSI5152 (COMP5310) EVOLVING INFORMATION NETWORKS (3cr.)
Convergence of social and technological networks with WWW. Interplay between information content, entities creating it and technologies supporting it. Structure and analysis of such networks, models abstracting their properties, link analysis, search, mechanism design, power laws, cascading, clustering and connections with work in social sciences. Prerequisites: introductory-level background in networks, algorithms, and probability.

CSI5153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line-analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/implementations.

CSI5154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

CSI5161 (COMP 5606) PRINCIPLES OF DISTRIBUTED SIMULATION (3cr.)
Distributed simulation principles and practices. Synchronization protocols: Optimistic vs Conservative, Deadlock detection in conservative simulations, Time warp simulation. Distributed interactive simulation: Data distribution management, Interest management, High Level Architectures (HLA), Run Time Infrastructure (RTI). Distributed web-based simulation. Distributed agent based simulation. Real time applications of distributed simulation. Distributed and collaborative virtual simulations.

CSI5163 (COMP 5703) ALGORITHM ANALYSIS AND DESIGN (3cr.)
Topics of current interest in the design and analysis of computer algorithms for graph-theoretical applications; e.g. shortest paths, chromatic number, etc. Lower bounds, upper bounds, and average performance of algorithms. Complexity theory.

CSI5164 (COMP 5008) COMPUTATIONAL GEOMETRY (3cr.)
Study of design and analysis of algorithms to solve geometric problems; emphasis on applications such as robotics, graphics, and pattern recognition. Topics include: visibility problems, hidden line and surface removal, path planning amidst obstacles, convex hulls, polygon triangulation, point location.

CSI5165 (COMP 5709) COMBINATORIAL ALGORITHMS (3cr.)
Design of algorithms for solving problems that are combinatorial in nature, using both sequential and parallel models of computation. Parallel algorithms for enumerating basic combinatorial objects (permutations, combinations, set partitions) and for solving optimization problems (knapsack, minimal cover, branch-and-bound). Polymatroids, polygonal systems, enumeration and classification and benzenoid and coronoid hydrocarbons in chemistry. Combinatorial geometry (Voronoi diagrams, polytopes arrangements). Algorithmic problems in many-valued logics (base enumeration, tautology checking, minimization, finding the spectra).

CSI5166 (COMP 5805) APPLICATIONS OF COMBINATORIAL OPTIMIZATION (3cr.)
Topics in combinatorial optimization with emphasis on applications in Computer Science. Topics include network flows, various routing algorithms, polyhedral combinatorics, and the cutting plane method.

CSI5169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer, Media Access Control, Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery,
(Cannot be combined for credit with ELG 6168)

CS5173 (COMP 5203) DATA NETWORKS (3cr.)
Mathematical and practical aspects of design and analysis of communication networks. Topics include: basic concepts, layering, delay models, multi-access communication, queuing theory, routing, fault-tolerance, and advanced topics on high-speed networks, ATM, mobile wireless networks, and optical networks.

CS5174 (COMP 5604) VALIDATION METHODS FOR DISTRIBUTED SYSTEMS (3cr.)

CS5185 (COMP 5107) STATISTICAL AND SYNTACTIC PATTERN RECOGNITION (3cr.)
Topics include a mathematical review, Bayes decision theory, maximum likelihood and Bayesian learning for parametric pattern recognition, non-parametric methods including nearest neighbor and linear discriminants. Syntactic recognition of strings, substrings, subsequences and tree structures. Applications include speech, shape and character recognition.

CS5308 (COMP 5005) PRINCIPLES OF DISTRIBUTED COMPUTING (3cr.)
Formal models; semantics of distributed computations; theoretical issues in design of distributed algorithms; computational complexity; reducibility and equivalence of distributed problems. Related topics: systolic systems and computations, oligarchical systems and control mechanisms.

CS5390 (COMP 5005) LEARNING SYSTEMS FOR RANDOM ENVIRONMENTS (3cr.)
Computerized adaptive learning for random environments and its applications. Topics include a mathematical review, learning automata which are deterministic/stochastic, with fixed/variable structures, of continuous/discretized design, with ergodic/absorbing properties and of estimator families. Prerequisite(s): SYSC 5503 or equivalent.

CS5110 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
Methodologies in formal software specification, development, and verification. The use of theorem proving, automated deduction, and other related formal methods for software correctness. Applications in program verification, mobile code safety, and protocol verification.

CS5126 (COMP 5108) ALGORITHMS IN BIOINFORMATICS (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including alignment and probabilistic models), genomic rearrangement, phyllogenetic inference, computational proteomics and systems modelling of the whole cell. Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI3105 or (in case of graduate students) permission of the instructor.

CS5165 (COMP 5709) COMBINATORIAL ALGORITHMS (3cr.)
Design of algorithms for solving problems that are combinatorial in nature, using both sequential and parallel models of computation. Parallel algorithms for enumerating basic combinatorial objects (permutations, combinations, set partitions) and for solving optimization problems (knapsack, minimal cover, branch-and-bound). Polyminoes, polygonal systems, enumeration and classification and benzenoid and coronoid hydrocarbons in chemistry. Combinatorial geometry (Voronoi diagrams, polytopes arrangements). Algorithmic problems in many-valued logics (base enumeration, tautology checking, minimization, finding the spectra).

CS7160 (COMP 6601) ADVANCED TOPICS IN THE THEORY OF COMPUTING (3cr.)

CS7170 (COMP 6602) ADVANCED TOPICS IN DISTRIBUTED COMPUTING (3cr.)

Computer Applications (code A in the course list)
CS5100 (COMP 5306) DATA INTEGRATION (3cr.)
Materialized and virtual approaches to integration of heterogeneous and independent data sources. Emphasis on data models, architectures, logic-based techniques for query processing, metadata and consistency management, the role of XML and ontologies in data integration; connections to schema mapping, data exchange, and P2P systems. Prerequisite: COMP 3005 or equivalent.

CS5101 (COMP 5307) KNOWLEDGE REPRESENTATION (3cr.)
Knowledge is concerned with representing knowledge and using it in computers. Emphasis on logic-based languages for KR, and automated reasoning techniques and systems; important applications of this traditional area of AI to ontologies and semantic web. Prerequisites: COMP 1805 and COMP 3005, or equivalents.

CS5102 (COMP 5308) TOPICS IN MEDICAL COMPUTING (3cr.)
Introductory course on data structures, algorithms, techniques, and software development related to medical computing (in particular spatial modeling). Topics may include: computational geometry algorithms for cancer treatment, medical imaging, spatial data compression algorithms, dynamic programming for DNA analysis. Precludes additional credit for COMP 5900 section "Y" offered 2001-2002 to 2003-2006 inclusive.

CS5105 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks. Prerequisites: familiarity with basic
Specialized topics in security including advanced authentication techniques, user interface aspects, electronic and digital signatures, security infrastructures and protocols, software vulnerabilities affecting security, non-secure software and hosts, protecting software and digital content. **Prerequisites**: Basic course in Statistics or permission of the program director.

**CSIS124 (COMP 5204) COMPUTATIONAL ASPECTS OF GEOGRAPHIC INFORMATION SYSTEMS** (3cr.)
Computational perspective of geographic information systems (GIS). Data representations and their operations on raster and vector devices: e.g., quadtrees, grid files, digital elevation models, triangular irregular network models. Analysis and design of efficient algorithms for solving GIS problems: visibility queries, point location, facility location.

**CSIS126 (COMP 5108) ALGORITHMS IN BIOINFORMATICS** (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including alignment and probabilistic models), genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell. **Prerequisites**: CSI 3105, COMP 3804 or equivalent. **Prerequisite**: CSI3105 or (in case of graduate students) permission of the instructor.

**CSIS128 (COMP 5002) SWARM INTELLIGENCE** (3cr.)
Collective computation, collective action, and principles of self-organization in social agent systems. Algorithms for combinatorial optimization problems, division of labour, task allocation, task switching, and task sequencing with applications in security, routing, wireless and ad hoc networks and distributed manufacturing.

**CSIS129 (COMP 5305) ADVANCED DATABASE SYSTEMS** (3cr.)
In-depth study on developments in database systems shaping the future of information systems, including complex object, object-oriented, object-relational, and semi-structured databases. Data structures, query languages, implementation and applications.

**CSIS136 (COMP5110) COMPUTER SECURITY AND USABILITY** (3cr.)
Design and evaluation of security and privacy software with particular attention to human factors and how interaction design impacts security. Topics include current approaches to usable security, methodologies for empirical analysis, and design principles for usable security and privacy.

**CSIS146 (COMP 5402) COMPUTER GRAPHICS** (3cr.)

**CSIS147 (COMP 5201) COMPUTER ANIMATION** (3cr.)

**CSIS151 (COMP 5205) VIRTUAL ENVIRONMENTS** (3cr.)

**CSIS152 (COMP3510) EVOLVING INFORMATION NETWORKS** (3cr.)
Convergence of social and technological networks with WWW. Interplay between information content, entities creating it and technologies supporting it. Structure and analysis of such networks, models abstracting their properties, link analysis, search, mechanism design, power laws, cascading, clustering and connections with work in social sciences. **Prerequisites**: introductory-level background in networks, algorithms, and probability.

**CSIS153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE** (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/implementations.

**CSIS154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE** (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

**CSIS157 (COMP5210) HUMAN-COMPUTER INTERACTION MODELS, THEORIES, AND FRAMEWORKS** (3cr.)
A basis for graduate study in HCI with an emphasis on the application of theory to user interface design. Review of main theories of human behaviour relevant to
HCL, including especially Cognitive Dimensions of Notations Framework, Mental Models, Distributed Cognition, and Activity Theory, and their application to design and development of interactive systems.

CSI5168 (COMP 5309) DIGITAL WATERMARKING (3cr.)
Overview of recent advances in watermarking of image, video, audio, and other media. Spatial, spectral, and temporal watermarking algorithms. Perceptual models. Use of cryptography in steganography and watermarking. Robustness, security, imperceptibility, and capacity of watermarking. Content authentication, copy control, intellectual property, digital rights management, and other applications. Prerequisites: ELG 4172 or CEG 4311 or CSI 4133 or equivalent.

CSI5175 MOBILE COMMERCE TECHNOLOGIES (3cr.)
Wireless devices support for m-commerce; m-commerce architectures and applications; mobile payment support systems; business models; mobile devices and their operating systems; mobile content presentation; security issues and solutions; relevant cross layer standards and protocols; case studies. Exclusion: EBC5175

CSI5180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)
A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive systems. Assignments will be both (a) programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special topics in current A.I. journals.

CSI5183 (COMP 5206) EVOLUTIONARY COMPUTATION AND ARTIFICIAL LIFE (3cr.)
Study of algorithms based upon biological theories of evolution, applications to machine learning and optimization problems. Possible topics: Genetic Algorithms, Classifier Systems, and Genetic Programming. Recent work in the fields of Artificial Life (swarm intelligence, distributed agents, behavior-based AI) and of connectionism. Precludes additional credit for COMP 4107.

CSI5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

CSI5386 (COMP 5505) NATURAL LANGUAGE PROCESSING (3cr.)
Definitions, applications, challenges, lexicons, thesauri, corpora and other linguistic resources. Morphological analysis; tagging. Selected syntactic theories: phrase structure grammars, unification-based grammars. Parsing techniques: chart, deterministic parsing, logic grammars. Selected semantic representations: logic, logical forms, conceptual graphs. Elements of semantic and pragmatic analysis: reference, scope, focus. Elements of statistical language processing and text mining. Introduction to corpus linguistics. Term projects, one on syntax and one on semantics, will be done in Prolog and logic grammars. Prerequisite: CSI4106 or permission of the instructor

CSI5387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)

CSI5388 (COMP 5801) TOPICS IN MACHINE LEARNING (3cr.)
Prerequisite: CSI4106 or or permission of instructor

CSI5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

CSI5126 (COMP 5108) ALGORITHMS IN BIOINFORMATICS (3cr.)
Fundamental mathematical and algorithmic concepts underlying computational molecular biology; physical and genetic mapping, sequence analysis (including alignment and probabilistic models), genomic rearrangement, phylogenetic inference, computational proteomics and systems modelling of the whole cell. Prerequisites: CSI 3105, COMP 3804 or equivalent. Prerequisite: CSI3105 or (in case of graduate students) permission of the instructor.

CSI5180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)
A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive systems. Assignments will be both (a) programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special topics in current A.I. journals.

CSI5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

CSI5387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)
networks for representing and learning concepts. Knowledge-intensive concept learning. Introduction to the formal theory of concept learnability. Instance-based learning. Selected applications of data mining and concept learning. Prerequisite: CSI 4106 or permission of the program director.

CS1538G (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

CS17162 (COMP 6604) ADVANCED TOPICS IN COMPUTER APPLICATIONS (3cr.)

Computer Systems (code S in the course list)

CS15105 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks. Prerequisites: familiarity with basic concepts in networks, network security, and applied cryptography. For example, relevant background courses may include the following (or equivalents): CEG 4185 or COMP 3203 and/or CSI 4138 or CEG 4394 or COMP 4108, and/or CSI 4108 or ELG 5373 or COMP 4109.

CS15116 (COMP 5407) AUTHENTICATION AND SOFTWARE SECURITY (3cr.)
Specialized topics in security including advanced authentication techniques, user interface aspects, electronic and digital signatures, security infrastructures and protocols, software vulnerabilities affecting security, non-secure software and hosts, protecting software and digital content. Prerequisites: Basic course in Statistics or permission of the program director.

CS15129 (COMP 5305) ADVANCED DATABASE SYSTEMS (3cr.)
In-depth study on developments in database systems shaping the future of information systems, including complex object, object-oriented, object-relational, and semi-structured databases. Data structures, query languages, implementation and applications.

CS15131 (COMP 5704) PARALLEL ALGORITHMS AND APPLICATIONS IN BIOINFORMATICS (3cr.)
Multiprocessor architectures from an application programmer's perspective: programming models, processor clusters, multi-core processors, GPUs, algorithmic paradigms, efficient parallel problem solving, scalability and portability. Projects on high performance computing in Data Science, incl. data analytics, bioinformatics, simulations. Programming experience on parallel processing equipment. Prerequisite: COMP 3804 or equivalent.

CS15134 (COMP 5004) FAULT TOLERANCE (3cr.)
Hardware and software techniques for fault tolerance. Topics include modeling and evaluation techniques, error detecting and correcting codes, module and system level fault detection mechanisms, design techniques for, fault-tolerant and fail-safe systems, software fault tolerance through recovery blocks, N-version programming, algorithm-based fault tolerance, checkpointing and recovery techniques, and survey of practical fault-tolerant systems.

CS15142 (COMP 5402) PROTOCOLS FOR MOBILE AND WIRELESS NETWORKS (3cr.)
Link and network layer protocols of wireless networks; applications of wireless networks may be discussed. Topics may include: protocol implementation, mobile IP, resource discovery, wireless LANs/PANs, and Spread spectrum. Precludes additional credit for SYSC 5306.

CS15147 (COMP 5201) COMPUTER ANIMATION (3cr.)

CS15148 (COMP 5103) WIRELESS AD HOC NETWORKING (3cr.)

CS15153 (COMP 5111) DATA MANAGEMENT FOR BUSINESS INTELLIGENCE (3cr.)
Data management problems and information technology in decision making support in business environments. Topics include advanced data modeling, semantic modeling, multidimensional databases and data warehousing, on-line analytical processing, elements of data mining, context in data management, data quality assessment, data cleaning, elements of business process modeling. This course emphasizes concepts and techniques rather than specific applications or systems/implementations.

CS15154 (COMP 5112) ALGORITHMS FOR DATA SCIENCE (3cr.)
Algorithmic techniques to handle (massive/big) data arising from, for example, social media, mobile devices, sensors, financial transactions. Algorithmic techniques may include locality-sensitive hashing, dimensionality reduction, streaming, clustering, VC-dimension, external memory, core sets, link analysis and recommendation systems.

CS15161 (COMP 6606) PRINCIPLES OF DISTRIBUTED SIMULATION (3cr.)
Distributed simulation principles and practices. Synchronization protocols: Optimistic vs Conservative, Deadlock detection in conservative simulations, Time warp simulation. Distributed interactive simulation: Data distribution management, Interest management, High Level Architectures (HLA), Run Time Infrastructure (RTI). Distributed web-based simulation. Distributed agent based simulation. Real time applications of distributed simulation. Distributed and
collaborative virtual simulations.

**CS15168 (COMP 5309) DIGITAL WATERMARKING** (3cr.)
Overview of recent advances in watermarking of image, video, audio, and other media. Spatial, spectral, and temporal watermarking algorithms. Perceptual models. Use of cryptography in steganography and watermarking. Robustness, security, imperceptibility, and capacity of watermarking. Content authentication, copy control, intellectual property, digital rights management, and other applications. **Prerequisites:** ELG 4172 or CEG 4311 or CSI 4133 or equivalent.

**CS15169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING** (3cr.)
Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer, Media Access Control, Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery, Clustering, Multicasting, Localization, Mobile IP/TCP (Internet Protocol/Transmission Control Protocol), File Systems, Mobility Models, Wireless Applications. **(Cannot be combined for credit with ELG 6168)**

**CS15173 (COMP 5203) DATA NETWORKS** (3cr.)
Mathematical and practical aspects of design and analysis of communication networks. Topics include: basic concepts, layering, delay models, multi-access communication, queuing theory, routing, fault-tolerance, and advanced topics on high-speed networks, ATM, mobile wireless networks, and optical networks.

**CS15174 (COMP 5604) VALIDATION METHODS FOR DISTRIBUTED SYSTEMS** (3cr.)

**CS15175 MOBILE COMMERCE TECHNOLOGIES** (3cr.)
Wireless networks support for e-commerce; m-commerce applications and architectures; mobile payment support systems; business models; mobile devices and their operating systems; mobile content presentation; security issues and solutions; relevant cross-layer standards and protocols; case studies. **Exclusion:** EBC5175

**CS15185 (COMP 5107) STATISTICAL AND SYNTACTIC PATTERN RECOGNITION** (3cr.)
Topics include a mathematical review, Bayes decision theory, maximum likelihood and Bayesian learning for parametric pattern recognition, non-parametric methods including nearest neighbor and linear discriminants. Syntactic recognition of strings, substrings, subsequences and tree structures. Applications include speech, shape and character recognition.

**CS15308 (COMP 5003) PRINCIPLES OF DISTRIBUTED COMPUTING** (3cr.)
Formal models; semantics of distributed computations; theoretical issues in design of distributed algorithms; computational complexity; reducibility and equivalence of distributed problems. Related topics: systolic systems and computations, oligarchical systems and control mechanisms.

**CS15311 (COMP 5101) DISTRIBUTED DATABASES AND TRANSACTION PROCESSING SYSTEMS** (3cr.)
Principles involved in the design and implementation of distributed databases and distributed transaction processing systems. Topics include: distributed and multi-database system architectures and models, atomicity, synchronization and distributed concurrency control algorithms, data replication, recovery techniques, and reliability in distributed databases.

**CS15312 (COMP 5102) DISTRIBUTED OPERATING SYSTEMS** (3cr.)
Design issues of advanced multiprocessor distributed operating systems: multiprocessor system architectures; process and object models; synchronization and message passing primitives; memory architectures and management; distributed file systems; protection and security; distributed concurrency control; deadlock; recovery; remote tasking; dynamic reconfiguration; performance measurement, modeling, and system tuning.

**CS15380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE** (3cr.)
Content and transactions in e-commerce systems. System architecture with a focus on frameworks, tools and development process. Application frameworks. Information management. Security, standards, and regulatory compliance. Current research issues. Hands-on experience with an integrated set of current e-commerce tools. E-commerce development project. **Prerequisite:** CS15389

**CS15389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES** (3cr.)

**CS15380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE** (3cr.)
Content and transactions in e-commerce systems. System architecture with a focus on frameworks, tools and development process. Application frameworks. Information management. Security, standards, and regulatory compliance. Current research issues. Hands-on experience with an integrated set of current e-commerce tools. E-commerce development project. **Prerequisite:** CS15389

**CS15389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES** (3cr.)

**CS17131 (COMP 6100) ADVANCED PARALLEL AND SYSTOLIC ALGORITHMS** (3cr.)
Continuation of COMP 5704.

**CS17163 (COMP 6605) ADVANCED TOPICS IN COMPUTER SYSTEMS** (3cr.)

**CS17170 (COMP 6602) ADVANCED TOPICS IN DISTRIBUTED COMPUTING** (3cr.)

**Theses and Projects**

**CS15140 (COMP 5900) SELECTED TOPICS IN COMPUTER SCIENCE** (3cr.)
Selected topics, not covered by other graduate courses. Details will be available from the School at the time of registration.

**CS15900 (COMP 5902) PROJETS DE RECHERCHE EN INFORMATIQUE / GRADUATE PROJECTS IN COMPUTER SCIENCE** (3cr.)

**CS15901 (COMP 5901) ÉTUDES DIRIGÉES / DIRECTED STUDIES** (3cr.)
A course of independent study under the supervision of a member of the School of Computer Science.

**CS15902 (COMP 5904) COLLOQUE / SEMINAR** (3cr.)
To complete this course, the student must attend 5 graduate seminars at Carleton, and 5 at SITE within a year. The student must also make one presentation in the context of this graduate seminar.

**CS15903 STAGE EN COMMERCE ÉLECTRONIQUE/ ELECTRONIC COMMERCE WORK TERM** (3cr.)
Expérience en milieu de travail. Noté: S (satisfaisant)/ NS (non satisfaisant) selon les résultats du rapport écrit et l'évaluation de l'employeur. / Practical experience. S (satisfactory) / NS (not satisfactory) grade, to be based on the grades obtained for the written report as well as on the evaluations of the employer. Préalable: Être accepté au programme de certificat en commerce électronique (option technologie) et recevoir la permission du Comité du programme. / Prerequisites: Acceptance in the Graduate Certificate in e-Commerce (Technology Option) and permission of the Program Committee.

**CS16001 STAGE COOP I / CO-OP WORK TERM I** (6cr.)
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

**CS16002 STAGE COOP II / CO-OP WORK TERM II** (6cr.)
Expérience en milieu de travail. Noté P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l'évaluation du superviseur de stage. / Experience in a workplace setting. Graded P (pass) / F (fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

**CS16900 (COMP 5903) PROJETS DE RECHERCHE INTENSIVE EN INFORMATIQUE / INTENSIVE GRADUATE PROJECTS IN COMPUTER SCIENCE** (6cr.)
Cours de six crédits échelonnant sur une période de deux sessions. L'envergure du projet de recherche exigé dans ce cours est deux fois plus grande que dans le cas de CSI 5900. Les cours CSI 6900 et CSI 5900 sont mutuellement exclusifs. Cours ouvert uniquement aux étudiants inscrits à la maîtrise sans thèse / A two-session course. The project is twice the scope of projects in CSI 5900. Not to be combined for credit with CSI 5900. Not to be taken in the thesis option.

**CS17161 (COMP 6603) ADVANCED TOPICS IN PROGRAMMING SYSTEMS AND LANGUAGES** (3cr.)

**CS17900 (COMP 6902) PROJETS DE RECHERCHE EN INFORMATIQUE / GRADUATE PROJECTS IN COMPUTER SCIENCE** (3cr.)

**CS17901 (COMP 6901) ÉTUDES DIRIGÉES / DIRECTED STUDIES** (3cr.)

**CS17999 (COMP 5905) THÈSE DE MAÎTRISE EN INFORMATIQUE / MASTER OF COMPUTER SCIENCE THESIS**

**CS19901 COLLOQUE / SEMINAR**

**CS19902 COLLOQUE / SEMINAR**

**CS19997 (COMP 6908) PROPOSITION DE THÈSE DE DOCTORAT / DOCTORAL THESIS PROPOSAL**
Within 8 terms following initial registration in the program, a document generally defining the problem addressed, relating it to the literature, and outlining the hypotheses, goals, research methodology, initial results and validation approach must be submitted to an examination committee and successfully defended.
CSI9998 (COMP 6907) EXAMEN GÉNÉRAL DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION
A committee must be assembled and approve at least 3 topics for written examination: typically, a major and two minor areas. An oral examination occurs if the written exam is passed. Both elements must take place within the first 4 terms following initial registration in the program. The comprehensive may be failed, passed conditionally (i.e., with extra course requirements) or passed unconditionally. If failed this course may be retaken at most one time.

CSI9999 (COMP 6909) THÈSE DE DOCTORAT / PhD THESIS

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design: analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

**Conflict Studies**

The Faculty of Human Sciences (FHS) at Saint Paul University offers an MA and a PhD in Conflict Studies. The degrees are conferred jointly by the senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The programs explore the meaning of and generate processes for reconciliation, healing, and structural change. They combine a social science orientation common to Conflict Studies programs with a philosophical, ethical and theological orientation. The field of specialization is ethnic and religious dimensions of conflict in Canada.

These bilingual (English-French) programs cater to students from both academic and professional backgrounds. They are offered on a full-time basis.

Program objectives:

- Analysis
  - To explore the connections between conflict, violence, social justice, conflict resolution and peacebuilding in human communities.
- Training
  - To develop the attitudes, knowledge, research and skills necessary to analyze ethnic and religious dimensions of conflicts so as to cultivate peace.
- Outcomes
  - To produce graduates who are competent in:
    - Analyzing ethnic and religious dimensions of conflicts in a multidisciplinary perspective; and
    - Devising and evaluating appropriate conflict resolution strategies.

Two levels of learning are distinguished in the MA program:

- Foundational Level: this level entails intensive study of major themes in Conflict Studies. Graduate training is initiated in research skills and methodologies in preparation for the research project.
- Advanced Level: this level of study concentrates on the development of specific dimensions of conflict studies. Research seminars meet to define the problem, purpose, scope and methodology of the master’s research project.

Students are encouraged to consult the list of professors and their areas of interest which are posted on the FHS website to determine whom they might want to ask to serve as a supervisor for their research work.

The programs operate within the framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS), which are posted on the FGPS website.

**Programs**

Master of Arts Conflict Studies

Doctorate in Philosophy Conflict Studies
Admission

To be considered for admission, applicants must:

- Have achieved a minimum average of 75% (B+) calculated in accordance with FGPS guidelines;
- Provide three confidential letters of recommendation;
- Provide a CV and a statement of purpose outlining their career goals;
- Identify at least one professor in the program whose research interests correspond to theirs;
- Provide a detailed draft of their proposed research project.

Fast-track from the Masters to the PhD program

Students enrolled in the MA program in Conflict Studies at Saint Paul University may be allowed to fast-track to the PhD program without having completed the MA thesis, provided that they meet the following conditions:

- have completed the last two years of their undergraduate studies with a minimum of an A- average;
- have completed six of the seven compulsory courses in the MA program, 18 credits, with a grade equal to or greater than A- for each of these courses;
- have demonstrated satisfactory progress in their research program;
- have a written recommendation from the proposed PhD thesis supervisor;
- have approval from the Graduate Studies Committee of the Faculty of Human Sciences.

Students must make a written request to fast-track at the beginning of their fourth session of registration or earlier, and, if approved, must register for the PhD in their fifth session at the latest. Once in the PhD program all program requirements must be met.

Language Requirements

It is required to demonstrate an active knowledge of either English or French, and the capacity to comprehend and read in the other language. Language proficiency may be demonstrated by providing any of the following:

- proof of having studied for at least three years (full time) in a high school, college or university in Canada or elsewhere where the language of instruction was exclusively English or French;
- a minimum TOEFL score of 600 on the paper-based test (or 250 on the computer-based test) with a minimum writing score of 4.5; IBT 100 (writing: 24);
- an IELTS score of 7 (writing: 6.5);
- an average score of 4.5 in listening/ reading, and a score of 4.0 in writing on the CanTEST (for English) or the TESTCan (for French) administered by the University of Ottawa.

The Faculty of Human Sciences (FHS) reserves the right to conduct an interview to determine an applicant’s language level. If a student’s doctoral research requires knowledge of a language other than French or English, the FHS may require proof of such knowledge.

In accordance with Saint Paul University regulations, students have the right to submit their work, their thesis, and to answer examination questions in French or in English.

Program Requirements

The requirements of the PhD program in Conflict Studies include successful completion of 15 credits of coursework, a comprehensive examination and a thesis.

- Compulsory Courses (9 credits)
  - ECS8901 SEMINAIRE DE DOCTORAT I / DOCTORAL SEMINAR I (3cr.)
  - ECS8902 SEMINAIRE DE DOCTORAT II / DOCTORAL SEMINAR II (3cr.)
  - ECS8903 METHODOLOGIE DE RECHERCHE / RESEARCH METHODOLOGY (3cr.)
- Elective Courses (6 credits)
  - Two (2) elective courses (6 credits) from the list of graduate courses from the Conflict Studies program at Saint Paul University, from other programs at Saint Paul University or at another university.
  - Students may also choose ECS8911 LECTURES ET RECHERCHES DIRIGÉES / SELECTED READINGS AND RESEARCH (3cr.) as one of their two elective courses. Course selection is subject to the approval of the program director.
- ECS9997 PROJET DE THÈSE / THESIS PROPOSAL
  - The Thesis proposal must be submitted to the Thesis Advisory Committee for evaluation and approval before the end of the fifth session. In the event of failure, the proposal can be resubmitted and defended the following session at the latest. A second failure
leads to withdrawal from the program. The proposal must be approved by the Research Ethics Board before undertaking data collection.

- ECS9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION
  - The comprehensive exam allows students to demonstrate their mastery of the content of the courses as well as their ability to integrate and apply their knowledge to conflict situations. In the event of failure, the proposal can be resubmitted and defended the following session at the latest. A second failure leads to withdrawal from the program. The comprehensive examination, which includes a written and an oral component, must be completed within 24 months of initial registration in the program. The procedures for the comprehensive exam are found in the Doctoral Student Guide in Conflict Studies, available under the heading “Handbooks for Students” on the FHS web page.

- ECS9999 THÈSE DE DOCTORAT / PhD THESIS

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students fast-tracked from the master’s to the doctorate.

Residence

All students must complete a minimum of six sessions of full-time registration at the beginning of the program, or seven sessions in the case of students fast-tracked from the master’s.

Minimum standards

The passing grade in all courses is 70% (B). Students who fail two courses (equivalent to 6 credits), the comprehensive exam, the thesis proposal, the thesis or whose progress is deemed unsatisfactory must withdraw from the program.

Thesis Advisory Committee

A thesis advisory committee will be formed during the first session in the program, in consultation with the student based on potential thesis topics proposed in the initial application to the program. The thesis advisory committee will be composed of the supervisor and two additional professors who have agreed to offer the student support and direction throughout their doctoral studies. At least two members of the committee must be from the School of Conflict Studies. The composition of the committee is finalized at the end of the first year of the program. By the end of the third session, the student in consultation with the thesis supervisor must register the thesis topic with the Faculty of Graduate and Postdoctoral Studies.

Courses

All courses listed, with the exception of the thesis, are worth 3 credits and may be offered either in the fall or the winter session.

**ECS5101 IDENTITY-BASED CONFLICT** (3cr.)
Theoretical concepts to understand the dynamics of religious and ethnic conflicts. Application of these concepts to particular situations. Religion, ethnicity, gender, class, and other identity signifiers. Human identity needs, mimetic theory, and structures of domination. Ethno-nationalist movements and victimization.

**ECS5103 RESEARCH METHODS** (3cr.)
Critical evaluation of research findings in the human sciences. Qualitative and quantitative methods of gathering, validating, and interpreting evidence. Issues in research ethics. Applications in graduate research projects and theses.

**ECS5110 HISTORY OF CONFLICT RESOLUTION** (3cr.)
Conflict resolution approaches and institutions created over time in different regions of the world. Traditional dispute resolution mechanisms. State and law. Democratic institutions. Third party involvement and promotion of peace.

**ECS5112 TRAUMA, HEALING AND RECONCILIATION** (3cr.)
Violence and trauma in the context of identity-based conflicts. Emotional, spiritual, physical and cognitive dimensions of the human person. Reconciliation, forgiveness and trauma healing.

**ECS5114 GENOCIDE AND RECONCILIATION** (3cr.)
Degeneration of conflicts into unforgettable and unforgivable atrocities. Causes, mechanisms, attitudes leading to extreme mass violence. Role of faith in healing memories. Case study of genocides in Germany, South Africa, Rwanda and among indigenous peoples in North and South America.

**ECS5116 POLITICAL ECONOMY OF CONFLICT** (3cr.)
Influence of development and allocation of economic resources on political conflict, including ethnic and religious strife. Influence of globalization on the propensity of societies toward violence.
ECS5118 CONTEMPORARY PEACEBUILDING (3cr.)
National and international policies and programs designed to eliminate the causes of violent conflict and prevent their re-emergence. Dialogue and reconciliation. Political and economic reforms. Local development and empowerment.

ECS5119 MEDIATION AND NEGOTIATION: THEORY AND RESEARCH (3cr.)
Theoretical and empirical aspects of strategies and processes of mediation and negotiation. Critical examination of contemporary approaches to mediation and negotiation. Cases of successful or unsuccessful negotiations. Roles, capacities and motivations of parties.

ECS5120 SELECTED TOPICS IN CONFLICT STUDIES (3cr.)

ECS5131 CONFLICT RESOLUTION: ANALYSIS AND DESIGN (3cr.)
Basic conflict analysis design and methodologies in intervention strategies for dealing with identity-based conflict. Sequencing, timing and other contingencies due to emotional factors. Case presentations. Ethical questions related to planning of conflict resolution strategies.

ECS5140 THE ADAPTIVE LEADER (3cr.)
Using psychological theories of the development of consciousness, this course explores how leaders can adapt to complex environments. An integral approach is used to develop a methodology to systematically reflect on practical challenges in order to refine intentions, strategies and actions.

ECS5141 THE COMPREHENSIVE APPROACH TO COMPLEX OPERATIONS (3cr.)
The Comprehensive Approach, within international and domestic security environments, enables the student to better understand the capabilities and constraints of a variety of institutions within today's operational environments. Competencies are enhanced in achieving greater integration of effort among personnel and their organizations as more lasting solutions are generated to the complex challenges of international missions.

ECS5142 COMPLEXITY THINKING FOR INTEGRATIVE PEACEBUILDING (3cr.)
Both conflict and peacebuilding take place within complex adaptive systems with many variables. This course explores the characteristics of chaos, complexity and emerging creativity theories and how they assist in understanding the multi-dimensional dynamics of peacebuilding.

ECS5143 INTERCULTURAL AND INTER-RELIGIOUS ENGAGEMENT (3cr.)
Cultural competency is needed to be effective within host communities. Students will learn to identify dynamics of tensions between religious, national, economic, and ideological components of conflicts; to analyze reasons for various kinds of exclusivist and intolerant attitudes and to integrate the religious component into peacebuilding, development initiatives, and whole-of-government programming.

ECS5144 PEACEBUILDING, IDENTITY-BASED CONFLICT AND RECONCILIATION (3cr.)
The challenge of peacebuilding is situated in the context of historically driven, deep-rooted conflicts between identity-groups. Students will learn to use theoretical frameworks to analyze conflict and advance reconciliation. The dialectical relationship between peacebuilding and social and political reconciliation will be explored, emphasizing trust-building, structural change, symbolic conciliatory gestures, and socio-emotional transformation.

ECS5302 APPROACHES TO CONFLICT AND SOCIAL JUSTICE (3cr.)
Approaches employed to analyze conflict and to build peace with social justice. Contemporary theories from political sciences, social psychology, and theology addressing conflict and social justice.

ECS5304 ETHICAL DIMENSIONS OF CONFLICT (3cr.)
Conceptual and procedural ethical issues concerning norms of justice and reconciliation. Relation of ethical issues to self-other dialectics, dynamics of discourse and power, gender and class, memory and agency.

ECS5311 RELIGIOUS IDENTITIES AND CONFLICT (3cr.)
Implication of religious identities, traditions and actors in escalating, diverting or transforming deep-rooted conflicts in different societies. Comparative multi-religious framework. Sociology of religion and contextual theological hermeneutics.

ECS5313 SPIRITUALITY AND CONFLICT (3cr.)
Impact of conflict on spirituality and of spirituality on conflict. Part played in conflict by the spiritual life and convictions of those involved.

ECS5315 GENDER AND CONFLICT (3cr.)
Multidisciplinary examination of cases of domination and marginalization. Social and cultural constructions of gender. Role of these constructs in structures of domination. Challenges met in transforming these structures.

ECS5316 INDIGENOUS CULTURES, CONFLICT AND COEXISTENCE (3cr.)
Implication of indigenous identities in the emergence and transformation of conflicts. Ethnic and religious dimensions of indigenous cultural resurgence in Canada and other national contexts. Conflict reduction and pluralistic coexistence.

ECS5330 CONFLICT RESOLUTION: RESULTS ASSESSMENT (3cr.)
Hermeneutical and empirical methodologies used to analyze and evaluate conflict resolution strategies, conflict resolution projects and programs. Case study presentations.
ECS5333 DIALOGUE: THEORY AND RESEARCH (3cr.)
Dialogue as exploration of hidden assumptions and the flow of ideas. Conflict as a rupture of dialogue within oneself or between people. Theoretical background and research to understand processes needed for a dialogue to achieve deeper levels of mutual understanding among participants.

ECS9821 STAGE DE RECHERCHE / RESEARCH INTERNSHIP
Stage de 150 heures en analyse et/ou résolution des conflits impliquant un travail de recherche et d'analyse avancé et soutenu. Le stage est supervisé et le travail évalué par un professeur membre du programme. Noté S/NS. Réservé aux étudiants du programme de M.A. Préalables : Réussite de 9 crédits du programme de M.A., avec une moyenne d'au moins B+. Approbation de la proposition de stage par le directeur de programme. / Internship of 150 hours in Conflict analysis and/or resolution, involving advanced and sustained research and analysis work. The internship is supervised and the work evaluated by a professor member of the program. Graded S/NS. Reserved for students in the MA program. Prerequisites: Completion of 9 credits in the MA program with an average of at least B+. Approval of the internship proposal by the program director.

ECS6184 RESEARCH SEMINAR (3cr.)

ECS6999 THÈSE DE M.A. / MA THESIS

ECS8901 SÉMINAIRE DE DOCTORAT I / DOCTORAL SEMINAR I (3cr.)
Séminaire visant l’atteinte par les étudiants des objectifs suivants : approfondissement des connaissances des quatre thèmes du programme de doctorat (les dimensions ethniques, religieuses, morales et sociales des conflits); développement de la capacité d’analyser et d’évaluer de façon critique les théories, ainsi que la capacité d’examiner de façon critique les théories, concepts et hypothèses sur lesquels s’appuient tant l’analyse des conflits que les pratiques de résolution de conflits, le tout en rapport avec les intérêts de recherche propres à l’étudiant. Préalable : Une connaissance active du français ou de l’anglais et la capacité de comprendre et de lire dans l’autre langue. / Seminar aimed at enabling students to achieve the following objectives: gain expertise in the four themes of the PhD program (ethnic, religious, moral and social dimensions of conflict); develop the ability to analyze and evaluate critically the theories, concepts and assumptions underlying conflict analysis and resolution practice with particular attention to the students’ own research interests. Prerequisite: Active knowledge of either English or French and the ability to comprehend and read in the other language.

ECS8902 SÉMINAIRE DE DOCTORAT II / DOCTORAL SEMINAR II (3cr.)
Séminaire ayant pour objectifs de permettre aux étudiants d’atteindre les objectifs suivants : acquérir la capacité d’évaluer et de discuter de façon critique diverses perspectives sur les dimensions ethniques, religieuses, morales et sociales des conflits; acquérir des compétences théoriques permettant de relier les différentes disciplines utilisées en études de conflits et de comprendre en quoi ces disciplines peuvent contribuer de façon significative à l’approfondissement des intérêts de recherche de l’étudiant. Préalables : ECS8901. Connaissance active du français ou de l’anglais et la capacité de comprendre et de lire dans l’autre langue. / Seminar aimed at enabling students to achieve the following objectives: develop the ability to evaluate and discuss alternative perspectives on ethnic, religious, moral and social justice aspects of conflicts; develop the ability to bridge the disciplines used in conflict studies and to understand where and how these disciplines make valuable contributions to the students’ own research interests. Prerequisites: ECS8901. Active knowledge of either English or French and the ability to comprehend and read in the other language.

ECS8903 MÉTHODOLOGIE DE RECHERCHE / RESEARCH METHODOLOGY (3cr.)
Évaluation critique des résultats de la recherche en sciences humaines. Méthodes qualitatives et quantitatives pour la collecte des données, leur validation et leur interprétation. Développement des habiletés suivantes : la capacité de conceptualiser et de conduire des recherches susceptibles de générer des connaissances et des pratiques de pointe en études de conflits; acquisition de connaissances permettant d’examiner de façon critique les différentes méthodes de recherche en études de conflits et d’en évaluer leur valeur respective. Aspects éthiques de la recherche. Applications à des projets de recherche au niveau des projets de recherches et des thèses au niveau des études supérieures. Préalable : Connaissance active du français ou de l’anglais et la capacité de comprendre et de lire dans l’autre langue. / Critical evaluation of research findings in the human sciences. Qualitative and quantitative methods of gathering, validating, and interpreting evidence. Issues in research ethics relating to conflict studies. Development of the following abilities: to conceptualize and design research for the generation of new knowledge and applications at the forefront of conflict studies; and to assess research methods used in conflict studies and explain the value of those methods compared to methods used in other fields. Prerequisite: Active knowledge of either English or French and the ability to comprehend and read in the other language.

ECS8911 LECTURES ET RECHERCHES DIRIGÉES / SELECTED READINGS AND RESEARCH (3cr.)

ECS9997 PROJET DE THÈSE / THESIS PROPOSAL

ECS9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

ECS9999 THÈSE DE DOCTORAT / PhD THESIS
Préalables/Prerequisites : ECS9997 et ECS9998
Counselling and Spirituality

The Faculty of Human Sciences at Saint Paul University offers programs leading to a graduate diploma in Couple Counselling and Spirituality, a Master of Arts (MA) and a Doctor of Philosophy (PhD) in Counselling and Spirituality, all conferred jointly by the Senates of Saint Paul University and of the University of Ottawa, with which Saint Paul is federated.

Master’s program

The objective of the master’s program is to train specialists to counsel and guide couples or individuals with regard to their values, their spirituality, as well as both their individual and couple dynamics, and to prepare graduates for a career in research.

Each concentration of the MA program (individual counselling; couple counselling; spiritual care) includes three components: knowledge acquisition; a research project or thesis; and professional practice.

A collaborative program in Women’s Studies at the MA level is also offered.

Doctoral program

The goal of this program is to educate counsellors specialized in spirituality who are also researchers capable of independent and collaborative research. As researchers, they will be able to contribute to the knowledge base that informs counselling and spirituality.

Graduates from the PhD program will be prepared to:

- Demonstrate in-depth knowledge of one of the three fields mentioned above.
- Design and conduct research that contributes to the advancement of the discipline of Counselling and Spirituality.
- Practice as counselor with a specialization in spirituality.

Students will specialize in one of three fields: issues relating to special populations within society, existential and spiritual issues in counselling, and counselling in multi-faith and cross-cultural settings. These fields are described below.

Special Populations

The unique spiritual, social, and mental health needs of special populations are studied from a multidisciplinary perspective. Systemic issues related to special populations include but are not limited to the following: the challenges facing people who are homeless, people living in poverty, victims of abuse and trauma, women diagnosed with breast cancer.

Existential and Spiritual Issues in Counselling

This field addresses clients’ search for meaning and purpose in their lives. Spiritual and existential issues in counselling surface when people try to make sense of their lives, especially during moments of existential crises, trauma, major loss, death, sickness and life transitions.

Counselling in Multi-faith and Cross-cultural Settings

To respond to the personal and social needs, values and goals of diverse cultural and religious groups in Canada, counsellors must understand these cultures and their spirituality.

The programs are offered in English and in French on a full-time basis. In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.

Programs

Master of Arts Counselling and Spirituality

Master of Arts Counselling and Spirituality Concentration in Spiritual Care

Doctorate in Philosophy Counselling and Spirituality

Admission

Admission to the graduate programs in counselling and spirituality is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Applications to the PhD program are evaluated based on the following criteria:
A master's degree in a related discipline such as counselling, spirituality, practical theology, health care, psychology, social work, pastoral studies or a discipline judged equivalent to these, with a minimum overall average of 75% (B+).

Completion of at least one course in each of the following: research methods, professional ethics, psychopathology and treatment, theory of counselling, spirituality and religion.

Completion of at least three undergraduate courses in the area of spirituality and religion and one graduate course such as IPA5134, or IPA5144. Depending on the candidate's background the Admissions Committee may require additional courses prior to admission such as IPA6120, IPA6108, IPA5106, and IPA5131;

A good academic performance and research potential as shown by official transcripts, major research paper, master’s thesis, research reports, publications in peer-reviewed journals, abstracts, presentations, etc. The admission dossier must include a written description in the form of a basic outline of the proposed research project.

At least 120 hours of supervised direct, face-to-face, contact with clients.

Successful completion of an admission interview with the Admissions Committee. The factors evaluated at this interview will include the relevance of the candidate’s proposed research topic, the candidate’s previous experience, the capacity of the candidate to succeed in doctoral-level studies, personal aptitude and interpersonal skills, and the availability of appropriate core faculty to direct their research.

Three confidential letters of recommendation, including at least one addressing clinical skills and one addressing academic strengths from a professor who has known the applicant and is familiar with the candidate's work.

A statement of purpose indicating the interests, career goals, research focus, and other factors relevant to the proposed research area.

Identification of two potential thesis supervisors, ranked in order of preference, who must be members of the program and of the FGPS.

**Language requirement**

All applicants must be able to understand, speak and write proficiently in either English or French and must have a passive knowledge (ability to read and understand university level texts) of the other language. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

**Transfer from Master’s to PhD Program**

Students in a master’s program who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of 5 graduate courses (15 credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation from the supervisor and the thesis advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Following transfer, all the requirements of the doctoral program must be met.

**Program Requirements**

The following requirements must be met:

- Six compulsory graduate course of 3 credits each: IPA8101, IPA8102, IPA8103, IPA8104, IPA8105; IPA8106.
- Completion of a minimum of 1500 hours of clinical practicum, with at least 250 hours within Saint Paul University: IPA8201 and IPA8202.
- Comprehensive examination (IPA9998).
- Presentation and defence of a thesis (IPA9999) based on original research carried out under the direct supervision of a faculty member in the Faculty of Human Sciences and the FGPS. The thesis can be either a monograph or a series of articles prepared for publication in scholarly journals (See the FGPS guide: “Preparing a Thesis or a Research Paper: A Guide for Graduate Students and Supervisors.”).

**Comprehensive exam:**

The comprehensive examination, which has a written and an oral component, allows students to demonstrate the depth and breadth of knowledge gained from course work, and their ability to integrate concepts, principles and theories, and apply these to counselling and spirituality. In addition, the comprehensive exam provides students with the opportunity to defend their written work orally.

The procedures for the Comprehensive exam are available on the program website.

The evaluation of the written and oral exam is on a Satisfactory/Not Satisfactory basis.

A student who fails the comprehensive examination has the right to one retake. A second failure leads to compulsory withdrawal from the program.

**Thesis proposal:**

The proposal and ethics approval must be completed before data collection can commence.

**Duration of program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial
Residence

All students must complete a minimum of six sessions of full-time registration.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, the comprehensive exam or whose progress is deemed unsatisfactory must withdraw from the program.

Thesis Advisory Committee

The Thesis Advisory Committee is formed during the first session of registration in the program. It is composed of the thesis supervisor and two additional faculty members. At least two members of the Committee must be from the Faculty of Human Sciences.

Courses

IPA5129 GROUP DYNAMICS AND COUNSELLING (3cr.)
This course introduces theories, principles and practices in group therapy designed to help prepare future professionals to work with people in various settings. Group processes are covered through interactive discussions, small group participation, role plays, and other observations.

IPA5131 METHODOLOGY OF EMPIRICAL RESEARCH (3cr.)
This course helps the students to develop skills for the critical evaluation of empirical research in the human sciences and the application of these skills in graduate research projects and theses. Qualitative and quantitative methods of gathering and validating scientific evidence in observation, case, evaluation, correlational and experimental studies. The formation of problems, structured questions, causal and non-causal hypotheses; operational definitions; dependent, extraneous and randomized variables; the selection of samples. Research ethics will be examined.

IPA5134 PRACTICAL THEOLOGY (3cr.)
This course presents new developments in Practical Theology with its particular interdisciplinary perspectives on faith and practice. The origins and development of Practical Theology are presented as a background to its specific methods and content. Practical Theology is situated within the modern context of theology. The course introduces the pastoral practitioner and the student of theology to theological examination of the components of ministry and of contemporary expressions of faith.

IPA5138 THEORIES OF FAMILY SYSTEMS AND INTERVENTIONS (3cr.)
This course presents a history of the family systems theories with individuals, couples, and families with a major focus on advanced family systems theories and interventions. Theories covered include Structural, Strategic, Bowen, Narrative, Solution Focused and more. Attention is paid to assessment of functional and dysfunctional family systems. The student/practitioner will learn interviewing, assessment and restructuring techniques, and how to explore family rules, systems, values and boundaries.

IPA5142 WORKING WITH TRAUMA AND VIOLENCE IN COUPLES AND FAMILIES (3cr.)
The goal of this course is to provide a conceptual framework, including theory, research and interventions that will enable the students to understand and treat trauma and violence in couples and family relationships. The course will present an attachment perspective and research on trauma and outline advanced family systems therapeutic assessments and interventions for trauma survivors and their families.

IPA5144 SPIRITUALITY AND COUNSELLING (3cr.)
This course presents the human experience as the common bond linking theology, counselling and spirituality. A variety of approaches in theology and in counselling will be studied, including: The relationship between the stages of moral (human) development and the images of God, how psychology helps make the difference between an unhealthy theology, and a healthy one, that gives rise to a spirituality enriching us in our growth and development.

IPA5146 PROFESSIONAL ISSUES AND ETHICS IN PASTORAL COUNSELLING (3cr.)
Students are oriented to relevant professional organizations; the need for liability insurance, codes of ethics, professional standards and certification is examined. The course reviews major contemporary issues that surround the practice of pastoral counselling (e.g., confidentiality and its limits, record keeping, informed consent, the legal concerns impacting pastoral counselling) and research. The student is introduced to the processes of ethical reasoning and ethical decision-making. The need for continued training and supervised practice leading to certification will be discussed. Considerable attention is given to the role of informed judgment and peer consultation in resolving ethical dilemmas.

IPA5161 UNDERSTANDING THE TRAUMA OF SEXUAL ABUSE (3cr.)
The goal of this course is to present an overview of the theory, research, clinical and treatment issues related to trauma and childhood sexual abuse. This course will introduce the theories of trauma from a family systems perspective. Effects of sexual abuse in terms of developmental issues over the life span, associated symptomatology of sexual abuse and trauma, and related clinical issues and practices.

IPA5162 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS II (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5163 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS III (3cr.)
Study of a particular area in counselling and Spirituality.
IPA5164 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS IV (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5517 DYNAMIQUE DE LA MALADIE ET DE SES EFFETS (3cr.)
Les stresseurs reliés à la maladie, à la souffrance et à l'hospitalisation; les possibilités de développement humain et spirituel. Les stades psychodynamiques de la maladie, de la mort et du deuil; façons de répondre aux besoins des patients, de leurs familles et de la communauté professionelle des soins de santé. Les attitudes pastorales nécessaires pour un tel travail, espérance, ouverture, acceptation de sa propre mortalité.

IPA5549 QUESTIONS PROFESSIONNELLES ET QUESTIONS D’ÉTHIQUE EN SOINS SPIRituELS (3cr.)
Ce cours initie l’étudiant aux questions professionnelles d’éthique relatives aux services en soins de santé. L’étudiant apprend les normes professionnelles d’éthique et leur application en milieu hospitalier. Par le biais d’études de cas et de situations d’éthique difficiles, l’étudiant examine des questions d’ordre général, mais aussi des questions professionnelles plus spécifiques, i.e., l’utilisation des règles d’éthique au moment de la prise de décision, le respect de la liberté de conscience, le besoin de confidentialité et ses limites, la formulation de questions de recherche en soins de santé, et l’influence du travail d’équipe dans les soins apportés aux patients. L’étudiant aborde des questions d’éthique et de morale telles l’avortement, l’euthanasie et le prolongement de la vie. Enfin, il apprend à travailler avec des ressources souvent limitées.

IPA6103 SPIRITUAlITY AND HUMAN DEVELOPMENT (3cr.)
This course examines psychological and sociological theories of human development as they relate to the religious and spiritual dimensions of the human personality. More particularly, it looks at the impact of individual growth and development, cultural and social processes of religious experience, healthy and unhealthy religion, conversion and faith, religious attitude and maturity. Practical implications will be drawn from theory.

IPA6108 PSYCHOPATHOLOGY AND TREATMENT (3cr.)
Concepts such as normality and abnormality, and the inter-relationship of perceptual, cognitive and affective dimensions are discussed. Motivational, social, behavioural and inter-personal components of human functioning and reviewed. This course presents the mental disorders, distinguishing the neurotic and psychotic disorders. The neuroses, transient reactions to stress, psychological factors in physical illnesses, personality disorders and affective disorders are treated in depth. Each class of disorders is viewed from the point of view of its etiology, diagnostic indicators, assessment, research and treatment. An explanation of the factors that foster an individual’s invulnerability to stress, trauma, and genetic predispositions is presented. The interplay of stressors, interpersonal and intrapsychic resources, life history and community is emphasized in the etiology and course of the disorders and normal functioning. Disordered functioning is seen as a person’s attempt to come to terms with the demands of living.

IPA6120 THEORIES OF INDIVIDUAL COUNSELLING (3cr.)
This course provides a brief overview of the history of counselling theory and its orientations and trends. It attends to the nature of theory building and its interconnection to practice and research. It presents, critically in depth, representative theories from the current major orientations (e.g., experiential, cognitive, psychodynamic, behavioural) with a focus on the integration of understanding, assessment and treatment in the counselling process. In the presentation of theories, attention is given to the integration of theory, research and practice. Each theory is discussed with reference to its practical application, effectiveness and limitations. The manner in which one or more of these theories has been applied to pastoral counselling practice and in the development of pastoral counselling models, and in the development of a person’s spiritual and religious life is covered.

IPA6130 COUPLES, FAMILIES AND ADDICTIONS (3cr.)
The goal of this course is to present an in depth examination of the specific characteristics, dynamics and best therapeutic practices in working with individuals, couples and families affected by chronic addiction. It will focus on the challenges faced by professionals working with the addicted person or family and will teach ways to overcome those challenges. It will offer information regarding recovery issues and will provide students with systemic therapy interventions and resources for their work with this population.

IPA6151 SPIRITUAlITY AND ADAPTATION TO ILLNESS (3cr.)
Examines the phenomenology and etiology of health and illness. Emphasizes the creation of opportunities for human and spiritual growth. It examines the tensions that negatively affect certain types of terminal illness, their implications and effects on individuals, their families, and the community. It also examines the role of pastoral workers and how fears, guilt, feelings of inadequacy, and troubled interpersonal relationships can lead to Hope, forgiveness, self-fulfillment, and human and spiritual growth. This course will enrich the critical thinking of professionals working with individuals who are at the end of life and with those close to them.

IPA6156 RESEARCH SEMINAR (3cr.)

IPA6160 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM I (4cr.)
This beginner practicum provides a learning situation whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of pastoral care services. Students are trained in the basic skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff. This practicum consists of group activities, placement, written exercises and personal development seminar.

IPA6161 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM II (4cr.)
This practicum continues the experience gained in #1. Students learn more of the functions and concerns of spiritual care services; to the organization of a spiritual care department; to the practices and procedures for the implementation of spiritual care. The following methods encompass this experiential learning: supervised practice of ministry, lectures, seminars and didactics, personal development seminar, verbatim/ virtual visit reporting, individual supervision, and reflection reports.
IPA6181 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM I (4cr.)
This beginner extended unit practicum provides a learning situation in a hospital, health care institution, prison, or parish whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of pastoral care services; to the organization of a spiritual care department; to the practices and procedures for the implementation of spiritual care. Students are trained in the basic communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

IPA6182 CLINICAL PASTORAL EQUATION (CPE) EXTENDED PRACTICUM II (4cr.)
This extended practicum continues the learning whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students deepen the functions and concerns of pastoral care services. Students are trained in the advanced communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

IPA6183 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM III (4cr.)
This advanced extended practicum solidifies the experience gained whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students learn more of the functions and concerns of spiritual care services. Students are trained in the greater communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

IPA6184 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM IV (3cr.)
This advanced extended practicum solidifies the experience gained whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students learn more of the functions and concerns of spiritual care services. Students are trained in the greater communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

IPA6221 PRACTICUM IN INDIVIDUAL COUNSELLING I (6cr.)
Students receive training in basic communication, interpersonal and interviewing skills. The development of attitudes and interpersonal qualities that facilitate the helping process is encouraged through a didactic experiential training approach. Assessment of the client's needs, personal and religious development, current capabilities, and circumstances of living is carried out. The counsellor-in-training is taught to evaluate the client's emotional patterns, cognitive style, interpersonal patterns, and strategies for living. Students are instructed in a professional ethical approach to clients. Emphasis is placed on the integration of theory with an assessment of the client to plan counselling goals. These goals are continually re-evaluated with respect to theological and psychological theory, client responsiveness, clinical practice and research. When ready, students are given opportunities to counsel individuals. The student is introduced to assessments and treatment of couples through observations of videotapes and of live sessions. Acquired skills are systematically applied and practiced in role-playing sessions or with clients of the Centre for Counselling and Pastoral Services. Students are taught to write professional reports on their client sessions. Video and audio recordings, staff demonstrations, case studies and coaching may be used in both individual and small group supervision. Within the practicum, the student examines the spiritual values in the client's existential situation. A holistic approach to the person is encouraged. Face-to-face contacts with clients is determined by the availability of clients and the student's readiness to see clients.

IPA6257 MA THESIS (12cr.)

IPA6260 CLINICAL PASTORAL EDUCATION (CPE) SUMMER PRACTICUM (6cr.)
This practicum provides a learning situation in a hospital whereby students develop personal and professional qualifications for ministry as an intern chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of spiritual care services and acquire a knowledge base of the practices and procedures for the implementation of spiritual care. Students are trained in communication and assessment skills in order to meet the spiritual, emotional and religious needs of patients, families and staff.

IPA6301 THEOLOGICAL QUESTIONS IN FAMILY LIFE (3cr.)
This course treats the interrelation of contemporary family life and Christian faith. It examines the questions raised for theology and pastoral care by new values and lifestyles in the family. It offers a critical assessment of the forces responsible for these changes. In light of this analysis, it presents new possibilities for pastoral care. Among the questions treated are: faith and the sacrament of marriage; conjugal love and procreation; pastoral care of the divorced and separated; role relations in the family; family spirituality.

IPA6312 COUPLES, FAMILY DEVELOPMENT AND GROWTH (3cr.)
Introduction to the psychology of individuals, couple and family development and growth and provided knowledge of personality development over the life span. This course will review attachment over the life span, the stages of development from childhood to adulthood, and corresponding changes in family roles, as well as advanced therapeutic interventions.

IPA6321 PRACTICUM IN INDIVIDUAL COUNSELLING II (3cr.)
Students will further their training by practicing their counselling skills through role plays, client contact, and by practicing in regular supervision.

IPA6552 THÉOLOGIE ET SOINS SPIRITUELS (3cr.)
Ce cours offre aux étudiants une compréhension théologique critique et fournit les moyens de développer la pratique du ministère pastoral dans les services en soins de santé. Il présente une étude anthropologique de l’expérience humaine de la santé, de la maladie, de la guérison, de la souffrance, et de la mort, accompagnée d’une réflexion théologique basée sur différentes traditions chrétiennes. Il présente aussi les ressources suivantes : les principes du développement humain et de l’aide aux autres; la réflexion sur la pratique des soins pastoraux et des divers modèles de soins de santé; les habiletés requis à l’exercice de ces soins, ainsi qu’une réflexion sur les rites utilisés; enfin, l’étude de la religion personnalisée et de la spiritualité.

IPA6703 SPIRITUALITÉ ET DÉVELOPPEMENT HUMAIN (3cr.)
Ce cours examine les théories psychologiques et sociologiques du développement humain et les effets qu’elles ont en relation avec les dimensions religieuses et spirituelles de la personnalité humaine. Plus particulièrement, on étudiera la relation des processus de changement humain et des
processus d’inculturation et de socialisation avec le phénomène de l’expérience religieuse, la conversion et la foi, l’attitude et la maturité religieuses et le bien-être spirituel. Diverses applications pratiques seront examinées à la lumière des théories à l’étude.

**IPA7102 PHENOMENOLOGY OF HUMAN RELATIONSHIPS IN LOVE AND MARRIAGE (3cr.)**
This course examines the representation, practices, and issues of love and relationships. These issues will be examined through various systems theories, and then brought into everyday applied practice for counselors. The course will present aspects of love in committed relationships, review the literature and psychology theory on these aspects, and work with doing applied therapy on these aspects.

**IPA7103 THEOLOGICAL QUESTIONS IN MARITAL COUNSELLING (3cr.)**
This course examines the process of pastoral counselling with special reference to marital counseling. It looks at the value orientation of the marital counsellor, the place of religious values and resources in the counselling process, and the religious and moral development of the couple. The Christian dimension of certain ethical issues in marital counselling such as human sexuality, parenthood and divorce are explored as well as religious growth as it relates to the life cycle of the couple.

**IPA7104 THEORIES OF COUPLE COUNSELLING (3cr.)**
The goal of this course is to provide an overview of the history and nature of theories of couple counselling. This course will introduce the central theories and concepts guiding couple therapy, including attachment, family systems, Emotionally Focused, experiential, and humanistic and the recent research related to couple therapy. There will be a particular focus on the skills, assessment and practice associated with Emotionally Focused therapy. Couple relationships both on the conscious and unconscious levels of functioning are examined and conceptualized.

**IPA7105 ASSESSMENT PROCEDURES IN PASTORAL COUNSELLING (3cr.)**
This course approaches assessment from a non-testing perspective and by the use of clinical material. The major emphasis is given to the use of theoretical concepts to assess the internal and external factors that contribute to personal and interpersonal functioning or dysfunctioning. The clinical material for this assessment is derived from structured and unstructured interviews. The means and ways to assess individual’s strength and resources to cope with life demands are discussed. The use of applications that are linked to major current theoretical orientations (e.g., experiential, cognitive, psychodynamic, behavioural) are introduced. When to make referrals for assessment to another professional will be introduced. The ethics, limitations and purpose of assessments are integrated into the course.

**IPA7109 SURVEY OF SEXUAL DYSFUNCTION AND TREATMENT (3cr.)**
The purpose of this course is to present the history and development of dysfunctions in the field of human sexuality and to survey various treatments for couples. This course will examine the human development of sexual expressions in their male and female dysfunctions; the biological and psychological determinants; sexual dysfunction and marital interaction and sexual assessment and applied treatment within individual; and couple therapy.

**IPA7128 EXTERNAL CLINICAL PRACTICUM (0cr.)**
In this supervised field practicum, the student offers counselling services at a community centre or an agency located outside campus. Prerequisite: Have obtained an “S” (Satisfactory) in all evaluation items in the course IPA6221. Corequisites: IPA6221 or IPA7221 or IPA7205.

**IPA7162 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM III (4cr.)**
Students learn advanced skills in ministry to the sick, their families, as well as other specific settings in keeping with the students learning goals. They perfect and consolidate basic attitudes. Students are responsible for more complex ministry situations such as palliative care and mental health. They are taught to foster team work in a caring community as part of a spiritual care team.

**IPA7163 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM IV (3cr.)**
Students learn advanced skills in spiritual care to the sick, their families, as well as other specific settings in keeping with the students learning goals. Students are required to present in class or to other professionals on a topic of their expertise. They are taught to foster team work in a caring community as part of a spiritual care team. The following methods encompass this experiential learning: supervised practice of ministry, lectures, seminars and didactics, integration seminar, verbatim/ virtual visit reporting, individual supervision, and reflection reports.

**IPA7205 PRACTICUM IN COUPLE AND FAMILY COUNSELLING (6cr.)**
This practicum presents 1) theoretical study on couple and family therapy, 2) therapy application to various situations and role-plays, and video of various expert intervention modalities and 3) contact with clients (couples and/or families) and supervision. Studies will focus on advanced family systems theories. As well, this study portion will provide applied practices evolving from these theoretical orientations. The emphasis is on case conceptualization, applicable assessment, and executive therapeutic skills. Prerequisite: IPA7104.

**IPA7221 PRACTICUM IN INDIVIDUAL COUNSELLING III (6cr.)**
It emphasizes the use of advances assessment and treatment skills and presupposes that the students demonstrate the utility of their theoretical knowledge and their research knowledge. Students learn to use current major individual counselling models (e.g. experiential, cognitive, psychodynamic, behavioural) so that they can respond with a wide range of therapeutic strategies to the varied needs and circumstances of clients. Practice consists of counselling sessions with clients at the Centre for Counselling and Pastoral Services under team observation and individual and group supervision. These sessions or other case studies are used to assess the progress and plans of counselling. According to the Faculty’s regulations and at the discretion of the supervisor, audio-visual or written records are used to monitor the process. Additionally, field practice is arranged in order to ensure adequate exposure to a varied population of pastoral counselling clients.

**IPA8101 SPIRITUALITY AND COUNSELLING (3cr.)**
Study of qualitative and hermeneutical methods as these are used in the social sciences and in theological study of spirituality. Comparative study of one or more Christian spiritual traditions and one or more spiritual traditions within other religions and secular culture to increase understanding and practice of spirituality. The course is designed to highlight the role of spirituality in the emotional well-being and adjustment of individuals. This course will treat the question of personal and spiritual growth. The importance of spiritual practices and the overall relationship of spirituality to the counselling process will also be considered.
IPA8102 COUNSELLING IN MULTI-FAITH AND CROSS-CULTURAL SETTINGS (3cr.)
This course examines counselling in a culturally pluralistic spiritual and religious context. It examines the possibility of mutuality and dialogue using a comparative religious approach from social science and theological perspectives. The theory and practice proposed focuses on the differing spiritual and secular humanist journeys of the counsellor and the client, and the possibility of meeting in difference. Topics covered include: the impact of enculturation, intercultural identity, inter-religious dialogue, intercultural competence on both parties; the ways in which intercultural competence and intercultural growth contribute to spiritual growth. The course enables counsellors and their clients to assess the extent to which spiritual values, beliefs and practices are an asset or a liability for clients in reaching their counselling goals.

IPA8103 ISSUES IN SPECIAL POPULATIONS (3cr.)
This course treats issues related to the needs and social status of certain special populations. Accumulated data on group characteristics and challenges facing some special populations, such as those who are aged or those who are homeless, are critically reviewed. Membership in some social groups may involve loss of social privileges, as well as diminished access to mental and health care resources. Students explore issues related to the unique spiritual and mental health needs of these groups, their social circumstances, and the implications for service provision. Growing problems concerning assessment, intervention, and the increased barriers to services are examined from the point of view of community approaches to research and intervention. The role of counsellors working with persons with unique needs, individually or at the community level, will be addressed.

IPA8104 EXISTENTIAL ISSUES IN COUNSELLING (3cr.)
This course explores meaning-of-life issues often presented by clients in a variety of contexts, including, but not limited to, the quest for increased well-being, existential crises, life transitions, loss and death, end-of-life, and trauma. Qualitative methods of data collection and analysis are critically reviewed to gain insight into the meaning participants give to their lived experience, the meaning they place on events, processes, perceptions and into the ways in which they connect these meanings to the social world around them. A variety of religious, spiritual and secular humanist sources of and responses to existential issues are treated.

IPA8105 RESEARCH METHODS AND DESIGN PROBLEMS IN COUNSELLING AND SPIRITUALITY (3cr.)
The focus of this course is the critical analysis and discussion of the challenges that counsellors face in choosing and applying qualitative and quantitative methods to spirituality. In-depth study of design pitfalls that arise from the complexity and unpredictability of working with human subjects given the multi-cultural complexity of pluralistic societies. Potential topics include sampling issues, measurement issues, and special analytic techniques.

IPA8106 DOCTORAL SEMINAR (3cr.)
Guest lecturers will select readings and lead seminars related to relevant research topics such as proposal writing, conceptual frameworks, ethics, methods and procedures, and statistical analysis. Students must write an annotated bibliography and prepare a plan for their comprehensive exam. In addition, they must write a paper and do an oral presentation designed to facilitate their work around the thesis proposal. Evaluation by the seminar coordinator.

IPA8201 INTERNAL CLINICAL PRACTICUM
The internal clinical practicum takes place in the Saint Paul University Counselling Centre. The goal of the practicum is to put into practice the theoretical knowledge of counselling and spirituality. Supervisors will specify the goals, objectives and syllabus of practicum. They will use observation, debriefing, peer review, written and oral feedback, and direct intervention and observation, to instruct and evaluate students. Minimum number of hours: 250. Graded S/NS.

IPA8202 EXTERNAL CLINICAL PRACTICUM
Clinical practice in an external location that must be approved by the program director. Graded S/NS. Students complete a minimum of 1500 hours of supervised training, internal and external practicum combined.

IPA9997 PROPOSITION DE THÈSE / THESIS PROPOSAL
Présentation du projet de thèse devant un comité composé du directeur de la thèse, des membres du comité de thèse et d’un ou deux autres professeurs. / Presentation of the thesis proposal to an examining committee composed of the supervisor, the members of the advisory committee and one or two other professors.

IPA9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAM

IPA9999 THÈSE DE DOCTORAT / DOCTORAL THESIS

Criminology
The department of Criminology offers graduate programs leading to the degrees of Master of Arts (MA) and Doctor of Philosophy (PhD) in Criminology. Criminology is devoted to the scientific analysis of crime, justice and social control. It focuses on four broad questions: the social construction of norms and the notion of crime; the criminalization of specific behaviours, individuals and groups in our society; the analysis of the goals and functioning of the criminal justice system; and the examination of contemporary forms of intervention.
Master’s program

The master’s program consists of three distinct 30 credit options: one with major research paper, one with thesis, and one with a thesis and field placement. These three options are intended to equip students with knowledge of the major theoretical and methodological frameworks in criminology so that they will be able to critically analyze them and apply this knowledge to describe and explain conceptual and empirical problems of crime, justice and social control, both within the framework of optional courses or of an internship seminar with an on-site internship.

Thus, a master’s degree with three options is offered:

- Option with thesis (120 pages). In addition to the mandatory core courses, the acquisition of thematic theoretical and methodological competencies is achieved by means of a thesis and three elective courses.
- Option with thesis (120 pages) and field placement. In addition to the mandatory core courses, the acquisition of thematic theoretical and methodological competencies is achieved by means of a thesis, a field placement seminar and a field placement of 360 hours in an environment that responds to the learning interests of the student.
- Option with Major Research Paper (60 pages) that allows the student to complete the program on a part-time basis beginning in the fourth semester of registration. In addition to the mandatory core courses, the acquisition of thematic theoretical and methodological competencies is achieved by means of a major research project and five elective courses.

The department offers a collaborative program in Women’s Studies at the MA level. For more information on this program, see “Admission Requirements.”

Doctoral program

The doctoral program aims to prepare criminologists who have a solid understanding of contemporary issues in criminology and criminal justice policies, have in-depth knowledge of the theories and debates that characterize the discipline and are equipped to design and conduct a methodologically sound original research program.

The field is divided into two areas. The first addresses the process by means of which criminal justice policies (including laws and institutions such as the police, prison, etc.) are created and developed. The second concerns the theoretical and empirical analysis of the implementation of such policies. It examines how institutions function and attempts to assess the social consequences of these policies so as to suggest new reforms or alternative measures of a more moderate nature and more respectful of human dignity.

The programs are offered in English and French and are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Criminology
Master of Arts Criminology Specialization in Women’s Studies
Doctorate in Philosophy Criminology

Admission

To be eligible for admission to the PhD program:

- Students must hold a master's degree (thesis or research paper) in criminology or a related discipline, with a minimum average of 75% (B+).
- A brief description (one or two pages) of the proposed research project must be submitted.

Admission to the program will depend on the possibility of finding a professor to supervise the candidate's research.

Language requirements

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with University of Ottawa policy, students have a right to produce their written work and to answer examination questions in French or in English.

Second language requirement
Students who are not bilingual at the time of admission may take a placement test upon admission and, depending on their score, they will have to take and pass second language course(s) (e.g. FLS2513/ELS2113) to ensure they attain the required standard by the end of their second year of studies.

Transfer from master’s to PhD

Students in a master’s program who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of 5 graduate courses (15 credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation from the supervisor and the thesis advisory committee.
- Approval by the graduate studies committee.

The request to transfer must be made during the fourth session of registration or earlier. The student must register in the PhD in the fifth or, at the latest, in the sixth session. Following transfer, all the requirements of the doctoral program must be met.

Program Requirements

The minimal course requirements are stated below. Students may be required to take additional courses to ensure that they have the knowledge and skills needed to pursue their program.

- Compulsory courses:
  - CRM8100 DOCTORAL SEMINAR (3cr.)
  - CRM8110 RESEARCH METHODOLOGY IN CRIMINOLOGY II (3cr.)
  - CRM8102 CURRENT ISSUES IN CRIMINOLOGY (3cr.)
  - CRM9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION
  - The comprehensive examination has a written and an oral component. The written component must be successfully completed before taking the oral exam. For the oral component, the student will be tested on their personalized reading list (minimum 3,600 pages) and on the content of their written submission. The oral exam must take place in the first week of November of the student’s fourth session. Students who are unsuccessful are entitled to repeat the examination once prior to March 31st of their fifth session.
  - CRM9997 PROJET DE THÈSE / THESIS PROPOSAL
  - The thesis proposal must be defended by September 30th of the student’s seventh session. Students who, due to extenuating circumstances, are unable to meet this deadline may, in collaboration with their supervisor, apply for an extension.
  - CRM9999 THÈSE DE DOCTORAT / PhD THESIS

Transfer from master’s to PhD

The request to transfer must be made during the fourth session of registration or earlier. The student must register in the PhD in the fifth or, at the latest, in the sixth session. Following transfer, all the requirements of the doctoral program must be met.

Duration of program

Students are expected to fulfill all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

Residence

All students must complete a minimum of six sessions of full-time registration. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the initial registration in the program.

Minimum standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam (twice), who fail to meet the deadlines (for the reading list, the comprehensive exam, the second language requirement), or whose research progress is deemed unsatisfactory are required to withdraw.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

The TAC is composed of the supervisor and two additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Department of Criminology. The TAC is responsible for guiding the student through the comprehensive exam and thesis process.
The TAC must be established by the end of the student’s first session.

Courses

Required courses are offered in English and French every year. Optional courses are offered periodically.

**CRM6320 RESEARCH METHODOLOGY IN CRIMINOLOGY I** (3cr.)
Study of the main epistemological questions regarding research activities in criminology; in-depth analysis of data collection methods with a focus on data treatment and analysis. Prerequisites: CRM 3334 and CRM 4304 or the equivalent.

**CRM6325 RESEARCH SEMINAR IN CRIMINOLOGY** (3cr.)
Annual seminar (every two weeks) with the following objectives: (a) detailed analysis of the procedures involved in the implementation of a research activity; formulation of a research project (research problem and theoretical framework) at the end of the fall session; presentation of the final research project (research problem, theoretical framework and methodology) at the end of the winter session.

**CRM6330 QUANTITATIVE METHODS IN CRIMINOLOGY** (3cr.)
Study of various epistemological, methodological and ethical questions regarding the use of quantitative methods of data collection and analysis.

**CRM6331 QUALITATIVE METHODS IN CRIMINOLOGY** (3cr.)
Study of various epistemological, methodological and ethical questions regarding the use of qualitative methods of data collection and analysis.

**CRM6340 THEORIES OF INTERVENTION IN CRIMINOLOGY AND ALTERNATIVE PRACTICES** (3cr.)
Examination of the theories and bases of the treatment of the criminalized in our society. Analysis of alternative forms of practice.

**CRM6341 COUNSELLING IN CRIMINOLOGY** (3cr.)
Nature, analysis and limitations of counselling in criminology.

**CRM6342 COMMUNITY INTERVENTION IN CRIMINOLOGY** (3cr.)
Community methods of intervention; responsibility and limits. Use of community resources. Participation in correction and social action.

**CRM6343 SOCIAL POLICY AND CRIMINOLOGY** (3cr.)
Issues underlying social policies with respect to crime and social control. The process of policy formation; critical and comparative aspects.

**CRM6345 FIELD PLACEMENT SEMINAR** (3cr.)
Restricted to students registered in the field placement (CRM6400). Critical reflection on the field placement experience. Discussion of issues related to the field placement settings of the students. Oral presentation and written report.

**CRM6350 CONTEMPORARY CRIMINOCOLOGICAL THEORIES** (3cr.)
Analysis of current problems in criminological theory.

**CRM6353 REPRESENTATIONS AND IDEOLOGIES OF CRIME** (3cr.)
Study of the representations and ideologies of crime and social control.

**CRM6354 SOCIAL HISTORY OF THE CRIMINAL JUSTICE SYSTEM** (3cr.)
Problems of research on the history of penal institutions; analysis of selected cases or situations.

**CRM6355 COMPARATIVE CRIMINOLOGY** (3cr.)
Discussion of the bases of comparative analysis in criminology; analysis of specific situations.

**CRM6359 EVALUATION OF CRIMINAL JUSTICE PROGRAMS, POLICIES AND LEGISLATION** (3cr.)
Evaluation principles, approaches, models and methods; analysis of programs, policies and their theoretical underpinnings; selection of evaluation questions, preparation of a proposal and development of evaluation research tools.

**CRM6360 PHILOSOPHY OF CRIMINAL LAW** (3cr.)
Critical examination of the main theories and ideologies of the role of criminal law; the reform of criminal law.

**CRM6361 CRIME PREVENTION** (3cr.)
The impact and function of prevention research in criminology; prevention programs; evaluation.

**CRM6362 CRIMINAL JUSTICE AND THE VICTIMS OF CRIME** (3cr.)
The impact of the Victims Movement on the aims and operation of the criminal justice system.

**CRM6363 POLICE AND SOCIETY** (3cr.)
The role and functioning of the police in contemporary society; relation to the state and to civil society.

**CRM6364 SENTENCING** (3cr.)
Analysis of the aims and operation of sentencing.
CRM6365 THE SOCIO-POLITICS OF INCARCERATION (3cr.)
Analysis of the socio-political aims, functions and consequences of incarceration. The politicization of reform; abolition; prisoners rights movements.

CRM6367 WOMEN AND CRIMINAL JUSTICE (3cr.)
Women as criminals and victims; the impact of the operation of the criminal justice system on women.

CRM6370 CORPORATE CRIME (3cr.)
Analysis of the differential responses to various forms of corporate crime.

CRM6371 POLITICAL CRIME (3cr.)
Analysis of the forms of political crime and of the differential responses to the phenomenon.

CRM6380 SELECTED TOPICS I (3cr.)
Various topics will be discussed from year to year.

CRM6381 SELECTED TOPICS II (3cr.)
Various topics will be discussed from year to year.

CRM6400 FIELD WORK IN CRIMINOLOGY II (6cr.)
Restricted to students registered in the MA (Thesis and Field Placement option). Graded S/NS.

CRM6768 LE JEUNE ET LA JUSTICE PÉNALE (3cr.)
Analyse des différents aspects de la justice pour mineurs; leurs implications et les problèmes posés.

CRM6999 MÉMOIRE DE RECHERCHE / MAJOR RESEARCH PAPER (6cr.)

CRM7999 THÈSE / THESIS (12cr.)
Obligatoire pour les étudiants du M.A. / Compulsory for MA students.

CRM8100 DOCTORAL SEMINAR (3cr.)
This seminar provides students with the epistemological and theoretical tools necessary for developing an advanced level of reflection around their research topic. Attendance, active participation, an oral presentation, and a paper are compulsory.

CRM8102 CURRENT ISSUES IN CRIMINOLOGY (3cr.)
Presentation of current topics in criminology with discussions aimed at developing professional skills (facilitating/moderating a discussion, preparing for a debate, writing a grant proposal, etc.). Bi-weekly seminars with participation by different professors in the department, visiting professors, or other experts depending on the issue or topic. Graded S/NS.

CRM8110 RESEARCH METHODOLOGY IN CRIMINOLOGY II (3cr.)
Reflection on issues related to research methodology. In-depth training in a few methods. Methods of enquiry, practical considerations, data analysis, interpretation of results, etc. Acquisition of the knowledge needed to develop, direct, and administer a major research program in criminology.

CRM9997 PROJET DE THÈSE / THESIS PROPOSAL
Rédaction et soutenance orale d’un projet de thèse, à terminer normalement avant la fin de la cinquième session d’inscription au programme. Noté S/NS. Writing and oral defence of the thesis proposal to be completed normally before the end of the fifth session of registration in the program. Graded S/NS.

CRM9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

CRM9999 THÈSE DE DOCTORAT / PhD THESIS
Préalable CRM9997 / Pre-requisite CRM9997

Earth Sciences

Ottawa-Carleton Geoscience Centre

Established in 1982, the Ottawa-Carleton Geoscience Centre (OCGC) combines the research strengths of the University of Ottawa and Carleton University. The Centre offers graduate programs leading to the master's (MSc) and doctoral (PhD) degrees in Earth sciences.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in the following main areas of research: environmental geoscience, geochemistry / petrology,
Further information about the Joint doctoral program in Economics is available from the Director of Doctoral Studies in Economics at either

The joint doctoral program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the FGPS website.

### Programs

**Master of Science Earth Sciences**

- Master of Science Earth Sciences Specialization in Chemical and Environmental Toxicology
- Master of Science Earth Sciences Specialization in Environmental Sustainability
- Master of Science Earth Sciences Specialization in Science, Society and Policy

**Doctorate in Philosophy Earth Sciences**

- Doctorate in Philosophy Earth Sciences Specialization in Chemical and Environmental Toxicology

### Admission

Admission to the graduate program in Earth Sciences is governed by the general regulations of the Ottawa–Carleton Geoscience Centre (OCGC) and by the general regulations of the FGPS.

All applicants must be proficient in understanding, speaking and writing in either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Applications are evaluated based on the following criteria:

- Be the holder of a master’s degree in earth sciences (or equivalent) with a minimum average of 75% (B+).
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with their work.
- Provide a statement of purpose indicating their career goals and their interest in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the university where the student will register. It will also determine which university awards the degree.

### Transfer from master’s to PhD

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Achievement of an A- average in the last two years of undergraduate studies.
- Completion of two graduate courses (six credits) with a grade of A- or better in each.
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.

The transfer to the PhD must take place within sixteen months of initial registration in the master’s. Following the transfer, all the requirements of the doctoral program must be met: six credits of coursework in addition to the six already completed, the comprehensive exam (to be
completed within 12 months of transfer), participation in the geoscience seminar series, and the thesis.

**Collaborative programs**
The Ottawa-Carleton Geoscience Centre is one of the participating units in the collaborative programs in Chemical and Environmental Toxicology (master’s and PhD levels), in Environmental Sustainability (master’s level only) and in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

**Program Requirements**

**PhD in Earth Sciences**
The following requirements must be met:

○ Six credits of graduate courses at the 5000 level or above in earth sciences or in related disciplines approved by the Department of Earth Sciences.
○ Successful completion of a comprehensive examination (GEO9998) within twelve months of the initial admission into the program.
○ Presentation and successful defense of a thesis (GEO9999) based on original research carried out under the direct supervision of a faculty member of the Department.

The Department may require students to take additional courses depending on their backgrounds.

**Collaborative Program in Chemical and Environmental Toxicology**
The requirements of both the primary program and of the collaborative program must be met. The credits completed for the specialization count also towards the primary degree. If the seminar course was completed for the master’s specialization, the second requirement below does not apply.

The requirements specific to the collaborative program are as follows:

○ 3 compulsory credits of an introductory course in chemical and environmental toxicology (CHM8156 or BIO9104).
○ Enrollment in the seminar course in toxicology (TOX9105), which involves the presentation of a seminar, and regular attendance at the seminars presented by the Department.
○ Presentation and defense of a thesis in toxicology based on original research carried out under the supervision of a faculty member participating in the chemical and environmental toxicology collaborative program.
○ The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

**Requirements for the Transfer from the MSc to the PhD program**
Following the transfer, all of the requirements of the doctoral program must be met: six credits of course work in addition to the nine already completed, the comprehensive exam (to be completed within 12 months of transfer), participation in the geoscience seminar series and the thesis.

**Minimum Standards**
The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), or the thesis proposal, or the comprehensive exam, or whose progress is deemed unsatisfactory must withdraw from the program.

**Residence**
All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial registration in the program.

**Duration of the Program**
The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

**Thesis Advisory Committee**
During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be form the Faculty of Science. The TAC is responsible for guiding the student during the program.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.
Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

GEO5114 (ERTH 5104) MINERALOGY (3cr.)
An advanced course covering selected topics in mineralogy, such as crystallography, crystal chemistry, crystal structure, mineralogy of rock-forming mineral groups, and instrumental methods in mineralogical research, such as use of electronic optical instruments, spectroscopy, and X-ray crystallography; seminar presentations and practical exercises included.

GEO5122 (ERTH 5202) ADVANCED IGNEOUS PETROLOGY (3cr.)
The course focuses on particular aspects of the discipline and integrates physical and chemical processes with the dynamics of magmatic systems to understand igneous processes.

GEO5124 (ERTH 5204) GEOLGY AND GEOCHEMISTRY OF ORE DEPOSITS (3cr.)
An advanced course in ore deposits examining aspects of their geology, geochemistry, and exploration. Topics will be selected from a range of different deposit types, including hydrothermal and magmatic ore deposits, as well as laboratory and field examination of different ores and their host rocks.

GEO5131 (ERTH 5301) SILICICLASTIC SEDIMENTOLOGY (3cr.)
Origin and significance of physical and sedimentary processes and structures. Analysis of ancient siliciclastic depositional environments in a facies model and sequence stratigraphic framework. Course involves lectures, seminars and field excursions.

GEO5135 (ERTH 5305) CARBONATE SEDIMENTOLOGY (3cr.)
Lectures and seminars will cover aspects of modern depositional systems, dynamic facies models, sequence stratigraphy, mineralogy, and diagenesis of carbonate sediments. Practical part of the course will consist of a field-laboratory project that integrates various techniques in carbonate sedimentology (mapping, petrography, staining, cathodoluminescence, fluorescence, SEM).

GEO5136 (ERTH 5306) PALEOBIOLOGY (3cr.)
Selected topics in paleobiology of micro- and macro-invertebrates and vertebrates. Topics include extinctions, micro- and macro-evolutionary processes, long-term trends and cycles in the Phanerozoic, and functional morphology, as well as application of invertebrates to biostratigraphy, palaeoecography and palaeoecology.

GEO5139 (GEOL 5309) GLACIAL AND PERIGLACIAL GEOLOGY (3cr.)
An examination of various sedimentary environments associated with glacial and periglacial processes and their significance for mineral exploration and environmental geochemistry. Study of cold climate non-glacial conditions and the development of permafrost and permafrost-related features, including the effect of groundwater flow on permafrost distribution.

GEO5142 (GEOL 5402) ENVIRONMENTAL GEOSCIENCE (3cr.)
A study-seminar course in which students will examine, in depth, certain environmental problems, including geological hazards, mineral and energy consumption and environmental degradation. The relation between development and the environment will be considered. Students will prepare a report and present a seminar on a subject of their choice, and will participate in a research project centered in the Ottawa area.

GEO5143 (ERTH 5403) ENVIRONMENTAL ISOTOPES AND GROUNDWATER GEOCHEMISTRY (3cr.)
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radiocarbon, and exotic radioisotopes (e.g. 36Cl, 39Ar, 85Kr). Low temperature aqueous geochemistry and mineral solubility with emphasis on the carbonate system. Some applications to paleoclimatology will be discussed. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO 43.42) or equivalent.

GEO5146 (ERTH 5406) TECHNIQUES OF GROUNDWATER RESOURCES EVALUATION (3cr.)
Governing groundwater flow equations, initial and boundary conditions; simple numerical solutions (spreadsheets); complex numerical solutions (commercial software); and analytical solutions. Applications: aquifer response test analysis, capture zone analysis, groundwater flow modeling, water budgeting, and aquifer vulnerability assessment. Prerequisite: undergraduate hydrogeology.

GEO5147 (ERTH 5407) GEOCHEMISTRY OF NATURAL WATERS (3cr.)
Aqueous speciation, solubility of metals, minerals and gas, reaction kinetics and equilibria. Chemistry and dynamics of groundwaters and hydrothermal fluids.

GEO5148 (ERTH 5408) THEORY OF FLOW AND CONTAMINANT TRANSPORT IN GEOLOGICAL MATERIALS (3cr.)
Development of governing groundwater flow equations and solute transport equations from first principles, and application of principles in case studies. Topics: Forces and potentials, fluids, geological materials, contaminants, case studies. Prerequisite: undergraduate hydrogeology.

GEO5151 (ERTH 5301) PRECAMBRIAN GEOLGY (3cr.)
Geology and tectonic history of the Canadian Shield, emphasizing modern four-dimensional interpretations (map, depth, time); comparison and correlation with other Precambrian shields; global Precambrian tectonic evolution through review of continental reconstructions; Precambrian mineral deposits; field trips and research projects.
GEO5153 (ERTH 5503) COMPUTER TECHNIQUES IN THE EARTH SCIENCES (3cr.)
A practical course in the application of computer techniques in the acquisition and interpretation of geoscientific data. Topics will be selected from the following: remote sensing and geographic information systems; geostatistical analysis techniques; analysis and modelling of geoscientific data. Prerequisite: Permission of the Institute.

GEO5157 (ERTH 5507) TECTONIC PROCESSES EMPHASIZING GEOCHRONOLOGY AND METAMORPHISM (3cr.)
Applications of empirical, analytical and quantitative techniques to problems in regional geology and crustal tectonics; orogenic processes; heat and metamorphism; isotopic geochronology as applied to thermal history.

GEO5160 (ERTH 5600) CHEMISTRY OF THE EARTH (3cr.)
Examine the composition of the mantle and crust in selected tectonic settings, such as subduction zones and hot spots. Topics may include how geochemical data constrain geodynamic settings of study area.

GEO5163 (ERTH 5603) STABLE ISOTOPE GEOCHEMISTRY (3cr.)

GEO5169 (ERTH 5609) RADIOISOTOPE GEOCHEMISTRY (3cr.)
Nucleosynthesis; chemical differentiation of the Earth. Evolution of large-scale reservoirs. Isotopic tracers (143Nd/144Nd, 87Sr/86Sr, common Pb). Geochronology: fundamentals and application of Sm/Nd, Rb/Sr, U/Pb, K/Ar and Lu/Hf methods. Evolution of the solid Earth from the isotopic perspective.

GEO5171 (ERTH 5701) PHYSICS OF THE EARTH (3cr.)
The physics and dynamics of the solid Earth: seismology; gravitational and magnetic fields; thermal state. Geophysical constraints on the structure and composition of the interior. Geodynamic processes.

GEO5173 (ERTH 5703) STRUCTURAL GEOLOGY (3cr.)
Deformation processes and the analysis of geological structures at all scales.

GEO5174 (ERTH 5704) TECTONICS (3cr.)
Dynamical and geological aspects of plate tectonics throughout Earth history.

GEO5177 (ERTH 5707) ENGINEERING SEISMOLOGY (3cr.)

GEO5178 (ERTH 5708) GEOPHYSICAL SIGNAL PROCESSING (3cr.)
Practical aspects of earthquake and other geophysical signal processin; focus on application of Fourier analysis, digital filters, instrument response.

GEO5193 (ERTH 5903) FIELD STUDIES (3cr.)
Systematic investigations of geological problems, based on a minimum of 15 days field work plus related library research and laboratory projects. Written report required.

GEO5301 (ERTH 5001) SEMINARS IN EARTH SCIENCES I (3cr.)
One-session modular course covering a spectrum of Earth science topics and current research problems, ranging from the geology and geophysics of the solid Earth, to its surface environment and crustal resources. A minimum of 4 modules is offered per session; 3 must be completed to obtain credit for a course. Students may not normally obtain credit for modules that are offered by their supervisors. The choice of modules must be approved by the Director of the Geoscience Centre or a designate. This course complements GEO 5302 (ERTH 5002).

GEO5302 (ERTH 5002) SEMINARS IN EARTH SCIENCES II (3cr.)
One-session modular course covering a spectrum of Earth science topics and current research problems, ranging from the geology and geophysics of the solid Earth, to its surface environment and crustal resources. A minimum of 4 modules is offered per session; 3 must be completed to obtain credit for a course. Students may not normally obtain credit for modules that are offered by their supervisors. The choice of modules must be approved by the Director of the Geoscience Centre or a designate. This course complements GEO 5301 (ERTH 5001).

GEO5306 (GEQ5306) Hydrothermal Ore Deposits (3cr.)
An advanced course in economic geology related to hydrothermal ore deposits, including their geology and geochemistry, physical and chemical controls on hydrothermal mineralization, the recognition and characterization of ore-fluid reservoirs, and the nature of large-scale fluid flow and alteration, with an emphasis on applications to exploration.

GEO7999 (ERTH 5909) THÈSE DE MAÎTRISE / MSc THESIS

GEO9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAM (PhD)

GEO9999 (ERTH 6909) THÈSE DE DOCTORAT / PhD THESIS
The following courses are included in the centre's program:

**Department of Geography, Carleton University**

**Geography GEOG 5300 SOIL THERMAL AND HYDROLOGIC REGIMES**
Characteristics of soil regimes, particularly in freezing soils, role of soil properties; analytical and numerical methods, including computer simulation.

**Geography GEOG 5302 SOIL THERMAL AND HYDROLOGIC PROPERTIES**
Instrumental techniques for investigation of hydrological and thermal processes near the Earth's surface; laboratory instrumentation and analysis of laboratory and field procedures in geotechnical science.

**Geography GEOG 5303 PERIGLACIAL GEOCRYOLOGY**
Permafrost, its distribution and significance, seasonal ground freezing, ground thermal regime, physical, thermodynamic, and geotechnical properties of freezing and thawing soils, terrain features ascribable to frost action, and solifluction and patterned ground.

**Geography GEOG 5304 ASPECTS OF CLAY MINERALOGY AND SOIL CHEMISTRY**
The role of clay minerals in soils will be considered from a geotechnical or biological perspective.

**Geography GEOG 5803 REMOTE SENSING AND IMAGE ANALYSIS**
Radiometric, geometric and resolution characteristics of remotely sensed data, image processing algorithms, analysis of spectral, textural, and contextual image information, applications to vegetation mapping and environmental analysis.

**Department of Geography, University of Ottawa**

**GEG5301 COLD REGIONS HYDROLOGY AND GEOMORPHOLOGY**
Selected topics in the hydrology and geomorphology of cold regions. Emphasis on glacierized, periglacial, or nival environments.

**Ottawa–Carleton Institute for Physics**

**PHY5130 (PHYJ 5001) EXPERIMENTAL CHARACTERIZATION TECHNIQUES IN MATERIALS SCIENCE, PHYSICS, CHEMISTRY, AND MINERALOGY** (3cr.)
Survey of experimental techniques used in materials science, condensed matter physics, solid state chemistry, and mineralogy to characterize materials and solid substances. Diffraction (X-ray diffraction, neutron diffraction...). Spectroscopy (infra-red spectroscopy, Raman spectroscopy, nuclear magnetic resonance, Mössbauer spectroscopy, electron spin resonance...). Microscopy and imaging (scanning electron microscopy, transmission electron microscopy, optical microscopy, magnetic resonance imaging...). Other analytic techniques (thermal analysis, wet chemistry, bulk thermodynamic properties, linear response and dc susceptibility...).

**Economics**

The Department of Economics offers a Master of arts and a PhD in Economics. The Master of arts program includes a co-op option and the PhD program is offered jointly with Carleton University.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa. The joint doctoral program is governed by the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities.

**Ottawa–Carleton Joint Doctoral Program in Economics**

The joint doctoral program in Canadian economic policy and economic development is offered by the departments of economics at the University of Ottawa and Carleton University.

The PhD program stresses the application of economic theory to the analysis of Canadian economic policy and economic development. It offers specialization for intensive study and thesis research in:

- Public Economics - the allocative, redistributive and stabilization impact of governments.
- Industrial Organization - the effects of regulation, fiscal measures, government production, marketing boards and competition policy on the structure and performance of Canadian industries.
- Monetary Economics - the impact of money in general and on the Canadian economy in particular.
- International Economics - the interrelationships between the Canadian and world economies.
- Economic Development - the process of economic and structural change within Canada and in the developing countries.
- Economics and the Environment - an economic analysis of the environment including natural resources.
- Econometrics
- Labour Economics.

**Administration**
Further information about the Joint doctoral program in Economics is available from the Director of Doctoral Studies in economics at either University:

Department of Economics  
Faculty of Social Sciences  
University of Ottawa  
Desmarais Hall  
55 East Laurier Street, Room 10101  
Ottawa ON K1N 6N5  
CANADA

or

Department of Economics  
Carleton University  
1125 Colonel By Drive  
Ottawa ON K1S 5B6  
CANADA

## Programs

- Master of Arts Economics
- Doctorate in Philosophy Economics

## Admission

### Application deadline

To find the application deadline, please check the "program-specific requirements" under Application Procedures and Information at the following address: [Apply now](#).

### Language of instruction

The vast majority of PhD courses are taught in English, but students may write and defend their thesis in English or French. According to university regulations, students can write their papers and exams in the official language of their choice (either English or French).

### Language requirements

Proficiency in the English language is required for entry into the doctoral program.

Students who have achieved at least an average of "B+" (75%) at the MA or equivalent level are admissible to the PhD program. Six sessions of full-time registration are required.

The program encompasses course requirements – a core of theory and applied economics subjects – complemented by workshops to encourage the cross-fertilization of ideas in one field with those in others, comprehensive examinations and a thesis.

### Fast-track from master's to PhD

Students who achieve outstanding academic performance and demonstrate high promise for advanced research during the master’s program may, with the permission of the Graduate Studies Committee, transfer into the PhD program without completing the MA, provided they have completed the following three courses with an average of at least "A":

- ECO6120 (ECON 5020)
- ECO6122 (ECON 5021)
- ECO5185 (ECON 5027)

These students must successfully complete at least eleven regular courses (MA and PhD levels combined) and do not receive an MA degree. However, students who transfer but do not complete the PhD can receive an MA by fulfilling all the requirements of the MA program. Please note that the minimal admission average requirements for the doctoral program must also be met.

The request for permission to transfer must be made during the second session of registration of earlier. The student must register in the PhD in the third or, at the latest, in the fourth session.
Program Requirements

All courses are equivalent to three credits at the University of Ottawa except workshops and PhD tutorials, which are equivalent to six credits.

- **Basic courses (12 credits)**
  - ECO7119 (ECON 6019) MATHEMATICAL FOUNDATIONS FOR ECONOMIC THEORY (3cr.)
  - ECO7922 (ECON 6020) THÉORIE ÉCONOMIQUE : MICROÉCONOMIE / ECONOMIC THEORY: MICROECONOMICS (3cr.)
  - ECO7923 (ECON 6021) THÉORIE ÉCONOMIQUE : MACROÉCONOMIE / ECONOMIC THEORY: MACROECONOMICS (3cr.)
  - ECO7126 (ECON 6027) ECONOMETRICS II (3cr.)
- **Field courses (6 credits)**
  - Two three-credit courses in each of the student’s two fields of specialization:
    - Industrial Organization
      - ECO6135 (ECON 5305) TOPICS IN INDUSTRIAL ORGANIZATION (3cr.)
      - ECO6140 (ECON 5301) INDUSTRIAL ORGANIZATION I (3cr.)
      - ECO6142 (ECON 5303) INDUSTRIAL ORGANIZATION II (3cr.)
    - Public Economics
      - ECO6130 (ECON 5401) PUBLIC ECONOMICS: EXPENDITURE (3cr.)
      - ECO6131 (ECON 5402) PUBLIC ECONOMICS: TAXATION (3cr.)
      - ECO6133 (ECON 5403) TOPICS IN THEORY OF PUBLIC ECONOMICS (3cr.)
    - International Economics
      - ECO6160 (ECON 5601) INTERNATIONAL TRADE: THEORY AND POLICY (3cr.)
      - ECO6161 (ECON 5602) INTERNATIONAL MONETARY THEORY AND POLICY (3cr.)
      - ECO6162 (ECON 5603) TOPICS IN INTERNATIONAL ECONOMICS (3cr.)
    - Monetary Economics
      - ECO6180 (ECON 5606) FOUNDATIONS OF MONETARY THEORY (3cr.)
      - ECO6181 (ECON 5607) TOPICS IN MONETARY ECONOMICS (3cr.)
      - ECO6183 (ECON 5609) EXPLORATIONS IN MONETARY ECONOMICS (3cr.)
    - Economic Development
      - ECO6170 (ECON 5500) THEORY OF ECONOMIC DEVELOPMENT (3cr.)
      - ECO6171 (ECON 5504) ECONOMIC DEVELOPMENT: DOMESTIC ASPECTS (3cr.)
      - ECO6172 (ECON 5505) ECONOMIC DEVELOPMENT: INTERNATIONAL ASPECTS (3cr.)
    - Economics of the Environment
      - ECO6134 (ECON 5805) TOPICS IN ENVIRONMENTAL AND RESOURCE ECONOMICS (3cr.)
      - ECO6143 (ECON 5803) ECONOMICS OF NATURAL RESOURCES (3cr.)
      - ECO6151 (ECON 5804) ECONOMICS OF THE ENVIRONMENT (3cr.)
    - Econometrics
      - ECO6175 (ECON 5712) MICRO-ECONOMETRICS (3cr.)
      - ECO6176 (ECON 5713) TIME-SERIES ECONOMETRICS (3cr.)
      - ECO6177
    - Labour Economics
      - ECO6191 (ECON 5361) LABOUR ECONOMICS I (3cr.)
      - ECO6192 (ECON 5362) LABOUR ECONOMICS II (3cr.)
      - ECO6193 (ECON 5363) ADVANCED TOPICS IN LABOUR ECONOMICS (3cr.)
- **Comprehensive examinations**
  - Theory
    - There are two theory examinations to be successfully completed within twelve months of beginning full-time study:
      - ECO7990 (ECON 6990) EXAMEN DE SYNTHÈSE EN MICROÉCONOMIE / PhD COMPREHENSIVE EXAM IN MICROECONOMICS
      - ECO7991 (ECON 6992) EXAMEN DE SYNTHÈSE EN MACROÉCONOMIE / PhD COMPREHENSIVE EXAM IN MACROECONOMICS
    - The examining committee may ask the candidate to take an oral examination following the written examination.
  - Fields
    - Students choose two fields: a primary field and a secondary field. Students will be required to take a comprehensive examination in the primary field (ECO9990). This examination must be successfully completed within two years of beginning full-time study. A student who fails on the first attempt can take the exam once more. A second failure leads to mandatory withdrawal from the program.
- **Thesis and Workshops**
  - In preparing the thesis, the student is required to give two workshops:
    - ECO7002 (ECON 6907) PREMIER ATELIER / FIRST WORKSHOP (6cr.)
    - A research proposal for the thesis will be presented for evaluation by faculty members.
    - ECO7004 (ECON 6908) DEUXIÈME ATELIER / FIRST WORKSHOP (6cr.)
    - A substantial portion of the research for the thesis will have been completed and will be presented and evaluated as above.
  - Successful completion of each workshop is a requirement for graduation. Students must have completed the courses ECO7922, ECO7923, ECO7126, the four field courses, as well as the comprehensive examinations (ECO7990, ECO7991 and ECO9990) before registering for the workshops.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial...
registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

Residence
All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the time of initial registration in the program.

Minimum standards
The passing grade in all courses is B. Students who fail 6 credits, the thesis proposal, the comprehensive exam, the thesis, or whose progress is deemed unsatisfactory will be withdrawn from the program.

Thesis Advisory Committee
During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Social Sciences. The TAC is responsible for guiding the student throughout the program.

A meeting between the student and the Thesis Advisory Committee will take place at least once per year. The thesis examining board may include members who are not part of the TAC.

Courses

ECO5114 ECONOMIC GROWTH (3cr.)
Analyses of capital accumulation and income distribution; measures of technical progress, general equilibrium theory, and labour markets; growth and institutions: the State, firms, financial markets; multisectorial growth.

ECO5116 POST-KEYNESIAN THEORY: VALUE AND PRODUCTION (3cr.)

ECO5185 (ECON 5005) ECONOMETRICS I (3cr.)

ECO6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)
Expérience en milieu de travail. Évalué P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l’évaluation du superviseur de stage. / Experience in a workplace setting. Evaluated P (Pass) / F (Fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

ECO6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)
Expérience en milieu de travail. Évalué P (réussite) / F (échec) par un professeur du programme selon les résultats du rapport écrit et l’évaluation du superviseur de stage. / Experience in a workplace setting. Evaluated P (Pass) / F (Fail) by a professor in the program based on the written report and the evaluation of the internship supervisor. Préalable : permission du responsable des études supérieures. / Prerequisite: permission of the graduate studies co-ordinator.

ECO6106 (ECON 5209) HISTORY OF ECONOMIC THOUGHT AND METHODOLOGY (3cr.)
Evolution of economic thought, from the economic doctrines of antiquity to present times; critique and appraisal of scientific methods in economics.

ECO6108 ECONOMIC SYSTEM DESIGN (3cr.)
Deterministic dynamic optimization methods: economic and managerial applications of the maximum principle of Pontryagin and of dynamic programming. Discrete time stochastic dynamic optimization methods: Bayesian and Markovian decision theory, measures of risk-aversion and risk, portfolio theory, elements of search theory, applications of discrete time stochastic control to economics. Prerequisites: ECO4186 or ECO4184 and ECO6108 or MAT2341, MAT2324, MAT2317 or (MAT2371 and MAT2375).

ECO6110 INTRODUCTION TO APPLIED GENERAL EQUILIBRIUM MODELLING (3cr.)
Computable general equilibrium (CGE) modelling: impacts of economic shocks; theoretical foundations; model specification, numerical solutions. Understanding model assumptions and interpretation of results.

ECO6120 MACROECONOMIC THEORY IV (3cr.)
Macroeconomic theory, including topics such as economic growth, consumption, investment, real and nominal frictions in the goods, labour, and credit markets, models of short-run economic fluctuations, and monetary and fiscal policy design. Prerequisite: ECO3152
ECO6122 MICROECONOMIC THEORY IV (3cr.)
Microeconomic theory, including topics such as utility maximization and individual choice, decision-making under uncertainty, producer theory (technology, costs, and profit maximization), alternative market structures (competition, monopoly, and oligopoly), general equilibrium, and the economics of information. Prerequisite: ECO3121

ECO6130 (ECON 5401) PUBLIC ECONOMICS: EXPENDITURE (3cr.)
The theory of public expenditures. Topics may include public goods and externalities, social insurance and redistribution, public provision of health care and education, public pension systems, and underemployment insurance.

ECO6131 (ECON 5402) PUBLIC ECONOMICS: TAXATION (3cr.)
The study of tax systems. Concepts of equity and efficiency in taxation. The optimal design of tax structures using commodity, income, and capital taxes. Additional topics may include political economy of taxation, low-income support, environmental taxes, and tax evasion.

ECO6132 (ECON 5403) TOPICS IN THEORY OF PUBLIC ECONOMICS (3cr.)
Topics may include political economy, tax incidence in general equilibrium, the theory and practice of tax reform, normative approaches to income redistribution, the theory of non-market decision-making, the non-profit sector, and social choice theory.

ECO6134 (ECON 5805) TOPICS IN ENVIRONMENTAL AND RESOURCE ECONOMICS (3cr.)
Topics may include international dimensions of environmental regulation, including treaties, competitiveness, and the effects of trade liberalization; development issues, including fiscal sustainability, Dutch disease, the resource curse, and population growth; resource topics, including optimal taxation, green national accounts, sustainability theory, and scarcity of extractive resources.

ECO6135 (ECON 5305) TOPICS IN INDUSTRIAL ORGANIZATION (3cr.)
Topics may include vertical restraints and vertical integration, innovation and research and development, network economics, contract theory, search theory and advertising, and industry studies.

ECO6140 (ECON 5301) INDUSTRIAL ORGANIZATION I (3cr.)
An examination of theories pertaining to industrial organization and their application by way of empirical studies. Topics include oligopoly theory, product differentiation, and strategic behaviour.

ECO6142 (ECON 5302) INDUSTRIAL ORGANIZATION II (3cr.)
Regulation and competition policy as alternative approaches for influencing industry conduct and performance and correcting market failures. Topics may include incentive regulation under asymmetric information, cost-based pricing, second-best pricing, peak-load pricing, rate-of-return regulation, price-cap regulation, access pricing, and regulatory capture.

ECO6143 (ECON 5803) ECONOMICS OF NATURAL RESOURCES (3cr.)

ECO6151 (ECON 5804) ECONOMICS OF THE ENVIRONMENT (3cr.)
Theory of environmental regulation, including command and control, incentive based mechanisms, effects of market structure, and interactions with pre-existing taxes. Valuation of non-marketed goods, including existence value, contingent valuation, hedonic price methods, health impacts, irreversibility, and recreational benefits. Prerequisite: ECO6150 or the permission of the Department.

ECO6160 (ECON 5601) INTERNATIONAL TRADE: THEORY AND POLICY (3cr.)
International trade theory and its implications for economic policy, with emphasis on topics such as determinants of trade and specialization, gains from trade and commercial policy, international factor mobility, growth, and development.

ECO6161 (ECON 5602) INTERNATIONAL MONETARY THEORY AND POLICY (3cr.)
International monetary theory and its implications for economic policy, with emphasis on topics such as sources of equilibrium and disequilibrium in the balance of payments, balance-of-payments adjustment under fixed versus flexible exchange rates, international capital movements, and recent issues in the international monetary system.

ECO6162 (ECON 5603) TOPICS IN INTERNATIONAL ECONOMICS (3cr.)
Selected topics in international economics, including theoretical analysis, quantitative methods and policy formulation, implementation and evaluation.

ECO6170 (ECON 5500) THEORY OF ECONOMIC DEVELOPMENT (3cr.)
Theoretical approaches in the economic development literature in relation to the historical, economic, environmental, social and political dimensions of the development process.

ECO6171 (ECON 5504) ECONOMIC DEVELOPMENT: DOMESTIC ASPECTS (3cr.)
Major domestic problems of economic development. Topics may include employment, income distribution, choice of technology, sectoral allocation of resources, human resources development, and domestic environment issues.

ECO6172 (ECON 5505) ECONOMIC DEVELOPMENT: INTERNATIONAL ASPECTS (3cr.)
Key problems of international economic development such as trade in primary commodities and manufactures, financial flow and debt, the role of multinational corporations, the transfer of technology, and the international dimensions of environmental issues as they relate to the developing countries.
ECO6173 (ECON 5507) ENVIRONMENTAL ASPECTS OF ECONOMIC DEVELOPMENT (3cr.)
Policy aspects of sustainable economic development and environmental quality in developing countries. Topics to include energy use, deforestation, drought and desertification, depletion of natural resources, debt, environment and poverty, sustainable industrial and agricultural development, conservation policies, pollution control and global environmental issues.

ECO6174 HEALTH ECONOMICS (3cr.)
Review of both classic and frontier work in the field of health and health care economics. Empirical work with an emphasis on theory and methodology. This course is also relevant to students interested in broader empirical microeconomic research.

ECO6175 (ECON 5712) MICRO-ECONOMETRICS (3cr.)
Analysis of the concepts and tools used in micro-econometrics with particular focus on empirical applicability. Topics may include discrete choice models, limited dependent variables, panel data, duration models, and program evaluation, together with relevant economic applications. Prerequisite: ECO 5185 (or equivalent).

ECO6176 (ECON 5713) TIME-SERIES ECONOMETRICS (3cr.)
Analysis of the concepts and tools used in time-series econometrics with particular focus on empirical applicability. Topics may include cointegration analysis, error-correction models, VAR models, volatility analysis, and non-linear time-series models, together with relevant economic applications. Prerequisite: ECO5185 (or equivalent).

ECO6180 (ECON 5506) FOUNDATIONS OF MONETARY THEORY (3cr.)
Microeconomic foundations of monetary theory. Alternative theories of the existence of money and the micro-foundations for understanding how money is integrated into aggregate macroeconomic models.

ECO6181 (ECON 5507) TOPICS IN MONETARY ECONOMICS (3cr.)
Coverage of one or more areas of current research on the frontiers of monetary economics.

ECO6182 (ECON 5608) MONETARY ECONOMICS AND FINANCIAL INTERMEDIATION (3cr.)
The evolution of the financial system and its interrelationship with the money supply process. Monetary and finance theory and empirical research applied to institutional problems in both historical and contemporary settings. Topics may include credit markets, financial instability, bubbles, and links to central bank policy.

ECO6183 (ECON 5609) EXPLORATIONS IN MONETARY ECONOMICS (3cr.)
Explorations in theory, policy recommendations, and empirical study. Course material challenges traditional approaches by examining such topics as the endogeneity of money, the role of credit, financial instability, the circuit approach, flow-of-funds analysis, sectoral stock-flow coherence, and functional finance.

ECO6191 (ECON 5361) LABOUR ECONOMICS I (3cr.)
The application of microeconomic and macroeconomic theory to the labour market. Topics include labour supply and labour demand, wage determination, human capital and the economics of education, and unemployment.

ECO6192 (ECON 5362) LABOUR ECONOMICS II (3cr.)
Personnel economics and contract theory. Topics include the economics of unions, discrimination, the economics of the household, gender and fertility, and labour mobility.

ECO6193 (ECON 5363) ADVANCED TOPICS IN LABOUR ECONOMICS (3cr.)
Topics may include program evaluation, inequality, labour markets and health, labour markets and crime, and the structural estimation of labour market models.

ECO6304 SELECTED TOPICS IN APPLIED ECONOMICS (3cr.)
Study of selected topics in applied economics; contents may change from year to year.

ECO6900 THÈMES CHOISIS EN THÉORIE ÉCONOMIQUE / SELECTED TOPICS IN ECONOMIC THEORY (3cr.)
Étude de thèmes choisis en théorie économique; contenu variable selon l’année. / Study of selected topics in economic theory; contents may change from year to year.

ECO6904 THÈMES CHOISIS EN ÉCONOMIE APPLIQUÉE / SELECTED TOPICS IN APPLIED ECONOMICS (3cr.)
Étude de thèmes choisis en économie appliquée; contenu variable selon l’année. / Study of selected topics in applied economics; contents may change from year to year.

ECO6906 THÈMES CHOISIS EN POLITIQUE ÉCONOMIQUE / SELECTED TOPICS IN ECONOMIC POLICY (3cr.)
Étude de thèmes choisis en politique économique; contenu variable selon l’année / Study of selected topics in economic policy; contents may change from year to year.

ECO6999 MÉMOIRE / MAJOR PAPER (6cr.)

ECO7002 (ECON 6907) PREMIER ATELIER / FIRST WORKSHOP (6cr.)

ECO7004 (ECON 6908) DEUXIÈME ATELIER / FIRST WORKSHOP (6cr.)
ECO7119 (ECON6019) MATHEMATICAL FOUNDATIONS FOR ECONOMIC THEORY (3cr.)
Mathematical techniques needed to understand micro- and macro-economic theory at the PhD level, and to carry out research. Real analysis, Review of static optimization. Continuous- and discrete-time dynamic optimization in deterministic and stochastic environments. Applications to economic theory are presented. Prerequisites: ECO6120/6520 and ECO6122/6522, or permission of the Department.

ECO7126 (ECON 6027) ECONOMETRICS II (3cr.)
Selected topics from estimating and testing the regression and simultaneous equation models. Topics include maximum likelihood estimation, statistical analysis of residuals, auto-regressive and other time-series models, multivariate regression model, and elements of asymptotic statistical theory within the context of the simultaneous equation model. Prerequisite: ECO5185 (or equivalent).

ECO7177 (ECON 6714) ADVANCED TOPICS IN ECONOMETRICS (3cr.)
Coverage of one or more areas of current econometric research. Prerequisite: ECO 7126.

ECO7922 (ECON 6020) THÉORIE ÉCONOMIQUE : MICROÉCONOMIE / ECONOMIC THEORY: MICROECONOMICS (3cr.)
Théorie microéconomique au niveau gradué avancé, incluant des thèmes tels que la théorie des jeux, les externalités et les biens publics, l'équilibre général, et le bien être. / Advanced graduate-level microeconomic theory, including topics such as game theory, externalities and public goods, general equilibrium, and welfare. Préalables : ECO6522 et ECO7119 (ou l'équivalent). / Prerequisites: ECO6122 and ECO7119 (or equivalent).

ECO7923 (ECON 6021) THÉORIE ÉCONOMIQUE : MACROÉCONOMIE / ECONOMIC THEORY: MACROECONOMICS (3cr.)
Théorie macroéconomique au niveau gradué avancé avec emphase sur les modèles d’équilibre général dynamiques. Présentation des concepts théoriques principaux et exploration de la structure de base sous-jacente à ces modèles. Application à l'étude des décisions de consommation des ménages, d'investissement des entreprises, et à la croissance économique. / Advanced graduate-level macroeconomic theory with particular focus on dynamic general equilibrium models. Exposition of the main theoretical concepts and exploration of the basic structure underlying these models. Application to the study of household consumption decisions, firm investment decisions, and economic growth. Préalables : ECO6520 et ECO7119 (ou l'équivalent). / Prerequisites: ECO6120 and ECO7119 (or equivalent).

ECO7980 (ECON 6904) LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)

ECO7990 (ECON 6900) EXAMEN DE SYNTHÈSE EN MICROÉCONOMIE / PhD COMPREHENSIVE EXAM IN MICROECONOMICS

ECO7991 (ECON 6902) EXAMEN DE SYNTHÈSE EN MACROÉCONOMIE / PhD COMPREHENSIVE EXAM IN MACROECONOMICS

ECO9990 (ECON 6905) EXAMEN DE SPÉCIALISATION I / FIELD EXAM I

ECO9999 (ECON 6909) THÈSE DE DOCTORAT / PhD THESIS

Education

Please note that, in May 2016, changes were made to the concentration in Educational Counselling, now named Counselling Psychology. Students who were admitted to and enrolled in the concentration in Educational Counselling before May 2016 can find information about the program requirements in the archives of the FGPS calendar. They can also direct any of their related questions to the Faculty of Education.

The Faculty of Education offers graduate programs leading to the graduate diploma in Program Evaluation, the graduate diploma in Health Professions Education and to the degrees of Master of Education (MEd), Master of Arts (MA) in Education and Doctor of Philosophy (PhD) in Education.

The Faculty is directed by a council responsible to the Senate of the University. The Council is composed of the Dean, the two Vice-Deans, the Vice-Dean and Secretary of the Faculty, the four program directors, one full-time student per program, and six professors.

The Executive Committee of the Faculty is composed of the Dean, the two Vice-Deans, the Vice-Dean and Secretary of the Faculty and three professors.

The various programs offered by the Faculty are governed by the program council composed of the program director and professors.

Other regular committees of the Faculty are the Research and Staff Development Committee, the Educational Policy Committee, the Educational Equity Committee, the Graduate Studies Programs Council and the Executive Committee of Graduate Studies Programs.

The programs are offered in English and French and are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).
Master's program

The MEd and MA programs participate in the collaborative program in Women's Studies at the master's level. For more information, see "Admission" below.

Master of Education (MEd)

The master of education program includes a minimum of 10 courses (30 credits) except for the Counselling Psychology concentration, which requires a minimum of 12 courses (36 credits). A minimum of eight courses must be taken at the Faculty of Education (10 in the case of Counselling Psychology). Courses taken in other faculties and/or at other universities must be related to the field of study, and must have received prior approval from the program director. The program is offered in the following five concentrations:

- Leadership, Evaluation, Curriculum and Policy Studies
- Studies in Teaching and Learning
- Societies, Cultures and Languages
- Counselling Psychology
- Health Professions Education

Master of Arts in Education (MA)

The master of arts in education program is intended for candidates who wish to undertake research in a specific domain of educational studies. It is offered in the following five concentrations:

- Leadership, Evaluation, Curriculum and Policy Studies
- Studies in Teaching and Learning
- Societies, Cultures and Languages
- Counselling Psychology
- Health Professions Education

Doctoral program

The program participates in the collaborative program in Canadian Studies at the PhD level. For more information, see "Admission" below.

The PhD program is offered in the following five concentrations:

- Leadership, Evaluation, Curriculum and Policy Studies
- Studies in Teaching and Learning
- Societies, Cultures and Languages
- Educational Counselling (suspended until further notice)
- Health Professions Education

Programs

Master of Arts Education Concentration in Counselling Psychology
Master of Arts Education Concentration in Health Professions Education
Master of Arts Education Concentration in Leadership, Evaluation, Curriculum and Policy Studies
Master of Arts Education Concentration in Societies, Cultures and Languages
Master of Arts Education Concentration in Studies in Teaching and Learning
Master of Arts Education Specialization in Women's Studies
Master of Education Concentration in Counselling Psychology
Master of Education Concentration in Health Professions Education
Master of Education Concentration in Leadership, Evaluation, Curriculum and Policy Studies
Master of Education Concentration in Societies, Cultures and Languages
Master of Education Concentration in Studies in Teaching and Learning
Doctorate in Philosophy Education Concentration in Educational Counselling
Doctorate in Philosophy Education Concentration in Health Professions Education
Doctorate in Philosophy Education Concentration in Leadership, Evaluation, Curriculum and Policy Studies
Doctorate in Philosophy Education Concentration in Societies, Cultures and Languages

Doctorate in Philosophy Education Concentration in Studies in Teaching and Learning

Doctorate in Philosophy Education Specialization in Canadian Studies

**Admission**

To be admitted to the PhD program, candidates must fulfill the following requirements:

1. A minimum average of B+ (75%), or equivalent, calculated in accordance with the Faculty of Graduate and Postdoctoral Studies (FGPS) guidelines.
2. A master’s degree with thesis, or equivalent (except for candidates for the concentration in Health Professions Education; see item 5). Students who have not completed a thesis must provide evidence of their ability to do research at the doctoral level by providing a sample of written work such as a memoir, research report, scholarly publication, or qualifying research paper. (If the applicant does not have any of these documents, he or she may be invited to complete an interim report, as described in the Interim Report Guide.)
3. Courses recognized by the Admissions Committee as courses in education (or in health education, or in health if applying for the concentration in Health Professions Education).
4. The ability to understand and fluently speak the language of instruction.
5. Candidates for the concentration in Health Professions Education must have a master’s degree with thesis in science, in health science or in a related field. If not, they must submit documents demonstrating their ability to conduct research in the area of health (for examples of documentation, see item 2 above).

Applications for admission will be considered only if all supporting documentation has been received.

Admission to the program depends on the availability of a thesis supervisor whose research interests are compatible with the student’s area of interest.

NOTE: Admission to the concentration in Educational Counselling requires a master’s degree in Counselling with thesis or the equivalent of the internship component. Applicants must also have completed graduate-level courses in theories of counselling, theories of career development, and micro-counselling. (Please note that this concentration is suspended until further notice.)

**Application procedure**

All completed files for admission to graduate studies will be examined by the Admissions Committee concerned.

For the application deadline, please check the specific requirements for the program (under "Apply for admission").

Neither the Faculty of Education nor the Faculty of Graduate and Postdoctoral Studies can give assurance that a candidate whose application and supporting documents are received after the closing dates will be able to register for the session requested.

Candidates who wish to be admitted to a graduate program in Education must complete the application for admission online and then print and send a copy to the Graduate Programs Academic Secretariat of the Faculty of Education. Supporting documentation that is not attached to the application form must be sent to the same office.

**Documents required**

To view the list of required documents, go to "Apply now" on the right-hand side of this page.

**Evaluation of applications**

When an admission file is completed, it will be evaluated by the Admissions Committee. All candidates will be informed of their status in writing.

In exceptional cases, an applicant may be asked to attend a selection interview at the Faculty.

Candidates for the concentration in Educational Counselling are selected according to the criteria listed below based on all relevant information in the admission file. These criteria are ranked in order of the weight they are given in selection decisions. (Please note that this concentration is suspended until further notice.)

- Academic achievement
- Preparation for the PhD program with a concentration in Educational counselling
- Personal suitability for a career in counselling

**Language requirements**

All applicants must be proficient in understanding, speaking and writing in either French or English. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other language.

**Fast-tracking from master’s to PhD**
Exceptional students who are registered in the MA program may be permitted to transfer to the PhD program without completing an MA thesis, provided they meet the following criteria:

- Their academic performance must be exceptional: they must have successfully completed five MA courses, including EDU6290, with an average of A or A+.
- They must demonstrate an aptitude for high-quality research.
- They must be recommended by their thesis supervisor, two professors who are members of the Faculty of Graduate and Postdoctoral Studies, and the professor responsible for the course EDU6290. In the event that the thesis supervisor is the professor in charge of EDU6290, a recommendation from a third professor and member of the FGPS will be required.
- The transfer must have been approved by the MA and PhD Admissions Committee and by the Faculty of Graduate and Postdoctoral Studies.

Students who have spent more than six sessions in the MA program will not be allowed to fast-track. Fast-tracking normally occur after the third session but can occur as early as the second.

Transfer students must pass all the courses required for the doctoral program in addition to the five MA courses already completed. The total number of courses required is therefore eleven.

The PhD comprehensive examination must be completed within four sessions of the transfer and no later than within seven sessions following initial enrolment in the Master’s program. Failure to meet this deadline will lead to a return to the Master’s level.

**Equivalence and advanced standing**

- Upon receiving a copy of the student’s official transcript and a course description, the program director may grant equivalence for graduate work done in another recognized university or as a special student in the Faculty of Education. A maximum of two courses (six credits) may be granted.
- In some cases, a student who already holds a graduate degree (master’s or doctorate) may, upon being admitted to a second master’s or a second doctoral program, be granted equivalencies for courses completed for the first degree. (NOTE: The number of transfer credits must not exceed 25% of the total course credits required for the program to which the student is applying.) To be eligible, the courses must meet the following three conditions:
  1. be deemed relevant by the program’s Admissions Committee;
  2. have been completed with a grade of at least B; and
  3. have been completed within the last eight years.
- No credits will be given for the following:
  - courses or work completed eight or more years before the date of the request for admission;
  - course work with a final grade lower than B.

**Collaborative programs**

The Faculty of Education is one of the units participating in the collaborative program in Canadian Studies (PhD level only). Students should indicate in their initial application for admission that they wish to be accepted into this collaborative program. For further details, see the description of the program posted on the FGPS website.

**Assistantships**

Each year, the Faculty allocates research and teaching assistantships to a number of students.

**Scholarships**

Information on scholarships can be obtained through the “Scholarships for Graduate Studies” brochure and through reference books available at the FGPS Awards Office. Information is also available on the FGPS website.

**Change of program**

Students can only register for the program to which they were admitted. Transfer requests and requests to change concentrations must be submitted, using the appropriate form, at least one month prior to the intended start of the new program.

Students interested in transferring into a program at a more advanced level of study (for example, from master’s to PhD), must submit a new application for admission to the Faculty. Students may not register for the new program until they have received a new offer of admission.

**Language of instruction**

The Faculty offers courses in English, French and, in some cases, in both languages.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be completed in either French or English.

**Program Requirements**
Given the individualized nature of the PhD program, each student’s program is determined by an interim adviser (appointed by the program director), in consultation with the student. Because the Faculty believes that the student’s coursework and research should be integrated into the overall program, determining which courses the student should take depends to some extent on his or her research topic. For this reason, students are strongly encouraged to begin exploratory work and make tentative decisions regarding their research topic early on in the program so that course work and research can be interrelated.

Doctoral students typically take a minimum of six courses (18 credits). However, with the approval of the Admissions Committee and their thesis supervisor, students who have completed a master’s degree in Education (MA/MEd) and have been admitted to the PhD program may reduce their course load to five courses (15 credits).

**Course sequence**

1. Three courses are compulsory:
   - EDU8105 CONTEMPORARY ISSUES IN EDUCATION (3cr.)
   - EDU8106 EPISODES OF EDUCATIONAL RESEARCH (3cr.)
   - and one of the following four courses:
     - EDU7795 SELECTED TOPICS IN QUANTITATIVE RESEARCH (3cr.)
     - EDU7996 TECHNIQUES OF DOCUMENT ANALYSIS IN EDUCATIONAL RESEARCH (3cr.)
     - EDU7397 DATA COLLECTION INSTRUMENTS (3cr.)
     - EDU8190 QUALITATIVE RESEARCH II (3cr.)

2. Three additional courses, two of which must be within the student’s concentration. (Two additional courses in the concentration, for students who have completed a master’s degree in Education (MA/MEd) with the approval of the Admission Committee and the agreement of their thesis supervisor.)

3. One additional course in research methodology (chosen from among the following) may also be taken in place of one of the concentration courses:
   - EDU7795 SELECTED TOPICS IN QUANTITATIVE RESEARCH (3cr.)
   - EDU7996 TECHNIQUES OF DOCUMENT ANALYSIS IN EDUCATIONAL RESEARCH (3cr.)
   - EDU7397 DATA COLLECTION INSTRUMENTS (3cr.)
   - EDU8190 QUALITATIVE RESEARCH II (3cr.)

4. EDU9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / PhD COMPREHENSIVE EXAMINATION
5. EDU9997 PROPOSITION DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL
   - The thesis proposal must be approved by a committee of professors.
   - Following approval of the thesis proposal, a seminar must be presented.
6. EDU9999 THÈSE DE DOCTORAT / PhD THESIS

**Concentrations**

EDU8002, EDU8105 and EDU8106 are strictly restricted for PhD students.

- **Leadership, Evaluation, Curriculum and Policy Studies**
  - EDU5210 PHILOSOPHIES OF EDUCATION (3cr.)
  - EDU5222 ETHNOGRAPHIES IN EDUCATION (3cr.)
  - EDU5265 INTERNATIONALIZATION OF CURRICULUM STUDIES (3cr.)
  - EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS (3cr.)
  - EDU5499 CURRENT METHODS OF STUDENT ASSESSMENT (3cr.)
  - EDU6102 SEMINAR IN CURRICULUM STUDIES (3cr.)
  - EDU6110 CURRICULUM, POLITICS AND POLICY IN EDUCATION (3cr.)
  - EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
  - EDU6293 ASSESSMENT FOR LEARNING (3cr.)
  - EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
  - EDU6422 EDUCATION AND DEMOCRATIC COMMUNITIES (3cr.)
  - EDU6426 CIVICSHIP AND GLOBAL EDUCATION (3cr.)
  - EDU6428 SOCIAL CONTEXTS OF EDUCATION (3cr.)
  - EDU6460 CURRICULUM, CULTURE, AND LANGUAGE (3cr.)
  - EDU7102 SELECTED TOPICS IN LEADERSHIP, EVALUATION, CURRICULUM AND POLICY STUDIES (3cr.)
  - EDU7193 ADVANCED MEASUREMENT THEORIES (3cr.)
  - EDU8002 LECTURE DIRIGÉE / DIRECTED STUDIES (3cr.)

- **Studies in Teaching and Learning**
  - EDU5210 PHILOSOPHIES OF EDUCATION (3cr.)
  - EDU5265 INTERNATIONALIZATION OF CURRICULUM STUDIES (3cr.)
  - EDU5386 SEMINAR ON LITERACY (3cr.)
  - EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS (3cr.)
  - EDU5499 CURRENT METHODS OF STUDENT ASSESSMENT (3cr.)
  - EDU6103 RESEARCHING PROFESSIONAL PRACTICE (3cr.)
EDU6106 SCIENCE, TECHNOLOGY, SOCIETY AND ENVIRONMENT (3cr.)
EDU6107 HEALTH AND PHYSICAL EDUCATION PEDAGOGY (3cr.)
EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR (3cr.)
EDU6203 LEARNING AND LITERACIES (3cr.)
EDU6204 LEARNING IN ADULTHOOD (3cr.)
EDU6259 RESEARCH AND CONTEMPORARY ISSUES IN TEACHING MODELS AND PRACTICES (3cr.)
EDU6293 ASSESSMENT FOR LEARNING (3cr.)
EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
EDU7150 SELECTED TOPICS IN TEACHING AND LEARNING (3cr.)
EDU7171 SOCIOCULTURAL PERSPECTIVES ON LEARNING (3cr.)
EDU7163 THEORETICAL PERSPECTIVES IN MATHEMATICS EDUCATION (3cr.)
EDU7193 ADVANCED MEASUREMENT THEORIES (3cr.)
EDU8002 LECTURE DIRIGÉE / DIRECTED STUDIES (3cr.)
EDU8253 COGNITIVE PERSPECTIVES ON LEARNING (3cr.)

Societies, Cultures and Languages
- EDU5146 SOCIAL, POLITICAL AND CULTURAL ISSUES IN SECOND LANGUAGE EDUCATION (3cr.)
- EDU5210 PHILOSOPHIES OF EDUCATION (3cr.)
- EDU5221 HISTORICAL NARRATIVES AND EDUCATION (3cr.)
- EDU5222 ETHNOGRAPHIES IN EDUCATION (3cr.)
- EDU5244 BILINGUAL, MULTILINGUAL AND MINORITY CONTEXTS OF LANGUAGE EDUCATION (3cr.)
- EDU5386 SEMINAR ON LITERACY (3cr.)
- EDU5463 CULTURAL STUDIES AND EDUCATION: THEORY AND PRAXIS (3cr.)
- EDU5465 GLOBALIZATION AND COMPARATIVE EDUCATION (3cr.)
- EDU5466 RACISM AND ANTI-RACISM IN EDUCATION (3cr.)
- EDU5610 YOUTH CULTURE, POPULAR CULTURE AND PEDAGOGY (3cr.)
- EDU6110 CURRICULUM, POLITICS AND POLICY IN EDUCATION (3cr.)
- EDU6111 TEACHING AND LEARNING OF LITERACIES IN A SECOND LANGUAGE (3cr.)
- EDU6115 SOCIAL AND POLITICAL ISSUES IN LITERACY ASSESSMENT (3cr.)
- EDU6146 SECOND LANGUAGE LEARNING THEORIES (3cr.)
- EDU6203 LEARNING AND LITERACIES (3cr.)
- EDU6241 SECOND LANGUAGE PROGRAM AND POLICY DEVELOPMENT AND EVALUATION (3cr.)
- EDU6373 EDUCATION OF MARGINALIZED YOUTH (3cr.)
- EDU6421 PUBLIC MEMORY, LIVED HISTORIES AND EDUCATION (3cr.)
- EDU6422 EDUCATION AND DEMOCRATIC COMMUNITIES (3cr.)
- EDU6426 CITIZENSHIP AND GLOBAL EDUCATION (3cr.)
- EDU6428 SOCIAL CONTEXTS OF EDUCATION (3cr.)
- EDU6429 PEDAGOGIES OF DIFFERENCE (3cr.)
- EDU6460 CURRICULUM, CULTURE, AND LANGUAGE (3cr.)
- EDU7133 SELECTED TOPICS IN SOCIETIES, CULTURES AND LANGUAGES (3cr.)
- EDU7141 CURRENT RESEARCH IN SECOND LANGUAGE EDUCATION (3cr.)
- EDU8002 LECTURE DIRIGÉE / DIRECTED STUDIES (3cr.)

Educational Counselling (suspended until further notice)
- Courses and thesis research in the Educational Counselling concentration are focused on issues related to the education and supervision of counsellors.
- EDU6371 SELECTED TOPICS IN COUNSELLING PSYCHOLOGY (3cr.)
- EDU6372 MODELS OF CONSULTATION AND CASE MANAGEMENT IN EDUCATIONAL COUNSELLING (3cr.)
- EDU6373 EDUCATION OF MARGINALIZED YOUTH (3cr.)
- EDU6470 MULTICULTURAL COUNSELLING (3cr.)
- EDU6472 SEMINAR AND PRACTICUM IN GROUP COUNSELLING (3cr.)
- EDU8107 SEMINAR IN COUNSELLING AND SUPERVISION (3cr.)
- EDU8908 INTERNSHIP IN COUNSELLING ET EN SUPERVISION / INTERNSHIP IN COUNSELLING AND SUPERVISION

Health Professions Education
- EDU5105 INTER-PROFESSIONAL EDUCATION IN THE HEALTH PROFESSIONS (3cr.)
- EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
- EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)
- EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION (3cr.)
- EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
- EDU5463 CULTURAL STUDIES AND EDUCATION: THEORY AND PRAXIS (3cr.)
- EDU5466 RACISM AND ANTI-RACISM IN EDUCATION (3cr.)
- EDU6101 SEMINAR IN HEALTH PROFESSIONS EDUCATION (3cr.)
- EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR (3cr.)
- EDU7101 SELECTED TOPICS IN HEALTH PROFESSIONS EDUCATION (3cr.)

Registration of thesis topic

Students must register their thesis topic by the end of the third session of studies.
Thesis supervision and thesis submission

The program director ensures that all procedures for thesis supervision and submission specified by the Faculty of Graduate and Postdoctoral Studies and the program council of the Faculty are followed.

At the time of admission, the Faculty of Education designates a thesis adviser in consultation with the professor concerned.

Comprehensive examination

The overall purpose of the comprehensive exam (EDU9998) is to assess the candidate's mastery of his or her field of study. More specifically, the purpose is to examine the candidate's integrative breadth and depth of knowledge within the context of his or her domains of study and professional/scientific perspective.

The examination is conducted according to a format approved by the program council. It comprises the preparation, submission, evaluation and oral defense of a written text (the Comprehensive Document).

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal or the comprehensive exam, or whose research progress is deemed unsatisfactory will be withdrawn from the program.

Residence

All full-time students must complete a minimum of six sessions of full-time registration. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the time of initial registration in the program.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program.

Courses

Students who started their program before May 2016 will need to consult the program description available in the Archive section.

EDU5101 PERSPECTIVES IN EDUCATION (3cr.)
Overview of key concepts, actors, practices and forms of organization in education; examination of diverse contexts and forms of education and their place and function in society; critical discussion of historical and contemporary debates in education. (This course is reserved for students in the M.Ed. extended program.)

EDU5105 INTER-PROFESSIONAL EDUCATION IN THE HEALTH PROFESSIONS (3cr.)
Examination of educational research, theory and practice related to the professional interdependence of work in the health concentration; study of the impact of interdisciplinary professional principles on teaching and learning strategies, curricular design, and evaluation strategies.

EDU5113 INCLUSIVE AND SPECIAL EDUCATION (3cr.)
Critical examination of current issues and research in inclusive and special education.

EDU5146 SOCIAL, POLITICAL AND CULTURAL ISSUES IN SECOND LANGUAGE EDUCATION (3cr.)
Examination of the social, political and cultural dimensions of learning and teaching an additional language; influences on learners, on opportunities for learning a language and on curriculum, pedagogical materials, and assessment.

EDU5160 MATHEMATICAL THINKING ACROSS THE MATHEMATICS CURRICULUM (3cr.)
Examination of the development of mathematical thinking with respect to a variety of concepts that appear in school mathematics curricula.

EDU5188 INTEGRATION OF TECHNOLOGY IN EDUCATION (3cr.)
Examination of the implications on teaching practice and learning outcomes in the integration of technology studies across the curriculum.

EDU5190 INTRODUCTION TO RESEARCH IN EDUCATION (3cr.)
Introduces students to understanding and applying research in education: researching a topic, critical reading, overview of various types of applied research.

EDU5199 SYNTHESIS SEMINAR (3cr.)
Integration of theoretical knowledge to contribute to educational practice.

EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
EDU5206 PROGRAM PLANNING IN ADULT EDUCATION (3cr.)
Exploration of the fundamental concepts necessary to understand program development in adult education; review of conceptual frameworks for planning, recruitment, evaluation and research on program implementation and program building; procedures for making programs more meaningful to adult learners.

EDU5210 PHILOSOPHIES OF EDUCATION (3cr.)
Inquiry into selected philosophical perspectives and their effects on contemporary educational thought and practice.

EDU5221 HISTORICAL NARRATIVES AND EDUCATION (3cr.)
Critical examination of educational issues in historical perspective: exploration of the roles of race, class, ethnicity, religion and gender in education; historical narratives and their implications.

EDU5222 ETHNOGRAPHIES IN EDUCATION (3cr.)
Ethnographic perspectives on schools and school cultures, and on the relations between education and broader social-cultural forces.

EDU5230 LEADERSHIP IN EDUCATIONAL ORGANIZATIONS (3cr.)
Examination of selected approaches to leadership theory, training, and practice pertinent to the challenges of administration in contemporary educational organizations.

EDU5232 HUMAN RELATIONS IN EDUCATIONAL ADMINISTRATION (3cr.)
Examination of the working functions of administration in relation to people within and otherwise associated with educational organizations; study of motivation and decision-making within static and dynamic situations and of conflict within organizations.

EDU5242 TRENDS IN SECOND LANGUAGE TEACHING (3cr.)
Study of conceptual frameworks and theories of second language teaching: historical overview of major developments and current trends; critical analysis of theoretical foundations, methods and practices.

EDU5244 BILINGUAL, MULTILINGUAL AND MINORITY CONTEXTS OF LANGUAGE EDUCATION (3cr.)
Examination of conceptualizations of bilingual and multilingual education in diverse contexts with an emphasis on Canada; analysis of issues related to the educational success of immigrants and members of minority groups and their integration into schools and society.

EDU5253 THEORIES OF LEARNING APPLIED TO TEACHING (3cr.)
Critical survey of theories of learning in historical and contemporary perspectives and their pedagogical implications for classroom practices.

EDU5258 LEARNING DIFFERENCES IN EDUCATION (3cr.)
Examination and critical analysis of research and practice related to the teaching and learning of people with learning differences; diverse educational contexts and perspectives; social construction of exceptionalities.

EDU5260 INTRODUCTION TO CURRICULUM STUDIES (3cr.)
Overview of recurring curriculum issues in historical and contemporary perspectives; introduction to the practices of curriculum theorizing; investigation of the effects of shifting paradigms within the field of curriculum studies.

EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)
Examination of theory for current practices related to curriculum design in health professions.

EDU5262 CURRICULUM, CULTURE, AND TECHNOLOGIES (3cr.)
Exploration of the theoretical and practical issues of curriculum and program design in relation to culture and technology; examination of the relationships between curriculum, information culture, and E-learning; investigation of the impact of cyber curriculum on cultural identities of teachers and learners.

EDU5263 INTRODUCTION TO EDUCATIONAL ADMINISTRATION (3cr.)
Survey of the theories, research, and practices that have shaped the field of educational administration as both an applied profession and as an area of scholarly inquiry; implications for people, educational structures, and institutional purposes.

EDU5265 INTERNATIONALIZATION OF CURRICULUM STUDIES (3cr.)
Investigation of contemporary issues in curriculum studies within an international context; analysis of curriculum reform initiatives in other countries; examination of current trends in international and transnational curriculum movements; exploration of alternative curricular arrangements within global, national, and local contexts.

EDU5270 PROFESSIONAL ETHICS IN COUNSELLING PSYCHOLOGY (3cr.)
Examination of professional ethical standards and codes of conduct for counsellors and psychotherapists; legal and legislative context of counselling and psychotherapy; application of ethical decision making; ethical dimensions of professional relationships.

EDU5271 COUNSELLING AND PSYCHOTHERAPY: THEORIES AND PRACTICES I (3cr.)
Critical examination of major personality and counselling theories.

**EDU5274 TESTS AND MEASUREMENT IN COUNSELLING PSYCHOLOGY** (3cr.)
Examination of common tests and inventories used in counselling and psychotherapy; selection, administration, scoring and interpretation of tests in counselling and psychotherapy settings.

**EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION** (3cr.)
Study of the impact of computer technology on communication and instructional techniques for health professions education; exploration of distance education, on-line learning, and low and high fidelity simulation.

**EDU5287 EMERGING TECHNOLOGIES AND LEARNING** (3cr.)
Research, theory and practice concerning the use of emerging technologies to facilitate learning; the impact of new media on teaching and learning strategies, on curriculum change, on learner attitudes and motivation, and on higher order learning.

**EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION** (3cr.)
Exploration of the assessment formats used to evaluate the domains of clinical competence in health care professional training at both the undergraduate and postgraduate levels; analysis of written and oral examinations, oral and performance-based testing.

**EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE** (3cr.)
Exploration of principles of effective program evaluation methods; planning; instrument development; data collection, processing and analysis; reporting and follow-up; survey of diverse models of evaluation. *Prerequisite: EDU5190*

**EDU5301 PRINCIPLES OF EDUCATIONAL PLANNING FOR THE HEALTH PROFESSIONS - PART I** (3cr.)
Exploration of practical approaches to planning, implementing, and evaluating programs in health professions education, examination of learning needs, learning objectives, learning methods and program evaluation.

**EDU5302 PRINCIPLES OF EDUCATIONAL PLANNING FOR THE HEALTH PROFESSIONS - PART II** (3cr.)
Exploration of concepts related to curricular reform, implementation of changes in education, selection of approaches to enable learning, and development of valid methods for evaluation of learning and programs of studies in the health professions. *Prerequisite: EDU 5301*

**EDU5357 CURRENT ISSUES IN MATHEMATICS EDUCATION** (3cr.)
Examination of current issues associated with mathematics education, such as educational equity, inquiry-based learning, classroom diversity, and the role of technology.

**EDU5358 TEACHING AND LEARNING IN THE ARTS** (3cr.)
Examination of the theoretical foundations of arts-based instruction and arts integration; investigation of the current methods of teaching, learning and evaluation in, about, with and through the arts in a variety of program areas.

**EDU5381 CREATIVITY IN EDUCATIONAL SETTINGs** (3cr.)
Analysis of theories of creativity in educational settings and their applications to education.

**EDU5384 INTEGRATED APPROACHES TO LANGUAGE CURRICULUM** (3cr.)
Theories and principles underlying the integrated approach to the teaching, learning and assessment of language and literacy (oral and written communication and media literacy); applications of language and literacy practices in specific contexts.

**EDU5385 CRITICAL PERSPECTIVES ON CHILDREN'S LITERATURE AND LEARNING** (3cr.)
Critical investigation of children's literature as a factor in social learning.

**EDU5386 SEMINAR ON LITERACY** (3cr.)
Theoretical perspectives in various areas of the field of literacy.

**EDU5391 INTERACTION OF RESEARCH AND PRACTICE** (3cr.)
Examination of the strengths, challenges, limitations and possibilities for enhancing research-based practice and practitioner-relevant research using quantitative and/or qualitative research.

**EDU5399 DEVELOPMENT OF ASSESSMENT INSTRUMENTS** (3cr.)
Study of the modalities of assessment of knowledge, skills, attitudes and performance; strategies for developing instruments to assess students learning; examination of instrument quality.

**EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS** (3cr.)
Critical examination of current literature on managing change in educational organizations; theories of change, restructuring, organizational reform and improvement.

**EDU5463 CULTURAL STUDIES AND EDUCATION: THEORY AND PRAXIS** (3cr.)
Introduction to the interdisciplinary study of contemporary popular culture including theories of representation, texts, social identities, and their implications for school practices.

**EDU5465 GLOBALIZATION AND COMPARATIVE EDUCATION (3cr.)**
Examination of the interaction between globalization and education; theories of mass education in developing and industrialized countries; comparative perspectives on issues of educational innovation and reform.

**EDU5466 RACISM AND ANTIRACISM IN EDUCATION (3cr.)**
Theories of "race", racism and antiracism in education; exploration of the challenges of anti-racist education and change.

**EDU5471 SKILL DEVELOPMENT IN COUNSELLING AND PSYCHOTHERAPY (3cr.)**
Examination of counselling and psychotherapy models, methods and skills; focus on developing personal resources in verbal and non-verbal communication within counselling and psychotherapy models.

**EDU5473 THEORIES OF CAREER DEVELOPMENT (3cr.)**
Analysis of career development theories with emphasis on issues in career decision making and transition.

**EDU5499 CURRENT METHODS OF STUDENT ASSESSMENT (3cr.)**
Essential principles, concepts, skills relative to the selection, construction, critique and use of current student assessment methods; emphasis on classroom practices and large-scale assessments.

**EDU5504 SÉMINAIRE D'INTÉGRATION EN ÉVALUATION DE PROGRAMMES (3cr.)**
Integration of theories, of the research and of the practice in rapport with the evaluation of programmes. Production of a report of research on a theme related to the theory and / or the practice in the evaluation of programs. Prerequisites: a) EDU 5299 or EDU 5699 or PSY 7503 or PSY 7103 or CRM 6759 or CRM 6359; b) EDU 6299 or EDU 6699; c) PSY 7102 or PSY 7502. It is preferable that the student has completed, in addition, a course approved by the program director.

**EDU5578 INFORMATION SCOLAIRE ET PROFESSIONNELLE (3cr.)**
Overview of the organization and functioning of the services of orientation and information for school and professional. Study of different provincial systems. Analysis, evaluation, classification and use of different types of documents. Initiation to the use of digitized documents.

**EDU5581 SCIENCES ET DIVERSITÉS (3cr.)**
Analysis of the conditions of production of scientific knowledge in diverse contexts socio-cultural. Identification and analysis of the principal problematic issues related to teaching and to the training of sciences.

**EDU5582 MODÈLES MÉDIATISÉS D'ENSEIGNEMENT (3cr.)**
Study of the mediated models of teaching and their applications in present and at a distance. Analysis of the individual and structural factors of success of these models.

**EDU5583 CRÉATIVITÉ ET ÉDUCATION (3cr.)**
Analysis of the theories of creativity. Identification of links between the creative process and teaching and training, and from new diversity of learners. Mise en perspective dans les champs disciplinaires.

**EDU5584 Dimensions, stratègies et gestion des apprentissages (3cr.)**
Study of the dimensions, strategies and management of learning. Study of management in the teaching-learning process and in the relationship between students and teachers.

**EDU5585 PSYCHOPÉDAGOGIE DE L'ENFANCE ET DE L'ADOLESCENCE**
Study of the development and of the training of the competencies of the child in physical, emotional, social and cognitive areas, including the adolescent. Analyse de modèles d'intervention éducative adaptée et des modèles de prévention des difficultés chez l'enfant et l'adolescent.

**EDU5600 L'APPRENTISSAGE À L'ÂGE ADULTE (3cr.)**
Study of the theories of the learning applied to the education of the adult. Analyse critique des modèles de mises en pratique de ces théories en situation d'apprentissage.

**EDU5611 ÉTHIQUE PROFESSIONNELLE EN ÉDUCATION (3cr.)**
Analysis of the concepts and principles of ethical education in the resolution of ethical dilemmas. Analyse des enjeux d'une éthique professionnelle.

**EDU5616 PRINCIPALES PROBLÉMATIQUES EN ÉDUCATION (3cr.)**
Study of the problematic issues of education, with philosophical approaches, with goals, with programs of studies, with methods, with structures and with personnel in education.

**EDU5618 ÉDUCATION COMPARÉE (3cr.)**
Analyse comparative of the systems of education in Canada and on an international plan. Analyse des différentes réformes en cours. Étude des tendances en...
Étude des interactions entre la structure organisationnelle des établissements scolaires et les comportements des acteurs.


Examen des enjeux liés à l'apprentissage et l'enseignement en milieu minoritaire francophone permettant de préciser les démarches éducatives pertinentes.

Étude du développement de la pensée mathématique associée à différents concepts présents dans les programmes de mathématiques en milieu scolaire.


Étude du concept de compétence. Comparaison des divers types d'évaluation de l'apprentissage selon les dimensions visées. Identification d'instrumentation appropriée.


Comparaison de divers schémas d'interprétation. Étude de divers types de bulletin scolaire. Analyse du processus de prise de décision, du suivi et de la rétroaction.

Application des théories et principes en administration éducationnelle à partir de problèmes, d'événements et de politiques éducationnelles récents. Préalable :
EDU5616 ou EDU5630.

Examen de l'importance des relations avec la communauté scolaire. Approfondissement du concept de partenariat, des modèles de répartition des pouvoirs, des techniques de communication efficace, du marketing des produits éducatifs et du concept de client et d'usager.


Fondements théoriques et enjeux actuels de l'approche inclusive à l'éducation. Perspectives des élèves, du personnel scolaire, des intervenant/es communautaires et associatifs/ves et des parents.

Critical examination of selected topics in health professions education based on research and disciplinary issues. (Open to MEd Students with permission of the program director.)

Critical examination of research within the field of curriculum studies.

Critical examination of the scholarship and research on professional practice of teaching, its application to knowledge.
building and pedagogical improvement.

EDU6106 SCIENCE, TECHNOLOGY, SOCIETY AND ENVIRONMENT (3cr.)
(Teaching, Learning and Evaluation) Critical examination of the social impact of science and technology and their educational implications. Study of the roles of ecological and scientific literacies.

EDU6107 HEALTH AND PHYSICAL EDUCATION PEDAGOGY (3cr.)
(Teaching, Learning and Evaluation) Research in health and physical education and their implications for pedagogy.

EDU6109 YOUTH CULTURE, POPULAR CULTURE AND PEDAGOGY (3cr.)
(Society, Culture and Literacies) Research in youth culture, popular culture and their implications for pedagogy.

EDU6110 CURRICULUM, POLITICS AND POLICY IN EDUCATION (3cr.)
(Organizational Studies in Education) Critical study of the political organization of education; the role of government in shaping curriculum; the cultural politics of educational change.

EDU6111 TEACHING AND LEARNING OF LITERACIES IN A SECOND LANGUAGE (3cr.)
(Second Language Education) Critical examination of contextualized practices for the teaching, learning and assessment of multiple literacies in a second language.

EDU6115 SOCIAL AND POLITICAL ISSUES IN LITERACY ASSESSMENT (3cr.)
(Society, Culture and Literacies) Critical examination of contemporary literacy assessment practices; focus on political contexts, social consequences and validity.

EDU6146 SECOND LANGUAGE LEARNING THEORIES (3cr.)
Critical study of second language learning theories from linguistics, cognitive, social and pedagogical perspectives.

EDU6191 QUANTITATIVE RESEARCH (3cr.)
Planning, analysis and interpretation of quantitative research within experimental and quasi-experimental frameworks; application of analysis of variance, analysis of covariance and techniques of linear regression (explanation, prediction) to educational contexts. Prerequisite: EDU5191 or equivalent.

EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
Classical test theory; composite variables; reliability; validity; applications to norm-referenced and criterion-referenced tests; scales standardization.

EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR (3cr.)
Study of functions and tasks, and the various roles of adult educators as volunteers, as trainers, as teachers of adults, as researchers; examination of the pre service and on going training of adult educators and professionalization in adult education.

EDU6203 LEARNING AND LITERACIES (3cr.)
Examination of literacy in relation to the construction of ethnicity, gender, social class and racialized difference; exploration of literacy theories from historical, psychological, political and educational perspectives; study of school, family, workplace and community literacy practices.

EDU6204 LEARNING IN ADULTHOOD (3cr.)
Examination of theories and stages of adulthood with emphasis on adult psychological development and implications for education. Critical study of adult characteristics, motivation, gender roles and other concepts related to development.

EDU6241 SECOND LANGUAGE PROGRAM AND POLICY DEVELOPMENT AND EVALUATION (3cr.)
Study of second language policy and how it affects program design and implementation; needs analysis, setting goals and objectives, syllabus design, materials development and classroom implementation; learning assessment, program evaluation and revision.

EDU6259 RESEARCH AND CONTEMPORARY ISSUES IN TEACHING MODELS AND PRACTICES (3cr.)
Analysis of current pedagogical models and practices, and of their underlying theoretical constructs; critical examination of traditional and recent perspectives on the context and process of teaching.

EDU6271 COUNSELLING AND PSYCHOTHERAPY: THEORIES AND PRACTICES II (3cr.)
Advanced critical examination of major personality and counselling theories. Prerequisite: EDU5271 or its equivalent.

EDU6290 RESEARCH IN EDUCATION (3cr.)
Critical review of approaches, methods and processes in educational research; examination of complementarity of different types of research methodology.

EDU6293 ASSESSMENT FOR LEARNING (3cr.)
Nature and role of formative assessment in instructional settings; conditions and contexts favorable for effective use of assessment for learning.

EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
Critical exploration of theoretical orientations to program evaluation and in-depth examination of selected contemporary issues confronting evaluators. 

Prerequisite: EDU 5299 or PSI 7103 or PSI 7503 or CRM 6359 or CRM 6759 (Diploma in Program Evaluation).

**EDU6371 SELECTED TOPICS IN COUNSELLING PSYCHOLOGY** (3cr.)
An examination of current issues in counselling psychology.

**EDU6372 MODELS OF CONSULTATION AND CASE MANAGEMENT IN EDUCATIONAL COUNSELLING** (3cr.)
Analysis of roles of counsellor as leader, team member, and integral resource in developing, mobilizing, and/or utilizing school/community resources within a systems approach; personal development of the skills of co-ordination, collaboration, brokering, and consultation.

**EDU6373 EDUCATION OF MARGINALIZED YOUTH** (3cr.)
Examination of the social ecology and educational problems and needs of diverse groups of marginalized youth in different contexts in Canada and in other countries; related socio-political issues, policy implications, and intervention strategies.

**EDU6421 PUBLIC MEMORY, LIVED HISTORIES AND EDUCATION** (3cr.)
Critical examination of the social construction of public memory through schooling; relations between public memory, peoples' lived histories and the making of communities; the roles of public memory in shaping social identities of race, nation and gender.

**EDU6422 EDUCATION AND DEMOCRATIC COMMUNITIES** (3cr.)
Inquiry into the democratic purposes of schooling and the theory and practices of democratic education; implications for civic engagement, curriculum, school organizations and leadership.

**EDU6426 CITIZENSHIP AND GLOBAL EDUCATION** (3cr.)
Theories of citizenship, global education and their related pedagogies.

**EDU6428 SOCIAL CONTEXTS OF EDUCATION** (3cr.)
Examination of education and its role as part of the fabric of society; exploration of changing norms of schooling, school organization, and social environments; the effects of schooling on social stratification, the relationships between schools and other social institutions, and the paradoxes of education in pluralistic societies; inquiry into issues of authority, power, socialization and culture.

**EDU6429 PEDAGOGIES OF DIFFERENCE** (3cr.)
Exploration of diversity and education from cultural, economic, historical and political perspectives including critical pedagogy and pedagogies of transformation.

**EDU6460 CURRICULUM, CULTURE, AND LANGUAGE** (3cr.)
Examination of the ways in which curriculum works to reproduce and/or suppress certain identities; interdisciplinary inquiries into how current curricular language is situated in relation to identity formations; deconstruction of the marginalization of identities across various curricular contexts. Prerequisite: one of EDU5260, EDU5262 or EDU5265.

**EDU6470 MULTICULTURAL COUNSELLING** (3cr.)
Exploration of practical and theoretical issues relevant to counselling individuals, groups, and families from diverse cultural backgrounds. Emphasis on development of attitudes, values, and skills that promote effective interpersonal relations and counselling.

**EDU6472 SEMINAR AND PRACTICUM IN GROUP COUNSELLING** (3cr.)
Examination of group counselling theory and technique; emphasis on dynamics of group behaviour, social-psychological interactions in small groups, and practice in developing and providing group counselling services. Prerequisites: EDU5271 and EDU5471.

**EDU6473 PRACTICUM IN COUNSELLING PSYCHOLOGY I** (3cr.)
Seminar and minimum of 200 hours of supervised on-site experience in an approved counselling setting. Examination of organizational issues in the delivery of counselling and psychotherapy services; development of professional competence. Prerequisites: EDU5271, EDU5471

**EDU6474 PRACTICUM IN COUNSELLING PSYCHOLOGY II** (3cr.)
Seminar and minimum of 200 hours of supervised on-site experience in an approved counselling setting. Critical examination of selected helping techniques; critical examination of ethical and legal issues in counselling psychology. Prerequisites: EDU6473.

**EDU6504 ÉDUCATION DANS UNE PERSPECTIVE HISTORIQUE** (3cr.)
(Société, culture et littératures) Étude du rôle de la langue, de la culture, de l’ethnicité, du genre et de la religion dans le développement de l’éducation en milieu majoritaire et minoritaire au Canada et dans le monde. Analyse de diverses perspectives en histoire de l’éducation.

**EDU6508 ENJEUX ACTUELS EN ENSEIGNEMENT** (3cr.)
(Enseignement, apprentissage et évaluation) Étude des problématiques actuelles en éducation et de leurs enjeux en enseignement.

**EDU6508 PERSPECTIVES DE LA DIDACTIQUE DU FRANÇAIS LANGUE SECONDE EN CONTEXTE NATIONALS** (3cr.)
EDU6516 ENSEIGNEMENT ET APPRENTISSAGE DE LA GRAMMAIRE DU FRANÇAIS LANGUE SECONDE (3cr.)
(Didactique des langues secondes) Analyse des différents types de grammaire. Étude critique de la recherche sur les pratiques pédagogiques dans l’enseignement de la grammaire en français langue seconde.

EDU6529 APPROCHES THÉORIQUES ET PRATIQUES EN LITTÉRATURES MULTIPLES (3cr.)
Études des approches théoriques et pratiques associées aux différents champs des littératures tels que la littérature familiale, scolaire, personnelle et critique.

EDU6571 SÉMINAIRE EN DÉVELOPPEMENT PROFESSIONNEL ET EN PLANIFICATION DE CARRIÈRE (3cr.)
Approfondissement de certains aspects conceptuels du counselling et de la recherche appliquée au domaine du développement professionnel et de la planification de carrière.

EDU6573 TRAVAIL ET SANTÉ MENTALE (3cr.)
Analyse des problèmes de santé mentale provoqués par le travail ou l'absence de travail : perte d'estime de soi, d'identité, de motivation, humiliation, culpabilité, épuisement professionnel, mise en chômage technique, etc. Nature et diagnostic. Mise en contexte de ces troubles dans divers courants de pensée. Étude des effets thérapeutiques du travail.

EDU6634 GESTION DE LA QUALITÉ EN ÉDUCATION (3cr.)
Analyse critique des principes, des méthodes et des techniques de gestion de la qualité totale appliquées à l'organisation scolaire.

EDU6637 GESTION ET SUPERVISION DES RESSOURCES PROFESSIONNELLES EN ÉDUCATION (3cr.)
Étude des modèles de gestion des ressources humaines dans les systèmes scolaires à partir de paramètres comme les conventions collectives, l'équité, la supervision, l'évaluation du rendement, le développement professionnel.

EDU6651 ÉDUCATION À LA CITOYENNETÉ (3cr.)
Études des différentes approches théoriques et pratiques associées à la citoyenneté et leur lien avec les inégalités et la marginalisation sociales.

EDU6652 LITTÉRATIE ET DIVERSITÉ (3cr.)
Examen des divers concepts associé à la littératie et leurs rapports avec la construction de la personne en lien avec le langage et l'identité ethnique et sociale.

EDU6670 COUNSELLING ET ORIENTATION AUPRÈS DES GROUPES MINORITAIRES (3cr.)
Études des caractéristiques des groupes minoritaires tels que les femmes, les gais et les lesbiennes, les handicapés, les minorités linguistiques et (ou) ethniques, etc., selon la perspective du counselling et de l'orientation de carrière.

EDU6672 MODÈLES ET STRATÉGIES D'INTERVENTION EN CONTEXTE DE LA PSYCHOLOGIE DU COUNSELLING (3cr.)
Différents modèles d'intervention associés au développement d'habiletés interpersonnelles et sociales des élèves. Stratégies de solution de problèmes, de gestion de classe, de résolution de conflits et de gestion du temps.

EDU6871 STAGE EN PSYCHOLOGIE DU COUNSELLING I (3cr.)
Stage clinique supervisé d'un minimum de 200 heures dans un centre offrant des services de counselling personnel et (ou) de carrière. Préalables : EDU5671, EDU5871.

EDU6997 PROPOSITION DE THÈSE DE MAÎTRISE / MASTER'S THESIS PROPOSAL

EDU7000 LECTURE DIRIGÉE / DIRECTED READING (3cr.)

EDU7101 SELECTED TOPICS IN HEALTH PROFESSIONS EDUCATION (3cr.)
Critical analysis of selected topics and their implications for health professions education.

EDU7102 SELECTED TOPICS IN LEADERSHIP, EVALUATION, CURRICULUM AND POLICY STUDIES (3cr.)
In-depth study of a topic in leadership, evaluation and curriculum.

EDU7133 SELECTED TOPICS IN SOCIETIES, CULTURES AND LANGUAGES (3cr.)
Topics of current interest will be selected for intensive study.

EDU7141 CURRENT RESEARCH IN SECOND LANGUAGE EDUCATION (3cr.)
Examination of current research in second language education representing diverse contemporary issues and conceptual frameworks.

EDU7150 SELECTED TOPICS IN TEACHING AND LEARNING (3cr.)
Topics of current interest will be selected for intensive study.

EDU7151 SOCIOCULTURAL PERSPECTIVES ON LEARNING (3cr.)
Critical examination of theories of learning from sociocultural perspectives and their effects on educational practices.

**EDU7163 THEORETICAL PERSPECTIVES IN MATHEMATICS EDUCATION** (3cr.)
Study of theoretical perspectives in mathematics education, examination of the connection between theory, research and practice in mathematics teaching and learning.

**EDU7190 QUALITATIVE RESEARCH I** (3cr.)
Critical review of fundamental aspects of qualitative research in education: approaches, characteristics and strategies.

**EDU7193 ADVANCED MEASUREMENT THEORIES** (3cr.)
Item response models; generalizability theory; dimensionality.

**EDU7395 SELECTED TOPICS IN QUANTITATIVE RESEARCH** (3cr.)
Topics of current interest will be selected for intensive study.

**EDU7396 TECHNIQUES OF DOCUMENT ANALYSIS IN EDUCATIONAL RESEARCH** (3cr.)
Study of educational documents and approaches to textual research including historical criticism, discourse analysis and narrative theory.

**EDU7397 DATA COLLECTION INSTRUMENTS** (3cr.)
Study of the construction of data collection instruments in education and of the validation of interpretations of findings.

**EDU7534 THÈMES CHOISIS : LEADERSHIP, ÉVALUATION, PROGRAMMES ET POLITIQUES ÉDUCATIONNELLES** (3cr.)
Thèmes variés choisis pour une étude approfondie.

**EDU7588 THÈMES CHOISIS EN ENSEIGNEMENT ET APPRENTISSAGE** (3cr.)
Thèmes variés choisis pour une étude approfondie.

**EDU7696 TECHNIQUES D'ANALYSE DE DOCUMENTS EN RECHERCHE ÉDUCATIONNELLE** (3cr.)
Étude de documents éducationnels et de procédures d'analyse de textes, incluant la critique historique, l'analyse de discours et la théorie narrative.

**EDU7999 THÈSE DE MAÎTRISE EN ÉDUCATION / MA THESIS IN EDUCATION**

**EDU8002 LECTURE DIRIGÉE / DIRECTED STUDIES** (3cr.)

**EDU8105 CONTEMPORARY ISSUES IN EDUCATION** (3cr.)
Examination of current issues in education from multiple research traditions; exploration of students' prospective PhD projects in relation to major trends in educational research. (Reserved for PhD students.)

**EDU8106 EPISTEMOLOGY OF EDUCATIONAL RESEARCH** (3cr.)
Critical study of the epistemological foundations of the principal research paradigms in education; exploration of the epistemological assumptions underlying candidates' prospective PhD projects. (Reserved for PhD students.)

**EDU8107 SEMINAR IN COUNSELLING AND SUPERVISION** (3cr.)
Examination and critique of current scholarship from multiple research traditions in counselling and supervision; implications for counselling and supervisory practice.

**EDU8190 QUALITATIVE RESEARCH II** (3cr.)
Examination of methodological, organizational, ethical and political issues within qualitative research.

**EDU8253 COGNITIVE PERSPECTIVES ON LEARNING** (3cr.)
Analysis of essential cognitive processes from different theoretical perspectives; application of learning theories to various contexts. *This course is open to master's students with permission of the instructor.*

**EDU8908 INTERNAT EN COUNSELLING ET EN SUPERVISION / INTERNSHIP IN COUNSELLING AND SUPERVISION**
Internat de 600 heures en counselling et en supervision dans un centre approuvé par la direction du programme; développement des compétences en supervision et application des normes éthiques relatives à la pratique et à la supervision en counselling. Noté S (satisfaisant) / NS (non satisfaisant). / Internship of 600 hours of counselling and counsellor supervision in approved settings; development of advanced counselling and supervisory competence; application of ethical principles to counselling and supervisory practice. Graded S (Satisfactory) / NS (Not satisfactory).

**EDU8999 RAPPORT INTÉRIMAIRE / INTERIM REPORT**
Introduction to Lisp and Objective C. Knowledge representation using rules, semantic nets and frames. State space representation. Procedural and declarative

ELG5161 (EACJ 5207) ROBOTICS: CONTROL, SENSING AND INTELLIGENCE

ELG6171 (SYSC 5701) OPERATING SYSTEM METHODS FOR REAL-TIME APPLICATIONS

and disadvantages. Analyzing designs for robustness, modularity, extensibility, portability and performance. Implementation issues. Major course project.


distribution networks, network monitoring and measurements, quality of service, protection and restoration, virtual private networks, cross layer interworking,

EDU9977 PROPOSITION DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL

EDU9978 EXAMEN DE SYNTHÈSE (DOCTORAT) / PhD COMPREHENSIVE EXAMINATION

EDU9999 THÈSE DE DOCTORAT / PhD THESIS

Electrical and Computer Engineering

Ottawa-Carleton Joint Program

Established in 1983, the Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE) combines the research strengths of the School of Electrical Engineering and Computer Science (EECS) at the University of Ottawa and the departments of Electronics and of Systems and Computer Engineering at Carleton University.

The Institute offers graduate programs leading to the degrees of Master of Applied Science (MAsc), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Electrical and Computer Engineering.

The Institute is one of the participating units in the collaborative program in Science, Society and Policy (master’s level only).

Members of the Institute are involved in ten main research fields: computer communications, multimedia and distributed systems; computer-aided design for electronic circuits; computer and software engineering; digital and wireless communications; microwave and electromagnetics; signal, speech and image processing; integrated circuits and devices; systems and machine intelligence; photonics systems; and, biomedical engineering. Further information is posted on the departmental websites.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

Programs

Master of Applied Science Electrical and Computer Engineering

Master of Applied Science Electrical and Computer Engineering Specialization in Science, Society and Policy

Master of Engineering Electrical and Computer Engineering

Doctorate in Philosophy Electrical and Computer Engineering

Admission

Admission to the graduate program in Electrical and Computer Engineering is governed the general regulations of the Ottawa-Carleton Institute for Electrical and Computer Engineering (OCIECE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold a master’s degree in computer and electrical engineering or in a related discipline with a minimum average of 80% (A-);
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills;
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work;
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area;
- Identify at least one professor who is willing and available to act as thesis supervisor;
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The Department may require students to take additional courses depending on their backgrounds.
Transfer from master's to PhD

Students enrolled in the MASc program may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Completion of all graduate courses with a minimum average of A- (80%);
- Satisfactory progress in the research program;
- Written recommendation by the supervisor and by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master's. Please note that the minimal admission average requirements for the doctoral program must also be met. Following the transfer, all of the requirements of the doctoral program must be met.

Program Requirements

PhD Degree Requirements

The requirements of this program are as follows:

- Successful completion of a minimum of 9 course credits;
- Successful completion of a thesis proposal (ELG9997) and a comprehensive examination (ELG9998);
- Presentation and defense of a thesis (ELG9999) based on original research carried out under the direct supervision of a research faculty member in the Department.

Requirements Following Transfer from the Master's to the PhD Program

The transfer must take place within sixteen months of initial registration in the master's. Following the transfer, all of the requirements of the doctoral program must be met.

Minimum Standards

The passing grade in all courses is B. Students who fail 6 credits, the thesis proposal, the comprehensive exam, the thesis, or whose progress is deemed unsatisfactory must withdraw from the program.

Residence

All students must successfully complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the time of the initial registration in the program.

Duration of the Program

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program or seven years in the case of transfer students.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee's membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Engineering. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

In all programs, the student may choose graduate courses from either university with the approval of the adviser/graduate program coordinator or Advisory Committee. The graduate courses are listed below, grouped by subject area. Course descriptions are to be found in the departmental section of the calendar concerned. All courses are of one session duration.

The Department offering the course is identified by the prefix of the number assigned to the course as follows:

UNIVERSITÉ D’OTTAWA / UNIVERSITY OF OTTAWA:

ELG / EACJ SIGE (École de science informatique et de génie électrique)
Overview of health care system/participants: biophysical measurements for diagnosis/monitoring; biomedical sensors/technology; telemedicine and applications;

ELG5100 (EACJ 5200) SOFTWARE ENGINEERING PROJECT MANAGEMENT (3cr.)
Software system engineering and organization methods; work breakdown structure and task determination; effort, duration and cost estimation; scheduling and planning. Monitoring and control; analysis of options; management of risks, change, and expectations. Process and product metrics, post-performance analysis, process improvement and maturity. Management of Agile Programming methodologies such as Extreme Programming. Case studies.

ELG5124 (EACJ 5204) VIRTUAL ENVIRONMENTS (3cr.)

ELG5125 (EACJ 5205) QUALITY OF SERVICE MANAGEMENT FOR MULTIMEDIA APPLICATIONS (3cr.)
Design principles: layering, protocols, interface; models for open distributed processing; real-time requirement; request-response and stream processing, real-time scheduling, design for performance and scalability; other quality of services issues; user perspective versus system performance parameters, cost/performance trade-off, negotiations; adaptive and mobile applications; examples of multimedia applications and protocols. Prerequisite: ELG 5374 (EACJ 5607) or SYSC 5201 (ELG 6121) or equivalent.

ELG5134 (SYSC 5404) MULTIMEDIA COMPRESSION, SCALABILITY, AND ADAPTATION (3cr.)
Covers media compression, in-depth issues of scalability in the compression domain (including audio, images, video, 2D and 3D graphics), and adaptation towards various contexts; also covers various popular media encoding standards (including JPEG and MPEG).

ELG5136 (SYSC 5406) NETWORK ROUTING TECHNOLOGIES (3cr.)
Covers network routing, in-depth issues and technologies in traffic engineering, quality of service, protection for high-speed networks. Addresses the following topics: basic routing, MPLS (Multiprotocol Label Switching) system components and architecture, constraint-based routing, traffic engineering, content distribution networks, network monitoring and measurements, quality of service, protection and restoration, virtual private networks, cross layer interworking, and special topics. Prerequisite: SYSC 4602 or equivalent.

ELG5137 (SYSC 5407) PLANNING AND DESIGN OF COMPUTER NETWORKS (3cr.)
Planning process of computer networks; needs and technical requirements; modeling of different network planning problems; exact and approximate algorithms; topological planning and expansion problems; equipment (switch, router) location problem; approximate and optimal routing algorithms; presentation of various case studies. Prerequisites: SYSC 4602, SYSC 4701, GEG3185, GEG4190, or equivalent networking courses.

ELG5138 (SYSC 5408) CROSS LAYER DESIGN FOR WIRELESS MULTIMEDIA NETWORKS (3cr.)
Quality of service measures at different layers. Parameter adaptation, trade-offs, and optimization at physical, data-link, network, transport, and application layers. Examples of cross-layer design in cellular, ad hoc, sensor, local area, green, and cognitive radio networks.

ELG5191 (EACJ 5203) DESIGN OF DISTRIBUTED SYSTEM SOFTWARE (3cr.)
 Distributed systems design and programming issues; distributed computing. Basics of object oriented technology for distributed computing. Distributed objects technologies. Object oriented models for distributed programming. Distributed computing architecture design. Component based distributed software design. Scalability, interoperability, portability and distributed services. Distributed applications design. Prerequisites: an undergraduate degree in Computer Engineering, or Computer Science, or practical experience in system software design. Prerequisite: An undergraduate education in Computer Engineering, or Computer Science, or practical experience in system software design.

ELG5194 (EACJ 5703) DESIGN AND TESTING OF RELIABLE DIGITAL SYSTEMS (3cr.)

ELG5195 (EACJ 5708) DIGITAL LOGIC DESIGN: PRINCIPLES AND PRACTICES (3cr.)
ELG5197 (EACJ 5102) INTRODUCTION TO EMBEDDED SYSTEMS (3cr.)
Embedded systems' general characteristics, niche, and design alternatives. Simple embedded systems: sequential event response systems and cyclic executives. Prototype based designs, multitasking and multiaactivity paradigms. Multitasking system design; elements of real-time operating systems and harmony. Multiaactivity system design: process activity language (PAL) and PAL-based design tools. Prerequisite: ELG 4161 or the equivalent.

ELG5198 (EACJ 5103) PARALLEL PROCESSING WITH VLSI (3cr.)

ELG5199 (EACJ 5104) DESIGN OF MULTIMEDIA DISTRIBUTED DATABASE SYSTEMS (3cr.)
Database concepts and architectures. Data modelling. Relational technology and distributed databases. Examples of the new generation of databases for advanced multimedia applications such as multimedia information retrieval, VOD and the limitations of the conventional models for managing multimedia information (graphics, text, image, audio and video).

ELG6101 (SYSC 5003) DISCRETE STOCHASTIC MODELS (3cr.)

ELG6106 (SYSC 5006) DESIGN OF REAL-TIME AND DISTRIBUTED SYSTEMS (3cr.)
Characteristics of real-time and distributed systems. Modern midware systems, such as CORBA, DCE, RMI for building distributed applications: advantages and disadvantages. Analyzing designs for robustness, modularity, extensibility, portability and performance. Implementation issues. Major course project. Prerequisites: Engineering SYSC 3303 and SYSC 5708 or similar experience. Prerequisites: Engineering SYSC3303 and SYSC5708 or similar experience.

ELG6111 (SYSC 5101) DESIGN OF HIGH-PERFORMANCE SOFTWARE (3cr.)
Designing software to demanding performance specifications. Design analysis using models of computation, workload, and performance. Principles to govern design improvement for sequential, concurrent and parallel execution, based on resource architecture and quantitative analysis. Prerequisites: Engineering SYSC 5704 and a course in software engineering; or the equivalent.

ELG6112 (SYSC 5102) PERFORMANCE MEASUREMENT AND MODELLING OF DISTRIBUTED APPLICATIONS (3cr.)
Performance measurements, metrics and models of midware based systems and applications. Benchmarks, workload characterization, and methods for capacity planning and system sizing. Performance monitoring infrastructures for operating systems and applications. Introduction to the design and analysis of experiments and the interpretation of measurements. Prerequisites: SYSC 5101 or the equivalent. Prerequisite: SYSC5101 or the equivalent.

ELG6113 (SYSC 5103) SOFTWARE AGENTS (3cr.) Agent-based programming; elements of Distributed Artificial Intelligence; beliefs, desires and intentions; component-based technology; languages for agent implementations; interface agents; information sharing and coordination; KIF; collaboration; Communication; ontologies; KQML; autonomy; adaptability; security issues; mobility; standards; agent design issues and frameworks, applications in telecommunications. Prerequisites: Knowledge of Java,

ELG6114 (SYSC 5104) METHODOLOGIES FOR DISCRETE-EVENT MODELLING AND SIMULATION (3cr.)

ELG6115 (SYSC 5105) SOFTWARE QUALITY ENGINEERING AND MANAGEMENT (3cr.)
All aspects of software quality engineering. Software testing, at all stages of the software development and maintenance life cycle. Software reviews and inspections. Use of software measurement and quantitative modelling for the purpose of software quality control and improvement. Precludes additional credit for CSI5111 (COMP 5501). Prerequisites: an undergraduate course in software engineering such as SYSC 4800 or SEG 3300, or equivalent, and basic statistics.

ELG6118 (SYSC 5108) TOPICS IN INFORMATION SYSTEMS (3cr.)
Recent and advanced topics in the field of Information Systems and its related areas. Prerequisite: 94.507 or 94.583 or the equivalent.

ELG6130 (SYSC 5402) HEALTH CARE ENGINEERING (3cr.)
Overview of health care system/participants; biophysical measurements for diagnosis/monitoring; biomedical sensors/technology; telemedicine and applications; safety considerations; managing medical technologies/funding models for clinical engineering departments; considerations for developing countries. Precludes additional credit for ELG 5123. Prerequisite: permission of the program director.

ELG6131 (EACJ 5127 / SYSC 5301) ADVANCED TOPICS IN BIOMEDICAL ENGINEERING (3cr.)
Topics vary from year to year. Prerequisite: Permission of the Institute.

ELG6136 (SYSC 5306) MOBILE COMPUTING SYSTEMS (3cr.)
Systems to build mobile applications. Covers data link layer to application layer. Emphasis on existing wireless infrastructure and IETF protocols. Focuses on
view of mobile application developer; communication systems, middleware and application frameworks, de facto standards proposed/developed by industry consortia.

**ELG6158 (SYSC 5508) DIGITAL SYSTEMS ARCHITECTURE (3cr.)**
New architectural concepts are introduced. Discussion of programmable architectures (micro-controllers, DSPs, GP) and FPGAs. Memory interfacing. Scalable, superscalar, RISC, CISC, and VLIW concepts. Parallel structures; SIMD, MISD, and MIMD. Fault tolerant systems and DSP architectures. Examples of current systems are used for discussions. **Prerequisite: SYSC 4507 or the equivalent.**

**ELG6171 (SYSC 5701) OPERATING SYSTEM METHODS FOR REAL-TIME APPLICATIONS (3cr.)**
Principles and methods for operating system design with application to real-time, embedded systems. Concurrent programming: mechanisms and languages; design approaches and issues; run-time support (kernel). Methods for hard real-time applications. Methods for distributed systems; I/O handling. **Prerequisites:** Engineering SYSC 3303 or SYSC 5704 or equivalent and/or experience. Programming experience in high level and assembly languages. **Prerequisite:** SYSC3303 or SYSC5704 or equivalent courses and/or experience. Programming experience in high level and assembly languages.

**ELG6173 (SYSC 5703) INTEGRATED DATABASE SYSTEMS**
Database definitions, applications, and architectures. Conceptual design based on the entity-relationship and object-oriented models. Relational data model: relational algebra and calculus, normal forms, data definition and manipulation languages. Database management systems: transaction management, recovery and concurrency control. Current trends: object-oriented, knowledge-based, multimedia and distributed databases. **Prerequisite:** SYSC 5704 (ELG 6174) or the equivalent.

**ELG6174 (SYSC 5704) ELEMENTS OF COMPUTER SYSTEMS (3cr.)**
Concepts in basic computer architecture, assembly languages, high level languages including object orientation, compilers and operating system concepts (including concurrency mechanisms such as processes and threads and computer communication). Designed for graduate students without extensive undergraduate preparation in computer system engineering (or the equivalent experience). **Prerequisite:** Programming experience in at least one high-level language and some experience in assembly language programming.

**ELG6176 (SYSC 5706) ANALYTICAL PERFORMANCE MODELS OF COMPUTER SYSTEMS (3cr.)**
Analytical modelling techniques for performance analysis of computing systems. Theoretical techniques covered include single and multiple class queueing network models, together with a treatment of computational techniques, approximations, and limitations. Applications include scheduling, memory management, peripheral devices, databases, multiprocessoring, and distributed computing. **Prerequisites:** one of SYSC 5003, SYSC 5503, or ELG 5119, or the equivalent. **Prerequisite:** One of SYSC 5003, SYSC 5503, or ELG 5119, or the equivalent.

**ELG6178 (SYSC 5708) DEVELOPMENT OF REAL-TIME AND DISTRIBUTED SOFTWARE WITH REUSABLE COMPONENTS (3cr.)**
Advanced object-oriented design and programming of real-time and distributed systems using C++ and/or Java. Object-oriented features; inheritance, polymorphism, templates, exception handling. Concurrency issues. Design patterns and frameworks for distributed systems, with examples from communication applications. Design issues for reusable software. **Prerequisites:** Knowledge of C++ and/or Java, of operating system concepts, and permission of the Department.

**ELG6179 (SYSC 5709) ADVANCED TOPICS IN SOFTWARE ENGINEERING (3cr.)**

**ELG6186 (SYSC 5806) OBJECT ORIENTED DESIGN OF REAL-TIME AND DISTRIBUTED SYSTEMS (3cr.)**
Advanced course in software design dealing with design issues at a high level of abstraction. Design models: use case maps for high-level behaviour description; UML for traditional object-oriented concerns. Design patterns. Forward, reverse, and re-engineering. Substantial course project on applications chosen by students. **Prerequisite:** Permission of the Department.

**ELG6187 (SYSC 5807) ADVANCED TOPICS IN COMPUTER SYSTEMS (3cr.)**

**ELG7186 (EACJ 5807) TOPICS IN COMPUTERS I: FORMAL METHODS FOR THE DEVELOPMENT OF REAL-TIME SYSTEM APPLICATIONS (3cr.)**

**ELG7187 (EACJ 5807) TOPICS IN COMPUTERS II (3cr.)**

**ELG7173 (EACJ 5601) TOPICS IN SIGNAL PROCESSING II (3cr.)**

**Systems and Machine Intelligence**

**ELG5113 (EACJ 5106) STOCHASTIC SYSTEMS (3cr.)**
ELG5123 (EACJ 5303) HEALTH CARE ENGINEERING (3cr.)
Overview of health care system/participants: biophysical measurements for diagnosis/monitoring; biomedical sensors/technology; telemedicine and applications; safety considerations; managing medical technologies/funding models for clinical engineering departments; considerations for developing countries. Precludes credits for ELG6130. Prerequisites: Permission of the Department. Prerequisite: Permission of the Department.

ELG5161 (EACJ 5207) ROBOTICS: CONTROL, SENSING AND INTELLIGENCE (3cr.)

ELG5162 (EAJC 5005) KNOWLEDGE-BASED SYSTEMS: PRINCIPLES AND DESIGN (3cr.)

ELG5163 (EAJC 5105) MACHINE VISION (3cr.)

ELG5196 (EAJC 5709) AUTOMATA AND NEURAL NETWORKS (3cr.)

ELG6101 (SYSC 5001) SIMULATION AND MODELLING

ELG6104 (SYSC 5004) OPTIMIZATION FOR ENGINEERING APPLICATIONS (3cr.)
Introduction to algorithms and computer methods for optimizing complex engineering systems. Includes linear programming, networks, nonlinear programming, integer and mixed-integer programming, genetic algorithms and search methods, and dynamic programming. Emphasizes practical algorithms and computer methods for engineering applications.

ELG6105 (SYSC 5005) OPTIMIZATION THEORY AND METHODS

ELG6107 (SYSC/COMP 5007) EXPERT SYSTEMS
Survey of some landmark expert systems; types of architecture and knowledge representation; inferencing techniques; approximate reasoning; truth maintenance; explanation facilities; knowledge acquisition. A project to implement a small expert system will be assigned. Prerequisite: COMP 4007 or COMP 5001 or permission from the Department.

ELG6141 (SYSC 5401) ADAPTIVE CONTROL (3cr.)

ELG6142 (SYSC 5402) ADVANCED DYNAMICS WITH APPLICATIONS TO ROBOTICS (3cr.)

ELG6152 (SYSC 5502) ADVANCED LINEAR SYSTEMS (3cr.)

ELG6182 (SYSC 5802) INTRODUCTION TO INFORMATION AND SYSTEMS SCIENCE (3cr.)
An introduction to the process of applying computers in problem solving. Emphasis is placed on the design and analysis of efficient computer algorithms for large, complex problems. Applications in a number of areas are presented: data manipulation, databases, computer networks, queueing systems, optimization.
ELG6183 (SYSC 5803) LOGIC PROGRAMMING (3cr.)
Review of relational databases, first order predicate calculus, semantics of first order models, deductive querying. Proof theory, unification and resolution strategies. Introduction to Prolog, and/or parallelism and Concurrent Prolog. Applications in knowledge representation and rule based expert systems.

ELG7113 (EACJ 5209) TOPICS IN SYSTEMS AND CONTROL I (3cr.)
Current topics in the field, including linear semigroup theory and optimal feedback control.

ELG7114 (EACJ 5300) TOPICS IN SYSTEMS AND CONTROL II (3cr.)
Current topics in the field, including linear and nonlinear filtering and optimal control of stochastic systems.

ELG7574 (EACJ 5301) SUJETS CHOISIS EN SYSTÈMES ET RÉGLAGE AUTOMATIQUE (3cr.)
Sujets d'intérêt courant dans le domaine.

Digital and Optical Communications
ELG5103 OPTICAL COMMUNICATIONS SYSTEMS (3cr.)
Optical communication system concepts and basic characteristics. Optical Transmitters. Optical detection. Optical noise sources and their mathematical models. Non-coherent (direct) detection: system model, direct detection of intensity modulation, application of photo-multiplication, optimal post-detection processing, and subcarrier systems. Coherent detection: heterodyne receivers, the field matching problem and receiver performance. Optical binary digital system, single-mode binary and heterodyne binary systems. Block coded digital optical communication systems: PPM, PAM, PSK, and FSK signalling. Integration of device technology and system architecture. Selected topics in optical communications and networking. Prerequisites: ELG 5119, and ELG 5375 or the equivalents. Prerequisites: ELG5119, and ELG5375, or the equivalents.

ELG5106 (EACJ 5003) FOURIER OPTICS (3cr.)

ELG5119 (EACJ 5109) STOCHASTIC PROCESSES (3cr.)

ELG5126 (EACJ 5206) SOURCE CODING AND DATA COMPRESSION (3cr.)

ELG5131 (EACJ5131) GRAPHICAL MODELS (3cr.)
Bayesian networks, factor graphs, Markov random fields, maximum a posteriori probability (MAP) and maximum likelihood (ML) principles, elimination algorithm, sum-product algorithm, decomposable and non-decomposable models, junction tree algorithm, completely observed models, iterative proportional fitting algorithm, expectation-maximization (EM) algorithm, iterative conditional modes algorithm, variational methods, applications. Precludes credit for ELG7177C (EACJ5605C) Prerequisite: Permission of the Institute.

ELG5132 (EACJ5132) SMART ANTENNAS (3cr.)

ELG5133 (EACJ5133) INTRODUCTION TO MOBILE COMMUNICATIONS (3cr.)
Introduction to mobile and cellular systems. Radio channel characterization: signal strength prediction techniques and coverage; indoor/outdoor models; fading; delay spread; interference models and outage probabilities. Digital modulation and transmission system performance. Signal processing techniques, diversity and beamforming. Multiple-input multiple-output (MIMO) systems. New directions and recent results. Precludes additional credit for ELG7178A (EACJ5606A) Prerequisites: ELG5119 (EACJ5109) and ELG5375 (EACJ5506), or equivalent.

ELG5170 (EACJ 5501) INFORMATION THEORY (3cr.)
Measure of information: entropy, relative entropy, mutual information, asymptotic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capacity; random coding bound, reliability function, Blahut-Arimoto algorithm, Gaussian channels, colored Gaussian noise and "water-filling"; Rate distortion theory; Network information theory. Prerequisite: ELG 5119 (EACJ 5109) or SYSC 5503 (ELG 5119) or the equivalent.

ELG5179 (EACJ 5503) DETECTION AND ESTIMATION (3cr.)

**ELG5180 (EACJ 5704) ADVANCED DIGITAL COMMUNICATIONS (3cr.)**

Techniques and performance of digital signalling and equalization over linear bandlimited channels with additive Gaussian noise. Fading multipath channels: diversity concepts, modelling and error probability performance evaluation. Synchronization in digital communications. Spread spectrum in digital transmission over multipath fading channels. Precludes additional credit for SYSC 5605. **Prerequisite: SYSC 5504 or ELG 5375 or the equivalent.**

**ELG5360 (EACJ5360) DIGITAL WATERMARKING (3cr.)**

Overview of recent advances in watermarking of image, video, audio, and other media. Spatial, spectral, and temporal watermarking algorithms. Perceptual models. Use of cryptography in steganography and watermarking. Robustness, security, imperceptibility, and capacity of watermarking. Content authentication, copy control, intellectual property, and other applications. **Prerequisite: ELG4172 or CEG4311 or equivalent.**

**ELG5369 (EACJ5369) INTERNETWORKING TECHNOLOGIES (3cr.)**

IP Based Internet Technologies: Internet architecture and its protocols. Software/hardware requirements for quality of service (QoS), Integrated services. Scheduling. Fair queuing. Traffic and admission control algorithms. Differentiated services. Multiprotocol label switching (MPLS) and associated software/hardware design issues. Fast internet protocol (IP), asynchronous transfer mode (ATM), internet protocol (IP) over synchronous optical network (SONET), wavelength division multiplexing (WDM), satellite implementations. Precludes additional credit for ELG7187B (EACJ5808B) **Prerequisite: CEG/ELG 4183.**

**ELG5371 (EACJ 5500) DIGITAL COMMUNICATION BY SATELLITE (3cr.)**

Propagation and interference considerations. Link budget calculations. GEO, LEO, HEO systems. Transponders. Earth stations; modems (PSK, MSK, etc.), low noise amplifiers, high power amplifiers. Error control. Access techniques; FDMA, TDMA, CDMA, random access. Switching, onboard processing. Networking. ATM over satellites. Mobile satellite communications and IMT2000. **Prerequisite: ELG 4171 or the equivalent.**

**ELG5372 (EACJ 5504) ERROR CONTROL CODING (3cr.)**


**ELG5373 (EACJ 5105) DATA ENCRYPTION (3cr.)**


**ELG5375 (EACJ 5506) PRINCIPLES OF DIGITAL COMMUNICATION (3cr.)**

Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Analysis of digital data transmission techniques for additive Gaussian noise channels. Efficient modulation and coding for reliable transmission. Spread spectrum and line coding techniques. **Prerequisite: ELG 5119 or SYSC 5503, or the equivalent (may be taken concurrently).**

**ELG5380 (EACJ 5002) ADVANCED CHANNEL CODING (3cr.)**

Channel coding theorem, channel capacity and cutoff rate. Trellis coded modulation; multilevel codes. Spacetime coding. Product codes. Generalized code concatenation. Turbo codes and iterative decoding techniques, interleavers for turbo codes, Turbo Trellis coded modulation. Low density parity check codes. Performance analysis of iteratively decoded codes. **Prerequisites: ELG 5372 (SYSC 5504) or ELG 5375 (SYSC 5506).**

**ELG6110 (SYSC 5506) INFORMATION THEORY (3cr.)**

Measure of information: entropy, relative entropy, mutual information, asymptotic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capacity: random coding bound, reliability function, Blahut-Arimoto algorithm, Gaussian channels, coloured Gaussian noise and “water-filling”; Rate distortion theory; Network information theory. **Prerequisite: SYSC 5303 (ELG 6153) or ELG 5119 (SYSC 5109) or equivalent. Precludes credit for EACJ 5301 (ELG 5170).**

**ELG6120 (SYSC 5200) ALGEBRAIC CODING THEORY (3cr.)**

Review of Algebra, Finite Fields, Linear Block Codes and their Properties, Hamming Codes, Cyclic codes; Hadamard Matrices and Hadamard Codes, Golay Codes, Reed-Muller Codes, BCH and Reed-Solomon Codes, Decoding Algorithms, Coding Bounds. Precludes additional credit for SYSC 5507 (ELG 6157).

**ELG6143 (SYSC 5403) NETWORK ACCESS TECHNOQUES (3cr.)**

A range of access technologies with emphasis on broadband access. Physical channels and the state-of-the-art of coding, modulation, multiplexing strategies to overcome physical impairments, including high-speed transmission over twisted pair, wireless, fibre and coaxial media. **Prerequisites: ELG 6153 (SYSC 5503) and ELG 5375 (SYSC 5504).**
ELG6153 (SYSC 5503) STOCHASTIC PROCESSES (3cr.)
Basic concepts of randomness, as applied to communications, signal processing, and queueing systems; probability theory, random variables, stochastic processes; random signals in linear systems; introduction to decision and estimation; Markov chains and elements of queuing theory. **Exclusion: ELG 5119.**

ELG6154 (SYSC 5504) PRINCIPLES OF DIGITAL COMMUNICATION (3cr.)
Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Optimum Receiver Theory. Modulation and coding for reliable transmission: MPSK, MQAM, M-ary orthogonal modulation. Channel coding, trellis coded modulation. Spread spectrum and CDMA communications. Precludes additional credit for EACJ 5506 (ELG 5375). **Prerequisite: SYSC 5503 or ELG 5119 or the equivalent (may be taken concurrently).**

ELG6159 (SYSC5409) Interactive Media and Digital Art (3cr.)
Interactive digital technologies as new media for art and entertainment. Topics include essential features of the digital media, interactivity, computer games and gamification, interactive stories, serious games, virtual worlds and social networks, and digital art. **Prerequisite: A basic knowledge of programming and multimedia design is strongly recommended.**

ELG6189 (SYSC5500) Designing Secure Networking and Computer Systems (3cr.)
Security issues in data networks and computer systems. The course considers the protocol layers, looks at issues that are associated with specific types of network architectures. Issues with Web security, protocol security and different classes of attacks and defences will also be addressed. Finally, security issues in emerging paradigms, and trends such as social networks and cloud computing, will be addressed. Prerequisites: A senior undergraduate or graduate networking course (e.g. SYSC4602 or SYSC5201 or equivalent), an operating systems course, or permission of the graduate program director.

ELG6165 (SYSC 5605) ADVANCED DIGITAL COMMUNICATIONS (3cr.)
Techniques and performance of digital signalling and equalization over linear bandlimited channels with additive Gaussian noise. Fading multipath channels: diversity concepts, modelling and error probability performance evaluation. Synchronization in digital communications. Spread spectrum in digital transmission over multipath fading channels. Precludes additional credit for EACJ 5704 (ELG 5780). **Prerequisite: SYSC 5504 (ELG 6154).**

ELG6166 (SYSC 5606) INTRODUCTION TO MOBILE COMMUNICATIONS (3cr.)
Mobile radio channel characterization: signal strength prediction techniques and statistical coverage; fading; delay spread; interference models and outage probabilities. Digital modulation and transmission system performance. Signal processing techniques: diversity and beamforming, adaptive equalization, coding. Applications to TDMA and CDMA cellular systems. **Co-requisite: Can be taken concurrently with SYSC 5503 and SYSC 5504.**

ELG6167 (SYSC 5607) SOURCE CODING AND DATA COMPRESSION (3cr.)
Discrete and continuous sources. Discrete sources: Huffman coding and run length encoding. Continuous sources: waveform construction coding; PCM, DPCM, delta modulation; speech compression by parameter extraction; predictive encoding; image coding by transformation and block quantization. Fourier and Walsh transform coding. Applications to speech, television, facsimile. **Prerequisite: SYSC 5503 or ELG 5119 or the equivalent.**

ELG6168 (SYSC 5608) WIRELESS COMMUNICATIONS SYSTEMS ENGINEERING (3cr.)
Multi-user cellular and personal radio communication systems; frequency reuse, traffic engineering, system capacity, mobility and channel resource allocation. Multiple access principles, cellular radio systems, signalling and interworking. Security and authentication. Wireless ATM, satellite systems, mobile location, wireless LANs, wireless local loops, broadband wireless etc. Corequisites: SYSC 5503 or ELG 5119, and SYSC 5504 or ELG 5375, or their equivalents. **Prerequisite: SYSC5503 or ELG5119, and SYSC5504 or their equivalents.**

ELG6169 (SYSC 5609) DIGITAL TELEVISION (3cr.)

ELG6170 (SYSC 5700) SPREAD SPECTRUM SYSTEMS (3cr.)
Types of spread spectrum systems, FH and DS-SS, TH-SS using radio. Hybrid DS/FH-SS. Pseudo-noise generators: statistical properties of M sequences, Galois field connections, Gold codes, OVSF codes. Code tracking loops, initial synchronization of receiver spreading code. Performance in interference environments and fading channels. CDMA systems. SS applications in UWB communications and Imaging systems. **Prerequisite: ELG 6154 (SYSC 5504) or the equivalent.**

ELG6184 (SYSC 5804) ADVANCED TOPICS IN COMMUNICATIONS SYSTEMS (3cr.)

ELG6365 (ELEC 5605) OPTICAL FIBRE COMMUNICATIONS (3cr.)
Transmission characteristics of and design considerations for multi-mode and single-mode optical fibre waveguides; materials, structures, and device properties of laser light sources; properties and performance of p-i-n and avalanche photodiodes; types of optical fibre signal formats, preamplifier topologies and noise, receiver sensitivity, transmitter design; link design for digital systems.

ELG6366 (ELEC 5606) PHASE-LOCKED LOOPS AND RECEIVER SYNCHRONIZERS (3cr.)
Phase-locked loops: components, fundamentals, stability, transient response, sinusoidal operation, noise performance, tracking, acquisition and optimization. Receiver synchronizers: carrier synchronizers including squaring loop, Costas loop, and remodulator for BPSK, QPSK BER performance; clock synchronizers including early late gate, imphase/midphase, and delay line multiplier; direct sequence spread spectrum code synchronizers including single dwell and multiple
dwell serial PN acquisition, matched filter PN acquisition, delay locked loop and Tau-Dither loop PN tracking; frequency hopped spread spectrum time and frequency synchronization.

ELG7172 (EACJ 5600) TOPICS IN SIGNAL PROCESSING I (3cr.)

Signal, Speech and Image Processing

ELG5127 (EACJ 5304) MEDICAL IMAGE PROCESSING (3cr.)
Mathematical models of image formation based on the image modality and tissue properties. Linear models of image degradation and reconstruction. Inverse problems and regularization for image reconstruction. Image formation in Radiology, Computed Tomography, Magnetic Resonance Imaging, Nuclear Medicine, Ultrasound, Positron Emission Tomography, Electrical Impedance Tomography. Also offered as SYSC 5304. Precludes additional credit for EACJ 5601 (ELG 7173) if EACJ 5601 was taken as this topic. Prerequisites: ELG 4172, CEG 4311, SYSC 4405 or permission of the Institute.

ELG5370 (EACJ 5370) MULTIREOLUTION SIGNAL DECOMPOSITION: ANALYSIS AND APPLICATIONS (3cr.)
Multirate signal processing: sampling rate conversion, polyphase representation. Bases, filter banks: series expansion of discrete-time signals, series expansion of continuous-time signals, multiresolution concept and analysis, construction of wavelet, wavelet series. Complexity of multirate discrete-time processing, filter banks, and wavelet series computation. Prerequisite: a basic course in Digital Signal Processing such as ELG 5376 or ELG 4172.

ELG5376 (EACJ 5507) DIGITAL SIGNAL PROCESSING (3cr.)

ELG5377 (EACJ 5800) ADAPTIVE SIGNAL PROCESSING (3cr.)
Theory and techniques of adaptive filtering, including Wiener filters, gradient and LMS methods; adaptive transversal and lattice filters; recursive and fast recursive least squares; convergence and tracking performance; implementation. Applications, such as adaptive prediction; channel equalization; echo cancellation; source coding; antenna beamforming; spectral estimation. Precludes additional credit for Engineering ELG 6160. Prerequisite: SYSC 5003 or ELG 5119, or the equivalent; SYSC 5602 or ELG 5376 or the equivalent.

ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3cr.)

ELG5385 (EACJ5385) MATRIX METHODS AND ALGORITHMS FOR SIGNAL PROCESSING (3cr.)
Representation and approximation in vector spaces, matrix factorization, pseudoinverses, application of eigen decomposition methods, Singular Values Decomposition, least squares problems, applications of special matrices, iterative algorithms, expectation maximization algorithm.

ELG6160 (SYSC 5600) ADAPTIVE SIGNAL PROCESSING (3cr.)
Theory and techniques of adaptive filtering, including Wiener filters, gradient and LMS methods; adaptive transversal and lattice filters; recursive and fast recursive least squares; convergence and tracking performance; implementation. Applications, such as adaptive prediction; channel equalization; echo cancellation; source coding; antenna beamforming; spectral estimation. Prerequisites: SYSC 5503 or ELG 5119, or equivalent; SYSC 5602 or ELG 5376 or equivalent. Prerequisite: SYSC5503 or ELG5159, or equivalent; SYSC5602 or ELG5376 or equivalent.

ELG6161 (SYSC 5601) NEURAL SIGNAL PROCESSING (3cr.)

ELG6162 (SYSC 5602) DIGITAL SIGNAL PROCESSING (3cr.)

ELG6163 (SYSC 5603) DIGITAL SIGNAL PROCESSING: MICROPROCESSORS, SOFTWARE AND APPLICATIONS (3cr.)
Characteristics of DSP algorithms and architectural features of current DSP chips: TMS320, DSP-56xxx, AD-21xx and SHARC. DSP multiprocessors and fault tolerant systems. Algorithm/software/hardware architecture interaction, program activity analysis, development cycle, and design tools. Case studies: LPC, codecs, FFT, echo cancellation, Viterbi decoding. Prerequisite: SYSC 5602 or ELG 5376 or the equivalent.

ELG6164 (SYSC 5604) ADVANCED TOPICS IN DIGITAL SIGNAL PROCESSING: SPEECH COMMUNICATIONS AND APPLICATIONS (3cr.)
Prerequisites: SYSC 5602 or ELG 5376, or the equivalent, and permission of the Department.
ELG6321 (EACJ 5302 / SYSC 5302) PRINCIPLES AND DESIGN OF ADVANCED BIOMEDICAL INSTRUMENTATION (3cr.)
Principles of physiological measurements and related instrumentation with particular applications to cardiology, lung function, cerebral and muscle signals, surgery and anaesthesiology, ultrasound measurements, and critical care for infants. Prerequisite: Permission of the Institute.

ELG7172 (EACJ 5600) TOPICS IN SIGNAL PROCESSING I (3cr.)

ELG7173 (EACJ 5601) TOPICS IN SIGNAL PROCESSING II (3cr.)

ELG7179 (EACJ 5603) TOPICS IN SIGNAL PROCESSING III (3cr.)

Computer Communication Networks, Distributed Systems and BISDN

ELG5120 (EACJ 5200) QUEUEING SYSTEMS (3cr.)
Resource sharing issues: delay, throughput and queue length. Basic queueing theory, Markov chains, birth and death processes. M/M/m/k/n queues, bulk arrival/service systems. Little's Rule. Intermediate queueing theory: M/G/1, G/M/m queues. Advanced queueing theory: G/G/m queue, priority queue, network of queues, etc. Queueing applications. Precludes additional credit for SYSC 5107 (ELG 6117). Prerequisite: One of ELG 5119, SYSC 5003, SYSC 5503, or the equivalent.

ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS (3cr.)

ELG5122 (EACJ 5202) MODELLING, ANALYSIS AND PERFORMANCE EVALUATION IN COMPUTER COMMUNICATIONS (3cr.)
Network performance issues and their mathematical analysis techniques. Intermittently available server model, probing and tree search, delay cycle, switch/network topology and reliability. Analysis of controlled and random access methods, routing allocation/ control, topological design. Selected topics from current literature on various network applications. Precludes additional credit for ELG 7186 (EACJ 5606). Prerequisites: ELG 5120 (EACJ 5200), ELG 5374 (EACJ 5607), or SYSC 5201 (ELG 6121), or the equivalents. Prerequisites: ELG5120 (EACJ5200), ELG5374 (EACJ5607), or SYSC 5201 (ELG6121), or the equivalents.

ELG5128 (ELG5128) WIRELESS AD HOC NETWORKING (3cr.)

ELG5374 (EACJ 5607) COMPUTER COMMUNICATION NETWORKS (3cr.)
Network applications, structures and their design issues. Resource sharing/access methods. Network transmission and switching techniques. OSI model. Error control, flow control and various issues related to the physical, data link and network layers. Local area networks. Performance issues of delay-throughput in various protocols. Precludes additional credit for SYSC 5201. Prerequisites: an undergraduate course in probability and statistics such as MAT 2377. Prerequisite: an undergraduate course in probability and statistics such as MAT2377.

ELG5381 (EACJ 5004) PHOTONICS NETWORKS (3cr.)

ELG5382 (EACJ 5108) SWITCHING AND TRAFFIC THEORY FOR INTEGRATED BROADBAND NETWORKS (3cr.)
Principles of switching theory. Asynchronous Transfer Mode switching architectures. Principle of teletraffic engineering. Queueing theory and performance evaluation techniques as applied to the computer network architectures. Current topics in computer network modelling analysis and traffic control for high-speed multimedia networks. Prerequisite: ELG 5374 (EACJ 5607) or ELG 6121 (SYSC 5201), or the equivalent. Corequisite: ELG 5119 (EACJ 5109) or ELG 6153 (SYSC 5503) or ELG 6103 (SYSC 5003), or the equivalent.

ELG5383 (EACJ 5009) SURVIVABLE OPTICAL NETWORKS (3cr.)
Optical networks design with emphasis on network survivability. Wavelength division multiplexing (WDM), wavelength conversion, optical switch architectures, routing and wavelength assignment algorithms, IP over WDM, optical network protocols, optical network control architectures, protection and restoration, spare capacity allocation, survivable routing, design and performance evaluation. Prerequisites: ELG 5374 or its equivalent.

ELG5386 (EACJ5386) NEURAL NETWORKS AND FUZZY SYSTEMS (3cr.)
ELG6119 (SYSC 5109) TELETRAFFIC ENGINEERING (3cr.)
Congestion phenomena in telephone systems, and related telecommunications networks and systems, with an emphasis on the problems, notation, terminology, and typical switching systems and networks of the operating telephone companies. Analytical queueing models and applications to these systems. Prerequisite: Engineering SYSC 5503 or ELG 5119, or the equivalent.

ELG6121 (SYSC 5201) COMPUTER COMMUNICATION (3cr.)

ELG6127 (SYSC 5207) DISTRIBUTED SYSTEMS ENGINEERING (3cr.)

ELG6180 (SYSC 5800) NETWORK COMPUTING (3cr.)
Design and Java implementation of distributed applications that use telecommunication networks as their computing platform. Basics of networking; Java networking facilities. Introduction to open distributed processing; CORBA, JavaIDL, JavaRMI, CGI/HTTP, DCOM, Componentware; Enterprise JavaBeans, ActiveX. Agents: Java code mobility facilities. Security issues; Java security model.

ELG6181 (SYSC 5801) ADVANCED TOPICS IN COMPUTER COMMUNICATIONS (3cr.)

ELG6188 (SYSC 5808) COMMUNICATIONS NETWORK MANAGEMENT (3cr.)
Network management issues, WANs and LANs. The Internet and ISO models of network management. Network management protocols SNMP, CMIP, CMOT, etc. Events, Managed Objects and MIBs. Fault management techniques. Current diagnostic theory and its limitations. AI and Machine learning approaches. Monitoring and fault management tools. Prerequisites: SYSC 5201 or ELG 5374, or the equivalent. Prerequisite: SYSC5201 or the equivalent.

ELG6189 (SYSC5500) Designing Secure Networking and Computer Systems (3cr.)
Security issues in data networks and computer systems. The course considers the protocol layers, looks at issues that are associated with specific types of network architectures. Issues with Web security, protocol security and different classes of attacks and defences will also be addressed. Finally, security issues in emerging paradigms, and trends such as social networks and cloud computing, will be addressed. Prerequisites: A senior undergraduate or graduate networking course (e.g. SYSC4602 or SYSC5201 or equivalent), an operating systems course, or permission of the graduate program director.

ELG7177 (EACJ 5605) TOPICS IN COMMUNICATIONS I (3cr.)
Current topics in the field.

ELG7178 TOPICS IN COMMUNICATIONS II (3cr.)

Computer-Aided Design for Electronic Circuits

ELG6353 (ELEC 5503) RADIO FREQUENCY INTEGRATED CIRCUIT DESIGN (3cr.)
Integrated radio front-end component design, with emphasis on a bipolar process. Overview of radio systems, discussion of frequency response, gain, noise, linearity, intermodulation, image rejection, impedance matching, stability, and power dissipation. Detailed design of low-noise amplifiers, mixers, oscillators and power amplifiers. Design alternatives through the use of one-chip inductors and baluns. The impact of process variations, parasitics, and packaging. Simulation issues and techniques.

ELG6354 (ELEC 5504) ANALYSIS OF HIGH-SPEED ELECTRONIC PACKAGES AND INTERCONNECTS (3cr.)
Introduction to techniques of modelling, simulation and optimization in designing high-speed VLSI packages and systems; models for IC packages, interconnects and ground/power planes; lumped element models, distributed models and EM-based models for high-speed VLSI interconnects; delay, crosstalk and switching noise analysis; simulation of multiconductor transmission line networks; asymptotic waveform evaluation (AWE) and moment matching techniques; concurrent thermal and electrical analysis of IC packages and boards; optimization of signal integrity in IC packages and printed circuit boards; macromodelling of linear and non-linear components and circuits.

ELG6356 (ELEC 5506) SIMULATION AND OPTIMIZATION OF ELECTRONIC CIRCUITS (3cr.)
Time and frequency-domain formulations for simulation, sensitivity analysis and optimization. Optimization techniques for performance, cost and yield-driven analysis of electronic circuits. Optimization approaches to modelling and parameter extraction of active and passive elements. Advanced techniques include statistical modelling, tolerance and reliability optimization, computer-aided tuning and analog diagnosis, and large-scale optimizations. Examples and case studies include FET modelling, optimization of amplifiers, filters, multiplexers, mixers, high-speed VLSI packages/interconnects, signal-integrity in high-speed ICs, printed circuit boards and multichip modules.

ELG6358 (ELEC 5508) COMPUTER METHODS FOR ANALYSIS AND DESIGN OF VLSI AND COMMUNICATION CIRCUITS (3cr.)

ELG6381 (ELEC5801) HIGH-SPEED AND LOW-POWER VLSI (3cr.)
High-Speed and Low-Power CMOS VLSI Circuit techniques covering the low and high levels of abstraction, including Transistor, Switch, Logic-Gate, Module, and System Levels. At each level students learn the state-of-the-art techniques to optimize the performance and energy consumption of a circuit. They also use one or more of these techniques in a design project. Prerequisites: ELEC 4708 or ELEC 5804 (VLSI Design) or Equivalent (Permission of the Director).

ELG6383 (ELEC 5803) BEHAVIOURAL SYNTHESIS OF ICs (3cr.)
Various topics related to computer analysis and synthesis of VLSI circuits including: logic synthesis, finite state machine synthesis, design methodologies, design for reuse, testing, common VLSI functions, a review of Verilog. Prerequisite: some IC design knowledge such as given in 4708.

Microwaves and Electromagnetics

ELG5104 (EACJ 5401) ELECTROMAGNETIC WAVES: THEORY AND APPLICATIONS (3cr.)

ELG5108 (EACJ 5305) ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE (3cr.)

ELG5379 (EACJ 5402) NUMERICAL METHODS IN ELECTROMAGNETIC ENGINEERING (3cr.)
Review of electromagnetic and potential theory. Formulation of static and electrodynamic problems. Introduction to numerical and field-theoretical modelling techniques. Numerical methods considered: FD, MoL, SDA, TLM and BPM. Examples of commonly encountered electromagnetic problems at microwave, millimeterwave and optical frequencies. Prerequisite: ELG 4103 or the equivalent.

ELG6344 (ELEC 5404) NEURAL NETWORKS FOR HIGH-SPEED/HIGH-FREQUENCY CIRCUIT DESIGN (3cr.)
Neural network methodologies for computer-aided design of high-speed/high-frequency circuits, including modeling of passive and active devices/circuits, and their applications in high-level design and optimization in wired and wireless electronic systems.

ELG6349 (ELEC 5409) MICROWAVE AND MILLIMETERWAVE INTEGRATED CIRCUITS (3cr.)

ELG6351 (ELEC 5501) PASSIVE MICROWAVE CIRCUITS (3cr.)

ELG6355 (ELEC 5505) PASSIVE CIRCUIT THEORY (3cr.)

ELG6357 (ELEC 5507) ACTIVE CIRCUIT THEORY (3cr.)
Characterization of negative-resistance one-port networks, signal general and amplification. Active twoports; y, z, h, k, chain and scattering parameters. Measurement of two-port parameters. Activity and passivity; reciprocity, non-reciprocity, and anti-reciprocity. Gyror as a circuit element. Stability, inherent and conditional; power gain of conjugate and mismatched two-port amplifiers. Amplifier gain sensitivity. Stability, inherent and conditional; power gain of conjugate and mismatched two-port amplifiers. Active filter design; gyrator, negative immittance converter (NIC) and operational amplifier used as functional elements. Practical realization of gyrators and NICs. Active network synthesis. Prerequisite: ELEC 5505 or the equivalent.

ELG6362 (ELEC 5602) MICROWAVE SEMICONDUCTOR DEVICES AND APPLICATIONS (3cr.)
Theory of operation for microwave diodes (varactor, p-i-n, Gunn, IMPATT) and transistors (BJT, MESFET, HBT, HEMT). Small-signal, large-signal, and noise models for CAD. Diode oscillators and reflection amplifiers. Design of transistor oscillators and amplifiers. Discussion of technology/fabrication issues and MMIC applications.

ELG6363 (ELEC 5603) ELECTROMAGNETIC WAVE PROPAGATION (3cr.)
Review of groundwave, skywave and transionospheric propagation modes relevant to radar, communications and other systems operating in the medium to
extra-high frequency bands. The occurrence and magnitude of various types of electromagnetic noise: physical principles involved, modelling and prediction techniques, and limitations of such techniques in practical situations.

ELG6364 (ELEC 5604) RADAR SYSTEMS (3cr.)

ELG6367 (ELEC 5607) FUNDAMENTALS OF ANTENNA ENGINEERING (3cr.)
Basic properties of antennas (gain, radiation patterns, polarization, antenna temperature). Analysis of common antennas (dipoles, loops, helices, aperture antennas, microstrip, dielectric resonator antennas, reflectors). Analysis and design of linear and planar arrays (array factors, beam scanning, amplitude weighting, feed networks).

ELG6368 (ELEC 5608) FOURIER OPTICS (3cr.)

ELG6369 (ELEC 5609) NONLINEAR MICROWAVE DEVICES AND EFFECTS (3cr.)
The physical basis and mathematical modelling of a variety of microwave/millimetre-wave devices, (some of which exhibit the most extreme nonlinear behaviour known), how they can be exploited in practical circuits and systems, and how the resulting device/circuit interactions can be analyzed. Devices include two-terminal nonlinear-resistance elements (varistors) and two two-terminal nonlinear-reactance devices (varactors) based on classical, heterostructure and superconducting technologies: pn and Schottky-barrier diodes, tunnel and resonant-tunneling diodes, BIN and BNN varactor diodes, single-barrier-varactor diodes, high-electron-mobility varactor diodes, Josephson-junction diodes, and SIS quasiparticle tunneling junctions. Three-terminal nonlinear devices include MESFETs, HBTs, and HEMTs and RHETs. Circuit applications encompass direct radiation detectors; frequency mixers; resistive, reactive, and active frequency multipliers; as well as reactive and regenerative frequency dividers. Emphasis will be placed on analytical approaches that provide global insight into the nonlinear phenomena.

ELG6372 (ELEC 5702) PRINCIPLES OF PHOTONICS (3cr.)
Electromagnetic wave propagation in crystals; review of geometric optics; Gaussian beam propagation; optical fibres; dielectric waveguides for optical integrated circuits; optical resonators; optical properties of materials; theory of laser oscillation; specific laser systems; electro-optic modulators; photorefractive materials and applications; holography; optical interconnects.

ELG6379 (ELEC 5709) ADVANCED TOPICS IN ELECTROMAGNETICS (3cr.)

ELG7100 (EACJ 5404) TOPICS IN ELECTROMAGNETICS I (3cr.)

ELG7101 (EACJ 5405) TOPICS IN ELECTROMAGNETICS II

Solid State Devices and Integrated Circuit Fabrication

ELG5107 (EACJ 5001) SEMICONDUCTOR OPTICAL LOGIC (3cr.)
Principles of Optical Amplification. Structures of Semiconductor Optical Amplifier (SOA). Steady-state model of SOA. Dynamic model of SOA. Network Applications of SOAs. SOA Nonlinearities. SOA Wavelength Converters. SOA optical gates. SOA Logic Devices. Optical Memory Devices. SOA based signal regeneration. Precludes additional credit for this course taken as a special topic in (EACJ 5807) ELG 7186. Prerequisites: ELG 5103 or equivalent course.

ELG6320 (EACJ 5208 / ELEC 5200) ADVANCED TOPICS IN INTEGRATED CIRCUITS AND DEVICES (3cr.)
Recent and advanced topics in the field of Integrated Circuits and Devices and its related areas.

ELG6342 (ELEC5402) INTRODUCTION TO ELECTRONIC DESIGN AUTOMATION ALGORITHMS AND TECHNIQUES (3cr.)
Digital design process; Overview of design automation tools/methodologies; Theory of computational complexity; Layout compaction; Placement and Partitioning; Floorplanning; Routing; Digital simulation; Switch-level simulation; Logic synthesis; Verification; Analog and RF simulation. Area: Computer-Aided Design for Electronic Circuits.

ELG6359 (ELEC 5509) INTERGRATED CIRCUIT TECHNOLOGY (3cr.)
Survey of technology used in integrated circuit fabrication. Crystal growth and crystal defects, oxidation, diffusion, ion implantation and annealing, gettering, chemical vapour deposition, etching, materials for metallization and contacting, and photolithography. Structures and fabrication techniques for submicron
ELG6637 (ELEC 5703) ADVANCED TOPICS IN SOLID STATE DEVICES AND IC TECHNOLOGY (3cr.)
Recent and advanced topics in Solid State Devices and IC Technology. The subject material will vary from year to year according to research interests in the department. Students may be expected to contribute to lectures or seminars on selected topics. Prerequisite: Permission of the Department.

ELG6637 (ELEC 5707) MICROELECTRONICS SENSORS (3cr.)
Physical design of microelectromechanical systems (MEMS) and microfabricated sensors and actuators. An overview of thin and thick film processes and micromachining techniques will provide fabrication background. Design of a variety of devices including piezoresistive, piezoelectric, electromagnetic, thermal, optical, and chemical sensors and actuators.

ELG6638 (ELEC 5800) THEORY OF SEMICONDUCTOR DEVICES (3cr.)

ELG6638 (ELEC 5802) SURFACE-CONTROLLED SEMICONDUCTOR DEVICES (3cr.)

ELG7132 (EACJ 5006) TOPICS IN ELECTRONICS I (3cr.)
Current topics in the field.

ELG7133 (EACJ 5007) TOPICS IN ELECTRONICS II (3cr.)

ELG7575 (EACJ 5008) SUJETS CHOISIS EN ÉLECTRONIQUE (3cr.)

VLSI
ELG6632 (ELEC 5502) ANALOG INTEGRATED FILTERS (3cr.)
The fundamentals and details of analog integrated filters with emphasis on active continuous-time filters and SAW filters. Comparison to switched-capacitor filters. Review of filter concepts, types of filters, approximations, transformations. Building blocks such as op amps, transconductance amplifiers, and gyrators. Design using cascaded second-order sections, multiple loop feedback and LC ladder simulations. Discussion of issues such as tuning, linearity, dynamic range, and noise.

ELG6636 (ELEC 5600) DIGITAL INTEGRATED CIRCUIT TESTING (3cr.)
Production testing of digital integrated circuits. Cost and difficulty of testing. Outline of methods of testing used in production. Testing schemes and design for testability. Specific topics are: faults and fault models, yield estimates, testability measures, fault simulation, test generation methods, sequential testing, scan design, boundary scan, built-in self-test, CMOS testing.

ELG6637 (ELEC 5704) ADVANCED TOPICS IN CAD (3cr.)
Recent and advanced topics in Computer-Aided Design (CAD). The subject material will vary from year to year according to research interests in the department. Students may be expected to contribute to lectures or seminars on selected topics. Prerequisite: Permission of the Department.

ELG6637 (ELEC 5705) ADVANCED TOPICS IN VLSI (3cr.)
Recent and advanced topics in Very Large Scale Integration (VLSI). The subject material will vary from year to year according to research interests in the department. Students may be expected to contribute to lectures or seminars on selected topics. Prerequisite: Permission of the Department.

ELG6636 (ELEC 5706) SUBMICRON CMOS AND BICMOS CIRCUITS FOR SAMPLED DATA APPLICATIONS (3cr.)
The analog aspects of digital CMOS and BiCMOS circuit design in submicron technologies including reliability; sampled analog circuits, including amplifier nonidealities and switch charge injection; CMOS/BiCMOS amplifier design considerations, leading up to standard folded-cascode and two-stage circuits.

ELG6638 (ELEC 5708) ASICs IN TELECOMMUNICATIONS (3cr.)
The definition of Application Specific Integrated Circuits is given along with current ASIC technology trends. CMOS and BiCMOS fabrication technologies are compared for their potential use in communications circuits. Circuit building blocks such as amplifiers, switched-capacitor filters and analog to digital converters are overviewed in the context of their communications applications. An overview of vendor technologies is followed by application examples such as line drivers, pulse shaping and equalization circuits, high-speed data transmission over twisted pair copper cables and mobile radio components and implementation issues. Students are required to submit a related literature study and design a communications integrated circuit component using a standard cell library environment.

ELG6638 (ELEC 5804) VLSI DESIGN (3cr.)
Integrated circuit design with a strong emphasis on design methodology. Design philosophies considered include Full Custom design, standard cells, gate arrays and sea-of-gates using CMOS and BiCMOS technology. A prelude to ELEC 5805.
ELG6385 (ELEC 5805) VLSI DESIGN PROJECT (3cr.)
Using state-of-the-art CMOS and BiCMOS technologies, students will initiate their own design of an integrated circuit using tools in the CAD lab and submit it for fabrication where the design warrants.

ELG6388 (ELEC 5808) SIGNAL PROCESSING ELECTRONICS (3cr.)
Signal processing from the viewpoint of analog circuit design. CCDS, BBDs, transversal filters, recursive filters, switched capacitor filters, with particular emphasis on integration of analog signal processing techniques in monolithic MOS ICs. Detailed operational amplifier design in CMOS technology. Implications of nonideal operational amplifier behaviour in filter performance. Basic sampled data concepts, detailed Z transform analysis of switched capacitor filters and more complex circuits. Noise in analog and sampled analog circuits, including calculation of dynamic range and signal-to-noise ratio.

ELG6389 (ELEC 5809) NONLINEAR ELECTRONIC CIRCUITS (3cr.)
A unified representation of non-linear circuits used in today’s telecommunications ICs is introduced. Nonlinear representation of circuits based on operational amplifiers, sinusoidal oscillators, amplitude modulators, demodulators, frequency modulators, frequency demodulators, mixers and Phase Locked Loop (PLL) is introduced. Design implications for commonly used Complementary Metal-Oxide Semiconductor (CMOS) and bipolar circuits. Precluded additional credit for this course taken previously as a special topics course ELG 6375 (ELEC 5705) in Fall 1999, Winter 2004 and Winter 2005. Prerequisite: Permission of the Institute.

Cotes de service / Service Codes
ELG5900 Projet / Project (3cr.)

ELG7199 (EACJ 5101) DIRECTED STUDIES (3cr.)
Various possibilities exist for pursuing directed studies on topics approved by the Department and which a full-time faculty member has agreed to direct, including any of the courses listed in the Graduate Calendar that are not being offered on a formal basis in the current academic year.

ELG7999 THÈSE DE M.Sc.A. / MASc THESIS

ELG8000 TRAVAIL COOPÉRATIF - 1er STAGE / CO-OP WORK-TERM I
Pour les étudiants et les étudiantes d'un programme coopératif de maîtrise qui font leur première session de travail. / For students in a co-operative master's program who are on their first work session.

ELG8001 TRAVAIL COOPÉRATIF - 2e STAGE / CO-OP WORK-TERM II
Pour les candidats et les candidates à un programme coopératif de maîtrise qui font leur deuxième session de travail. / For students in a co-operative master's program who are on their second work session.

ELG9997 PROPOSITION DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL

ELG9998 EXAMEN DE SYNTHÈSE DU DOCTORAT / PhD COMPREHENSIVE EXAM

ELG9999 THÈSE DE DOCTORAT / PhD THESIS

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design: analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Electronic Business

The PhD program in Electronic Business is offered under the auspices of the Faculty of Graduate and Postdoctoral Studies (FGPS), the Telfer School of Management, the School of Electrical and Computer Engineering, the Faculty of Law and the Faculty of Arts. It is offered on a full-
time basis in the following three fields:

- Electronic Business (e-Business)
- Electronic Technologies (e-Technologies)
- Electronic Society (e-Society)

Information on the fields and research interests of the professors is posted on the program website.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

## Programs

Doctorate in Philosophy Electronic Business

## Admission

To be considered for admission, applicants must:

- Hold one of the following master’s degrees with thesis: MSc in e-Business Technologies, in Management, in Health Systems, or in Systems Science; or an MA in Electrical and Computer Engineering; or a Master of Computer Science; or a Master of Information Studies; or an MA in Communication; or a master’s in a related relevant discipline;
- Have an admission average of at least 8.0 (A-) calculated in accordance with FGPS regulations;
- Provide two confidential letters of recommendation;
- Provide a CV;
- Identify at least one professor in the program whose research interests correspond to theirs;
- Provide a statement of their research interests and their proposed field (Electronic Business, Electronic Technologies, or Electronic Society).

Exceptionally, applicants holding a master’s degree without thesis may be considered provided their file includes scholarly publications or equivalent evidence of their capacity for advanced research.

### Additional Coursework

Students whose master’s degree was in an area other than Electronic Business Technologies may be required to take up to 12 credits of additional courses beyond the 9 credits normally required for the PhD. The additional coursework would consist of the following:

- EBC 7100 Research Methods in e-Business Technologies, or an equivalent course.
- At least one course (3 credits) in a field other than the candidate’s chosen field of research, to be chosen from the list of field designated courses in the program.
- The additional coursework is defined by the Admissions Committee, in consultation with the potential supervisor and the Graduate Studies Committee, and is specified in the student’s letter of admission.

### Language Requirements

The program is offered mainly in English. Candidates whose first language is not English must submit evidence of proficiency by providing any of the documents in the following list:

- A score of at least 600 on the paper version of the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE). The TOEFL is administered by Educational Testing Service, Box 899, Princeton, New Jersey, USA, 08540; see also www.webt.toefl.org.
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: www.ielts.org.
- A score of at least 14 on the CANTEST, administered by the University of Ottawa, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years over the last six years).

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

### Fast-track from Master’s to PhD program

Students enrolled in the MSc program in E-Business Technologies at the University of Ottawa may be allowed to fast-track to the PhD program without being required to write a master’s thesis, provided they meet the following conditions:
Program Requirements

The requirements of the PhD program in e-Business include successful completion of 9 credits of coursework, a comprehensive examination, a thesis proposal and a thesis, as follows:

- Compulsory courses (6 credits)

  EBC8101 INTERDISCIPLINARY DOCTORAL SEMINAR IN E-BUSINESS I (3cr.)
  EBC8102 INTERDISCIPLINARY DOCTORAL SEMINAR IN E-BUSINESS II (3cr.)

- Optional course (3 credits)

  The optional course must be selected from the list of courses in the student’s chosen field and must be preapproved by the Thesis Advisory Committee.

- EBC9998 COMPREHENSIVE EXAMINATION

  The Comprehensive Examination is a two-part examination (written and oral) that is overseen by the Advisory Committee. Once the written exam has been passed, the student proceeds to the oral. A student who fails either component of the exam is allowed to repeat it the following session. A second failure in either component leads to withdrawal from the program. The Comprehensive Examination must normally be completed within 4 sessions of commencing the program and, at the latest, by the end of of the fifth session. Failure to sit and pass the examination by the deadline counts as a failure.

  Further details about the comprehensive exam are posted on the program’s Website.

- EBC9997 THESIS PROPOSAL

  The thesis proposal, prepared under the direction of the thesis supervisor, must be defended to the satisfaction of the Thesis Advisory Committee (TAC). The proposal must normally be successfully completed by the end of the fifth session. In the event of failure, the proposal can be resubmitted and defended the following session at the latest. A second failure leads to withdrawal from the program. The proposal must be successfully defended before submitting it to the Research Ethics Board (if required) and before undertaking any independent data collection.

  Further details about the thesis proposal are posted on the program Website.

- EBC9999 THESIS

Additional coursework

The requirements outlined above are a minimum. For information about additional courses, please see the Admission section.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students fast-tracked from the master’s to the doctorate.

Residence

All students must complete a minimum of six sessions of full-time registration at the beginning of the program or nine sessions in the case of being fast-tracked.

Minimum standards

The passing grade in all courses is 65% (C+). Students who fail two courses (equivalent to 6 credits), the comprehensive exam, the thesis proposal, the thesis or whose progress is deemed unsatisfactory must withdraw from the program.

Thesis Advisory Committee (TAC)

During the first session, a thesis advisory committee (consisting of the thesis supervisor and at least two other professors who must be members of the program) is assigned in consultation with the student. The three committee members must cover at least two of the three fields in the
program. The composition of the committee must be approved by the Program Director. This committee is responsible for providing advice throughout the program, including on academic integrity and research ethics. The student meets with the TAC at least once a year and receives a report from the Committee following each meeting.

Courses

Courses by field

Electronic Business

ADM6274 INTERNATIONAL E-BUSINESS STRATEGIES (1.5cr.)
International trends in the global economy together with assessment of risks, and associated international e-business opportunities. Strategies for translating international opportunities into e-businesses, including localizing international web-based content, developing international supply networks, international crowdsourcing, international payments and international collaboration. How to address local laws on privacy, intellectual property and business contracts. Prerequisite: MBA 5270 (for EMP, MBA and MHA students).

ADM6275 BUSINESS INTELLIGENCE TECHNOLOGIES AND BIG DATA ANALYTICS (1.5cr.)
Business Intelligence (BI) as a concept; review of major BI tools and methods; identification of the right types of BI for different types of decision making environments; Introduction to Big Data; Business applications of Big Data; review of the supporting technologies such as data bases and data warehouses and Big Data Platforms for integrating structured and unstructured data including Hadoop, sandbox analytics; Streaming Analytics, and advances in data warehousing appliances that accelerate analytics. Prerequisite: MBA5270 (for EMP, MBA and MHA students).

ADM6279 SOCIO-TECHNICAL CHANGE (1.5cr.)
This course explores the structural-, cultural- and process-based organizational change management challenges facing business strategists during new technology implementation initiatives. Toward this, the course draws upon management frameworks, support tools and best practices for the joint optimization of technology and social subsystems within organizations. Adopting a complex adaptive system viewpoint of the organization, the course will highlight issues of technological and social embeddedness, and illustrate the use of configuration modeling and analysis tools for enterprise engineering and strategy models to facilitate change sustainability and continuity.

ADM6420 ELECTRONIC MARKETING (1.5cr.)

CMN5150 KNOWLEDGE MANAGEMENT (3cr.)
Research directions in organizational learning, collective intelligence and information architecture, situated in the technical context of the general digitization of communication and the socio-cultural context of knowledge societies and human development policies. Interdisciplinary perspectives. Case studies from the work place, education, health, and cultural industries.

EBC6180 ELECTRONIC HUMAN RESOURCES MANAGEMENT (1.5cr.)
The human resource functions needed for technology. Recruitment and selection via the internet. Internet and intranet applications for training personnel and enabling self-management. Measurement and management of employee performance using web-based applications. Using the web to maximize knowledge acquisition and sharing among employees. Knowing when and when not to use technology to effectively manage human resources.

EBC6210 ELECTRONIC COMMERCE ARCHITECTURE (1.5cr.)

EBC6230 BUSINESS PROCESS MANAGEMENT TECHNOLOGIES AND APPLICATIONS (1.5cr.)
Introduction to Business Process Management Technologies. Review of the latest concepts for using technology to improve performance of business processes. Analysis of advances in Internet-enabled B2B and enterprise business models with emphasis on service-oriented and event-driven architecture. Example applications from supply chain management, order processing, and health care process management will be studied.

EBC6240 MOBILE COMMERCE (1.5cr.)

EBC7100 RESEARCH METHODS IN ELECTRONIC BUSINESS TECHNOLOGIES (3cr.)
decidability and computability. Qualitative methods. Writing a Research Manuscript. Presentation of research results.

**ISI6342 WEB ARCHITECTURE AND TECHNOLOGIES (3cr.)**
Design and management of websites information architecture as it pertains to website design and the web environment. The course examines methodologies applied in information organization, website design, and evaluation of the user experience, as well as state of the art software tools supporting website design and management. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: IS16127)

**MGT5101 MULTIVARIATE RESEARCH METHODS (3cr.)**
Analysis of the basic multivariate techniques that are often used in the social and life sciences in order to enable students to apply the correct technique to any given set of data, properly interpret the output of statistical computer packages, and understand and critique scientific papers that use these techniques. Topics will include principal components analysis, factor analysis, multivariate analysis of variance, multiple and logistic regression, log-linear analysis, and introduction to structural equation modeling.

**MGT5102 QUALITATIVE RESEARCH METHODS (3cr.)**
Designing qualitative studies, collecting and analyzing qualitative data, attaining research credibility, and writing a qualitative research report. Topics will include the case study, ethnography, phenomenology and grounded theory. Introduction to the use of qualitative data analysis software (such as N-Vivo). Critical evaluation of qualitative studies. *Exclusion: MGT7302*

**MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)**
Overview of current developments, issues and challenges in the emerging field of health informatics. Historical development as well as basic foundations of health informatics including theoretical, methodological and ethical/legal underpinnings will be studied. Critical examination of information management principles and methods in Canadian health care organizations both public and private. Emerging applications in health informatics as well as approaches to understanding and evaluating these applications. Identification of the issues that CIO’s face in their attempts to provide the right information to the right people, at the right time.

**MHA6271 TECHNOLOGY AS AN INSTRUMENT OF CHANGE IN HEALTH CARE (1.5cr.)**
Discusses research on the implementation of contemporary health information technologies (IT) and their role in improving, transforming and supporting the delivery of health services: computer-based patient records, computerized order entry and results reporting, clinical services applications (lab, pharmacy, radiology- PACS), clinical decision support systems, nursing information systems, telemedicine and telehealth applications, e-health applications, (including end users involvement, implementation aspects, alignment with work practices), inherent risks associated with application of IT in healthcare, information security and privacy, IT impacts and challenges, issues related to IT assessment and evaluation in healthcare. Technology as an enabler of change supporting process standardization using Business Process Orchestration Technologies to create a foundation for optimization and active process management. *Prerequisite: MHA 6370*

**MHS6380 SYSTEMS ANALYSIS, MODELING, AND DECISION SUPPORT IN HEALTH (3cr.)**
Review of Checkland’s soft-systems modeling methodology and of other systems approaches. Study of systems analysis in the broader context of modeling complex systems and of techniques for providing decisional support at macro and micro levels, including support of clinical decisions. Oral and written reports required.

**SYS5110 FOUNDATIONS OF MODELLING AND SIMULATION (3cr.)**
Fundamental aspects of systems modeling and the simulation process. Elements of continuous system simulation. Issues relating to the numerical solution of ordinary differential equations. Elements of discrete event simulation Generation of random numbers and variates. Simulation validation and quality assurance. Introduction to simulation languages. *Prerequisites: CSI1100 and MAT2341 and (MAT2324 or MAT 2331) and MAT2371 and MAT2375.*

**Electronic Technologies**

**CSI5105 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)**
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks. *Prerequisites: familiarity with basic concepts in networks, network security, and applied cryptography. For example, relevant background courses may include the following (or equivalents): CEG 4185 or COMP 3203 and/or CSI 4138 or CEG 4394 or COMP 4108, and/or CSI 4108 or ELG 5373 or COMP 4109.*

**CSI5175 MOBILE COMMERCE TECHNOLOGIES (3cr.)**
Wireless networks support for m-commerce; m-commerce architectures and applications; mobile payment support systems; business models; mobile devices and their operating systems; mobile content presentation; security issues and solutions; relevant cross layer standards and protocols; case studies. *Exclusion: EBCS175*

**CSI5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)**

**CSI5387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)**
concepts. Knowledge-intensive concept learning. Introduction to the formal theory of concept learnability. Instance-based learning. Selected applications of data mining and concept learning. Prerequisite: CSI 4106 or permission of the program director.

CSI5389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

CSI5115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
The dimensional and multidimensional data models for data warehousing. Data dependencies and decomposition. Structure and use of data definition and manipulation languages. Database economics, engineering, deployment and evolution. Issues in integrity, security, the Internet and distributed databases. Relationships to decision support systems. Prerequisite: CSI3317 or equivalent.

EBC6130 WEB SERVICES (1.5cr.)
Web services business models and strategies. Enterprise Application Integration and Service Oriented Architectures. Web services technology standards. Consumer and enterprise adoption of web service technologies and platforms such as Mashups and Cloud Computing. Prerequisites: ADM6276, CSI5389

EBC6170 INTERNET SECURITY (1.5cr.)
User, data and network security principles. Information systems security standards. Security risk analysis frameworks. Fundamentals of Internet security mechanisms including authentication, access control, data encryption and integrity, and Public Key Infrastructure. Internet security including security in the wireless environment. Payment card industry security standards and compliance.

EBC6220 DATA MINING FOR BUSINESS APPLICATIONS (1.5cr.)
Introduction to business data collection, data pre-processing, data warehouses, data marts, and online analytical processing. Data mining tasks including classification, clustering and association rules. Data mining model building, tools and techniques including decision trees, neural networks, and regression analysis. Application of these techniques in business including CRM, target marketing, credit scoring, churn, survival analysis, and fraud detection.

EBC6250 DOCUMENT ENGINEERING FOR E-BUSINESS (1.5cr.)

ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS (3cr.)

ELG5373 (EACJ 5105) DATA ENCRYPTION (3cr.)

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Electronic Society

CMNS5105 CONTEMPORARY COMMUNICATION ISSUES (3cr.)
State of the art of the discipline. Exploration of major domains of communication research, along with contemporary issues being addressed by scholars in these fields of specialization.

CMNS5110 SOCIAL HISTORY OF COMMUNICATION TECHNOLOGIES (3cr.)
Exploration of the social, political, economic, cultural and ethical ramifications of communication technologies as they have evolved over time. Relationship between innovation in new communication technologies and social and cultural change.

**CMN5115 COMMUNICATION ETHICS** (3cr.)
Emphasis on the significance of ethical principles and responsibilities of public communicators, as well as sanctions faced when communicators fail to uphold these principles. Critique of self-regulation of the media. Analysis of argumentation. Study of legal precedents with respect to defamation.

**CMN5130 DIVERSITY IN THE WORKPLACE : COMMUNICATION CHALLENGES** (3cr.)
Theories and pragmatics of intercultural communication as applicable to various forms of communication (verbal and nonverbal ) between and among individuals of different ethnicities, races, cultures, age groups, sexual orientations, genders, classes, abilities, language, religion, and value orientations. Focused on workplace interactions.

**CMN5131 ORGANIZATIONAL COMMUNICATION THEORIES** (3cr.)
Different approaches (e.g., interactionist, narrative, critical) to organizational communication research, with a focus on benchmark studies and key researchers. Role of theories in understanding communication challenges faced by contemporary organizations. Issues related to communication networks, organizational learning, management of diversity, computerization of organizations, and management of risks, among others.

**CMN5133 HEALTH COMMUNICATION THEORIES** (3cr.)
Concepts, research, and theories regarding health communication issues at the micro level (e.g., interactions between patient and healthcare provider), mezzo level (e.g., role of information in healthcare organizations) and macro level (e.g., role of media in shaping public perceptions of health and illness). Qualitative, quantitative, and mixed-method research, with a stress on interdisciplinary approaches to health communication and public health research.

**CMN5136 VIRTUAL WORK TEAMS** (3cr.)
Theoretical and practical issues raised by the integration of mediated and distance communication into the work place, including those specific to the functioning of virtual teams (e.g., E-leadership, cohesion, communication, and trust).

**CMN5140 COMMUNICATION, GLOBALIZATION AND CHANGE** (3cr.)
Impact of information and communication technologies and political, cultural, and global dynamics on organizations. Theoretical and critical reflections on the strategic management of change in organizations, the transformation of organizational cultures, and intervention practices. Case studies of hybrid cultures.

**DCL7301 REGULATION OF INTERNET COMMERCE** (3cr.)
Seminar analyzing the legal challenges posed by the Internet to the traditional commercial law framework. Topics include intellectual property issues, on-line contracts, digital signatures, taxation, securities regulation, and the provision of online legal services.

**ISI5301 INFORMATION RESOURCE DISCOVERY** (3cr.)
Theories and models relating to information seeking and use within both individual and institutional contexts. The course addresses the identification and representation of information needs, search strategies and techniques, ethical issues, and evaluation methods all within a variety of user communities and technological settings. The course also examines the information mediation process and services that facilitate information access. (Formerly: ISI5104)

**ISI5305 MANAGEMENT FOUNDATIONS FOR THE INFORMATION PROFESSIONAL** (3cr.)
Core management theories, principles, and methods used to effectively plan, deliver, and control the provision of information services. The course addresses strategic planning, project management, human and financial management, collaboration and team building, communications and marketing, and the evaluation of programs and services. (Formerly: ISI5103)

**ISI6310 ETHICS, VALUES AND INFORMATION DILEMMAS** (3cr.)
Exploration of major ethical concerns currently confronting our information society. The course examines the moral and ethical values involved in information and technology-related situations faced by today’s information professionals and agencies, and provides an opportunity to apply ethical theories to situations involving issues such as freedom of expression, censorship, intellectual property rights, equitable access, and privacy. (Formerly: ISI5160) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

**ISI6351 SOCIAL MEDIA** (3cr.)
Exploration of social media technologies and how they are changing the way we learn, communicate, interact, and share information. The course assesses the implications of social media for individuals, organizations, social networks, and communities, and examines how social media can be used to develop innovative information services and applications. (Formerly: ISI6129) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

PhD courses

**EBCS8101 INTERDISCIPLINARY DOCTORAL SEMINAR IN E-BUSINESS I** (3cr.)
Recent developments in e-Business applications and research. Critical analysis of theories, models, and methods. Critical synthesis of the field literature from different perspectives. Students will write a systematic survey paper of the literature relevant to their research in one of the three fields of the program. The paper must be in a different field from that selected for the paper in EBCS8102. Course reserved for students in the EBC PhD program.

**EBCS8102 INTERDISCIPLINARY DOCTORAL SEMINAR IN E-BUSINESS II** (3cr.)
Recent developments in e-Business applications and research. Critical analysis of theories, models, and methods. Critical synthesis of the field literature from different perspectives. Students will write a systematic survey paper of the literature relevant to their research in one of the three fields of the program. The paper must be in a different field from that selected for the paper in EBC8101. Course reserved for students in the EBC PhD program.

**EBC9997 PROJET DE THÈSE / THESIS PROPOSAL**
Préalable / Prerequisite: EBC9998

**EBC9998 EXAMEN GÉNÉRAL DE DOCTORAT / COMPREHENSIVE EXAM**

**EBC9999 THÈSE DE DOCTORAT / DOCTORAL THESIS**
Préalables / Prerequisites: EBC9997 et EBC9998

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**English**

The Department of English offers the degrees of Master of Arts (with or without thesis) and Doctor of Philosophy in English. Both programs equip students to pursue advanced studies in British, Canadian, or American literature informed by a broad knowledge of literary history and by recent developments in literary criticism and cultural theory. The department is well known for its annual Canadian Literature Symposium, and its faculty is distinguished and well-published. The Ontario Council on Graduate Studies (OCGS) has consistently awarded the department the council’s highest rating.

The department participates in the collaborative programs in Women's Studies and in Medieval and Renaissance Studies at the master's level, and in the collaborative program in Canadian Studies at the PhD level. For more information on these programs, see “Program Requirements” below.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). Please note, however, that any course fulfilling a graduate degree requirement in English must be completed with a mark of B or higher. A student whose record shows any two grades lower than a mark of B will automatically be withdrawn from the program. Most graduate courses in the Department of English at the University of Ottawa carry three credits. Requirements are stated in number of credits.

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**Programs**

Master of Arts English Literature

Master of Arts English Literature Specialization in Medieval and Renaissance Studies

Master of Arts English Literature Specialization in Women's Studies

Doctorate in Philosophy English Literature

Doctorate in Philosophy English Literature Specialization in Canadian Studies

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**Admission**

A master's degree in English literature, or the equivalent, with at least high second class standing (B+), is required.

A 500-word statement describing the student’s specific interest in the program is required with the application.

**Collaborative programs**

The Department of English is a participating unit in the collaborative program in Canadian Studies at the PhD level. This program has been established for students wishing to include an interdisciplinary component in Canadian studies as part of their degree in English. The Canadian Studies Seminar (CDN6910) counts towards departmental course requirements and does not add to the number of courses required for the PhD.

To be admitted to the program, students must be registered in or have successfully completed at least one graduate course in English with Canadian content. The mention “Specialization in Canadian Studies” will be added to the diploma of students who pass the CDN6910 Seminar and successfully defend a thesis on a Canadian topic in English. For further details, please consult the Canadian Studies website of the Faculty of Graduate and Postdoctoral Studies.

**Program Requirements**
The student must successfully complete 18 credits of course work (or 15 credits if the student has completed ENG6302 and ENG6303 as an MA student in English at the University of Ottawa, or an equivalent course elsewhere), one language requirement, comprehensive examinations, ENG9997 (PhD Thesis Proposal), and ENG9999 (PhD Thesis Research).

Normal progress through the program:

**Year One:**
18 credits of course work, including ENG6302 and ENG6303 (or 15 credits if the student has completed ENG6302 and ENG6303 as an MA student in English at the University of Ottawa, or an equivalent course elsewhere), and including ENG6304; registration of the dissertation topic by the end of the third session (that is, the spring session, if initially registered in the fall) after the date of initial enrollment; progress toward meeting the language requirement.

**Year Two:**
Completion of comprehensive examinations and the language requirement.

**Year Three:**
Submission of thesis proposal ENG9997 followed by research and writing of the dissertation.

**Year Four:**
Completion of the dissertation and its defence.

Comprehensive examinations are normally taken by the end of the second year and are offered three times each year (late August, December, and April). Students who wish to write the comprehensives must obtain approval from the director of graduate studies by April 1 for August examinations, by September 1 for December examinations, and by December 1 for April examinations.

The examinations are made up of three written papers (a major field and two minor fields) and corresponding oral examinations. If the major field is before 1790, then at least one of the minor fields will be post-1790, or the converse. Complete guidelines and procedures are available in the department.

**Language requirements**

The language requirement is normally French. However, where knowledge of another language is necessary for the major field (e.g. Latin for students working in Medieval or Renaissance studies), the student may request an alternative choice from the Department’s Graduate Committee.

Students may satisfy the requirement by passing FLS1000 or by passing six credits of second-year university-level language course(s). These courses are additional to the 18 credits required for the degree. Language testing of languages other than French is normally administered by the Department during the first week of September and in December and April of each year. The departmental language tests are one-hour examinations which require the candidate to translate, with the aid of a dictionary, a passage of literary criticism or another appropriate selection of similar difficulty approximately one page in length. In all cases, the minimum passing mark is 65%, and leads to an S (Satisfactory) on the transcript for ENG7999. Students who already achieved 65% in the test at the MA level are not required to retake the test at the PhD level.

The language requirement must be satisfied before the student proceeds to the thesis proposal.

**Duration of program**

The student must complete all requirements within six years of initial registration.

**Residence**

The program is offered on a full-time basis only and requires full-time registration for a minimum of six sessions.

**Minimum standards**

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

**Courses**

Every year the department usually offers at least three credits in each of the following areas: medieval, renaissance, restoration and 18th century, romanticism, victorian, modern British, American, Canadian, and theory.

The titles below refer to general subject areas, whereas the actual seminars will consist of specific studies in the subject areas. For a detailed description of the seminars available in any year, please consult the department webpage. Information is normally available early in the winter for the next academic year. All courses are three credits.

**ENG6300 OLD ENGLISH I** (3cr.)
ENG6301 OLD ENGLISH II (3cr.)

ENG6302 RESEARCH METHODOLOGY (1.5cr.)
Preparation of students for the professional study of English and for the application of graduate level research skills to non-academic careers. Review and analysis of electronic and print research tools and methods. Internet database searches, both in the discipline of English as well as in related fields (such as history, philosophy, and sociology), and evaluation of Internet sites. Short assignments developing skills in academic and non-academic research. Preparation of grant applications and of the thesis proposal (for students in the MA with thesis program). Graded S/NS. Offered in the fall session.

ENG6303 PROFESSIONAL DEVELOPMENT (1.5cr.)
Preparation of students for careers involving graduate level research and communication skills, including teaching, university research, and non-academic careers. Introduction to academic and non-academic professional activities: writing and publishing scholarly articles, and research reports, disseminating research results through academic and non-academic presentations, networking, participation in conferences and professional associations, and career planning for both academic and non-academic career paths for holders of graduate degrees. Sessions to be devoted to the practice of teaching, covering such topics as syllabus construction, teaching ‘styles,’ classroom management, teaching dossiers, student evaluation, and the application of teaching skills to non-academic goals such as presentations and team-building. Graded S/NS. Offered in the winter session.

ENG6304 Doctoral Research Methods (3cr.)
Overview of theoretical, methodological, and critical approaches to literary studies to enable students to situate their own research within the discipline.

ENG6310 MIDDLE ENGLISH LITERATURE I (3cr.)

ENG6320 MIDDLE ENGLISH LITERATURE (3cr.)

ENG6321 MIDDLE ENGLISH LITERATURE III (3cr.)

ENG6322 MIDDLE ENGLISH LITERATURE IV (3cr.)

ENG6330 RENAISSANCE LITERATURE I (3cr.)

ENG6341 SHAKESPEARE I (3cr.)

ENG6342 SHAKESPEARE II (3cr.)

ENG6343 SHAKESPEARE III (3cr.)

ENG6344 SHAKESPEARE IV (3cr.)

ENG6350 RENAISSANCE LITERATURE II (3cr.)

ENG6351 RENAISSANCE LITERATURE III (3cr.)

ENG6352 RENAISSANCE LITERATURE IV (3cr.)

ENG6355 RESTORATION LITERATURE I (3cr.)

ENG6356 RESTORATION LITERATURE II (3cr.)

ENG6357 RESTORATION LITERATURE III (3cr.)

ENG6360 EIGHTEENTH CENTURY LITERATURE I (3cr.)
The physical, chemical and biological processes involved in the treatment of domestic and industrial wastes. Waste characteristics, stream assimilation, biological
software); and analytical solutions. Applications: aquifer response test analysis, capture zone analysis, groundwater flow modeling, water budgeting, and aquifer
CVG5124 (CIVJ 5605) COASTAL ENGINEERING

Requirement” under “Master’s Program”) through course work (undergraduate and graduate) already completed. The comprehensive

Only in the most exceptional of circumstances and subject to the approval of the graduate committee will a directed reading course be accepted.

ENG6361 EIGHTEENTH CENTURY LITERATURE II (3cr.)
ENG6362 EIGHTEENTH-CENTURY LITERATURE III (3cr.)
ENG6363 EIGHTEENTH-CENTURY LITERATURE IV (3cr.)
ENG6370 ROMANTIC LITERATURE I (3cr.)
ENG6371 ROMANTIC LITERATURE II (3cr.)
ENG6372 ROMANTIC LITERATURE III (3cr.)
ENG6373 ROMANTIC LITERATURE IV (3cr.)
ENG6380 VICTORIAN LITERATURE I (3cr.)
ENG6381 VICTORIAN LITERATURE II (3cr.)
ENG6382 VICTORIAN LITERATURE III (3cr.)
ENG6383 VICTORIAN LITERATURE IV (3cr.)

ENG6900 SECOND LANGUAGE REQUIREMENT
In keeping with the bilingual character of the University, the MA program has a French language requirement. Students may satisfy this
requirement by passing the FLS1000, the test administered by the Official Languages and Bilingualism Institute, or the departmental language
test. The departmental tests are one-hour examinations which require the candidate to translate, with the aid of a dictionary, a passage of
literary criticism or another appropriate selection of similar difficulty approximately one page in length. Students may also satisfy the language
requirement by passing six credits of second-year university-level language course(s). These courses are additional to the English courses
required for the degree. In all cases, the minimum passing grade is 50% and leads to an "S" (Satisfactory) on the transcript for ENG6900.

ENG6999 MA RESEARCH PAPER
The research paper is prepared under the direction of the research paper supervisor and is approved by the graduate committee. The research
paper must be successfully completed by the end of the third session of full-time registration in the master’s. In the event of failure, the student
must register for an additional session. A second failure leads to a grade of NS on the transcript and to withdrawal from the program.
Prerequisites: 15 credits.

ENG7300 MODERN LITERATURE I (3cr.)
ENG7301 MODERN LITERATURE II (3cr.)
ENG7302 MODERN LITERATURE III (3cr.)
ENG7303 MODERN LITERATURE IV (3cr.)
ENG7310 AMERICAN LITERATURE I (3cr.)
ENG7311 AMERICAN LITERATURE II (3cr.)
ENG7312 AMERICAN LITERATURE III (3cr.)
ENG7313 AMERICAN LITERATURE IV (3cr.)
ENG7320 CANADIAN LITERATURE I (3cr.)
ENG7321 CANADIAN LITERATURE II (3cr.)
ENG7322 CANADIAN LITERATURE III (3cr.)
ENG7323 CANADIAN LITERATURE IV (3cr.)
ENG7330 ANGLO IRISH LITERATURE (3cr.)
ENG7331 ANGLO-IRISH LITERATURE II (3cr.)
ENG7332 ANGLO-IRISH LITERATURE III (3cr.)
ENG7370 HISTORY OF ENGLISH LANGUAGE (3cr.)
ENG7375 COMMONWEALTH LITERATURE (3cr.)
ENG7376 COMMONWEALTH LITERATURE II (3cr.)
ENG7377 COMMONWEALTH LITERATURE III (3cr.)
ENG7380 HISTORY OF CRITICISM I (3cr.)
ENG7381 THEORY OF CRITICISM I (3cr.)
ENG7382 HISTORY OF CRITICISM II (3cr.)
ENG7383 HISTORY OF CRITICISM III (3cr.)
ENG7384 THEORY OF CRITICISM II (3cr.)
ENG7385 THEORY OF CRITICISM III (3cr.)

ENG7900 SECOND LANGUAGE REQUIREMENT
In keeping with the bilingual character of the University, the PhD program has a French language requirement. Students may satisfy this requirement by passing FLS1000, the test administered by the Official Languages and Bilingualism Institute, or the departmental language test. The departmental tests are one-hour examinations which require the candidate to translate, with the aid of a dictionary, a passage of literary criticism or another appropriate selection of similar difficulty approximately one page in length. Language testing of languages other than French is normally administered by the Department. Students may also satisfy the language requirement by passing six credits of second-year university-level language course(s). These courses are additional to the 18 credits required for the degree. In all cases, the minimum passing grade is 66 percent and leads to an "S" (Satisfactory) on the transcript for ENG7900. NOTE: Students who achieve 65% or higher at the MA level will not be required to retake the test if they continue on to the PhD.

Readings and Research
ENG6111 DIRECTED READINGS I (3cr.)
Only in the most exceptional of circumstances and subject to the approval of the graduate committee will a directed reading course be accepted.

ENG6112 DIRECTED READINGS II (3cr.)
Only in the most exceptional of circumstances and subject to the approval of the graduate committee will a directed reading course be accepted.
ENG6313 DIRECTED READING (3cr.)

ENG7997 MA THESIS PROPOSAL
The thesis proposal is prepared under the direction of the thesis supervisor and is approved by the graduate committee. The proposal must normally be successfully completed by the end of the third session. In the event of failure, the proposal can be resubmitted the following session at the latest. A second failure leads to a grade of NS on the transcript and to withdrawal from the program. Graded: S (Satisfactory) / N/S (Not Satisfactory). Prerequisites: 7.5 credits.

ENG7999 MA THESIS RESEARCH

ENG9997 PhD Thesis Proposal
The thesis proposal is prepared under the direction of the thesis supervisor and is approved by the graduate committee after consultation with area experts. The proposal must normally be successfully completed by the end of the seventh session. In the event of failure, the proposal can be resubmitted the following session at the latest. A second failure leads to a grade of NS on the transcript and to withdrawal from the program. Graded: S (Satisfactory) / N/S (Not Satisfactory). Prerequisites: 15 credits.

ENG9998 COMPREHENSIVE EXAM (PhD)

ENG9999 PhD THESIS RESEARCH

Environmental Engineering

Ottawa–Carleton Joint Program

Established in 2000, the Ottawa–Carleton Institute of Environmental Engineering (OCIEE) combines the teaching and research strengths of the Department of Civil Engineering and the Department of Chemical Engineering at the University of Ottawa with that of the Departments of Civil and Environmental Engineering at Carleton University.

The Institute offers graduate programs leading to the degrees of Master of Applied Science in Environmental Engineering (MAsC), Master of Applied Science in Environmental Engineering (MAsC) Specialization in Environmental Sustainability, a Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Environmental Engineering.

The objective of these programs is to prepare candidates for careers in teaching and/or in research, in a private or a public setting. Graduates will acquire autonomy in conducting research and in preparing scholarly publications.

Members of the Institute are involved in four main research fields: water and waste processing or treatment; management of solid and hazardous waste; air pollution; water resources and groundwater management. Further information is posted on the departmental website.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

Programs

- Master of Applied Science Environmental Engineering
- Master of Engineering Environmental Engineering
- Doctorate in Philosophy Environmental Engineering

Admission

Admission to the graduate programs in Environmental Engineering is governed by the general regulations of the Ottawa–Carleton Institute of Environmental Engineering (OCIEE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold a master's degree in chemical engineering or in an engineering discipline with an environmental specialization;
The Department may require students to take additional courses depending on their backgrounds.

**Program Requirements**

**PhD Degree Requirements**

The requirements of this program are as follows:

- Successful completion of a minimum of 9 course credits;
- Participation and attendance at the environmental engineering seminar EVG 5801;
- Successful completion of comprehensive examination (EVG9998) within 16 months of initial registration;
- Presentation and defense of a thesis (EVG9999) based on original research carried out under the direct supervision of a research faculty member in the Department.

**Transfer from Master’s to PhD Program**

Master’s students with outstanding performance in the master’s courses may request transfer into the PhD program without completing the master’s degree. Students who are permitted to do so must successfully complete a total of 24 course credits (15 at the Master’s and 9 at the PhD) for a PhD.

Candidates in the PhD program are expected to demonstrate a broad knowledge of the areas within environmental engineering (see “Breadth Requirement” under “Master’s Program”) through course work (undergraduate and graduate) already completed. The comprehensive examination should be completed within the first 16 months (or the equivalent of four full-time sessions) of the student’s registration in the PhD program.

**Minimum Standards**

The passing grade in all courses is B. Students who fail 6 credits, or whose research progress is deemed unsatisfactory are required to withdraw from the program.

**Residence**

The program is intended for full-time students. All students must complete a minimum of six sessions of full-time registration at the beginning of the program. All requests for non-consecutive full-time study sessions will need to be approved by the FGPS.

In the case of transfer students, the residency period is nine sessions from the initial registration in the master’s program.

**Duration of the Program**

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program. In the case of transfer students, the residency is seven full-time sessions from the time of the initial registration in the program.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Engineering. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

**Courses**

Course selection is subject to the approval of the advisor or the advisory committee. Students may choose courses offered at either university.
from among those listed below.

The courses listed below are grouped by area of study. Students must complete at least one course in three of the five areas. The director will decide when a course offered under a special topics or directed studies heading can be considered to meet the requirements of a given area. Course descriptions may be found in the departmental sections of the calendars concerned.

Course codes in parentheses are for Carleton University. Only a selection of courses given in a particular academic year.

**Air Pollution**

**CVG7161 (ENVE 5102) TRAFFIC RELATED AIR POLLUTION** (3cr.)

**CVG7162 (ENVE 5103) AMBIENT AIR QUALITY AND POLLUTION MODELLING** (3cr.)

**CHG8132 (ENVE 5105) ADSORPTION SEPARATION PROCESSES** (3cr.)

**EVM5101 (ENVE 5101) AIR POLLUTION CONTROL** (3cr.)

**EVM7104 (ENVE 5104) INDOOR AIR QUALITY** (3cr.)

**Water Resources Management, Groundwater Management, and Contaminant Transport**

**CVG5124 (CIVJ 5605) COASTAL ENGINEERING** (3cr.)
Key concepts in coastal engineering. Wave mechanics and coastal hydrodynamics, (2) sediment transport and coastal morphodynamics and (3) coastal structures and coastal zone management. Wave mechanics and coastal hydrodynamics to include small-amplitude wave theory, finite amplitude wave theories (Stokes, Chodlal and solitary wave), wave generation, wave transformations, development and prediction, hydrodynamics of coastal circulation. Sediment transport and coastal morphodynamics to include: wave and current-induced sediment transport, coastal sediment processes, longshore and cross-shore beach morphologic transformations, etc. Coastal structures and coastal zone management to include: beach erosion control, coastal structures (dikes, breakwaters, groins, seawalls), beach nourishment, coastal pollution and control, nearshore area development.

**CVG5125 (CIVJ 5601) STATISTICAL METHODS IN HYDROLOGY** (3cr.)
Concepts of probability and random variables applied to hydrology. Statistical distributions, their approximation and analysis. Statistical inference, including tests of significance and estimation theory. Linear and multivariate correlation and regression techniques. Data generation and simulation techniques for design of water-resource systems. Introduction to hydrologic and meteorologic time series.

**CVG5126 (CIVJ 5602) STOCHASTIC HYDROLOGY**

**CVG5131 (CIVJ 5606) RIVER ENGINEERING**
Introduction to fluvial processes and flow regimes: modes of sediment transportation; suspended and bedload transport theories; sediment measuring techniques and their limitations; secondary circulation and the meander process; hydraulics of bridge waterways and pipeline crossings; local scour at bridge piers; erosion protection.

**CVG5154 (CIVJ 5308) RANDOM VIBRATION** (3cr.)

**CVG5160 (CIVJ 5503) SEDIMENT TRANSPORT** (3cr.)
An introduction to particle transport, with special emphasis on river engineering applications, including natural channel design. Sediment properties, initiation of motion, bed load, suspended load, fluvial dunes, alluvial channels, bank erosion and protection, natural channel design. Special topics include contaminated sediments, local scour, morphodynamic modelling, fluvial habitat.

**CVG5162 (CIVJ 5504) RIVER HYDRAULICS** (3cr.)
Advanced concepts of river hydraulics, with an emphasis on field measurement techniques and application of numerical models. Navier-Stokes equations, turbulence, flow resistance, numerical modelling of simplified momentum and continuity equations, field-based measurement and statistical analysis of velocity fields. Special topics include contaminant transport, morphodynamic modelling.

**CVG7108 (CIVE 5504) SEEPAGE AND WATER FLOW THROUGH SOILS** (3cr.)
CVG7163 (ENVE 5302) CASE STUDIES IN HYDROGEOLOGY (3cr.)

CHG5158 (ENVJ5304) POROUS MEDIA (3cr.)

GEO5143 (GEOL 5403) ENVIRONMENTAL ISOTOPES AND GROUNDWATER GEOCHEMISTRY (3cr.)
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radiocarbon, and exotic radioisotopes (e.g. 36Cl, 39Ar, 85Kr). Low temperature aqueous geochemistry and mineral solubility with emphasis on the carbonate system. Some applications to paleoclimatology will be discussed. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO 4342) or equivalent.

GEO5144 (ERTH 5404) GROUNDWATER RESOURCES
Advanced topics in the exploration and development of groundwater resources, including detailed aquifer response analysis. Examination of hydrogeology in arid and undeveloped regions will also be included. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO4341) or equivalent.

GEO5146 (ERTH 5406) TECHNIQUES OF GROUNDWATER RESOURCES EVALUATION (3cr.)
Governing groundwater flow equations, initial and boundary conditions; simple numerical solutions (spreadsheets); complex numerical solutions (commercial software); and analytical solutions. Applications: aquifer response test analysis, capture zone analysis, groundwater flow modeling, water budgeting, and aquifer vulnerability assessment. Prerequisite: undergraduate hydrogeology.

GEO5147 (ERTH 5407) GEOCHEMISTRY OF NATURAL WATERS (3cr.)
Aqueous speciation, solubility of metals, minerals and gas, reaction kinetics and equilibria. Chemistry and dynamics of groundwaters and hydrothermal fluids.

GEO5148 (ERTH 5408) THEORY OF FLOW AND CONTAMINANT TRANSPORT IN GEOLOGICAL MATERIALS (3cr.)
Development of governing groundwater flow equations and solute transport equations from first principles, and application of principles in case studies. Topics: Forces and potentials, fluids, geological materials, contaminants, case studies. Prerequisite: undergraduate hydrogeology.

EVC7301 (ENVE 5301) CONTAMINANT HYDROLOGY (3cr.)

EVC7303 (ENVE 5303) MULTIPHASE FLOW IN SOILS (3cr.)

Management of Solid, Hazardous, and Radioactive Waste and Pollution Prevention
CVG5133 (ENVJ 5906) SOLID WASTE DISPOSAL (3cr.)
Collection and disposal of solid wastes. Sanitary landfill, composting, incineration and other methods of disposal. Material and energy recovery.

CVG5179 (ENVJ 5908) ANAEROBIC DIGESTION (3cr.)
Advanced theoretical, biological, and practical aspects of anaerobic digestion processes. Principles to be applied to the design and application of conventional and advanced anaerobic processes used for treatment of municipal and industrial wastewaters. Topics to include microbiology and biochemistry fundamentals, techniques for monitoring anaerobic digestion performance, municipal sludge stabilization, anaerobic composting, anoxic/anaerobic bioremediation, Andrew’s dynamic model. Design of the following: two-phase digestion; Downflow Stationary Fixed Film (DSFF) reactors; Upflow Anaerobic Sludge Blanket (UASB); Upflow Blanket Filter (UBF) reactors; and Anaerobic Sequencing Batch Reactors (ASBR).

CVG5331 (ENVJ 5902) SLUDGE UTILIZATION AND DISPOSAL (3cr.)
Introduction to sludge processing technology and procedures to be used in the planning and design of sludge treatment processes. Evaluate the economics and performance of sludge unit process operations. Selection of methods for final disposal of sludge.

EVC5203 (ENVE 5203) HAZARDOUS AND RADIOACTIVE WASTE MANAGEMENT (3cr.)

EVC7201 (ENVE 5201) GEO-ENVIRONMENTAL ENGINEERING (3cr.)

EVC7202 (ENVE 5202) CONTAMINANT FATE MECHANISMS (3cr.)

Water and Wastewater Treatment
CVG5130 (ENVJ 5900) WASTEWATER TREATMENT PROCESS DESIGN (3cr.)
The physical, chemical and biological processes involved in the treatment of domestic and industrial wastes. Waste characteristics, stream assimilation, biological oxidation, aeration, sedimentation, anaerobic digestion, sludge disposal.

CVG5132 (ENVJ 5901) UNIT OPERATIONS OF WATER TREATMENT (3cr.)
Unit operations and unit processes involved in the treatment of a water supply for various uses. Topics included are: water quality, water microbiology, sedimentation, chemical treatment, disinfection, water chemistry, flocculation.

CVG5134 (ENVJ 5907) CHEMICAL ANALYSIS FOR ENVIRONMENTAL ENGINEERING (3cr.)

CVG5135 (CIV 5608) WATER SUPPLY AND SANITATION IN DEVELOPING COUNTRIES (3cr.)

CVG5137 (ENVJ 5905) WATER AND WASTEWATER TREATMENT PROCESS ANALYSIS (3cr.)
Mass balancing in complex systems. Reaction kinetics and kinetic data analysis: classical and computer based methods. Reactor design: ideal reactors and real reactors. Analysis of tracer tests. Interfacial mass transfer: common theories. Mass transfer models. Prerequisite: CVG 3132 or equivalent. Students with a Chemical Engineering background may not take this course for credit.

CVG5138 (ENVJ 5902) ADVANCED WATER TREATMENT (3cr.)
Scope, limitations and design procedures for water treatment processes for the removal of toxic and non-standard contaminants. Current water treatment problems and regulations, activated carbon treatment, ion exchange, disinfection practices and oxidation via advanced oxidation processes (ozonation and UV oxidation), iron and manganese removal, recent developments in coagulation, membranes, air stripping. Prerequisite: CVG 3132 or equivalent.

CVG7160 (ENVE 5001) BIOFILM PROCESSES IN WASTEWATER TREATMENT (3cr.)

CVG5180 (ENVJ 5909) BIOLOGICAL NUTRIENT REMOVAL (3cr.)
Advanced theoretical, biological, and practical aspects of biological nutrient removal (BNR) (nitrification, denitrification and excess biological phosphorus) processes. Principles to be applied to the design and application of conventional and advanced BNR processes used for treatment of municipal and industrial wastewaters. Topics as follows: microbiology and biochemistry fundamentals of BNR, nitrification process design of suspended growth and fixed film growth systems, denitrification process design of suspended growth and fixed film growth systems, excess biological phosphorus removal design including prefermentation. Design of 2,3,4 and 5 stage BNR systems. General activated sludge model and Simworks for BNR systems. Retrofit of exiting plants and pilot plant testing for BNR.

CVG5232 (ENVJ 5911) UNIT OPERATIONS OF WATER TREATMENT LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for particular applications, and b) design a full-scale facility. Conventional analytical techniques used in water treatment (pH, alkalinity, hardness, turbidity, color, spectrophotometric analysis). Process analysis techniques for process evaluation and scale-up including: zone sedimentation, batch flux settling tests, coagulation with iron and aluminum salts, flocculent sedimentation, filtration and fluidization, floation. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5132.

CVG5238 (ENVJ 5912) ADVANCED WATER TREATMENT PROCESSES LAB (1.5cr.)
Bench-scale and pilot-scale experiments required to: a) assess the suitability of different physicochemical processes for the removal of toxic and non-standard contaminants, and b) design a full-scale facility. Tracer tests and none-ideal reactor behaviour, activated carbon adsorption equilibria and kinetics, aeration. Total organic carbon analysis, spectrophotometry. Process analysis, techniques for process evaluation and scale-up including: aeration, analysis of non-ideal flow conditions. Tracer study of three basins, adsorption isotherm tests, activated carbon mini-column tests, oxidation kinetic tests. Prerequisite: CVG 3132 or equivalent. Co-requisite: CVG 5138.

CHG8181 (ENJ5501) BIOCHEMICAL ENGINEERING (3cr.)

CHG8192 (ENJ5502) MEMBRANE APPLICATIONS IN ENVIRONMENTAL ENGINEERING (3cr.)
Course emphasizing the applications of membrane separation processes in the resolution of various environmental problems. Applications of reverse osmosis, ultrafiltration and pervaporation to the treatment of industrial waste waters. Applications of membrane gas and vapor permeation to the removal of pollutants from air. Discussion of fundamentals underlying each separation process.

CHG8198 (ENJ5503) REVERSE OSMOSIS (3cr.)

Environmental Impact Assessment
EVG7401 (ENVE 5401) ENVIRONMENTAL IMPACT ASSESSMENT OF MAJOR PROJECTS (3cr.)

CVG5139 (ENVJ 5700) ENVIRONMENTAL ASSESSMENT OF CIVIL ENGINEERING PROJECTS (3cr.)
Procedures and methods for systematic evaluation of the environmental impact of civil engineering projects including wastewater disposal systems, solid waste disposal systems, and water resource development systems.

Other Courses
To fulfill the requirements beyond the nine credits of area courses, students may choose from the following:

EVG7402 (ENVE 5402) FINITE ELEMENTS IN FIELD PROBLEMS (3cr.)

CHG8153 (ENVJ5500) STATISTICAL MODELLING AND CONTROL OF DYNAMIC PROCESSES (3cr.)

Dynamic Processes
CHG8186 (ENVJ5506) MODELLING OF STEADY-STATE PROCESSES (3cr.)
A comprehensive examination of techniques for building and analyzing process models is made. Topics include: linear least squares estimation, non-linear least squares estimation, multiresponse parameter estimation, error in variables estimation, heteroscedasticity, design of experiments for precise parameter estimation and model discrimination.

CHG8194 (ENVJ5504) MEMBRANE SEPARATION PROCESSES (3cr.)
Advanced topics of membrane separations including reverse osmosis, ultrafiltration, gas separation, non-aqueous liquid separation, and membrane applications in biotechnology. The course involves problem solving in membrane transport, membrane design, and membrane process design.

CHG8195 (ENVJ5505) ADVANCED NUMERICAL METHODS IN TRANSPORT PHENOMENA (3cr.)
Survey course of numerical methods for solving linear and non-linear ordinary and partial differential equations. Techniques reviewed include Runge-Kutta and predictor-corrector methods, shooting techniques, control volume discretization methods and finite elements. Example problems from the field of transport phenomena.

Transport Phenomena
CHG8196 (ENVJ5507) INTERFACIAL PHENOMENA IN ENGINEERING (3cr.)
Interfacial tension and interfacial free energy; contact angles; spreading of liquids; wetting of surfaces; experimental techniques. Interfacial tension of mixtures; Gibbs equation; absorbed and insoluble monolayers; properties of monolayers and films. Electrical phenomena at interfaces; the electrical double layer; zeta-potential; electrokinetic phenomena (electrophoresis, electro-osmosis, streaming potential); surface conductance. Dispersed systems; formation and practical uses of emulsions; spontaneous emulsification; flocculation.

CVG5128 (ENVJ 5604) WATER RESOURCES PLANNING AND POLICY
Examination of engineering and non-engineering aspects of arrangements which affect Federal and Provincial water resources policy. Application of basic concepts of engineering hydrology, economic projections and water law to current problems of water resources planning and policy.

CVG7140 (CIVE 5601) STATISTICS, PROBABILITIES AND DECISION-MAKING (3cr.)

CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)

CVG7151 (CIVE 5305) TRAFFIC ENGINEERING (3cr.)

CVG7153 (CIVE 5307) URBAN TRANSPORTATION AND MANAGEMENT (3cr.)

Students may also, subject to approval, select courses from the graduate programs in mechanical engineering, biology, chemistry, earth sciences, computer sciences, geography and public administration at both universities.

Seminars, Directed Studies and Special Topics
EVG5800 (ENVE 5800) SEMINAR FOR MASTER’S CANDIDATES IN ENVIRONMENTAL ENGINEERING (1cr.)

EVG5801 (ENVE 7800) SEMINAR FOR DOCTORAL CANDIDATES IN ENVIRONMENTAL ENGINEERING (3cr.)

619
EVI6108 (ENVE 5906) DIRECTED STUDIES I (3cr.)

EVI6109 (ENVE 5907) DIRECTED STUDIES II (3cr.)

EVI6300 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING I (3cr.)

EVI6301 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING II (3cr.)

EVI6302 SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING III (3cr.)

Project and Theses

EVI6001 PROJET EN GÉNIE DE L'ENVIRONNEMENT / ENVIRONMENTAL ENGINEERING PROJECT (6cr.)

EVI7999 THÈSE DE M.Sc.A. / MASc THESIS

EVI9998 EXAMEN DE SYNTHÈSE/ COMPREHENSIVE EXAMINATION

EVI9999 THÈSE DE DOCTORAT / PhD THESIS

(ENVE 5900) ENVIRONMENTAL ENGINEERING PROJECT

(ENVE 5909) MASTER'S THESIS

(ENVE 6909) PhD THESIS

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Epidemiology

Use of the masculine gender in the generic sense should be taken to include women as well as men in this publication.

The Department of Epidemiology and Community Medicine, located in the Faculty of Medicine, offers graduate programs leading to the Master of Science (MSc) degree and the Doctor of Philosophy (PhD) degree in Epidemiology.

The purpose of the programs is to provide a scholarly environment for the health sciences community that will stimulate and enhance learning and expand knowledge by conducting research. Graduates are professional experts or consultants who can advice persons and agencies in other fields.

The faculty members of the Department come from a wide variety of academic backgrounds and interests. The Department has an active research program, involving extensive collaborations with other groups, which includes three broad areas:

- Etiological Epidemiology
- Social Epidemiology
- Clinical Epidemiology & Health Services Research
The Department is a participating unit in the biostatistics program (at the master’s level).

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Most of the requirements of these programs must be fulfilled in English. A very good knowledge of this language is therefore required.

**Programs**

**Master of Science Epidemiology**
**Master of Science Epidemiology Specialization in Biostatistics**
**Doctorate in Philosophy Epidemiology**

**Admission**

Admission to the PhD program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

To be considered for admission, applicants must:

- Hold a master’s degree with thesis in epidemiology or a closely related discipline such as biostatistics or population-based genetics*.
- Have achieved a minimum average of B+.
- Demonstrate strong research performance
- Provide at least two confidential letters of recommendation from professors who are familiar with their work.
- Provide a statement of purpose outlining their career goals and their proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.
- Provide proof of proficiency (understand, speak and write) in either English or French and of at least a passive knowledge (listening, reading) in English so as to be able to take courses and read the scientific literature in English. The list of acceptable proofs is indicated in the Admission section of the general regulations of the FGPS.

* Applicants must have mastered the equivalent of the content of the following courses either during their previous studies or through work experience: EPI5240; EPI5242; EPI5240; EPI5241; EPI6178; (2 among EPI5344; EPI5345; EPI5346). Otherwise, they may need to complete some of these courses either prior to admission or in addition to the regular requirements of the degree.

**Transfer from master’s to PhD program**

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of all master’s course work.
- Satisfactory progress in the research program.
- Submission of a well developed research plan that must include, at a minimum, a thesis proposal and background literature review that has been approved by the departmental Graduate Education Committee.
- Proof of substantial experience in empirical data collection and analysis.
- Written recommendation by the thesis supervisor and the advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Following the transfer, all of the requirements of the doctoral program must be met.

**Program Requirements**

The following requirements must be completed:

- **Successful completion of compulsory course** MED8166 *Professionalism and Professional Skills*.
- Six compulsory credits: EPI8166 or EPI8566 and MED8167 or MED 8567.
- Six optional credits chosen from EPI graduate courses.
- A comprehensive examination (EPI9998) to be completed within sixteen months of initial registration in the program.
- A thesis proposal to be completed and defended within 24 months of initial registration in the program.
- Presentation and defense of a thesis (EPI9999) based on original research carried out under the direct supervision of a faculty member of the department.
NOTE: The Department may require students to take additional courses depending on their backgrounds.

**Individual Study Plan (ISP)**

Students will have an Individual Study Plan approved by their thesis supervisor and by the Graduate Studies Committee prior to their initial registration in the PhD program. This plan will specify items such as the following: courses to be taken, skills to be mastered; the proposed thesis topic and area; expectations for attendance at workshops and scientific meetings; a timeline for completion. Any deviation from this plan requires the approval of the Graduate Studies Committee.

**Thesis Advisory Committee**

During their first session in the program, a thesis advisory committee (TAC) is formed for each student. The thesis supervisor chairs the TAC, which consists of at least two members and at most four, including the chair. The TAC is responsible for guiding the student throughout the program, including the comprehensive examination, thesis proposal, and thesis preparation and defence.

**Comprehensive Examination (EPI9998)**

The comprehensive examination consists of two parts, each with a part involving a written exam followed by an oral presentation and defence. Details about the examination are posted on the program website. Students who fail any component of this exam are allowed to repeat it once. A second failure in any component leads to withdrawal from the program.

**Thesis Proposal (EPI 9997)**

The thesis proposal, prepared under the direction of the thesis supervisor, must be defended to the satisfaction of the Thesis Advisory Committee (TAC). In the event of failure, the proposal can be resubmitted and defended the following session at the latest. A second failure leads to withdrawal from the program. The proposal must be successfully completed before submitting it to the Research Ethics Board and before undertaking any independent data collection.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the comprehensive exam, the thesis proposal, the thesis or whose progress is deemed unsatisfactory must withdraw from the program.

**Residence**

All students must complete a minimum of six sessions of full-time registration. In the case of students transferring from the master’s, the residency period is nine full-time sessions from the date of initial registration in the master’s.

**Duration of the Program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of students transferring from the master’s to the doctorate.

**Courses**

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE** (3cr.)

Exploration of principles of effective program evaluation methods; planning; instrument development; data collection, processing and analysis; reporting and follow-up; survey of diverse models of evaluation. **Prerequisite: EDU5190**

**EPI5126 INTRODUCTION TO HEALTHCARE EPIDEMIOLOGY** (3cr.)

Applications of epidemiologic and statistical methods within the healthcare setting; issues specific to infection control; roles and administration of infection control, risk management and quality assurance within healthcare facilities; surveillance mechanisms for nosocomial infections; outbreak investigation methods; infection risks in special populations and settings; prevention and risk management of adverse outcomes; regulatory guidelines and accreditation; emerging issues in infection control.

**EPI5142 HEALTH SERVICES EVALUATION** (3cr.)

The theory and practice of health services evaluation, including specification of objectives, research designs, measures of process and outcome, and practical problems in conducting evaluations. The focus is on scientific (research) evaluation, but other evaluation strategies and techniques are discussed. Lectures and student presentations. **Prerequisite: EPI 5240 or equivalent and permission of the program director.**

**EPI5143 EPIDEMIOLOGICAL RESEARCH USING LARGE DATABASES** (3cr.)

A practical approach to using administrative and other large databases for epidemiological research. Basic and advanced statistical techniques to manipulate, link, and examine datasets; large health surveys; coding systems; data warehouses; data mining; birth and death registries; use of census data; linking postal codes to geographical files; geographical information systems. Extensive use of SAS as the primary application package. **Prerequisite: Permission of the program director.**

**EPI5144 GLOBAL HEALTH EPIDEMIOLOGY AND PRACTICE** (3cr.)
Global burden of illness; epidemiology of major infectious and non-communicable diseases; global environmental health; maternal and child health, global nutrition, one health. Global health practice, research methods, systematic reviews, knowledge translation, communication, ethics, collaboration, funding, sustainability, publication, evaluation, and evidence for global health action.

EPI5145 GLOBALIZATION AND HEALTH EQUITY (3cr.)
Keys to understanding how globalization processes are affecting health. Policy options for creating a fairer and more health equitable globalization. Review of relevant theories from sociology, political science (international relations) and political economy; and of evidence derived from all three disciplines, as well as from public health and epidemiology. Explanatory models for public health practice on a global scale.

EPI5180 INTERNATIONAL HEALTH AND DEVELOPMENT (3cr.)
Presentations and seminars on philosophy of international development, international health and demographics, determinants of health, international health and human rights and humanitarian emergencies, tropical diseases and emerging pathogens, aboriginal health issues, impact of new health technologies on international health, cross cultural communication, management methods for international health. Seminar presentation required. Prerequisite: Permission of the program director.

EPI5181 POPULATION HEALTH RISK ASSESSMENT I (3cr.)
National and international policy frameworks for health risk assessment and management, including determinants of population health; epidemiological, clinical, and toxicological methods for identifying health hazards; population health surveillance; methods of population health risk assessment; regulatory, economic, advisory, and technological approaches to population health risk management; community action and social marketing; selection of risk management strategies; risk perception and risk communication. Lectures and case studies. Preparation of term paper on a current issue in population health risk assessment. Co-requisites: EPI 5240 and EPI 5242 or equivalents. Exclusion: PHR 5181. Prerequisite: Permission of the program director.

EPI5182 SAMPLE SURVEY RESEARCH METHODS (3cr.)

EPI5183 APPROACHES TO COMMUNITY/PUBLIC HEALTH PROGRAM EVALUATION (3cr.)
Critical review and practical application, in collaboration with a health care community partner, of approaches to community and public health program evaluation. Community partners include representatives of the community agencies whose mandate or remit includes evaluation of their community/public health program(s). Evaluation based on student’s ability to (a) identify most appropriate approaches to evaluation, (b) critically review strengths and limitations of chosen approaches, (c) apply the selected approach appropriately to examine and quantify impact of the program(s).

EPI5188 HEALTH TECHNOLOGY ASSESSMENT (3cr.)
Definition and scope of health technology assessment; needs assessment; practice variations; use of administrative databases; evaluation of diagnostic tests; development and use of practice guidelines and clinical prediction rules; health technology assessment in the developing world. Lectures, seminars and case studies. Prerequisite: Permission of the program director.

EPI5189 HEALTH ECONOMIC EVALUATION (3cr.)
Brief overview of economics and health economics; examination of analyses used in epidemiologic and clinical research: cost-effectiveness analysis, cost-minimization analysis, cost-utility analysis (including determination of utilities), cost-benefit analysis, cost of illness studies and use of economic methods in priority-setting. Lectures and seminars. Written report required, presenting an economic evaluation or a detailed review of the economic literature in a particular area. Prerequisite: Permission of the program director.

EPI5210 PUBLIC HEALTH ADMINISTRATION (3cr.)
Introduction to practical aspects of managing a health unit from the viewpoint of a Medical Officer of Health. The organization of public health services, relationships with the Board, leadership and management, budgeting and human resource issues including labour relations. Problem-based approach in a seminar format. Prerequisite: Permission of the program director.

EPI5212 COMMUNICABLE DISEASE EPIDEMIOLOGY (3cr.)
Consideration of the specialized methods used in the investigation and control of communicable disease. Detailed review of the epidemiology of the major communicable diseases. Lectures, presentations by invited experts, and student presentations. Prerequisite: A basic knowledge of epidemiologic methods and permission of the program director.

EPI5213 CHRONIC DISEASE EPIDEMIOLOGY (3cr.)
Review of the descriptive epidemiology (distribution, trends, risk factors) of the major chronic diseases, with emphasis on circulatory diseases, cancer, injuries, and mental health problems. Approaches to primary and secondary prevention. Lectures, presentations by invited experts, and student presentations. Prerequisite: Permission of the program director.

EPI5240 EPIDEMIOLOGY I - INTRODUCTORY EPIDEMIOLOGY (3cr.)
An overview of epidemiology - uses, methods, and data sources. Descriptive and analytical epidemiology. Lectures and assignments in which students will work with data and will gain experience in critically reviewing epidemiologic literature. Prerequisites: EPI 5242 (Biostatistics I) or equivalent; may be taken concurrently with the permission of the program director. Prerequisites: EPI5242 (Biostatistics I) or equivalent; may be taken concurrently. Permission of instructor.

EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
This second level epidemiology course covers major principles of design, analysis, and interpretation of epidemiologic research. Material presented in a quantitative manner. Prerequisites: EPI 5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology); EPI 6276
may be taken concurrently with the permission of the program director. Prerequisites: EPI 5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology).

EPI 5242 BIOSTATISTICS I (3cr.)
Building on the students’ prior background in statistics, this course explores the use of mathematical models in statistical data analysis. Topics include analysis of categorical data, choice of linear vs non-linear models, estimation of parameters, testing of hypotheses by parametric and non-parametric methods, analysis of variance, linear and logistic regression models, introduction to survival analysis. This course may also be offered in French: EPI 5642. Prerequisite: Basic course in Statistics and permission of the program director.

EPI 5243 GUIDED RESEARCH PROJECTS (3cr.)
Practical experience of the application of epidemiologic methods. The student will participate in one or more research projects underway in the Department, and will gain experience in the day-to-day management of the project, in data collection, in data analysis and report preparation.

EPI 5244 SPECIAL TOPICS IN EPIDEMIOLOGY (3cr.)
The content of this seminar course is flexible, covering issues of current debate in communicable and non-communicable disease epidemiology: Presentations by participants and invited experts and seminar discussion. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI 5240 and EPI 5242 and permission of instructor.

EPI 5251 MEASUREMENT IN HEALTH (3cr.)
An overview of measurement theory as applied to health measurement; a review of existing measurements of health status in clinical and research applications, plus practical experience of how to develop and test new measurement methods. Prerequisite: Permission of the program director.

EPI 5271 HEALTH PROMOTION (3cr.)
Origins, theories and techniques of health promotion at the individual and community levels. Examination of current health promotion activities in Canada and elsewhere. Prerequisite: Permission of the program director.

EPI 5281 DEVELOPMENTS IN EPIDEMIOLOGY (3cr.)
Major new developments in epidemiology, conceptualization of research topics and objectives for the thesis. Critical appraisal of current and classical literature in epidemiology. Seminars on current topics. Prerequisite: Permission of the program director.

EPI 5330 VITAL AND HEALTH STATISTICS AND DEMOGRAPHY (3cr.)
Techniques of demography, health and vital statistics with particular reference to health care and epidemiologic research. The Canadian demographic structure and trends, vital registration procedures, calculation and interpretation of vital rates, life table analysis and record linkage. Lectures and exercises. Prerequisite: Permission of the program director.

EPI 5340 EPIDEMIOLOGICAL METHODS (1.5cr.)
Major principles of study design and analysis: validity in epidemiologic studies; precision and statistics in epidemiology studies; confounding; additive and multiplicative interaction; stratified analysis; regression models; regression modeling; bias analysis; analytical strategy. Prerequisites: EPI 5240 and EPI 5242.

EPI 5341 EPIDEMIOLOGICAL APPLICATIONS (1.5cr.)
Interpretation of epidemiologic research and some specific topics: complex survey data analysis; attributable risk, odds ratio and relative risk estimation in multivariate analysis; combined effect of multiple exposures and interaction measures; chronic disease screening and surveillance; environmental epidemiology. Prerequisite: EPI 5330.

EPI 5342 GENETIC EPIDEMIOLOGY (1.5cr.)
Scope of genetic epidemiology, including an overview of types of human genetic variation, approaches to gene discovery vs. gene characterization. Specific issues include: assessment of effect of family history on disease risk; measurement of genetic variation, genotyping errors and factors affecting these; study designs specially adapted to genetic epidemiology – family based designs (e.g. case-parent trio, case-sib designs), case-only designs; candidate gene and genome-wide association approaches to genetic association; gene-environment and gene-gene interaction; Integration of evidence; evaluation of potential value of genetic information in screening (e.g. newborn screening), family history tools and genetic testing. Prerequisite: EPI 5340.

EPI 5343 OUTCOME MEASURES IN HEALTH RESEARCH (1.5cr.)
Technical review of the design requirements for outcome measures in health research and clinical trials; a historical review of the evolution of such measures and a survey of the quality of existing instruments in various fields of health research (disability, quality of life, mental health, pain, etc.). This course is designed for students who will need to use and interpret health measures in their research. Prerequisite: EPI 5340.

EPI 5344 SURVIVAL ANALYSIS IN THE HEALTH SCIENCES (1.5cr.)
Exploration of methods for the analysis of data which includes information about the time when an event occurred. Non-regression methods of analyzing survival data, including actuarial life tables, the Kaplan-Meier method, the log-rank test, and person-time. The hazard curve and its links to incidence rate/density. Proportional hazards regression modelling (Cox modelling) including interpretation of model parameters, model building strategies and assessing the fit of the model. Methods to handle time varying covariates and non-proportional hazards will be discussed. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EPI 5340.

EPI 5345 APPLIED LOGISTIC REGRESSION (1.5cr.)
Foundation of model estimation: maximum likelihood; modeling dichotomous outcome (dependent) variables: logistic regression; logistic models with several independent variables; interpretation of model parameters; model-building strategies; assessing the fit of the model; regression diagnostics. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EPI 5340.
EPI5346 APPLIED LONGITUDINAL AND CLUSTERED DATA ANALYSIS (1.5cr.)
Introduction to longitudinal (repeated measures) and clustered data and overview of regression models for correlated data; linear mixed effects models; modelling the mean; modelling the covariance structure; generalized estimating equations and generalized linear mixed effects models; regression diagnostics; missing data and drop-out; case studies. Classes will include hands-on modeling examples using SAS statistical software.
Prerequisite: EPI5340

EPI5366 MSc SEMINAR
Seminars on topics in Epidemiology delivered by program faculty, visiting speakers and/or students. Compulsory attendance and participation during at least the first year of registration in the program. Graded S/NS (Satisfactory/Not satisfactory).

EPI6126 ADVANCED HEALTHCARE EPIDEMIOLOGY (3cr.)
Exploration of advanced healthcare epidemiology topics including pandemic planning, emergency preparedness, environmental considerations, healthcare surveillance techniques, quality improvement and patient safety initiatives, antimicrobial control programs, blood safety, developing and delivering educational programs, healthcare organization and administration, healthcare epidemiology research design. Lectures, presentations by invited experts, workshops and student presentations. Pre-requisites: EPI 5240, EPI 5126.

EPI678 INTERVENTION STUDIES IN HEALTH RESEARCH (3cr.)
Practical introduction to intervention studies in the health field, including experimental and quasi-experimental studies and clinical and community trials. Question formulation; conduct of literature reviews; design issues (choice of research design and study population, implications for validity of results); ethical issues; instrument development; data collection and management; approach to data analysis; report writing and presentation. Examples drawn from both population and clinical research. Development and presentation of proposal for an intervention study. Prerequisite: Permission of the program director.

EPI6179 COMPUTER APPLICATIONS IN MEDICINE (3cr.)
A laboratory course introducing health researchers to packaged computer programs for data analysis. Applications of these programs to the participants' own research, the organization of large data files and the choice between different types of computers. Prerequisite: Permission of the program director.

EPI6181 SOCIAL ASPECTS OF EPIDEMIOLOGY (3cr.)
This course will analyze the way in which behavioural, social and emotional forces influence patterns of disease. The links between these processes and physiological changes; inferences on how best to intervene to modify "lifestyle" risk factors; recent prevention and health promotion trials will be reviewed. May also be offered in French: EPI 6581. Prerequisite: Permission of the program director.

EPI6182 POPULATION HEALTH RISK ASSESSMENT II (3cr.)
Scientific methods for population health risk assessment; characterization of population health risks, and attendant uncertainties; risk modeling; combining risk information from different sources; risk acceptability; principles of risk management decision making; evidence-based risk management policy development; audit and evaluation of risk interventions; priority setting; case studies on current population health risk assessment issues. Term paper on a current methodological issue in population health risk assessment required Exclusion: PHR 6182. Prerequisites: EPI 5240, EPI 5242, and EPI 5181, or equivalents and permission of the program director.

EPI6188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
Approaches to the systematic review of evidence in the health sciences. Searching for the evidence, selection of studies, quality and validity of included studies, heterogeneity, statistical analysis and other quantitative and qualitative methods. Students will be required to do a meta-analysis on a topic of their own interest. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI 5240 and EPI 5242 and permission of instructor.

EPI6189 CLINICAL DECISION MAKING (3cr.)
Theories of decision making and their validity in health care applications. Comparison of decision support methods: decision analysis, utility assessment techniques, patient aids, practice guidelines, care maps. Methods for developing, evaluating, and disseminating decision support tools in clinical practice. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI 5240 and EPI 5242 and permission of instructor.

EPI6276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
Application of advanced topics in statistical methods for epidemiologic data analysis: logistic regression and discriminant analysis, Poisson regression, contingency table analysis (including log-linear modelling), time series, survival analysis, Cox regression with and without time-dependent covariates, principle components and factor analysis. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI 5242 or equivalent, and EPI 5241 (may be done concurrently), or permission of the professor.

EPI6277 BIOSTATISTICS II (3cr.)
Focus on the statistical analysis of more than one variable and/or more than two groups. Topics covered include the analysis of variance, multiple linear regression and multivariate analysis topics such as the linear discriminant analysis. Statistical analysis relevant to clinical medicine will be discussed in detail with relevant examples from clinical research papers. Prerequisite: EPI 5242 or equivalent and permission of the program director.

EPI6278 ADVANCED CLINICAL TRIALS (3cr.)
Lectures and laboratories on the detailed principles, design, methodology and statistical techniques associated with clinical trials. Emphasis on emerging topics and procedures. Prerequisites: EPI 5242 and EPI 6178 and permission of the program director. Prerequisites: EPI 5242 and EPI 6178 and permission of instructor.

EPI6282 SPECIAL TOPICS IN COMMUNITY MEDICINE (3cr.)
Current Community Health topics will be reviewed. Weekly seminars, written assignments, discussions, research meetings and presentations by
students and invited speakers. Each student must present two seminars. Prerequisite: Permission of the program director.

**EPI6283 PHARMACOEPIDEMIOLOGY (3cr.)**
Issues in and methodology of pharmacoepidemiology. Discussion on the biases and confounders possible at every stage of a pharmacoepidemiological study, in drug utilization review, drug effectiveness, risk/benefit assessment and other topics. This course will normally be given every second year. Prerequisites: EPI 5240 or equivalent and permission of the program director. Prerequisite: EPI5240 or equivalent and permission of instructor.

**EPI6344 CURRENT ISSUES IN EPIDEMIOLOGY (1.5cr.)**
Topics will be selected based on student and faculty interests. Depending on the topics, the course may be given as formal lectures or in seminar format with presentations by participants and invited experts followed by in-class discussion. Prerequisites: EPI 5240 and EPI 5242 or permission of the program director.

**PhD Courses**

**EPI7101 GENETIC EPIDEMIOLOGY (3cr.)**
Application of genetic biological methods to epidemiological research. Covers the development of research hypotheses; genetic determinants and gene-environment interactions; biomarkers for exposure and outcome as well as for predicting prognosis. Students will undertake a course project to design a genetic epidemiological study. Prerequisite: EPI5240 or equivalent.

**EPI7102 DATA ANALYSIS METHODS IN GENETIC EPIDEMIOLOGY (3cr.)**
Data analysis methods in genetic epidemiology and gene identification. Topics include the relationship between design and analysis; genetic models; methods for case-unrelated control studies, case-familial control studies and other familial designs; introduction to frequentist multiple testing and empirical Bayes methods. Focus on applications to genome-wide association studies. Basic approaches in bioinformatics; insights into gene function based on the characterization of three major categories of cellular components (genome, transcriptome and proteome) and their interactions; public molecular databases. Practical lab sessions, both on statistical analysis and integration of discovery with information on gene function (commonly used algorithms; hands-on practice with data retrieval, manipulation and analysis). Prerequisite: EPI5242 or equivalent.

**EPI7103 GENETIC ASSOCIATION STUDIES (3cr.)**
Population-based family studies, case-control and case-family control designs and analysis. Topics include population-based family studies; case-unrelated control design and variants; case-family control designs (including case-parent trios, e.g. maternal versus paternal versus fetal genetic effects; mitochondrial DNA; imprinting); genome-wide association; linkage disequilibrium; genotyping error; imputation; population stratification and methods for its control; genotyping errors; modeling haplotype variation; Hardy-Weinberg equilibrium; replication; selection of participants, rationale for choice of genes and variants; treatment effects in studying quantitative traits; relatedness of participants; reporting of descriptive and outcome data; issues of data volume; joint effects of genes and environmental factors; epistasis; bioinformatics; causal inference. Prerequisite: EPI5242 or equivalent.

**EPI7104 ADVANCED METHODS IN BIOSTATISTICS: ANALYSIS OF VARIANCE (3cr.)**
Exploration of the theoretical foundations of the advanced methods in biostatistics as well as of the practical application and interpretation of these methods. Topics include repeated measures ANOVA; multivariate analysis of variance (MANOVA); split-plot ANOVA (SPANOVA); expected mean squares; randomization theory; estimation of variance using regression; tests of hypotheses for balanced and unbalanced data sets. Prerequisite: EPI5242 or equivalent.

**EPI7105 ADVANCED METHODS IN BIOSTATISTICS: STATISTICAL INFERENCE (3cr.)**
Advanced methods in biostatistics and probability modeling. Sample topics include: Bayesian parameter estimation; construction and use of likelihoods; hypothesis testing; comparison of inference methods using jackknife, bootstrap and normal approximations. Prerequisite: EPI5242 or equivalent.

**EPI7106 QUALITATIVE RESEARCH METHODS IN EPIDEMIOLOGY (3cr.)**
Theoretical frameworks and corresponding methods of qualitative research applied to epidemiological research. Topics will include: theoretical paradigms of qualitative research; matching qualitative research to types of research questions; sampling objectives and procedures; methods of data collection; analysis and interpretation; quality criteria for evaluating qualitative research studies; ethical issues and responsibilities of qualitative researchers. Relationship between qualitative and quantitative research will be explored. Prerequisite: EPI5240 or equivalent.

**EPI7107 DESCRIPTIVE EPIDEMIOLOGY (3cr.)**
Issues of current debate in Descriptive Epidemiology and epidemiological methods. Topics will include methods for studying the distribution of health conditions and their predictors in populations, current issues and principles of disease classification and surveillance, surveillance of prognostic factors, applying principles of demography in epidemiologic research. Prerequisite: EPI5240 or equivalent.

**EPI7108 ANALYTIC EPIDEMIOLOGY (3cr.)**
Issues of current debate in Analytic Epidemiology and epidemiological methods. Topics will include theory and methods in the study of the etiology of health conditions and prognostic factors, current theories of disease causation, application of causal models to epidemiologic questions, implications for study design and analysis, measurement error. Prerequisite: EPI5240 or equivalent.

**EPI7109 CLINICAL AND APPLIED EPIDEMIOLOGY (3cr.)**
Issues of current debate in Clinical and Applied Epidemiology and epidemiological methods. Topics will include clinical health interventions related to individual patient care; research related to the design and delivery of broader health systems and services; current analytical methods and population-based studies;
decision rules; randomized clinical trials; diagnostic tests; interventions that are relevant to public health practice. Prerequisite: EPI5240 or equivalent.

EPI7111 BIOSTATISTICS III (3cr.)
Advanced methods in biostatistics, with emphasis on one or two major methods. Examination of the theoretical foundations of the methods as well as of their practical application and interpretation. Topics include multivariate statistics, longitudinal data analysis, multi-level models, and statistical genetics. Pre-requisite: EPI5242 or equivalent.

EPI7113 SPECIAL TOPICS IN EPIDEMIOLOGY II (3cr.)
Variable topics depending on the interests of students and faculty.

EPI7184 HEALTH POLICY (3cr.)
Exploration of key issues relating to health policy within and outside Canada. Topics covered: rationale for public provision and funding of health care in Canada; historical and current perspectives regarding structure and process of the Canadian health care system; specific micro and macro policy issues relating to health and health care provision (Canadian and international).

EPI7302 OBSERVATIONAL DESIGNS (1.5cr.)
Examination of the case-control method from conceptual, practical and analytical perspectives. Potential biases of different approaches. Role of nested case-control studies. Case-cohort, case-based, case-only and case-crossover designs. Implications of sampling methods for analytical approaches. Analysis of sample data sets, using SAS or STATA. The relationship between quantitative and qualitative research. Prerequisite: EPI5242 or equivalent.

EPI7303 TRANSLATION OF GENETIC DISCOVERIES FROM THE RESEARCH LABORATORY TO THE HEALTH CARE SYSTEM (1.5cr.)
Overview of the process of transferring genetic discoveries into medicine and public health, focusing primarily on chronic diseases. Topics include basic concepts and existing knowledge translational pathways and frameworks. Interdisciplinary approaches to knowledge translation, including clinical trials, guideline development, dissemination research, outcomes research, and health policy research. Using chronic disease examples to illustrate the process, students will learn which elements need to be considered at each step in the translation process. Prerequisite: EPI5240 or equivalent.

EPI7910 ÉTUDES DIRIGÉES EN ÉPIDÉMIologie / DIRECTED STUDIES IN EPIDEMIOLOGY (3cr.)
Étude approfondie d’un sujet d’intérêt particulier pour l’étudiant, sous la direction d’un professeur membre du programme. Préalables : EPI5240 ou l’équivalent et approbation du Comité des études doctorales/Directed Studies on a topic of individual interest to the student under the direction of a faculty supervisor. Students planning to take this course must have the proposed content, learning activities and evaluation methods approved by the Doctoral Studies Committee. Prerequisite: EPI5240 or equivalent.

EPI7912 ÉTUDES DIRIGÉES EN BIOSTATISTIQUE / DIRECTED STUDIES IN BIOSTATISTICS (3cr.)
Étude approfondie d’un sujet en biostatistique d’intérêt particulier pour l’étudiant, sous la direction d’un professeur membre du programme. Préalables : EPI5242 ou l’équivalent et approbation du Comité des études doctorales. / In-depth study on a topic in biostatistics of individual interest to the student under the direction of a faculty member in the program. Prerequisites: EPI5242 or equivalent and permission of the Doctoral Studies Committee.

EPI7913 THÈMES SPÉCIAUX EN ÉPIDÉMIologie / SPECIAL TOPICS IN EPIDEMIOLOGY (3cr.)
Sujets variables selon les intérêts des étudiants et du corps professoral. / Variable topics depending on the interests of students and faculty.

EPI7980 STAGE / INTERNSHIP
Expérience pratique et exécution d'un projet ayant trait à l'évaluation des technologies de la santé dans un organisme de recherche ou une agence d'évaluation des technologies de la santé, sous la supervision d'un membre du corps professoral. Noté S/NS à partir d'un rapport de stage écrit et des résultats du stage. / Practical experience and completion of a project related to HTA in a research organization or an HTA agency, under the supervision of a faculty member. Graded S/NS based on a written report on the project, and on performance during the internship.

EPI7998 Mémoire / Research Paper (6cr.)
Mémoire préparé sous la direction d’un ou deux membres du corps professoral choisis en accord avec la personne responsable des études supérieures. Le mémoire est évalué par le ou les personnes qui l’ont dirigé et un autre membre du corps professoral. Noté : S (satisfaisant) / NS (non satisfaisant). / Research paper prepared under the direction of one or two professors chosen in consultation with the director of graduate studies. The paper is evaluated by the (co-)advisors and another professor. Graded: S (Satisfactory)/NS (Not satisfactory).

EPI7999 THÈSE DE MAÎTRESE EN ÉPIDÉMIologie / Msc THESIS IN EPIDEMIOLOGY

EPI8166 PhD SEMINAR (3cr.)
Presentation of one seminar as well as regular attendance at the departmental seminar series. Offered over two consecutive sessions. Compulsory for all students enrolled in the doctoral program in Epidemiology. Graded S/NS (Satisfactory/Not satisfactory).

MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).
MED8167 PROFESSIONAL SKILLS (3cr.)
Professional skills related to teaching, research ethics, field work, writing, and information technology. Offered over two consecutive sessions. Compulsory for all students enrolled in the doctoral program in Epidemiology. Graded S/NS (Satisfactory/Not satisfactory). Note: Students in other Faculty of Medicine graduate programs may take this course as an additional course (above and beyond their minimum degree requirements). Graded S/NS (Satisfactory/Not satisfactory). Corequisite: MED8166 Professionalism and Professional Skills.

EP1997 PROJET DE THÈSE / THESIS PROPOSAL

EP1998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

EP1999 THÈSE DE DOCTORAT / PhD THESIS

HMGR8106 CLINICAL CYTOGENOMICS (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMGR8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMGR8108 CLINICAL MOLECULAR GENETICS (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

Geography

The objectives of the Department are to foster awareness of the field of Geography, and to add to the body of geographic knowledge and methodology through teaching and research. The Department also endeavors to prepare specialized teachers and researchers to meet the demands of the teaching profession and of various public and private agencies. The Department of Geography offers a master of arts (with thesis), a master of science (with thesis), and a PhD in geography. In certain cases, students may be admitted to the master's in geography on a part-time basis.**

The MA in Geography and MSc in Geography are two programs participating in the collaborative program in environmental sustainability as well as in the collaborative program in Science, Society and Policy (at the master's level only). The department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission Requirements.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Part-time students must normally complete course requirements, except the thesis, within a period of not more than 24 months. For more information consult the department.

Programs

Master of Arts Geography
Master of Arts Geography Specialization in Environmental Sustainability
Master of Arts Geography Specialization in Science, Society and Policy
Master of Geography
Master of Science Geography
Master of Science Geography Specialization in Science, Society and Policy
Master of Science in Geography Specialization in Environmental Sustainability
Doctorate in Philosophy Geography
Doctorate in Philosophy Geography Specialization in Canadian Studies
Admission

Students must meet the admission requirements outlined in the general regulations of the FGPS, as well as the specific requirements of the department.

Students may be admitted to the PhD program on the basis of a master’s degree or its equivalent in geography or a related discipline, with an academic record indicating at least a (B+) average or the equivalent.

The FGPS requires that these students spend at least six sessions of full-time registration at the University. For a definition of full-time registration, please see Section C - Registration of the general regulations of the FGPS.

Additional Coursework

The Admissions Committee may, depending on the candidates' background, require them to successfully complete additional courses, including language courses, beyond the basic MA degree requirements.

Application deadline

To find the application deadline, please check the “program-specific requirements” under Application Procedures and Information at the following address: www.grad.uOttawa.ca/apply.

Transfer from master’s to PhD

Students registered in the MA or MSc program in geography at the University of Ottawa who have obtained excellent results may be admitted into the PhD program without completing a master's thesis. To take advantage of this option, they must meet, in sequence, the following conditions: a) obtain a minimum average of A- in three master's courses, b) have the department's approval and c) successfully complete GEG7906 Directed Research and d) satisfactory progress in the research program. The course GEG7906 will provide six credits that may be used toward the fulfillment of the PhD course requirements, thus leaving one three-credit course to be completed. Please note that the minimal admission average requirements for the doctoral program must also be met.

Collaborative programs

The Department of Geography is one of the participating units in the collaborative programs in Canadian Studies (PhD level only) and in Science, Society and Policy (master’s level only). Students should indicate in their initial application for admission that they wish to be accepted into one of the collaborative programs. For further details, see the description of these programs posted on the FGPS website.

Additional information

For additional information refer to the following website:

http://www.geography.uottawa.ca/PDF/Form_geography.pdf

Program Requirements

Degree requirements

The requirements of this program are as follows:

* Nine credits in geography from courses at the 5000-level or higher. A maximum of three credits can be replaced by three other credits approved by the Department of Geography and by the Faculty of Graduate and Postdoctoral Studies.
* GEG9998 Comprehensive Examination
* GEG9001 Preparation and Presentation of PhD Thesis Project (6cr.)
* GEG9999 PhD Thesis
* Second Language Proficiency Test

The requirements for the second official language of Canada are the same as those specified for the Master of Arts (see Degree Requirements - Master of Arts).

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) must withdraw from the program.

Residence
As per FGPS regulations, all students must complete a minimum of six sessions of full-time registration at the beginning of the program. All requests for non-consecutive full-time study sessions will need to be approved by the FGPS. The program is intended for full-time students.

In the case of transfer to the PhD from the master’s, the residency period is nine full-time sessions from the time of initial registration in the master’s program.

**Duration of program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Medicine. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

**Courses**

Courses with 51XX and 55XX codes are reserved for students enrolled in the MA or PhD programs.

Courses with 53XX and 57XX codes are reserved for students enrolled in the MSc or PhD programs.

Courses at the 6000-level are available for all graduate students in geography.

Courses at the 7000-level are reserved for students enrolled in the MA and MSc programs.

Courses at the 8000- or 9000-levels are reserved for students enrolled in the PhD program.

**GEG5105 SELECTED TOPICS IN HUMAN GEOGRAPHY (3cr.)**
In-depth examination of a question or topic linked to new trends or research areas in human geography.

**GEG5109 PLACE AND SOCIAL TRANSFORMATIONS (3cr.)**
Interplay between social and spatial transformations and its implications for meanings and representations from global to local scales.

**GEG5310 SELECTED TOPICS IN PHYSICAL GEOGRAPHY (3cr.)**

**GEG5311 ENVIRONMENTAL CHANGE IN COLD REGIONS (3cr.)**
Dynamics of cold environments with particular emphasis on their sensitivity to climate variability and climate change, natural and anthropogenically induced.

**GEG5510 ESPACES ET LIEUX ENTRE SOCIÉTÉ ET CULTURE (3cr.)**
Espaces de référence, lieux d’appartenance et territoire dans le contexte des mutations sociales contemporaines et de la fragmentation des identités culturelles.

**GEG5707 MILIEUX NORDIQUES (3cr.)**
Les milieux glaciaires ou périglaciaires, anciens ou actuels. Approches géomorphologique, hydrologique et paléobotanique.

**GEG6101 DATA ANALYSIS AND MODELLING (3cr.)**
Techniques of analysis of empirical data: quantitative, semi-quantitative and qualitative. Multivariate and time-series data analysis.

**GEG6102 ADVANCED GEOMATICS (3cr.)**
Concepts and themes in advanced geomatics: geographical information systems, computer cartography and remote sensing.

**GEG6103 SPATIAL DATA ANALYSIS (3cr.)**
Visualisation and analysis of spatial data: point-pattern analysis, spatial interpolation and estimation, spatial autocorrelation. Analysis of spatial interaction and spatio-temporal dynamics.

**GEG7906 RECHERCHE DIRIGÉE / DIRECTED RESEARCH (6cr.)**
Recherche dirigée pendant une session, évaluée par trois membres de la Faculté des études supérieures et postdoctorales. L’inscription à temps plein est obligatoire. La note donnée sera (S) satisfaisant ou (NS) non satisfaisant. N.B. Inscription limitée aux étudiants désirant transférer de la maîtrise au doctorat. / One session of directed research, evaluated by three members of the Faculty of Graduate and Postdoctoral Studies. The student must be enrolled full-time for this session. The course will be graded (S) satisfactory or (NS) not satisfactory. NOTE: Restricted to
students intending to transfer from master's to PhD.

GEG7910 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)

GEG7996 ÉLABORATION ET PRÉSENTATION DU PROJET DE THÈSE DE MAÎTRISE ÉS SCIENCES/PREPARATION AND PRESENTATION OF THE Msc THESIS PROJECT (3cr.)
Le projet de recherche doit normalement s'inscrire dans un champ d'études reconnu par le CRSNG. / The research project must normally be in a research field recognized by NSERC.

GEG7998 ÉLABORATION ET PRÉSENTATION DU PROJET DE THÈSE DE MAÎTRISE ÉS ARTS/PREPARATION AND PRESENTATION OF THE MA THESIS PROJECT (3cr.)
Le projet de recherche doit normalement s'inscrire dans un champ d'études reconnu par le CRSHC. / The research project must normally be in a research field recognized by SSRHC.

GEG7999 THÈSE DE MAÎTRISE/MASTER'S THESIS

GEG8900 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)

GEG9001 ÉLABORATION ET PRÉSENTATION DU PROJET DE THÈSE DE DOCTORAT / PREPARATION AND PRESENTATION OF PhD THESIS PROJECT (6cr.)

GEG9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

GEG9999 THÈSE DE DOCTORAT / PhD THESIS

Ottawa-Carleton Geoscience Centre
GEO5133 (GEOL 5303) ADVANCED MICROPALAEONTOLOGY
Selected topics in micropalaeontology covered in greater detail than in introductory micropalaeontology. Areas addressed include the paleoecology, biogeography and biology of foraminifera and other microfossil groups, as well as their application to biostratigraphy and paleo-oceanography.

GEO5139 (GEOL 5309) GLACIAL AND PERIGLACIAL GEOLOGY (3cr.)
An examination of various sedimentary environments associated with glacial and periglacial processes and their significance for mineral exploration and environmental geochemistry. Study of cold climate non-glacial conditions and the development of permafrost and permafrost-related features, including the effect of groundwater flow on permafrost distribution.

GEO5140 (GEOL 5400) PLEISTOCENE PERMAFROST AND PERIGLACIAL ENVIRONMENTS
An examination of the stratigraphical evidence for cold, non-glacial conditions during the Pleistocene when extensive areas of mid-latitude were exposed to intense frost action and permafrost. Pleistocene periglacial sediments and sedimentary structures indicative of past permafrost are considered.

GEO5141 (GEOL 5401) PERMAFROST HYDROLOGY AND INVESTIGATIVE METHODS
An examination of groundwater flow in permafrost regions. The importance of groundwater in the formation of various types of ground ice, and the effect of groundwater flow on permafrost distribution.

GEO5142 (GEOL 5402) ENVIRONMENTAL GEOSCIENCE (3cr.)
A study-seminar course in which students will examine, in depth, certain environmental problems, including geological hazards, mineral and energy consumption and environmental degradation. The relation between development and the environment will be considered. Students will prepare a report and present a seminar on a subject of their choice, and will participate in a research project centered in the Ottawa area.

GEO5143 (GEOL 5403) ENVIRONMENTAL ISOTOPES AND GROUNDWATER GEOCHEMISTRY (3cr.)
Stable environmental isotopes (18O, 2H, 13C, 34S, 15N) in studies of groundwater origin and flow, and geothermal studies. Groundwater dating techniques involving tritium and radiocarbon, and exotic radioisotopes (e.g. 36Cl, 39Ar, 85Kr). Low temperature aqueous geochemistry and mineral solubility with emphasis on the carbonate system. Some applications to paleoclimatology will be discussed. Prerequisite: Fourth-year Hydrogeology (67.420 or GEO 4342) or equivalent.

History

The Department of History offers the degrees of Master of arts (with or without thesis) and doctor of philosophy in history. Within the limits imposed by the availability of qualified staff, students may pursue their studies in English or in French.
At the master’s level students undertake research in diverse areas corresponding to the expertise and interests of faculty members. The program includes a co-op option at the master’s.

The Department participates in the collaborative programs in Women’s Studies and in Medieval and Renaissance Studies at the master’s level, allowing students to specialize in one of these areas. For further details, please consult the "Admission" section of the master program.

At the doctoral level, the department has five areas of strength:

- Canada and North America
- Europe
- Women, Gender and the Family
- Empire, Colonization and Decolonization
- War, Conflict and Diplomacy.

Candidates may be accepted in other areas depending upon the availability of qualified supervisors.

The department participates in the collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission Requirements.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

## Programs

Master of Arts History

Master of Arts History Specialization in Medieval and Renaissance Studies

Master of Arts History Specialization in Women’s Studies

Doctorate in Philosophy History

Doctorate in Philosophy History Specialization in Canadian Studies

## Admission

Students must have an MA in history (or the equivalent) with a minimum average of 75 per cent (B+) before they can be considered for admission. The department may require a written or oral entrance examination.

## Advisers

On admission, students are assigned an adviser to assist in the choice of courses and fields.

## Collaborative programs

The Department of History is a participating unit in the collaborative program in Canadian Studies at the PhD level. This program has been established for students wishing to enrich their training by including an interdisciplinary component in Canadian Studies. For further details, see the description of this program posted on the FGPS website.

## Language requirements

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

## Program Requirements

Students satisfy the academic requirements of the doctoral degree by:

- the successful completion of the Doctoral Research Seminar (HIS 8900) (3 cr.)
- the successful completion of three fields (9 cr.)
the successful completion of an oral examination (HIS 9998), covering the candidate's three fields; and
the successful completion and defence of a doctoral thesis (HIS 9999).

Each doctoral field entails independent reading and written work under the guidance of a director. An outline of the work to be undertaken in each field must be approved by the relevant field director and submitted for approval to the graduate studies committee before the end of the student's first session of registration in the program. The field director is responsible for monitoring the student's progress and for grading the student's written work and overall performance. Students may not enrol in any doctoral field for more than four sessions.

The oral examination, combining all three doctoral fields, is held before a jury presided over by the chairperson of the departmental graduate studies committee, or his representative. Students are required to take the oral examination by the end of their fourth session.

The research, writing and defence of the thesis generally require two full years after the oral examination. The thesis must be an original contribution to historical knowledge. It should be 250-350 pages in length excluding notes and bibliography and appendices. It must be defended before a jury normally composed of four examiners, three of whom are members of the Faculty of Graduate and Postdoctoral Studies at the University of Ottawa and one of whom is from outside the University.

Transfer from master's to PhD

However, applicants with an 80 per cent (A-) average in the honours BA may also be accepted after completion of the course work of the non-thesis master's program, provided they have performed at the same level in their master's courses. Please note that the minimal admission average requirements for the doctoral program must also be met. The department may require a written or oral entrance examination.

Language requirements

Students in both the master’s and doctoral programs must understand, speak and write either English or French fluently. In addition, students in both programs must demonstrate their reading competence in Canada's other official language, French or English, at the earliest opportunity, by passing a language examination administered by the department in the fall or winter session. To this end, registration in HIS 5599 is compulsory.

Students who take a graduate course in history in the other language may be exempted from this examination, given a favourable report from the professor concerned.

Students working in a field of history where a language other than English or French is necessary may also be required to demonstrate their grasp of that language.

Collaborative Program in Canadian Studies

The Department of History is a participating unit in the collaborative program in Canadian Studies at the doctoral level. This program has been established for students wishing to enrich their training in history by including an interdisciplinary component in Canadian Studies. In addition to the 12 credits required for the PhD program in History, the collaborative program requires completion of either CDN 6910 Seminar in Canadian Studies or CDN 6520 Séminaire sur la Francophonie canadienne.

To be admitted to the collaborative program, students must have successfully completed at least one graduate course in history with Canadian content. The mention "Specialization in Canadian Studies" will be added to the diploma of students who pass the CDN 6910 or CDN 6520 seminar and successfully defend a thesis on a Canadian topic in history.

For further details, please consult the collaborative program in Canadian Studies website of the Faculty of Graduate and Postdoctoral Studies.

Duration of program

The Department of History is a participating unit in the collaborative program in Canadian Studies at the doctoral level. This program has been established for students wishing to enrich their training in history by including an interdisciplinary component in Canadian Studies. In addition to the 12 credits required for the PhD program in History, the collaborative program requires completion of either CDN 6910 Seminar in Canadian Studies or CDN 6520 Séminaire sur la Francophonie canadienne.

Students are expected to fulfill all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

Residence

Students must register full-time for at least six sessions at the beginning of their program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

Courses

Up to six credits in 9000-level fields may be counted towards the master's program course requirements. HIS 5122 or HIS 5522 is obligatory.
Students in the master’s program may take, at the discretion of the departmental graduate studies committee, one three-credit directed studies course (either HIS 7399 Directed Studies in History or HIS 7799 Études dirigées en histoire).

Master's students may also take, with the approval of the departmental graduate studies committee, three credits from among fourth-year seminars.

All of the 5000-, 6000- and 7000-level courses listed below are for three credits each (except for HIS 5199, 5599, 6999 and 7999). They are not necessarily offered every year.

Students should check with the Department or the departmental Web site for annual course offerings.

HIS5103 SEMINAR IN CANADIAN HISTORY (3cr.)

HIS5111 SEMINAR IN NEW FRANCE (3cr.)

HIS5122 RESEARCH SEMINAR (3cr.)

HIS5125 SEMINAR ON HISTORY OF QUEBEC (3cr.)

HIS5129 SEMINAR ON BRITISH NORTH AMERICA (3cr.)

HIS5199 ENGLISH LANGUAGE REQUIREMENT IN HISTORY

HIS6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)
Experience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. Préalable: permission du Bureau coop. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Prerequisite: Permission of the co-op office.

HIS6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)
Experience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. Préalable: HIS6001. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Prerequisite: HIS6001.

HIS6103 SEMINAR ON AMERICAN HISTORY (3cr.)

HIS6332 SEMINAR ON THE HISTORY OF TECHNOLOGY (3cr.)

HIS6334 HISTORY OF FRANCOPHONES IN NORTH AMERICA, OUTSIDE OF QUEBEC (3cr.)

HIS6336 SEMINAR ON IMMIGRANTS AND ETHNIC GROUPS IN NORTH AMERICA (3cr.)

HIS6336 SÉMINAIRE EN HISTOIRE DES IMMIGRANTS ET DES COMMUNAUTÉS ETHNO-CULTURELLES EN AMÉRIQUE DU NORD (3cr.)

HIS6999 MÉMOIRE DE MAÎTRISE / MA RESEARCH PAPER

HIS7103 SEMINAR IN EUROPEAN HISTORY (3cr.)

HIS7304 SEMINAR ON MEDIEVAL HISTORY (3cr.)

HIS7330 SEMINAR ON COMPARATIVE HISTORY (3cr.)

HIS7331 SEMINAR ON THE HISTORY OF WOMEN AND GENDER (3cr.)
HIS7333 SEMINAR ON INTERNATIONAL RELATIONS (3cr.)

HIS7335 SEMINAR ON WAR AND SOCIETY (3cr.)

HIS7336 SLOVAKS IN EUROPE, CANADA AND THE UNITED STATES SINCE 1870 (3cr.)

HIS7337 SEMINAR ON HISTORY OF MEDICINE (3cr.)

HIS7338 SEMINAR ON THE HISTORY OF COLONIALISM AND POSTCOLONIALISM (3cr.)
In-depth examination of issues relating to the history of colonialism and postcolonialism.

HIS7399 DIRECTED STUDIES IN HISTORY (3cr.)

HIS7504 SÉMINAIRE EN HISTOIRE MÉDIÉVALE (3cr.)

HIS7530 SÉMINAIRE EN HISTOIRE COMPARÉE (3cr.)

HIS7535 SÉMINAIRE SUR LA GUERRE ET LA SOCIÉTÉ (3cr.)

HIS7705 MÉTHODES DE RECHERCHE EN HISTOIRE (3cr.)

HIS7999 THÈSE DE MAÎTRISE / MA THESIS

HIS8900 SÉMINAIRE DE RECHERCHE DOCTORALE/ DOCTORAL RESEARCH SEMINAR (3cr.)
Séminaire sur des sujets se rapportant aux débats historiographiques et aux méthodologies de recherche en histoire. / Seminar on topics relating to the historiographical debates and research methodologies in history.

All the 9900-level doctoral fields listed below are for three credits (except HIS 9998 and 9999). Subject to availability of professors, students are responsible for determining their fields and field directors. The language of instruction is decided on mutually between the student and the professor.

HIS9901 LE CANADA FRANÇAIS / FRENCH CANADA (3cr.)

HIS9902 L’AMÉRIQUE COLONIALE / COLONIAL AMERICA (3cr.)

HIS9903 L’AMÉRIQUE BRITANNIQUE DU NORD JUSQU’À 1873 / BRITISH NORTH AMERICA TO 1873 (3cr.)

HIS9904 LE CANADA APRÈS LA CONFÉDÉRATION / POST-CONFEDERATION CANADA (3cr.)

HIS9905 LA NOUVELLE-FRANCE / NEW FRANCE (3cr.)

HIS9910 QUÉBEC / QUEBEC (3cr.)

HIS9920 L’AMÉRIQUE LATINE / LATIN AMERICA (3cr.)

HIS9930 HISTOIRE DE L’ASIE / ASIAN HISTORY (3cr.)

HIS9940 HISTOIRE DU MOYEN-ORIENT ET DE L’AFRIQUE DU NORD / MIDDLE EASTERN AND NORTH AFRICAN HISTORY (3cr.)

HIS9950 HISTOIRE DE L’AFRIQUE / HISTORY OF AFRICA (3cr.)
HIS9954 HISTOIRE DES ÉTATS-UNIS / U.S. HISTORY (3cr.)

HIS9980 HISTOIRE ÉCONOMIQUE / ECONOMIC HISTORY (3cr.)

HIS9981 HISTOIRE SOCIO-Culturelle / SOCIO-CULTURAL HISTORY (3cr.)

HIS9982 HISTOIRE INTELLECTUELLE / INTELLECTUAL HISTORY (3cr.)

HIS9983 HISTOIRE POLITIQUE / POLITICAL HISTORY (3cr.)

HIS9984 RELATIONS INTERNATIONALES / INTERNATIONAL RELATIONS (3cr.)

HIS9985 HISTOIRE DE LA MÉDECINE, DES TECHNIQUES ET DES SCIENCES / HISTORY OF MEDICINE, TECHNOLOGY AND SCIENCES (3cr.)

HIS9986 HISTOIRE DES AUTOCHTONES DU CANADA / HISTORY OF CANADA'S NATIVE PEOPLES (3cr.)

HIS9987 HISTOIRE DES IMMIGRANTS ET DES COMMUNAUTÉS ETHNO-Culturelles EN AMÉRIQUE DU NORD / HISTORY OF IMMIGRANTS AND ETHNIC GROUPS IN NORTH AMERICA (3cr.)

HIS9988 HISTOIRE DES FEMMES / HISTORY OF WOMEN (3cr.)

HIS9989 HISTOIRE MILITAIRE ET DIPLOMATIQUE / MILITARY AND DIPLOMATIC HISTORY (3cr.)

HIS9990 L'EUROPE MÉDIÉVALE / MEDIEVAL EUROPE (3cr.)

HIS9991 L'EUROPE MODERNE / EARLY MODERN EUROPE (3cr.)

HIS9992 LA GRANDE-BRETAGNE / GREAT BRITAIN (3cr.)

HIS9993 L'EUROPE DES 19e ET 20e SIÈCLES / 19th AND 20th CENTURY EUROPE (3cr.)

HIS9994 LA FRANCE DEPUIS LA RÉVOLUTION / FRANCE SINCE THE REVOLUTION (3cr.)

HIS9995 LA FRANCE DE L'ANCIEN RÉGIME / FRANCE OF THE ANCIEN RÉGIME (3cr.)

HIS9998 EXAMEN ORAL DU DOCTORAT / DOCTORAL ORAL EXAMINATION

HIS9999 THÈSE DE DOCTORAT / PhD THESIS

**Human and Molecular Genetics (Collaborative)**

The Faculty of Medicine offers a collaborative program in Human and Molecular Genetics at the master's and doctoral levels. The primary graduate programs in Biochemistry (BCH), Cellular and Molecular Medicine (CMM) and Neuroscience (NSC) collaborate in offering the specialization. The degree awarded specifies the primary program and indicates "specialization in Human and Molecular Genetics."

Students must meet the admission and curriculum requirements of their primary program as well as the specific requirements of the collaborative program.
Members of the program include scientists with interest and expertise in the following areas: developmental genetics, neuromuscular disease, microbial genetics, host resistance, cancer biology, aging, development of novel molecular therapeutics, gene therapy, growth and development, auto-immune diseases, molecular biology of viruses, bacteria and parasites, genetic epidemiology, retinal development and disease, animal models of human disease, molecular aspects of signal transduction.

The doctoral-level program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in their primary program with a specialization in Human and Molecular Genetics and an MD. For more information please see the website of the Faculty of Medicine.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Biochemistry Specialization in Human and Molecular Genetics
Master of Science Cellular and Molecular Medicine Specialization in Human and Molecular Genetics
Master of Science Neuroscience Specialization in Human and Molecular Genetics
Doctorate in Philosophy Biochemistry Specialization in Human and Molecular Genetics
Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Human and Molecular Genetics
Doctorate in Philosophy Neuroscience Specialization in Human and Molecular Genetics

Admission

Candidates are admitted through the master’s or doctoral program either in biochemistry (BCH) or cellular and molecular medicine (CMM) or neuroscience (NSC) and must therefore meet the admission requirements of those programs. Transfer from master’s to doctoral level without completing a master’s thesis is permitted in the collaborative program under the same conditions as in the primary programs. Proficiency in English is required. Candidates should indicate in their initial application for admission into the primary program that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students will normally be informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program.

Transfer from Master’s to PhD Program

Following transfer, all the requirements of the HMG doctoral program must be met: six credits of courses including three HMG credits, the seminar in the primary program, comprehensive exam, presentation of one research seminar, and the thesis.

Program Requirements

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

- Six credits of courses, three credits of which must be from the student's primary program and three of which must be HMG credits.
- Enrolment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Comprehensive examination as required by the primary program.
- Presentation of one research seminar to the primary program prior to thesis submission.
- Presentation and successful defence of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Course selection is subject to the approval of the HMG program director.

Comprehensive examination

The examination is subject to the regulations in place for the student’s primary program.

Residence

As per FGPS regulations, all students must complete a minimum of six sessions of full-time registration at the beginning of the program. All
requests for non-consecutive full-time study sessions will need to be approved by the FGPS. The program is intended for full-time students.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

**Courses**

**HMG8103 ADVANCED TOPICS IN THE MOLECULAR BIOLOGY OF HUMAN DISEASES I (3cr.)**
Topics will be selected and representative of current developments in the field. The course consists of a repeated series of a 3 hour lecture by an expert in the field one week, followed by student presentations, discussions and critique of assigned papers on that topic the following week. Topics on selected diseases will focus on various aspects of cancer, apoptosis, disease gene identification and gene therapy. In the past these topics have included the molecular aspects of various cancers, spinal muscular atrophy, tissue regeneration, the discovery of disease genes, infectious disease (HIV) and gene therapy. Students will write a grant proposal and participate in mock grant review panels. Depending on enrolment, the course may be limited to HMG students only. Prerequisite: Permission of the HMG program director.

**HMG8105 ADVANCED TOPICS IN THE MOLECULAR BIOLOGY OF HUMAN DISEASES II (3cr.)**
Topics will be selected and representative of current developments in the field. The course consists of a repeated series of a 3 hour lecture by an expert in the field one week, followed by student presentations, discussions and critique of assigned papers on that topic the following week. Topics on selected diseases will focus on various aspects of cancer, apoptosis, disease gene identification and gene therapy. In the past these topics have included the molecular aspects of various cancers, spinal muscular atrophy, tissue regeneration, the discovery of disease genes, infectious disease (HIV) and gene therapy. Students will write a grant proposal and participate in mock grant review panels. Depending on enrolment, the course may be limited to HMG students only. Prerequisite: Permission of the HMG program director.

**HMG8106 CLINICAL CYTOGENOMICS (3cr.)**
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

**HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)**
Presentation of the biomechanical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

**HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)**
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

**HMG8600 SPECIAL TOPICS IN HUMAN AND MOLECULAR GENETICS (3cr.)**
Current topics in molecular genetics, developmental genetics, cancer genetics, neurogenetics, population genetics, clinical genetics and other areas depending on available expertise and interest expressed. Offered alternate years subject to sufficient demand. Prerequisite: Permission of the course coordinator.

**Human Kinetics**

The School of Human Kinetics (SHK), located within the Faculty of Health Sciences, offers a Master of Arts degree (MA), a Master of Science degree (MSc), a Master of Human Kinetics (MHK) and a Doctor of Philosophy degree (PhD) in human kinetics. The MSc program and the MA program both require a thesis. The Master of Human Kinetics is a course based program, offering two concentrations, one in sport management and the other in intervention and consultation. An integrated approach to the study of sport, physical activity and health allows students and professors to share research interests and professional expertise, and to contribute to the broad field of human kinetics.

The programs are offered on a full-time or on a part-time basis in French and in English. In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English. The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Master's program**

The MA and MSc programs pursue three major objectives:

- To contribute to the accumulation of facts and scientific data related to sport, physical activity and health, as well as to foster the development of critical thinking skills and problem solving abilities.
- To facilitate the acquisition of quantitative and qualitative knowledge in the field of biophysical sciences of sport, physical activity and health.
- To prepare human kinetics specialists so that they are better able to play a determinant role in Canadian society.
Theses may pertain to either of two general areas of specialization:

- MA: the focus is on sociocultural, psychosocial and administrative sciences (e.g., psychology, sociology, administration, intervention) as they relate to sport, physical activity and health.
- MSc: the focus is on biophysical sciences (e.g., biomechanics, physiology, psychomotor) as they relate to sport, physical activity and health.

The MHK program is an applied studies program that prepares students either in Sport Management or in Intervention and consultation. The program is course-based with an emphasis on a supervised internship that seeks to enhance the personal, academic and career development of students. Academic goals include developing such cognitive skills as problem solving, critical thinking, analysis and synthesis and, most importantly, relating theory to practice.

The department participates in a collaborative program in Women's Studies at the MA level. For more information on this program, see the collaborative program in Women's Studies.

**Doctoral program**

The PhD program involves two fields of research:

- Psychosocial sciences of sport, physical activity and health: This field involves studying sport, physical activity, and health from psychological, pedagogical, administrative, and/or socio-cultural perspectives.
- Biophysical sciences of sport, physical activity and health: This field includes biomechanics, physiology and metabolism, and neuro-psychomotor sciences as they relate to sport, physical activity, and health.

The department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission Requirements.”

**Programs**

**Master of Arts Human Kinetics**

**Master of Arts Human Kinetics Specialization in Women's Studies**

**Master of Human Kinetics Concentration in Intervention and Consultation**

**Master of Human Kinetics Concentration in Sport Management**

**Master of Science Human Kinetics**

**Doctorate in Philosophy Human Kinetics**

**Doctorate in Philosophy Human Kinetics Specialization in Canadian Studies**

**Admission**

Admission to the PhD program in the human kinetics is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). Applicants must have a master’s degree in Human Kinetics or a related discipline with a minimum average of 75% (B+) calculated in accordance with FGPS guidelines. Proficiency in either English or French is required. Applicants whose first language is neither English nor French should provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the admission section of the general regulations of the FGPS.

Applications will be evaluated based on the following criteria:

- Academic performance in previous studies;
- Letters of recommendation (3);
- Statement of purpose;
- Identification of a professor (member of the FGPS) who is willing and available to act as thesis supervisor.

**Transfer from master’s to PhD**

Students in the human kinetics master’s program who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Completion of 5 graduate courses (15 credits) with a grade of A- or better in each;
- Satisfactory progress in the research program;
- Written recommendation from the supervisor and the thesis advisory committee;
- Approval by the graduate studies committee.
The transfer must take place within sixteen months of initial registration in the master’s.

**Collaborative programs**

The School of Human Kinetics is a participating unit in the Collaborative Program in Canadian Studies at the PhD level. This program has been established for students wishing to enrich their training in human kinetics by including an interdisciplinary component in Canadian Studies. Students must pass the Canadian Studies Seminar (CDN 6910 or CDN 6520) in addition to the six credits of course required for the PhD in human kinetics.

To be admitted to the Canadian Studies specialization, students must be registered in or have successfully completed at least one graduate course in human kinetics with Canadian content. The designation “Specialization in Canadian Studies” will be added to the diploma of students who pass the Canadian Studies Seminar (CDN 6910 or CDN 6520) and successfully defend a thesis on a Canadian topic in human kinetics.

For further details, see the description of this program posted on the FGPS website.

The program is offered on a full-time basis, in French and in English. In accordance with the University of Ottawa regulation, students have the right to produce their work, their thesis, and to answer examination questions in French or in English.

**Program Requirements**

The PhD program in human kinetics requires successful completion of the following: a minimum of 6 credits and a maximum of 18 credits of coursework, with at least 3 credits from 7000-level courses among APA7301/7701, APA7302/7702, APA7304/7704, APA7305/7705; a comprehensive examination; a thesis proposal; and a thesis. The type and amount of coursework depends on the student’s background (research experience and skills) and chosen field of research. Each student’s course selection must be approved by the School of Human Kinetics’ Assistant Director of Graduate Studies.

**Transfer from master’s to PhD**

The transfer must take place within sixteen months of initial registration in the master’s. Following transfer, all the requirements of the doctoral program must be met as specified above.

**Residence**

All full-time students must complete a minimum of six sessions of full-time registration. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the initial registration in the program.

**Duration of program**

Students are expected to fulfill all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, the comprehensive exam or whose progress is deemed unsatisfactory must withdraw from the program.

**Thesis Advisory Committee**

During their first session in the program, a thesis advisory committee (TAC) is formed for each student. The thesis supervisor chairs the TAC, which consists of at least three members, including the chair. The majority of committee members must be from the University of Ottawa and at least two members besides the supervisor must be from the School of Human Kinetics. The TAC is responsible for guiding the student throughout the program, including the comprehensive examination, thesis proposal, and thesis defence.

**Courses**

**APA5303** MARKETING AND SPONSORSHIP OF SPORT AND PHYSICAL ACTIVITY (3cr.)

Study of the literature and research pertaining to the marketing and sponsorship of sport and physical activity programs and events. Strategic planning, fundraising, and event management for various types of organizations.

**APA5305** POLICY ANALYSIS OF SPORT AND PHYSICAL ACTIVITY IN CANADA (3cr.)

Critical examination of the role of government in policy development. An analysis of sport and physical activity policies as related to amateur and professional sport organizations in Canada as well other organizations involved in sport and physical activity in the public and private sectors.

**APA5306** ETHICS AND VALUES IN SPORT AND PHYSICAL ACTIVITY (3cr.)
Critical examination of professionals' and volunteers' decision-making in the context of sport and physical activity. Discussion of concepts and theories to encourage and cultivate critical, reflective, and ethically-based thinking about the cases examined.

**APA5307 LEGAL ISSUES AND RISK MANAGEMENT IN SPORT** *(3cr.)*  
Study of legal aspects of sport including an introduction to law and the Canadian constitution (e.g., legislation relating to criminal and civil liability for injuries and the duties of managers, civil rights of athletes in selection and disciplinary procedures, human rights issues). Contractual obligations, responsibilities and principles of risk management in sport.

**APA5308 ORGANIZATIONAL BEHAVIOUR IN SPORT AND PHYSICAL ACTIVITY** *(3cr.)*  
Study of organizational behavior in sport and physical activity organizations. Discussion of topics such as effective interpersonal communication, goal setting, group dynamics, team building, diversity, leadership, group renewal processes, gender differences in the workplace, power dynamics, and conflict management.

**APA5311 ANALYSIS AND ENHANCEMENT OF INTERVENTIONS IN SPORT, PHYSICAL ACTIVITY AND HEALTH SETTINGS** *(3cr.)*  
Critical behaviour analysis of practitioners and clients in various sport, physical activity, and health contexts. Presentation of plans to enhance learning situations. Discussion of concepts of clinical supervision, self-supervision and peer-supervision. Experimentation with various observational tools. **Prerequisite:** APA5107, APA5926, APA6905.

**APA5318 FINANCIAL MANAGEMENT OF SPORT AND PHYSICAL ACTIVITY** *(3cr.)*  
Financial management concepts and tools applied to sport and physical activity programs. Topics include: public and private sector funding, accounting and budgeting, economic impact studies, feasibility studies, resource acquisition strategies, public private partnerships, forms of ownership and event management.

**APA5319 SEMINAR: INTERVENTION AND CONSULTATION** *(3cr.)*  
Critical analysis of current interventions and related issues in sport, physical activity, and health. Discussion of applied consultations. Preparation for the internship. Graded (S) satisfactory / (NS) not satisfactory.

**APA5404 SPORT AND PHYSICAL ACTIVITY IN CANADIAN LIFE** *(3cr.)*  
Sociological analysis of sport and physical activity. Socio-historical determinants of sport and physical activity. Emphasis on the organizational structure of sport and physical activity, ideologies, and current practices. Different themes may also be examined: sociology of sport organizations, social movements, and social problems.

**APA5405 ORGANIZATIONAL THEORY IN SPORT AND PHYSICAL ACTIVITY** *(3cr.)*  
Interpretation of organizational theory in the context of sport and physical activity environments. Focus on the study of Canadian amateur and professional sport organizations as well as other organizations associated to sport and physical activity in the public and private sectors.

**APA5407 COUNSELLING THEORIES AND SKILLS** *(3cr.)*  
Critical examination of counselling approaches and theories. Discussion and application of fundamental counselling skills in the contexts of sport, physical activity, and health.

**APA5409 MENTAL TRAINING AND QUALITY LIVING I** *(3cr.)*  
Presentation of current material in applied sport psychology, mental training consulting, and performance and life enhancement. Discussion of mental skills used at developmental and high performance levels. Application of mental skills related to personal excellence.

**APA5410 MENTAL TRAINING AND QUALITY LIVING II** *(3cr.)*  
Critical examination of mental skills used to enhance performance in diverse sport, exercise, and health settings. Discussion of various ways to assess mental skills. Experimentation with teaching different mental training techniques and creating effective mental skills training programs. **Prerequisite:** APA5409.

**APA5511 SPORT EVENT MANAGEMENT** *(3cr.)*  
Theories and principles related to planning, organizing, leading, and evaluating sporting events (e.g., Olympic Games, Jeux de la Francophonie, National Championships). Critical analysis of the academic literature related to sport event management.

**APA5512 INTERNATIONAL SPORT MANAGEMENT** *(3cr.)*  
Study of cultural, economic and political roles of sport within the broader context of globalization. Interdisciplinary approach examining the impact of sport on local and global cultures as well as on development.

**APA5916 STAGE EN ADMINISTRATION DU SPORT ET DE L'ACTIVITÉ PHYSIQUE / INTERNSHIP IN ADMINISTRATION OF SPORT AND PHYSICAL ACTIVITY** *(3cr.)*  
Entraînement pratique d'une durée de 360 heures sous la direction d'un membre du corps professoral et d'un spécialiste travaillant au sein d'un organisme ouvrant dans le domaine du sport et/ou de l'activité physique. A 360-hour practical internship under the supervision of a faculty member and of a specialist in a selected organization in the field of sport and/or physical activity. **Préalables:** APA5505, APA5703, APA5708 et permission écrite du directeur des études supérieures à l'ÉASP / **Prerequisite:** APA5105, APA5303 APA5308, and written permission of the director of graduate studies at the SHK.

**APA5921 ANALYSE ET RÉFLEXION CRITIQUES DE LA THÉORIE ET PRATIQUE EN GESTION DU SPORT / CRITICAL ANALYSIS OF AND REFLECTION ON THEORY AND PRACTICE IN SPORT MANAGEMENT** *(3cr.)*  
Rapport écrit analysant le stage pratique en administration du sport et de l'activité physique à la lumière des connaissances théoriques acquises dans les cours du programme. Major paper analyzing the internship in administration of sport and physical activity in light of the theoretical knowledge gained in program courses. **Préalable:** APA5916 / **Prerequisite:** APA5916.
APA5926 STAGE EN INTERVENTION ET CONSULTATION / INTERNSHIP IN INTERVENTION AND CONSULTATION (3cr.)
Entraînement pratique d'une durée de 400 heures sous la direction d'un membre du corps professoral et d'un spécialiste travaillant au sein d'un organisme dans le domaine du sport, de l'activité physique, et/ou de la santé. / A 400-hour practical internship under the supervision of a faculty member and a specialist in a selected organization in the field of sport, physical activity, and/or health. Préalables : APA5507, APA5509, APA5510, APA5706, APA5719 et APA6905. / Prerequisites: APA5507, APA5509, APA5510, APA5706, APA5719 and APA6905.

APA5931 ANALYSE ET RÉFLEXION CRITIQUES DE LA THÉORIE ET PRATIQUE: INTERVENTION ET CONSULTATION / CRITICAL ANALYSIS AND REFLECTION OF THEORY AND PRACTICE: INTERVENTION AND CONSULTATION (3cr.)
Rapport écrit analysant le stage pratique en intervention et consultation à la lumière des connaissances théoriques acquises dans les cours du programme. / Major paper analyzing the internship in intervention and consultation in light of the theoretical knowledge gained in program courses. Préalable : APA5926. / Prerequisite: APA5926.

APA5997 ÉTUDES DIRIGÉES EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / DIRECTED STUDIES IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Recherche individuelle sur un problème relié au sport, à l’activité physique et/ou à la santé. Le sujet, sa portée et le plan de travail doivent être approuvés par le directeur adjoint des études supérieures. Un résumé écrit, signé par le professeur(e) est exigé. / Individual research investigation of a problem related to sport, physical activity and/or health. The subject and the work plan must be approved by the Assistant Director of Graduate Studies. A written abstract, signed by the Professor is also required.

APA6100 QUALITATIVE DATA ANALYSIS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Study of the major methods (observation, interviews, textual analysis) used to collect qualitative data in sport, physical activity and health. Emphasis on developing the skills needed in the management, analysis and interpretation of qualitative data.

APA6101 QUANTITATIVE DATA ANALYSIS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Advanced statistical analysis and interpretation of data derived from experimental and quasi-experimental research. Application of analysis of variance, analysis of covariance, MANOVA and techniques of linear regression, multivariate analysis and factor analysis. Prerequisite: undergraduate statistics course is strongly recommended.

APA6302 QUALITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Discussion of theoretical foundations of qualitative research methods. Detailed examination of a research proposal. Critical evaluation of methodology and analysis of research related to sport, physical activity and health.

APA6303 QUANTITATIVE RESEARCH METHODS IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Discussion of theoretical foundations of quantitative research methods. Detailed examination of a research proposal. Critical evaluation of methodology and analysis of research related to sport, physical activity and health.

APA6901 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : ÉTUDES PHYSIOLOGIQUES / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: PHYSIOLOGICAL STUDIES (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine de la physiologie de l’exercice et de la santé. / Critical analysis and discussion of recent theoretical and empirical papers presented and published in the physiology of exercise and health.

APA6903 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : BIOMÉCANIQUE / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: BIOMECHANICS (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine du développement de la biomécanique. / Critical analysis and discussion of recent theoretical and empirical papers presented and published in biomechanics.

APA6904 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : ÉTUDES SOCIOCULTURELLES / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: SOCIOCULTURAL STUDIES (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine de la sociologie des organisations sportives ainsi que dans le domaine de la sociologie du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers presented and published in the sociology of sport organizations as well as in the sociology of sport, physical activity and health.

APA6905 THÈMES CHOISIS / SELECTED TOPICS (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine de l’intervention et de la psychologie du sport, de l’activité physique et de la santé. / A critical analysis and discussion of selected topics in sport, physical activity and health.

APA6907 EXAMEN DES ÉCRITS PSYCHOSOCIAUX EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / EXAMINATION OF PSYCHOSOCIAL LITERATURE IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Analyse critique et discussion des études théoriques et empiriques récemment publiées en études psychosociales dans le domaine du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers published in the psychosocial area of sport, physical activity and health.

APA6908 EXAMEN DES ÉCRITS BIOPHYSIQUES EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ / EXAMINATION OF BIOPHYSICAL LITERATURE IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Analyse critique et discussion des études théoriques et empiriques récemment publiées en études biophysiques dans le domaine du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers published in the biophysical area of sport, physical activity and health.
APA6909 THÈMES CHOISIS : CONTRÔLE MOTEUR ET APPRENTISSAGE / SELECTED TOPICS: MOTOR CONTROL AND LEARNING (3cr.)
Concepts and principles important for motor control, develop an understanding of the interactions between sensory, motor, and cognitive systems. Practical application of these principles to the design of instructional programs in physical education and adapted physical activity. / Major concepts and principles of motor control and learning. Analysis of sensory, cognitive, neural and environmental factors that affect motor control and learning. Study of special populations and computational models using contemporary laboratory techniques.

APA6910 THÈMES CHOISIS EN SPORT, ACTIVITÉ PHYSIQUE ET SANTÉ : GESTION / SELECTED TOPICS IN SPORT, PHYSICAL ACTIVITY AND HEALTH: MANAGEMENT (3cr.)
Analyse critique et discussion des articles théoriques et empiriques publiés récemment dans le domaine de la gestion du sport / Critical analysis and discussion of recent theoretical and empirical papers published in the area of sport management.

APA6911 THÈMES CHOISIS EN SCIENCES DU LOISIR / SELECTED TOPICS IN LEISURE STUDIES (3cr.)
Analyse critique et discussion des recherches récentes publiées en sciences du loisir / Critical analysis and discussion of recent research publications in leisure studies.

APA6912 CONSULTATION EN GESTION DU SPORT / SPORT BUSINESS CONSULTING (3cr.)
Cours de synthèse de la concentration en gestion du sport. Expérience pratique de l’approche entrepreneuriale et commerciale en contexte sportif. / Capstone course of the sport management concentration. Business and entrepreneurship experience in the context of sport. Implementation of knowledge acquired during courses and the internship in real-life consulting projects with sport organizations. Préalable : APA5916 / Prerequisite: APA5916

APA6923 SÉMINAIRE / SEMINAR (1.5cr.)
Discussion et critique des écrits scientifiques récents dans le domaine du sport, de l’activité physique et de la santé. Écriture scientifique et étapes menant au dépôt d’une proposition de thèse. Noté (S) satisfaisant ou (NS) non satisfaisant. / Lectures, discussions and critiques on current research in the field of sport, physical activity and health. Scientific writing and steps toward the submission of a thesis proposal. Graded on a (S) satisfactory / (NS) not satisfactory basis.

APA6924 SÉMINAIRE / SEMINAR (1.5cr.)
Discussion et critique des écrits scientifiques récents dans le domaine du sport, de l’activité physique et de la santé. Écriture scientifique et étapes menant à la publication d’un manuscrit. Noté (S) satisfaisant ou (NS) non satisfaisant. / Lectures, discussions and critiques on current research in the field of sport, physical activity and health. Scientific writing and steps toward the submission of a manuscript. Graded on a (S) satisfactory / (NS) not satisfactory basis.

APA6999 RECHERCHE ET THÈSE DE MAÎTRISE / MASTER’S RESEARCH AND THESIS

APA7120 SELECTED TOPICS (3cr.)
Selected aspects of biophysical and/or psychosocial sciences, not covered by other graduate courses. Topics vary from year to year. Students at the Master’s level must obtain permission from the Assistant Director of Graduate Studies.

APA7301 CRITICAL SOCIO-CULTURAL PERSPECTIVES ON SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Critical analysis of sport, physical activity and health issues and concepts through contemporary socio-cultural theories. Application of theoretical models most relevant to the students’ areas of research to assist them as they move forward in their doctoral thesis.

APA7302 CONTEMPORARY PSYCHOLOGICAL THEORIES IN SPORT, PHYSICAL ACTIVITY AND HEALTH (3cr.)
Application of the most recent theories in psychology to issues in sport, physical activity and health. Seminar course to encourage active dialogue around the application of theory to contemporary issues in the field.

APA7304 ADVANCED EXERCISE METABOLISM AND PHYSIOLOGY (3cr.)
Principles of exercise metabolism and physiology. Topics include: regulation of energy and substrate metabolism, neuroendocrine systems, adipose tissue, environmental influences, nutrition, weight control, and the impact of exercise on health and disease.

APA7305 ADVANCED TOPICS IN BIOMECHANICS AND MOTOR/COUNTROL LEARNING (3cr.)
Examination of current topics in biomechanics and motor/control research, including advanced motion analysis, biomedical imaging techniques, muscle mechanics, musculoskeletal injury mechanisms, musculoskeletal modeling, neuromuscular control of movement, and/or clinical biomechanics.

APA9997 PROJET DE THÈSE / THESIS PROPOSAL
Les étudiants, encadrés par leur directeur de thèse, rédigent leur projet de thèse. Ils le présentent et le défendent oralement devant le CCT. Il est possible d’obtenir des renseignements supplémentaires dans le guide des études supérieures pour étudiants et superviseurs, publié sur le site Web de notre programme. Après avoir réussi la soutenance orale du projet de thèse, l’étudiant doit ensuite obtenir l’approbation du comité d’éthique (si nécessaire) avant d’entreprendre la collecte de données. Règle générale, le projet de thèse est défendu vers le milieu de la deuxième année, au plus tard à la fin de cette année. Un étudiant qui échoue à la première tentative peut se voir accorder la permission de la répéter une seule fois. L’échec de la deuxième tentative mène à une note NS (non satisfaisant) et au retrait de l’étudiant du programme. Préalable : APA 9998. / Students write their thesis proposal under the guidance of their thesis supervisor and present and defend it orally before the TAC. Details are available in the Graduate Handbook for Students and Supervisors posted on our program website. After successfully defending the oral thesis proposal, the student must obtain ethics approval (if required) before proceeding to data collection. The proposal will normally have been defended towards the middle of the second year and, at the latest, by the end of that year. A student who is unsuccessful on the first attempt may be allowed to...
repeat it once. Failure on the second attempt leads to a grade of NS and withdrawal from the program. Prerequisite: APA 9998.

APA9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION
L'examen de synthèse a lieu une fois tous les cours réussis (habituellement à la fin de la première année pour les étudiants admis après l'obtention de la maîtrise). Il doit être terminé, au plus tard, avant la fin de la sixième session suivant l'inscription initiale. L'examen comporte une partie écrite et une partie orale. Le CCT en assure l'évaluation. Il est possible d'obtenir sur le site Web du programme plus de renseignements sur l'examen. La réussite de l'examen de synthèse est conditionnel à la présentation et à la soutenance du projet de thèse. Un étudiant qui échoue à la première tentative à l'examen peut se voir accorder la permission de le répéter une seule fois. L'échec de la deuxième tentative mène à une note NS (non satisfaisant) et au retrait de l'étudiant du programme. / The comprehensive examination takes place after successful completion of coursework (typically by the end of the first year for students admitted with a completed master’s degree). It must be completed at the latest within two years of initial registration. It is a two-part examination (written and oral) that is overseen by the TAC. Details on the examination are available on the program website. Successful completion of the comprehensive examination is a prerequisite for the presentation and defence of the PhD thesis proposal. A student who is unsuccessful on the first attempt at the comprehensive exam may be allowed to repeat it once. Failure on the second attempt leads to a grade of NS and withdrawal from the program.

APA9999 THÈSE DE DOCTORAT / PhD THESIS
La thèse sera fondée sur de la recherche originale effectuée dans le cadre du programme, de même que sur l'expertise et les intérêts majeurs de l'étudiant. La thèse mettra à la disposition de nouvelles connaissances dans les domaines psychosocial ou biophysique des sciences de l’activité physique. La qualité de la thèse doit être telle qu'elle mérite d'être publiée. Elle devra aussi démontrer la parfaite connaissance du champ par l'étudiant ainsi que sa capacité à appliquer cette connaissance de façon autonome, à un problème précis. / The thesis will be based on original research carried out while in the program and will build on the expertise and substantive interests of the student. The thesis will involve the generation of new knowledge within the psychosocial or biophysical disciplinary areas of human kinetics and is expected to be of publishable quality. The thesis must demonstrate a detailed understanding and knowledge of the field and the ability to apply that knowledge independently to a specific problem.

International Development

The School of International Development and Global Studies (SIDGS) offers an interdisciplinary graduate program leading to the degree of PhD in International Development. The program caters to students from both academic and professional backgrounds, and is offered in both English and French. In accordance with the University of Ottawa regulation, students have the right to produce their work, their thesis, and to answer examination questions in French or in English. The program is offered on a full-time basis.

Two fields are offered in the PhD program:

- Development Theory and Critique
- Development Policy and Practice

Further information on the fields and research interests of the professors is posted on the program website.

The program operates within the framework of the General Regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS), which are posted on the FGPS website.

Programs

Doctorate in Philosophy International Development

Admission

Admission to the PhD program is governed by the general regulations of the FGPS.

To be considered for admission, applicants must:

- Hold a master’s degree or equivalent in International Development Studies or in a related discipline. Examples of related disciplines include Economics, Education, Geography, Law, Political Science, Sociology and Anthropology.
- Have achieved a minimum average of 75% (B+) calculated in accordance with FGPS guidelines.

Language requirements

An active knowledge of French or English is essential. Applicants must indicate in their application the language in which they intend to take the majority of their courses. Applicants whose first language is other than English or French and who have completed their BA and MA degrees in a language other than English or French must provide proof of their level of competence in one of these languages. In the case of English, applicants must have a TOEFL score of 100 or an equivalent score on another test. In the case of French, the applicant must obtain a level of F?
on the Immersion Admission Test administered by the University of Ottawa’s Official Languages and Bilingualism Institute (OLBI). The School of International Development and Global Studies (SIDGS) reserves the right to conduct an interview and to require a test in either language. If a student’s doctoral research requires knowledge of a language other than French or English, the School may require proof of such knowledge.

Application deadline

For information about the admission deadline, please consult Program-Specific Requirements under “Application forms”.

Fast-track from master’s to PhD program

Students enrolled in the MA program in Globalization and International Development may be allowed to fast-track to the PhD program in International Development without being required to write a master's thesis, provided they meet the following conditions:

- Completion of six master’s courses (18 credits) including at least three courses in Globalization and International Development with a minimum average of 8/10 overall and 8.5/10 in three Globalization and International Development courses.
- Satisfactory progress in the research program.
- Submission of a well-developed research plan that must include, at a minimum, a thesis proposal and background literature review.
- Written recommendation from the proposed PhD thesis supervisor.
- Recommendation by the PhD studies committee.
- Approval of the vice-dean (graduate studies) of the Faculty of Social Sciences.
- Students must request permission to fast-track during the fourth session of registration or earlier and, if approved, must register in the PhD in the fifth or, at the latest, in the sixth session. To receive the doctorate, students must successfully complete 30 credits of courses (MA + PhD), the comprehensive examinations, the thesis proposal and the thesis. The total number of course credits required may be reduced by six, as determined by the PhD Studies Committee.

Program Requirements

The requirements of the PhD program in International Development include successful completion of 12 credits of coursework, 2 comprehensive examinations, a thesis proposal and a thesis.

- Compulsory Courses (9 credits):
  DVM8108 Research Seminar in International Development (3cr.)
  DVM8109 Theories of International Development (3cr.)
  DVM8110 Development Policy and Practice (3cr.)

- Optional course (3 credits):
  The optional course is selected from the program’s list of SIDGS graduate courses. Under exceptional circumstances, students may select a course from another graduate program with permission of both the DVM doctoral program director and the director of the other program.
  DVM6101 ECONOMIC GROWTH, PRIVATE SECTOR, SOCIAL INCLUSION (3cr.)
  DVM6102 LIVELIHOODS, RESOURCES AND SUSTAINABILITY (3cr.)
  DVM6103 CONFLICT, TRANSITIONS AND PEACE (3cr.)
  DVM6104 SOCIAL MOVEMENTS, EQUITY AND HUMAN RIGHTS (3cr.)

- DVM9996/9997 Comprehensive Examinations
  Subject to the successful completion of all the course requirements, registration in the first Comprehensive Examination (DVM9996) is permitted in the student’s third session in the program. Once the first examination has been successfully completed, registration in the second exam is permitted. Each of the two comprehensive examinations consists of a written exam followed by an oral presentation and defence. Both examinations must normally be completed by the end of the fourth session. Further details about the examinations are posted on the program website. Students who fail an exam are allowed to repeat it the following session at the latest. A second failure in either exam leads to compulsory withdrawal from the program.

- DVM9998 Thesis Proposal
  The thesis proposal, prepared under the direction of the thesis supervisor, must be defended to the satisfaction of the Thesis Advisory Committee (TAC). The proposal must normally be successfully completed by the end of the fifth session. In the event of failure, the proposal can be resubmitted and defended the following session at the latest. A second failure leads to withdrawal from the program. The proposal must be successfully completed before submitting it to the Research Ethics Board (if required) and before undertaking any independent data collection.

- DVM9999 PhD Thesis

Thesis Advisory Committee (TAC)
During the first session, a thesis advisory committee (consisting of the thesis supervisor and at least two other professors) is assigned in consultation with the student. At least two of the committee members must be professors within the School of International Development and Global Studies (SIDGS). The composition of the committee is confirmed at the end of the first year. This committee is responsible for approving the thesis proposal and for advising the student throughout the program.

Additional requirements

The requirements outlined above are a minimum. The Admissions Committee reserves the right to add up to two other courses if considered
Residence

All students must complete a minimum of six sessions of full-time registration, normally at the beginning of the program. In the case of students fast-tracked from the master’s, the residency period is nine full-time sessions from the date of initial registration in the master’s.

Minimum standards

The passing grade in all courses is 65% (C+). Students who fail two courses (equivalent to 6 credits), one of the comprehensive exams, the thesis proposal, the thesis or whose progress is deemed unsatisfactory must withdraw from the program.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students fast-tracked from the master’s to the doctorate.

Courses

DVM8108 Research Seminar in International Development (3cr.)
Study of advanced techniques of qualitative and quantitative methods used in development research and analysis. Methods examined include the use of statistical analysis, comparative methodology, case study selection, discourse analysis, interview techniques and focus groups, and participative methods.

DVM8109 Theories of International Development (3cr.)
Focus on the major texts that constitute the canon of international development studies. Key theories and approaches will include imperialism/colonialism, modernization theory, structuralist economics, dependency theory, neoliberal/neoclassical economics, and post-modern and post-colonial theory.

DVM8110 Development Policy and Practice (3cr.)
Study of policy formulation and the role of strategic planning in the global South. Emphasis will be placed on how international institutions and policy documents impact upon the global South and how, in turn, changes in domestic and international environments shape these institutions and actors. Various political planning approaches are also examined. Exclusion: DVM5110.

DVM8150 Special Topics in International Development (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in international development.

DVM8950 Thèmes choisis en développement international / Special Topics in International Development (3cr.)
Étude approfondie d’une problématique ou d’un sujet lié aux tendances émergentes en développement international. Préalable: connaissance active soit du français soit de l’anglais et connaissance au moins passive de l’autre langue. / In-depth examination of a question or topic linked to emerging trends or research areas in international development. Prerequisite: Active knowledge of either English or French and at least a passive knowledge of the other language.

DVM8955 Lectures dirigées / Directed Studies (3cr.)
Cours individuel ayant pour objectif d’approfondir les connaissances de l’étudiant dans un domaine particulier ou de lui permettre de se familiariser avec un nouveau domaine. Le sujet est déterminé et développé en consultation avec le professeur responsable et en conformité avec les directives du département. Le travail remis dans ce cours doit être différent de ce qui a pu être soumis dans d’autres cours, y compris le projet de thèse, le mémoire ou la thèse. Il y a une limite d’un cours de lectures dirigées par étudiant et la permission n’est accordée que dans des circonstances exceptionnelles. Préalable : Permission du responsable des études doctorales. / Individual course aimed at deepening a student’s knowledge of a particular area or at gaining knowledge of a new area. The topic is selected and developed in consultation with the supervising professor in accordance with departmental guidelines. The work submitted for this course must be different from that submitted for other courses, including the thesis proposal, the master’s research paper or the thesis. Maximum of one directed reading course per student and permission granted only under exceptional circumstances. Prerequisite: Permission of the PhD program director.

DVM9996 Examen de synthèse 1 / Comprehensive Exame 1
Préalable : réussite de toutes les exigences de cours/ Prerequisite: successful completion of all course requirements.

DVM9997 Examen de synthèse 2 / Comprehensive Examination 2
Préalable / Prerequisite : DVM9996

DVM9998 Projet de thèse / Thesis Proposal
Préalables / Prerequisites : DVM9996 ; DVM9997

DVM9999 Thèse de doctorat / PhD Thesis
Préalable / Prerequisite: DVM9998
Courses open to students in both the MA in Globalization and International Development and the PhD in International Development.

DVM6101 ECONOMIC GROWTH, PRIVATE SECTOR, SOCIAL INCLUSION (3cr.)
Understanding economic development, including the roles of the private sector and public policy, particularly in terms of their impact on economic growth, living standards, social inclusion, poverty and inequality, and human development.

DVM6102 LIVELIHOODS, RESOURCES AND SUSTAINABILITY (3cr.)
Interaction between society and nature. Consideration of how power shapes the use of resources such as land, water, food, or energy, and on how livelihoods adapt to environmental change in various rural and urban contexts. Theoretical lenses include commons theory, social ecological resilience, political ecology, and political economy.

DVM6103 CONFLICT, TRANSITIONS AND PEACE (3cr.)
Relationships between insecurity, transitions, peace and development. Key debates on links between development and security or, conversely, between insecurity, conflict and development. Different critical perspectives on the security-development nexus. Issues surrounding human (in) security, as well as key debates on transitions and peace.

DVM6104 SOCIAL MOVEMENTS, EQUITY AND HUMAN RIGHTS (3cr.)
Social movements, civil society, and informal networks, their roles, actions and impacts in the struggle against the vicious cycles of inequality and vulnerability in developing countries. Themes include class, gender, ethnicity, citizenship and migration.

Law

Reflecting Canada’s bilingual and trijuridical legal system (civil law, common law, aboriginal law), as well as its location in Canada’s Capital, the Faculty of Law offers graduate programs leading to a master’s degree and a doctoral degree in Law.

The graduate studies in law are a joint endeavour of the Common Law and Civil Law Sections. We welcome law graduates from both legal systems and from countries around the world. Courses are offered in English or in French, and occasionally in both languages. Students may readily complete their graduate studies while learning something of Canada’s other legal and linguistic traditions.

The programs are offered in English and in French, and sometimes in a combination of both. In accordance with University of Ottawa Policy, examinations, assignments and the research paper or thesis may be written in either English or French. The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS)

Master’s Program

For the Master of Laws degree (LLM), we offer both a thesis option and a research paper option. While students can pursue these options in any subject, we particularly emphasize the following two fields as well as the fields associated with our six concentrations described below:

- International law; and
- Human rights law.

In the context of the master’s with research paper, students have a choice of six concentrations:

- International Humanitarian and Security Law;
- Global Sustainability and Environmental Law;
- Law and Social Justice;
- Law and Technology;
- Notarial Law; and
- International Trade and Investment Law.

LLM students can also participate in a collaborative program in Women’s Studies at the Master's level (LLM with Specialization in Women’s Studies). For more information on this program, see “Degree Requirements”.

International Reciprocity Agreements

Are you interested in obtaining two LLM. degrees and studying abroad? The Faculty of Law at the University of Ottawa has international reciprocity agreements:

- with Washington College of Law (American University),
- l’Université Paris Ouest Nanterre La défense,
- l’Université Paul-Cézanne (Aix-Marseille III),
- the University of Haifa (Israel),
- and l’Université de Rennes 1.

Doctoral Program

The aim of the doctoral program is to develop autonomous academics and lawyers who are highly qualified to contribute to the advancement of
knowledge in their particular discipline through theoretical, practical and empirical research in various fields of law. The program focuses on the development and mastery of a research approach, of social and critical legal reasoning for the purpose of making original contributions in the field of law.

The doctoral program comprises the following elements: a legal research methodology and theory course, an elective course, a comprehensive examination, a thesis proposal examination, the writing of a thesis and its defence before an examining board.

Please see the Graduate Studies in Law website for further information: http://llmphpd.uottawa.ca/

**Programs**

Master of Laws (LL.M.)

Master of Laws (LL.M.) Concentration in Global Sustainability and Environmental Law

Master of Laws (LL.M.) Concentration in International Humanitarian and Security Law

Master of Laws (LL.M.) Concentration in International Trade and Foreign Investment

Master of Laws (LL.M.) Concentration in Law and Technology

Master of Laws (LL.M.) Concentration in Notarial Law

Master of Laws (LL.M.) Concentration Law and Social Justice

Doctorate in Philosophy Law

**Admission**

The applicant must:

1. Have a master of laws degree (LLM) awarded by an accredited Canadian university, obtained with a minimum average of 75% (B+), calculated as per the established standards of the Faculty of Graduate and Postdoctoral Studies (FGPS) or an equivalent degree in law from a foreign university meeting the same standards, as well as demonstrated legal research and writing abilities;

2. Have sufficient knowledge of French or English. Foreign applicants whose first language is neither English nor French will be required to provide proof of proficiency in one or other language as specified in section A of the General Regulations of the FGPS.

**Transfer from Master’s to PhD Program**

With the approval of the Director of the Doctoral Program or the Assistant Dean of Graduate Studies in Law, a master’s student may exceptionally be admitted into the doctoral program without having completed all the requirements of the master’s program. To take advantage of this option, the student must (a) complete at least three courses in the master's program with a minimum average of 80% (A-), and (b) obtain the approval of the Director of the Program or the Assistant Dean of Graduate Studies in Law. The student must also meet all the other requirements for admission to the doctoral program.

**Financial Support**

**Internal Scholarships**

The Faculty of Graduate and Postdoctoral Studies in conjunction with the Faculty of Law provides a number of admission scholarships per year to LLM and PhD students. Please note that students do not need to apply for these scholarships. Recommendations are made to the Faculty of Graduate and Postdoctoral Studies by the admissions committee in law.

Several other scholarships are available to LLM and PhD students thanks to generous donors. These scholarships require a separate application. Further details are available through the Graduate Studies in Law website.

**External Scholarships**

For a comprehensive list of scholarships and awards offered by outside agencies, and details regarding application, please visit the following website: www.grad.uottawa.ca or contact:

Awards Office
Faculty of Graduate and Postdoctoral Studies
University of Ottawa
115 Séraphin Marion
Room 107
Ottawa ON K1N 6N5
Applicants are encouraged to seek scholarships and financial assistance from other sources in Canada and abroad if applicable.

Program Requirements

Doctoral Degree Requirements

- DCL 8330 Legal Research Methodology and Theory (3 cr.) (1st session): The course will examine epistemology and methodology issues arising in the field of legal research;
- Elective Course (3 cr.) (2nd session): The student registers in an optional course chosen from the bank of graduate courses offered at the Faculty of Law or another faculty at the University of Ottawa. The chosen course must be related to the thesis proposal and be approved by the Director of the Doctoral Program or the Assistant Dean of Graduate Studies in Law;
- DCL 9998 Examen de synthèse / Comprehensive Examination (cr.) (1st session to 4th or 5th session): Directed readings, chosen in consultation with the Thesis Advisory Committee, allowing the student to acquire the theoretical foundations in his or her field of research. The student must complete a written examination followed by an oral examination, during which he or she will be assessed on his or her knowledge of the readings.
- DCL 9997 Projet de thèse / Thesis Proposal (5th or 6th session): The student presents, in writing and orally, his or her thesis proposal. The student must submit a research proposal, a detailed plan and a comprehensive bibliography;
- DCL 9999 Thèse de doctorat / PhD Thesis (from the 6th session onwards): The doctoral thesis is usually 90,000 to 120,000 words in length, excluding the tables, bibliography and appendices. It must be sufficiently well written to merit publication. The thesis must be approved by a jury of four members proposed by the Faculty of Law and approved by the FGPS.

For information regarding the thesis, consult Section G of the "General Regulations" of the FGPS and the guide "Preparing a Thesis or a Research Paper", which can both be accessed through the FGPS website: www.grad.uottawa.ca.

Additional Requirements

The Director of the Doctoral Program or the Assistant Dean of Graduate Studies in Law may impose additional requirements in order to allow students to acquire the necessary skills to succeed in the program. For example, a legal research and writing course may be required of students whose first language is neither English nor French, or optional courses considered essential for the purpose of the thesis proposal may be added.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, the comprehensive exam, or whose research progress is deemed unsatisfactory are required to withdraw.

Residence

The candidate must be registered full-time during the first six sessions of the program (24 months). Students who are admitted to the doctoral program without having completed their master’s degree must spend at least nine sessions in full-time residence, including the sessions already completed for the master’s.

Duration of the Program

The program is designed as a four-year program and students are expected to complete it within four years. All requirements other than the thesis must be fulfilled at the end of the sixth session of registration. The maximum time permitted is five years from the date of initial registration in the program, or six years in the case of students transferring from the master’s to the doctorate.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Law. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Part-time Registration

A part-time student may not take more than one activity in a given session.

Courses in other faculties

With the approval of the Director of the Program or the Assistant Dean of Graduate Studies in Law, a candidate may be allowed to take a limited number of courses in other faculties.
Courses

Not all of the courses listed are given each year. The course is offered in the language in which it is described.

DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)
This seminar will focus on a general overarching theme (i.e. equality, security, rights, access to justice, public interest lawyering, etc.) that will be discussed in relation to different areas of law.

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
Review of basic legal research techniques, legal resource materials and legal citation.

DCL5336 LEGAL RESEARCH SEMINAR (3cr.)
This seminar explores alternative teaching styles for legal education. Students will be presenting their research projects.

DCL5501 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)
Révision des techniques de recherche, des sources du droit et des méthodes d'analyse.

DCL5135 CONTEMPORARY ISSUES IN LAW (3cr.)
This seminar will focus on a general overarching theme (i.e. equality, security, rights, access to justice, public interest lawyering, etc.) that will be discussed in relation to different areas of law.

DCL6939 SPECIAL TOPICS IN LAW (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in law.

DCL6939 THEMES CHOISIS EN DROIT / SPECIAL TOPICS IN LAW (3cr.)
Étude approfondie d'une problématique ou d'un sujet lié aux tendances émergentes en droit. Préalable: connaissance active soit de l'anglais, soit du français et connaissance passive de l'autre langue./ In-depth examination of a question or topic linked to emerging trends or research areas in law. Prerequisite: Active knowledge of English or French and passive knowledge of the other language.

DCL7022 STAGE DE CLÉRICATURE / JUDICIAL CLERKSHIP (6cr.)

DCL8330 LEGAL RESEARCH METHODOLOGY AND THEORY (3cr.)
The course will examine epistemology and methodology issues arising in the field of legal research.

Théorie juridique

DCL5302 PHILOSOPHY OF LAW (3cr.)
Examination of topics, theories, writers in philosophy of law. May include comparative or critical materials.

DCL5303 STUDIES IN LEGAL THEORY I (3cr.)
Survey of current theories of law. May be organized around a particular problem or writer or perspective. May include interdisciplinary materials.

DCL5304 STUDIES IN LEGAL THEORY II (3cr.)
Exploration of a particular theme or problem from a theoretical point of view, eg. legal education, professional responsibility, law and sociology. May include interdisciplinary materials.

DCL5305 FEMINIST ANALYSIS OF LAW (3cr.)
Exploration of feminist perspectives, theories and themes and the application of these to particular problems or issues. Development of techniques for analyzing social meaning of law.

DCL5307 INTRODUCTION TO CIVIL LAW (3cr.)
Survey of basic concepts of Civil Law, including codification, law of the person, obligations, property. Exploration of legal reasoning in civilian context.

DCL5308 COMPARATIVE LAW (3cr.)
Exploration of issues, legal institutions, legal rules in context of different jurisdictions. May include theory of comparative law.

DCL5309 LEGAL THEORY SEMINAR (3cr.)
Examination of current legal issues in their legal, historical and social context.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.
DCL5337 CRITICAL LEGAL THEORIES (3cr.)
This course examines contemporary approaches to and debates in critical legal theory, law and society, feminist jurisprudence, critical race theory, and postcolonial theory, including critiques of essentialist theory and models of interdisciplinary analysis.

DCL5340 SUSTAINABILITY AND LAW (3cr.)
This course provides theoretical perspectives on alternative approaches to environmental policy, emphasizing ethical and economic perspectives.

DCL5502 PHILOSOPHIE DU DROIT (3cr.)
Définition du droit et de la philosophie du droit; les buts du droit; les concepts juridiques; le raisonnement du droit; le language du droit; les philosophies et les théories du droit.

DCL5503 THÉORIES CONTEMPORAINES DU DROIT (3cr.)
Introduction à l'étude des différentes théories contemporaines du droit, telles la théorie marxiste, l'analyse économique, l'approche féministe, le positivisme, le droit naturel, etc.

DCL5504 SOCIOLOGIE DU DROIT (3cr.)

DCL5505 ANALYSE FÉMINISTE DU DROIT (3cr.)
Statut juridique, droits et obligations des femmes dans les domaines de la santé, de la famille, du travail, de la criminalité, de la fiscalité, du commerce, etc. Analyse critique du droit à partir d'une perspective féministe. Étude des différentes théories féministes du droit.

DCL5508 DROIT COMPARÉ (3cr.)
Définition et méthode du droit comparé. Étude sommaire des grands système de droit contemporains, et comparaison de leurs fondements. Étude de certaines institutions juridiques dans le contexte de ces divers systèmes.

DCL5509 PROBLÈMES THÉORIQUES CHOISIS DE DROIT PUBLIC (3cr.)
Étude critique, d'ordre fondamental ou méthodologique, de notions, de mécanismes ou d'institutions de droit public.

DCL5510 PROBLÈMES THÉORIQUES CHOISIS DE DROIT PRIVÉ (3cr.)
Étude critique, d'ordre fondamental ou méthodologique, de notions, de mécanismes ou d'institutions de droit privé.

DCL5610 INTERPRÉTATION DES LOIS (3cr.)

DCL5337 CRITICAL LEGAL THEORIES (3cr.)
This course examines contemporary approaches to and debates in critical legal theory, law and society, feminist jurisprudence, critical race theory, and postcolonial theory, including critiques of essentialist theory and models of interdisciplinary analysis.

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)

DCL6126 INTERNATIONAL HUMANITARIAN LAW: CONTEMPORARY CHALLENGES (3cr.)
The philosophy, principles and practical application of International Humanitarian Law (IHL) in both historic and contemporary contexts.

DCL6319 ADVANCED INTERNATIONAL ECONOMIC LAW (3cr.)
This seminar explores theoretical and systemic issues of international economic law.

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)

DCL7300 TECHNOPRUDENCE : LEGAL THEORY IN THE INFORMATION AGE (3cr.)
Seminar examining the impact that cyberspace and other technologies utilized in the so-called information revolution might have on traditional legal theory and doctrine.

DCL7313 STATUTORY INTERPRETATION (3cr.)

DCL7500 TECHNO-THÉORIE : THÉORIE DU DROIT À L'ÈRE DE L'INFORMATION (3cr.)
Séminaire consacré à l'étude des incidences du cyberspace et des autres technologies de la soi-disant révolution de l’information sur la théorie et la doctrine traditionelles.

Electives
International Law

DCL6326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)

DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)

DCL6124 INTERNATIONAL BUSINESS TRANSACTIONS (3cr.)

DCL6125 INTERNATIONAL TRADE REGULATION (3cr.)

DCL6126 INTERNATIONAL HUMANITARIAN LAW: CONTEMPORARY CHALLENGES (3cr.)
The philosophy, principles and practical application of International Humanitarian Law (IHL) in both historic and contemporary contexts.

DCL6127 LAW AND DEVELOPING COUNTRIES (3cr.)
The role of domestic and international law in developing countries including historical, economic and critical (feminist and post-colonial) perspectives on law in the process of development; assessing the impact of law on developments regarding the environment, international trade, democratic and human rights, markets and investment, ethnic conflict, governance and corruption, technology development, and aid to developing countries.

DCL6128 LAW, POLITICS AND ECONOMICS IN INTERNATIONAL AFFAIRS (3cr.)
The linkages and differences between the disciplines of law, political science and economics as they relate to international affairs, including an in-depth exploration of the underlying assumptions of each discipline and how they interact in international affairs.

DCL6300 INTERNATIONAL INVESTMENT LAW (3cr.)
Study of the international law applicable to the promotion and protection of foreign investment. Origins, evolution and sources; treatment and protection principles; settlement of investment disputes.

DCL6319 ADVANCED INTERNATIONAL ECONOMIC LAW (3cr.)
This seminar explores theoretical and systemic issues of international economic law.

DCL6350 INTERNATIONAL ECONOMIC LAW CASE STUDIES (3cr.)
This seminar uses case studies to explore theoretical issues of international economic law in the context of actual disputes.

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)

DCL6728 DROIT INTERNATIONAL PRIVÉ (3cr.)

DCL6730 ASPECTS INTERNATIONAUX DE LA PROPRIÉTÉ INTELLECTUELLE (3cr.)

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

DCL6733 DROIT COMMERCIAL INTERNATIONAL (3cr.)
DCL6734 ORGANISATION INTERNATIONALE DU COMMERCE (3cr.)

DCL6735 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL III (3cr.)
Étude approfondie de problèmes d'actualité en droit international.

DCL6736 DROIT INTERNATIONAL HUMANITAIRE (3cr.)
Le droit international humanitaire est la branche du droit international public qui régite les conséquences humanitaires de conflits armés. Le cours a pour but de familiariser les étudiants et étudiantes avec les sources du droit international humanitaire, ses principes et ses règles fondamentaux.

DCL6737 JUSTICE ET VIOLENCES POLITIQUES EXTRÊMES : LA RÉPONSE DU DROIT INTERNATIONAL (3cr.)
La multiplication, dans le monde contemporain, de situations de violences politiques extrêmes, oblige le droit et la justice à s'adapter et à trouver de nouvelles réponses à ces types de violations systémiques et radicales. Il s’agira, dans le cadre de ce cours, de réfléchir sur la nature, le rôle, la place, le fonctionnement, les forces et les limites de la justice, ainsi que les attentes qu’elle suscite et les défis qu’il lui faut relever dans des contextes de sortie de périodes de génocides et/ou crimes contre l’humanité.

DCL6738 RÉPRESSION PÉNALE INTERNATIONALE (3cr.)
Les origines de la responsabilité pénale individuelle, les tribunaux pénaux internationaux, mixtes et autres mécanismes alternatifs de justice seront étudiés notamment le Tribunal pénal international pour l’ex-Yougoslavie, le Tribunal pénal international pour le Rwanda, la Cour spéciale pour la Sierra Leone et la Cour pénale internationale. Le fondement juridique de la création de ces tribunaux, leurs compétences, leurs structures, ainsi que l’apport de la jurisprudence au droit international humanitaire et au droit international des droits de la personne seront examinés.

**Human Rights**

DCL5120 ADVANCED HUMAN RIGHTS (3cr.)

DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)

DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)

DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)

DCL5127 CONSTITUTIONAL EQUALITY LAW AND THEORY (3cr.)
Examination of different models of equality rights and of rights adjudication that shape Canadian constitutional jurisprudence with the goal of developing a critical understanding of the social, political and legal possibilities, risks and limitations of attempting to advance equality claims through constitutional rights litigation.

DCL5131 CHILDREN’S RIGHTS: AN INTERDISCIPLINARY APPROACH (3cr.)
Study of specific questions related to various aspects of the life of a child, as well as the different realities of children: the child as a person and his/her identity, filial relations and family life, the child in the community, marginalized children, education and participation. A multidisciplinary perspective built around the United Nations’ Convention of the Rights of the Child, which allows the student to delve deeper into the issue of children’s rights by bringing together points of view from law, social sciences, education and health.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5721 PERSPECTIVES FÉMINISTES DU DROIT (3cr.)

DCL5730 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE (3cr.)

DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I (3cr.)

DCL5732 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE II (3cr.)

DCL5733 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE III (3cr.)
DCL5734 PERSPECTIVES AUTOCHTONES DU DROIT (3cr.)

DCL5735 PROBLÈMES CHOISIS DE DROITS DE LA PERSONNE IV (3cr.)
Étude approfondie de problèmes d'actualité dans le domaine des droits de la personne.

Concentrations
International Humanitarian and Security Law
DCL5106 INDIGENOUS LEGAL THEORY: WORLDVIEW, LANGUAGE, AND LEGAL CONCEPTS (3cr.)
Students will explore indigenous legal concepts as they are constructed within a particular Indigenous language and worldview. The specific language and people will vary depending on the instructor.

DCL5120 ADVANCED HUMAN RIGHTS (3cr.)

DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)

DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)

DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)

DCL5143 INDIGENOUS LAW CLINIC (3cr.)
The goal of the Clinic is to help create Indigenous law research materials for Indigenous communities, academic institutions and practitioners. In partnership with Indigenous communities and working under supervision, students will be placed in an Indigenous community to investigate questions pertaining to Indigenous law and the sui generis nature of Aboriginal law. The Clinic aims to promote a more in-depth understanding of Indigenous legal orders by providing hands-on experience to build on students' classroom learning. There will be a lecture component designed to enhance the hands-on clinic experience. Grading for the internship will be on an S (Satisfactory) / NS (Non-Satisfactory) basis.

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
Review of basic legal research techniques, legal resource materials and legal citation.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5327 COMPARATIVE INDIGENOUS RIGHTS / LEGAL REGIMES (3cr.)
Critical issues affecting indigenous people arising within Canada, the United States, Australia, New Zealand and other countries in which the similarities and differences in domestic law, indigenous legal orders and sui generis or hybrid law are explored in detail from a comparative perspective of legal pluralism.

DCL5501 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)
Révision des techniques de recherche, des sources du droit et des méthodes d'analyse.

DCL5730 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE (3cr.)

DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I (3cr.)

DCL5732 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE II (3cr.)

DCL5733 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE III (3cr.)

DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)
DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)

DCL6126 INTERNATIONAL HUMANITARIAN LAW: CONTEMPORARY CHALLENGES (3cr.)
The philosophy, principles and practical application of International Humanitarian Law (IHL) in both historic and contemporary contexts.

DCL6127 LAW AND DEVELOPING COUNTRIES (3cr.)
The role of domestic and international law in developing countries including historical, economic and critical (feminist and post-colonial) perspectives on law in the process of development; assessing the impact of law on developments regarding the environment, international trade, democratic and human rights, markets and investment, ethnic conflict, governance and corruption, technology development, and aid to developing countries.

DCL6128 LAW, POLITICS AND ECONOMICS IN INTERNATIONAL AFFAIRS (3cr.)
The linkages and differences between the disciplines of law, political science and economics as they relate to international affairs, including an in-depth exploration of the underlying assumptions of each discipline and how they interact in international affairs.

DCL6130 NATIONAL SECURITY LAW (3cr.)
This course examines international, Canadian and comparative laws governing efforts to preserve "national security." "National security" has been defined as the protection and preservation of a state's values, institutions and the well-being of its citizens - it is an expansive concept that, in colloquial terms, has a strong association with military preparedness and law enforcement and that sometimes co-exists uncomfortably with the "rule of law."

DCL6150 INTERNATIONAL HUMANITARIAN AND SECURITY LAW INTERNSHIP (3cr.)
Internship with a governmental or non-governmental organization in order to enhance the student's practical experience in international humanitarian and security law issues. Students will be required to submit a written report relating to the work accomplished during the internship. The internship assessment, which will be based on this written report, will be conducted by the internship Faculty supervisor on a "satisfactory" or "not-satisfactory" (SNS) basis.

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

DCL6737 JUSTICE ET VIOLENCES POLITIQUES EXTRÊMES : LA RÉPONSE DU DROIT INTERNATIONAL (3cr.)
La multiplication, dans le monde contemporain, de situations de violences politiques extrêmes, oblige le droit et la justice à s'adapter et à trouver de nouvelles réponses à ces types de violations systématiques et radicales. Il s'agira, dans le cadre de ce cours, de réfléchir sur la nature, le rôle, la place, le fonctionnement, les forces et les limites de la justice, ainsi que les attentes qu'elle suscite et les défis qu'il lui faut relever dans des contextes de sortie de périodes de génocides et/ou crimes contre l'humanité.

DCL6738 RÉPRESSION PÉNALE INTERNATIONALE (3cr.)
Les origines de la responsabilité pénale individuelle, les tribunaux pénaux internationaux, mixtes et autres mécanismes alternatifs de justice seront étudiés notamment le Tribunal pénal international pour l’ex-Yugoslavie, le Tribunal pénal international pour le Rwanda, la Cour spéciale pour la Sierra Leone et la Cour pénale internationale. Le fondement juridique de la création de ces tribunaux, leurs compétences, leurs structures, ainsi que l’apport de la jurisprudence au droit international humanitaire et au droit international des droits de la personne seront examinés.

Global Sustainability and Environmental Law

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)
Review of basic legal research techniques, legal resource materials and legal citation.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5340 SUSTAINABILITY AND LAW (3cr.)
This course provides theoretical perspectives on alternative approaches to environmental policy, emphasizing ethical and economic perspectives.

DCL5341 COMPARATIVE ENVIRONMENTAL LAW (3cr.)
This course offers comparative analysis of legal approaches to environmental law from civil, common, Islamic, socialist, and aboriginal law perspectives.

DCL5342 GLOBAL ENVIRONMENTAL GOVERNANCE (3cr.)
This course examines the responsibilities and operation of a number of organizations with significant environmental responsibilities operating at the global level.
The School

LIN7330 TOPICS IN THEORETICAL LINGUISTICS I (3cr.)

Phenomena in spontaneous speech.

LIN5303 SOCIOLINGUISTICS I (3cr.)

Registration in the program.

Minimum standards

session at the latest. Please note that the minimal admission average requirements for the doctoral program must also be met. Following the

The programs are governed by the

côtes générales de deux mois, à une reprise. S'il échoue une seconde fois, il doit se retirer du programme.

Passage accéléré du programme de maîtrise au doctorat

Admission

DCL6735 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL III (3cr.)

Analyse de cas, dossiers pratiques et rédaction d'actes touchant principalement les domaines suivants: régimes matrimoniaux; conventions matrimoniales; union internationale.

Cette évaluation est sanctionnée uniquement par la mention « Réussite » ou « Échec ».

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

Principles; settlement of investment disputes.

DCL6300 INTERNATIONAL INVESTMENT LAW (3cr.)

Protection; infringement and limitation issues; and new business strategies.

Co-operative and clinical work study program in technology law.

DCL5732 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE II (3cr.)

Étude critique, d'ordre fondamental ou méthodologique, de notions, de mécanismes ou d'institutions de droit privé.

Introduction à l'étude des différentes théories contemporaines du droit, telles la théorie marxiste, l'analyse économique, l'approche féministe, le positivisme, le

DCL5309 LEGAL THEORY SEMINAR (3cr.)

In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)

Law and Social Justice

DCL5106 INDIGENOUS LEGAL THEORY: WORLDVIEW, LANGUAGE, AND LEGAL CONCEPTS (3cr.)

Students will explore indigenous legal concepts as they are constructed within a particular Indigenous language and worldview. The specific language and people will vary depending on the instructor.

DCL5120 ADVANCED HUMAN RIGHTS (3cr.)

DCL5121 STUDIES IN HUMAN RIGHTS I (3cr.)

DCL5122 STUDIES IN HUMAN RIGHTS II (3cr.)

DCL5123 STUDIES IN HUMAN RIGHTS III (3cr.)

DCL5143 INDIGENOUS LAW CLINIC (3cr.)

The goal of the Clinic is to help create Indigenous law research materials for Indigenous communities, academic institutions and practitioners. In partnership with Indigenous communities and working under supervision, students will be placed in an Indigenous community to investigate questions pertaining to Indigenous law and the sui generis nature of Aboriginal law. The Clinic aims to promote a more in-depth understanding of Indigenous legal orders by providing hands-on experience to build on students' classroom learning. There will be a lecture component designed to enhance the hands-on clinic experience. Grading for the internship will be on an S (Satisfactory) / NS (Non-Satisfactory) basis.

DCL5301 LEGAL RESEARCH METHODOLOGY (3cr.)

Review of basic legal research techniques, legal resource materials and legal citation.

DCL5303 STUDIES IN LEGAL THEORY I (3cr.)

Survey of current theories of law. May be organized around a particular problem or writer or perspective. May include interdisciplinary materials.

DCL5304 STUDIES IN LEGAL THEORY II (3cr.)

Exploration of a particular theme or problem from a theoretical point of view, eg. legal education, professional responsibility, law and sociology. May include interdisciplinary materials.

DCL5305 FEMINIST ANALYSIS OF LAW (3cr.)

Exploration of feminist perspectives, theories and themes and the application of these to particular problems or issues. Development of techniques for analyzing social meaning of law.

DCL5309 LEGAL THEORY SEMINAR (3cr.)

Examination of current legal issues in their legal, historical and social context.

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)

In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.
DCL5327 COMPARATIVE INDIGENOUS RIGHTS / LEGAL REGIMES (3cr.)
Critical issues affecting indigenous people arising within Canada, the United States, Australia, New Zealand and other countries in which the similarities and differences in domestic law, indigenous legal orders and sui generis or hybrid law are explored in detail from a comparative perspective of legal pluralism.

DCL5337 CRITICAL LEGAL THEORIES (3cr.)
This course examines contemporary approaches to and debates in critical legal theory, law and society, feminist jurisprudence, critical race theory, and post-colonial theory, including critiques of essentialist theory and models of interdisciplinary analysis.

DCL5338 ACTION RESEARCH METHODOLOGY IN LAW (3cr.)
This course addresses issues of research ethics, accountability and partiality. It is also an introduction to research tools and methods of particular importance to studies related to social justice research and law.

DCL5501 MÉTHODOLOGIE DE LA RECHERCHE JURIDIQUE (3cr.)
Révision des techniques de recherche, des sources du droit et des méthodes d'analyse.

DCL5503 THÉORIES CONTEMPORAINES DU DROIT (3cr.)
Introduction à l'étude des différentes théories contemporaines du droit, telles la théorie marxiste, l'analyse économique, l'approche féministe, le positivisme, le droit naturel, etc.

DCL5504 SOCIOLOGIE DU DROIT (3cr.)

DCL5505 ANALYSE FÉMINISTE DU DROIT (3cr.)
Statut juridique, droits et obligations des femmes dans les domaines de la santé, de la famille, du travail, de la criminalité, de la fiscalité, du commerce, etc. Analyse critique du droit à partir d'une perspective féministe. Étude des différentes théories féministes du droit.

DCL5721 PERSPECTIVES FÉMINISTES DU DROIT (3cr.)

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL5370 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE (3cr.)

DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I (3cr.)

DCL5732 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE II (3cr.)

DCL5733 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE III (3cr.)

DCL5734 PERSPECTIVES AUTOCHTONES DU DROIT (3cr.)

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)

DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6123 INTERNATIONAL HUMAN RIGHTS (3cr.)

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)
DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)

Law and Technology

DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL7300 TECHNOPRUDENCE : LEGAL THEORY IN THE INFORMATION AGE (3cr.)
Seminar examining the impact that cyberspace and other technologies utilized in the so-called information revolution might have on traditional legal theory and doctrine.

DCL7301 REGULATION OF INTERNET COMMERCE (3cr.)
Seminar analyzing the legal challenges posed by the Internet to the traditional commercial law framework. Topics include intellectual property issues, on-line contracts, digital signatures, taxation, securities regulation, and the provision of online legal services.

DCL7302 REGULATION OF INTERNET COMMUNICATIONS (3cr.)
Seminar analyzing the legal challenges posed by the Internet to the rights of free speech and privacy. Topics include online obscenity, hate speech, defamation, as well as national and international approaches to data privacy protection.

DCL7303 ELECTRONIC COMMERCE PRACTICE WORKSHOP (3cr.)
Practice-oriented seminar analyzing the legal issues and implications of electronic commerce. Topics include licensing, privacy and acceptable use policies, Web development agreements, and regulatory issues.

DCL7304 TECHNOLOGY LAW INTERNSHIP (3cr.)
Co-operative and clinical work study program in technology law. Student placement at a technology-focused government department or a technology corporation’s in-house legal department. Pass/Fail grade, to be based on the grades obtained for the written report as well as on the evaluations of the employer. Prerequisite: At least one Intellectual Property or Internet Law course.

DCL7305 STUDIES IN INTERNET LAW (3cr.)
Selected problems in the emerging intersection of law and technology.

DCL7306 LEGAL PERSPECTIVES ON CYBERFEMINISM (3cr.)
This course analyzes issues relating to application of feminist principles to the legal regulation of communication technologies. Topics covered include the gendered dynamics of networked capitalist society; women’s relationships with communication technologies; technology’s potential impact on equality for women; and questions surrounding whether and how to legally regulate communication technologies.

DCL7307 DIGITAL MUSIC LAW (3cr.)
This course addresses legal, cultural, economic and technological aspects of digital music around the world. Topics include the music industry; copyright protection; infringement and limitation issues; and new business strategies.

DCL7310 TECHNOPOLICY : INTERPLAY BETWEEN TECHNOLOGIES AND EXISTING LEGAL RULES (3cr.)
Seminar examining the application of traditional legal analysis to difficult policy questions arising from the advent of information technologies.

DCL7311 STUDIES IN INTELLECTUAL AND INDUSTRIAL PROPERTY (3cr.)
Trademarks, registration, the torts of passing off and misappropriation of personality; trade names; copyright, the protection of computer software, arts and entertainment industries; trade secrets, confidential information; patents; industrial designs, related competitive torts. Canadian and international perspectives.

DCL7312 COMPETITION LAW (3cr.)
Restrictive trade practices and competition policy.

DCL7315 PATENT LAW (3cr.)
Law of patents, both national and international. Procurement, licensing and enforcement of patents.

DCL7316 STUDIES IN BUSINESS LAW : COPYRIGHT LAW (3cr.)
Law and policy relating to copyright law.

DCL7317 COMMUNICATIONS LAW (3cr.)
Examination of the regulatory framework governing communications in Canada. Three industry sectors (telecommunications, broadcasting and cable television)
be examined with particular attention to the legal, policy, administrative and practical constraints which affect their activities.

**DCL7366 TECHNOLOGY LAW PROJECT**
Technology-based project which will integrate legal content, usually within a piece of software, machine code or a web-based application. The project must incorporate a substantive legal dimension in order to satisfy the research requirement. A project that does not have a built-in substantive legal dimension must be accompanied by a written report outlining the legal significance of the project. Technology law projects will be evaluated on a Pass/Fail basis by the supervisor and one other person appointed by the Co-Director of Graduate Studies in Law.

**DCL7500 TECHNO-THÉORIE : THÉORIE DU DROIT À L'ÈRE DE L'INFORMATION** (3cr.)
Séminaire consacré à l’étude des incidences du cyberespace et des autres technologies de la soi-disant révolution de l’information sur la théorie et la doctrine traditionnelles.

**DCL7501 RÉGLEMENTATION DU CYBERCOMMERCHE** (3cr.)
Séminaire consacré à l’étude des défis juridiques que pose l’Internet en matière du droit commercial traditionnel. Les sujets à l’étude sont la propriété intellectuelle, les contrats en ligne, les signatures numériques, les impôts, la réglementation des valeurs mobilières et la prestation de services juridiques en ligne.

**DCL7502 RÉGLEMENTATION DES CYBERCOMMUNICATIONS** (3cr.)
Séminaire consacré à l’étude des défis juridiques que pose l’Internet en matière de liberté d’expression et du droit à la vie privée. Certains sujets à l’étude sont l’obscénité, le discours haineux, la diffamation, les mécanismes pour la protection des renseignements personnels, à l’échelle nationale et à l’échelle internationale.

**DCL7503 PRATIQUE DU COMMERCE ÉLECTRONIQUE** (3cr.)
Séminaire pratique pour l’approfondissement de diverses questions et implications juridiques du commerce électronique. Certains sujets à l’étude sont l’attribution de licences, les politiques relatives à la protection des renseignements personnels et à la négligence, les ententes pour le développement du Web et les questions de réglementation.

**DCL7504 STAGE EN DROIT DE LA HAUTE TECHNOLOGIE** (3cr.)
Stage professionnel auprès d’un ministère gouvernementale ou d’un service du contentieux d’une entreprise se spécialisant en droit de la haute technologie. Noté S (satisfaisant) ou N/S (non satisfaisant) selon les résultats du rapport écrit et de l’évaluation de l’employeur. Préalable : au moins un cours dans le domaine de la propriété intellectuelle ou du droit d’Internet.

**DCL7505 ÉTUDES EN DROIT D’INTERNET** (3cr.)
Études de problèmes d'actualité pour l'approfondissement des interactions croissantes entre le droit et la technologie.

**DCL7506 DROIT DE LA COMMUNICATION DANS LE CYBERESPACE** (3cr.)
Dans un contexte de droit civil, étude des problèmes juridiques liés à la réglementation du contenu d’Internet et à la protection de la vie privée des Internautes, envisagés dans divers domaines du droit, tels les communications, la pornographie, la criminalité, la protection des renseignements personnels et les libertés publiques.

**DCL7507 DROIT INTERNATIONAL D’INTERNET : L’INTÉGRATION DES DIFFÉRENTS SYSTÈMES JURIDIQUES** (3cr.)
Dans un contexte de droit civil, étude des solutions proposées par les différents intervenants du cyberespace, tels les gouvernements, les organismes non-gouvernementaux, l’industrie et les utilisateurs pour la résolution des divers problèmes juridiques, à caractère international, reliés à l’utilisation d’Internet, notamment dans les domaines de droit suivants : la réglementation, la propriété intellectuelle, les noms de domaines, la compétence des tribunaux et la résolution des conflits.

**DCL7508 PROBLÈMES CHOISIS DE PROPRIÉTÉ INTELLECTUELLE ET INDUSTRIELLE** (3cr.)
Dans un contexte de droit civil, étude approfondie de certains problèmes contemporains en droit de la propriété intellectuelle et industrielle.

**DCL7509 ÉTUDES APPROFONDISSES DU DROIT DE LA CONCURRENCE** (3cr.)
Dans un contexte de droit civil, étude des législations en droit de la concurrence; structure administrative; étude des règles portant sur les ententes restreignant la concurrence, les fusions, l’abus de position dominante, les pratiques restrictives, etc.; aspects internationaux du droit de la concurrence.

**DCL7510 TECHNO-RÉGULATION : INTERACTION ENTRE LES TECHNOLOGIES ET L’ÉTAT ACTUEL DU DROIT** (3cr.)
Séminaire consacré à l’application des règles traditionnelles de l’analyse juridique aux difficultes questions de politiques soulevées par les nouvelles technologies de l’information.

**DCL7511 ÉTUDES EN PROPRIÉTÉ INTELLECTUELLE ET INDUSTRIELLE** (3cr.)
Dans un contexte de common law, études des sujets suivants : marques de commerce; système d’enregistrement; délits de commercialisation trompeuse et d’usurpation d’identité; noms commerciaux; droit d’auteur; protection des logiciels, domaine des arts et de l’industrie du spectacle; droit des secrets commerciaux et des renseignements confidentiels; droit des brevets; dessin industriel et tout délit en matière de concurrence. Perspective canadienne et internationale.

**DCL7566 PROJET EN DROIT DE LA TECHNOLOGIE**
Projet à contenu juridique qui peut prendre la forme d’un logiciel, d’un code machine ou d’une application sur l’Internet. Pour satisfaire aux exigences de
recherche de la maîtrise, le contenu juridique doit être substantiel; à défaut d’un tel contenu, un rapport écrit décrivant la portée juridique du projet doit accompagner ce dernier. L’évaluation du projet est faite par la personne qui l’a dirigée et une autre personne désignée par la Direction des études supérieures en droit. Cette évaluation est sanctionnée uniquement par la mention « Réussite » ou « Échec ».

**Droit notarial**

**DCL5321 INTRODUCTION TO LEGAL DRAFTING AND THE PROFESSION OF NOTARY** *(3cr.)*
Introduction to preventive legal drafting (legal opinions, notarized writings and non-litigious proceedings). Introduction to the profession of notary throughout the world. Duties and organization of the profession. Ethical obligations. Writing samples and interpretation analysis.

**DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES** *(3cr.)*
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

**DCL5521 INITIATION À LA RÉDACTION D’ACTES ET À LA PROFESSION NOTARIALE** *(3cr.)*
Introduction à la profession notariale et au droit préventif (le rôle, les devoirs et la responsabilité du notaire; les actes notariés, leur communication et leur conservation). Règles et techniques de rédaction d’une opinion juridique, d’un acte notarié et d’un acte de procédure non contentieux. Introduction à la rédaction préventive et aux conventions de règlement de conflits. Exercices d’analyse, d’interprétation et de rédaction des actes concernés.

**DCL5522 STAGE DE DROIT NOTARIAL** *(3cr.)*
Travail à la clinique de droit notarial, en pratique privée ou au gouvernement sous la supervision d’un notaire. Rapport de stage supervisé par un membre de la Faculté de droit.

**DCL5523 PUBLICITÉ DES DROITS ET PROPRIÉTÉ** *(3cr.)*
Règles régissant la publicité des droits (domaine, modalités et effets de la publicité des droits, immatriculation des immeubles, radiation des droits). Initiation aux modes d’accès aux registres et aux documents à distance. Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : modalités du droit de propriété (copropriété et propriété superficiaire); démembrements du droit de propriété (enphytése, usufruit, usage et servitudes) et publicité des droits.

**DCL5524 RELATIONS FAMILIALES** *(3cr.)*
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : régimes matrimoniaux; conventions matrimoniales; union civile; union de fait; dissolution et liquidation du régime matrimonial et conséquences fiscales; projets d’accord en matière de séparation et de divorce; droit international privé; adoption; régimes de protection des personnes inaptes ou absentes (tutelle, curatelle, conseiller, mandat d’inaptitude) et administration du bien d’autrui. Initiation à la médiation familiale.

**DCL5525 NÉGOCIATION ET TRANSFERTS DE PROPRIÉTÉ** *(3cr.)*
Initiation aux règles de la négociation. Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : avant-contrats; contrats translatifs de propriété (promesse de vente, vente, vente d’un immeuble à usage d’habitation, vente d’entreprise, vente de créance, échange, donation de paiement, donation, etc.); patrimoines d’affectation; reconnaissance judiciaire du droit de propriété; publicité des droits; lois fiscales applicables et conséquences fiscales; restrictions ou autorisations résultant de lois particulières (Loi sur la protection du territoire agricole, Loi sur l’acquisition de terres agricoles par des non-résidents, Loi sur les biens culturels, Loi sur la Régie du logement.

**DCL5526 ENGAGEMENTS FINANCIERS** *(3cr.)*
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : obligations; reconnaissance de dette; sûretés (priorités, hypothèques, garantie bancaire, cautionnement); garanties particulières (vente à tempérance, faculté de rachat, clause résolutoire, fiducie); publicité des droits; procédure particulière à la vente du bien d’autrui; ordre de collocation; droit international privé; droit comparé (garanties mobilières de common law) et faillite et insolvabilité.

**DCL5527 DÉCÈS ET TRANSMISSION DES BIENS** *(3cr.)*
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : testaments; donation à cause de mort; assurance de personnes; substitution et fiducie testamentaire; jugement déclaratif de décès; règlement des successions; conséquences fiscales; devoirs, pouvoirs et responsabilité du légataire; administration du bien d’autrui; gestion fiduciaire; planification successorale; droit international privé et droit comparé (testament étranger, biens situés à l’étranger, etc.).

**DCL5528 EXAMEN DES TITRES IMMOBILIERS** *(3cr.)*

**DCL5529 DROIT DES SOCIÉTÉS** *(3cr.)*
Analyse de cas, dossiers pratiques et rédaction d’actes touchant principalement les domaines suivants : constitution, fonctionnement, financement, réorganisation, fusion et liquidation des sociétés par actions; distribution et attribution de bénéfices, surplus, biens ou avantages aux actionnaires; sociétés de personnes; lois fiscales et lois connexes; planifications financières, corporatives et fiscales.
DCL5530 DROIT DES ENTREPRISES RÉGLEMENTÉES (3cr.)

DCL5532 DROIT NOTARIAL APPROFONDI I (3cr.)
Étude approfondie par dossier maître de sujets spécifiques et d’actualité liés au droit notarial.

DCL5533 DROIT NOTARIAL APPROFONDI II (3cr.)
Étude approfondie par dossier maître de sujets spécifiques et d’actualité liés au droit notarial.

DCL5821 STAGE EN MILIEU PROFESSIONNEL (12cr.)

International Trade and Foreign Investment
DCL5326 STUDIES IN INDIGENOUS LEGAL ISSUES (3cr.)
In-depth examination of a question or topic linked to emerging trends or research areas in Aboriginal or Indigenous law. Topics may include the unique legal position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism; administrative arrangements and other related issues.

DCL6120 ADVANCED INTERNATIONAL LAW (3cr.)

DCL6121 STUDIES IN INTERNATIONAL LAW I (3cr.)

DCL6122 STUDIES IN INTERNATIONAL LAW II (3cr.)

DCL6124 INTERNATIONAL BUSINESS TRANSACTIONS (3cr.)

DCL6125 INTERNATIONAL TRADE REGULATION (3cr.)

DCL6128 LAW, POLITICS AND ECONOMICS IN INTERNATIONAL AFFAIRS (3cr.)
The linkages and differences between the disciplines of law, political science and economics as they relate to international affairs, including an in-depth exploration of the underlying assumptions of each discipline and how they interact in international affairs.

DCL6300 INTERNATIONAL INVESTMENT LAW (3cr.)
Study of the international law applicable to the promotion and protection of foreign investment. Origins, evolution and sources; treatment and protection principles; settlement of investment disputes.

DCL6319 ADVANCED INTERNATIONAL ECONOMIC LAW (3cr.)
This seminar explores theoretical and systemic issues of international economic law.

DCL6350 INTERNATIONAL ECONOMIC LAW CASE STUDIES (3cr.)
This seminar uses case studies to explore theoretical issues of international economic law in the context of actual disputes.

DCL6720 DROIT INTERNATIONAL APPROFONDI (3cr.)

DCL6728 DROIT INTERNATIONAL PRIVÉ (3cr.)

DCL6730 ASPECTS INTERNATIONAUX DE LA PROPRIÉTÉ INTELLECTUELLE (3cr.)

DCL6731 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL I (3cr.)

DCL6732 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL II (3cr.)
DCL6733 DROIT COMMERCIAL INTERNATIONAL (3cr.)

DCL6734 ORGANISATION INTERNATIONALE DU COMMERCE (3cr.)

DCL6735 PROBLÈMES CHOISIS DE DROIT INTERNATIONAL III (3cr.)
Étude approfondie de problèmes d'actualité en droit international.

Research
DCL7033 RECHERCHE DIRIGÉE / DIRECTED RESEARCH (3cr.)

DCL7066 MÉMOIRE DE RECHERCHE / RESEARCH PAPER

DCL7999 RECHERCHE ET THÈSE DE MAÎTRISE / RESEARCH AND MASTER'S THESIS

DCL8330 LEGAL RESEARCH METHODOLOGY AND THEORY (3cr.)
The course will examine epistemology and methodology issues arising in the field of legal research.

DCL9997 PROJET DE THÈSE / THESIS PROPOSAL
Examen au cours duquel l’étudiant expose, par écrit et oralement, son projet de thèse. L’étudiant doit soumettre une proposition de recherche, un plan détaillé ainsi qu’une bibliographie exhaustive. / The student presents, in writing and orally, his or her thesis proposal. The student must submit a research proposal, a detailed plan and a comprehensive bibliography.

DCL9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAM
Examen au cours duquel l’étudiant est évalué oralement sur ses connaissances des fondements dans son domaine de recherche. / During this examination the student will be assessed orally on his or her knowledge of legal foundations in his or her field of research.

DCL9999 THÈSE DE DOCTORAT / PhD THESIS

Lettres françaises

Le Département de français offre des programmes d’études supérieures menant aux grades de maîtrise ès arts (M.A.) en lettres françaises (avec mémoire ou avec thèse) et de docteur en philosophie (Ph.D.) en lettres françaises. Les champs de recherche sont les suivants :

- Création littéraire
- Littératures de langue française : littérature de la France, du Québec et du Canada français ainsi que du reste de la francophonie (Afrique, Antilles, Belgique, etc.)
- Langue et discours : étude diachronique de la langue française, grammaire et rédaction, analyse du discours, rhétorique et stylistique.

Le Département participe aussi à plusieurs programmes pluridisciplinaires : études des femmes (au niveau de la maîtrise), études médiévales et de la Renaissance (au niveau de la maîtrise), et études canadiennes (au niveau de doctorat), ce qui permet aux étudiants d’acquérir une spécialisation dans l’un de ces domaines.

Pour de plus amples renseignements, consultez le site Internet du Département de français.

Le programme de maîtrise est offert à temps plein ou à temps partiel ; le programme de doctorat est offert uniquement à temps plein.

Les programmes sont régis par les règlements généraux de la Faculté des études supérieures et postdoctorales (FÉSP).

Programs

Maîtrise ès arts Lettres françaises
Maîtrise ès arts Lettres françaises Spécialisation en études des femmes
Maîtrise ès arts Lettres françaises Spécialisation en études médiévales et de la renaissance
Doctorat en philosophie Lettres françaises
Doctorat en philosophie Lettres françaises Spécialisation en études canadiennes

Admission

Tout candidat doit détenir une maîtrise ès arts en Lettres françaises ou l’équivalent obtenue avec une note minimale de 75 % (B+).

Le candidat désirant rédiger une thèse de doctorat en création littéraire doit avoir soutenu une thèse de maîtrise en création littéraire, ou l’équivalent, ou présenter un dossier attestant une production de textes jugés équivalents à la thèse de maîtrise en Lettres françaises avec profil en création.

Programme pluridisciplinaire

Le Département de français est l’une des unités scolaires participant au programme pluridisciplinaire de doctorat en études canadiennes. Ce programme a été créé pour les étudiants qui souhaitent enrichir leur formation en Lettres françaises en y ajoutant la dimension interdisciplinaire des études canadiennes. Les séminaires d’études canadiennes (CDN6520 ou CDN6910) étant reconnus par le Département de français, les étudiants inscrits au programme pluridisciplinaire ne sont pas obligés de suivre un cours supplémentaire.

Afin d’être admis au programme, l’étudiant doit préalablement être inscrit à au moins un séminaire de deuxième ou troisième cycle en lettres françaises ayant un contenu canadien ou avoir réussi un séminaire de deuxième ou troisième cycle en Lettres françaises ayant un contenu canadien. Le titre du diplôme de ceux qui auront suivi avec succès l’un des séminaires (CDN6520 ou CDN6910) et qui auront soutenu avec succès une thèse avec contenu canadien sera suivi de la mention « spécialisation en Études canadiennes ».

Pour de plus amples renseignements, voir la description de ce programme affichée sur le site Web de la FÉSP.

Passage accéléré du programme de maîtrise au doctorat

Les étudiants qui, au cours de leur baccalauréat, ont obtenu d’excellents résultats (M.P.C. 8,5) et qui, dans chacun des quatre séminaires de maîtrise, ont mérité la note de 85 % (A) ou plus peuvent demander la permission d’accéder directement au programme de doctorat (l’adoption de cette voie d’accélération exige la recommandation expresse du Comité des études supérieures du Département; le passage doit avoir lieu avant la fin de la quatrième session d’inscription au programme).

Program Requirements

Les exigences du grade sont les suivantes :

Scolarité :

La scolarité de doctorat comprend quatre séminaires (3 crédits chacun), FRA9997 Projet de thèse et FRA9998 Examen de synthèse.

FRA9997 Projet de thèse :

Préparé sous la supervision du directeur de thèse, le projet de thèse doit être soumis, avant la fin de la troisième session d’inscription, au Comité des études supérieures, qui l’approuve ou non (note « satisfaisant » ou « non satisfaisant »). En cas d’échec, l’étudiant a droit, dans un délai de deux mois, à une reprise. S’il échoue une seconde fois, il doit se retirer du programme.

Comptant de 10 à 12 pages, le projet de thèse doit comporter l’énoncé de la problématique, l’état de la question, les objectifs et hypothèses de recherche, l’approche critique ou la méthodologie envisagée, la présentation du corpus envisagé et une bibliographie.

Après l’approbation du projet de thèse, le président du Comité des études supérieures désigne deux professeurs à qui il soumet la bibliographie contenue dans le projet. Ceux-ci examinent s’il y figure des ouvrages ayant trait au contexte (historique, social, littéraire ou théorique) du projet et, dans la négative, indiquent à l’étudiant, au plus tard un mois après l’approbation du projet, des lectures complémentaires.

Avant la fin de sa sixième session d’inscription, l’étudiant remet un texte d’environ vingt-cinq pages (bibliographie comprise de 3 à 4 pages) où il rend compte de l’avancement de sa recherche (présentation précise de sa problématique et de ses approches théoriques, résultats atteints dans l’analyse de son corpus, projet de table des matières).

Examen de synthèse (FRA9998) (cr.) :

L’examen a lieu devant trois professeurs (le directeur ou la directrice de thèse et les professeurs précédemment nommés. L’étudiant fait une présentation orale (environ 20 minutes) dans laquelle il expose sa problématique, ses méthodes d’analyse ainsi que les résultats atteints. Les membres du jury s’assurent tout d’abord que l’étudiant connaît les ouvrages qui ont trait au contexte de son projet, puis ils le questionnent sur tous les aspects de sa thèse, voire lui suggèrent des pistes de recherche ou des modifications à sa démarche. Une note, « satisfaisant » ou « non satisfaisant », attribuée par chacun des membres du jury (à l’exception du directeur ou de la directrice de thèse), sanctionne l’examen. En cas d’avis opposés des deux membres, le président de l’examen oral tranche. En cas d’échec, l’étudiant a droit à une reprise. S’il échoue une seconde fois, il doit se retirer du programme.
La note de passage dans tous les cours est de C+. Les étudiants qui échouent deux cours (équivalent à 6 crédits), le rapport d'étape ou l'examen de synthèse ou si le rapport de progrès est jugé insatisfaisant doivent se retirer du programme.

Référence

Dans un contexte de droit civil, étude des législations en droit de la concurrence; structure administrative; étude des règles portant sur les ententes restreignant la concurrence; protection de la propriété intellectuelle ou du droit d'Internet.

La note de passage dans tous les cours est de C+. Les étudiants qui échouent deux cours (équivalent à 6 crédits), le rapport d'étape ou l'examen de synthèse ou si le rapport de progrès est jugé insatisfaisant doivent se retirer du programme.

Exigences minimales

La note de passage dans tous les cours est de C+. Les étudiants qui échouent deux cours (équivalent à 6 crédits), le rapport d'étape ou l'examen de synthèse ou si le rapport de progrès est jugé insatisfaisant doivent se retirer du programme.

Résidence

Le candidat au doctorat doit être inscrit à temps plein durant au moins six sessions, normalement au début du programme.

Durée du programme

On s'attend à ce que les étudiants remplissent toutes les exigences dans une période de quatre ans. Le délai maximum permis est de six ans à partir de la date initiale d'inscription au programme.

Courses

Tous les cours, à l'exception de FRA 7997, 7998, 7999, 9997, 9998, 9999, valent trois crédits.

Certains cours ne sont pas offerts chaque année. Pour connaître les cours offerts, Cliquez ici.

Approches critiques

FRA5501 POÉTIQUE ET INTERTEXTUALITÉ (3cr.)

FRA5502 LECTURES FÉMINISTES (3cr.)

FRA5503 SOCIOCRITIQUE ET SOCILOGIE DE LA LITTÉRAURE (3cr.)

FRA5505 LITTÉRATURE ET PHILOSOPHIE (3cr.)

FRA5507 ENJEUX DE LA LITTÉRATURE (3cr.)

FRA5508 APPROCHES PHILOLOGIQUES DES TEXTES (3cr.)

FRA5560 ANALYSE DU DISCOURS (3cr.)

FRA5570 RHÉTORIQUE ET PRAGMATIQUE (3cr.)
The School (3cr.)

LIN7333 SEMINAR IN THEORETICAL LINGUISTICS II
First language acquisition, concentrating on theoretical, experimental and methodological issues.

Advanced topics in formal semantics; overview of current debates and technical proposals.

Current laboratory techniques in empirical linguistics.

Transfer from master's to PhD
Ottawa, examinations and assignments may be written in French or in English.

"Admission Requirements."
Detailed information about the programs, for instance, the research areas of professors, course descriptions, and student advising arrangements

FRA6742 LITTÉRATURE DU XX
FRA6741 LITTÉRATURE DU XIX

Tous les cours, à l'exception de FRA 7997, 7998, 7999, 9997, 9998, 9999, valent trois crédits.

membres du jury s'assurent tout d'abord que l'étudiant connaît les ouvrages qui ont trait au contexte de son projet, puis ils le questionnent sur

position of the Indian, Metis and Inuit peoples in Canadian law; the land claims process and agreements; aboriginal and treaty rights; legal pluralism;

DCL5529 DROIT DES SOCIÉTÉS

Introduction to preventive legal drafting (legal opinions, notarized writings and non-litigious proceedings).

administrative arrangements and other related issues.

DCL5730 ASPECTS INTERNATIONAUX DES DROITS DE LA PERSONNE

DCL5301 LEGAL RESEARCH METHODOLOGY

DCL6737 JUSTICE ET VIOLENCES POLITIQUES EXTRÊMES : LA RÉPONSE DU DROIT INTERNATIONAL

DCL6120 ADVANCED INTERNATIONAL LAW

DCL6124 INTERNATIONAL BUSINESS TRANSACTIONS

DCL5590 ATELIER DE MÉTHODOLOGIE (3cr.)

FRA5760 TEXTOLOGIE ET CRITIQUE GÉNÉTIQUE (3cr.)

FRA5770 LITTÉRATURE COMPARÉE (3cr.)

FRA6755 LECTURES POSTCOLONIALES (3cr.)

Siècles
FRA6701 LITTÉRATURE DU MOYEN ÂGE (3cr.)

FRA6702 LITTÉRATURE DE LA RENAISSANCE (3cr.)

FRA6703 LITTÉRATURE DU XVIIÈME SIÈCLE (3cr.)

FRA6704 LITTÉRATURE DU XVIIIÈME SIÈCLE (3cr.)

FRA6711 LITTÉRATURE DU XIXÈME SIÈCLE (3cr.)

FRA6742 LITTÉRATURE DU XXÈME SIÈCLE (3cr.)

FRA6745 LITTÉRATURE ACTUELLE (3cr.)

Genres
FRA5504 FRONTIÈRES DES GENRES (3cr.)

FRA5509 CRÉATION LITTÉRAIRE (3cr.)

FRA6751 ROMAN ET AUTRES GENRES NARRATIFS (3cr.)

FRA6752 POÉSIE (3cr.)

FRA6753 THÉÂTRE (3cr.)

FRA6754 ESSAI ET PROSE D'IDÉES (3cr.)

FRA7765 GENRES BREFS (3cr.)

Cotes générales
(Réservés au programme de maîtrise)

FRA7997 MÉMOIRE

FRA7998 PROJET DE THÈSE DE MAÎTRISE
Linguistics

Linguistics is a discipline that explores the structure of language, its role in human activity, and its relationship to the biological and psychological human organism. It is considered one of the humanities because it focuses on the relationship between human beings and language, but it is also an exact science because of its systematic explanation of the facts of language and its use of experimental methodology.

The Department of Linguistics offers graduate programs leading to the degrees of MA and PhD in linguistics. It is possible, through the selection of relevant courses, to specialize in a variety of areas of linguistic research. These include the following: theoretical linguistics (phonetics, phonology, morphology, syntax, semantics), first and second language acquisition, psycholinguistics, neurolinguistics and sociolinguistics. Detailed information about the programs, for instance, the research areas of professors, course descriptions, and student advising arrangements is provided in the department's student handbook.

The Department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see "Admission Requirements."

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Linguistics
Doctorate in Philosophy Linguistics
Doctorate in Philosophy Linguistics Specialization in Canadian Studies

Admission

The MA in Linguistics (or the equivalent) is required for admission to the doctoral program.

Collaborative programs

The Department of Linguistics is a participating unit in the collaborative program in Canadian Studies at the PhD level. This program has been established for students wishing to enrich their training in linguistics by including an interdisciplinary component in Canadian Studies. The Canadian Studies seminars (CDN 6520 and CDN 6910) fit into the departmental course requirements and do not add to the number of courses required for the PhD in linguistics.

To be admitted to the program, students must be registered in or have successfully completed at least one graduate course in Linguistics with Canadian content. The mention "Specialization in Canadian Studies" will be added to the diploma of students who pass one of the Canadian Studies seminars (CDN 6520 or CDN 6910) and successfully defend a thesis on a Canadian topic in Linguistics.

For further details, please consult the Canadian Studies website of the Faculty of Graduate and Postdoctoral Studies.

Language requirements

Candidates must have an adequate knowledge of English. Most of the courses are offered in English. Under the regulations of the University of Ottawa, examinations and assignments may be written in French or in English.
Transfer from master's to PhD

Students registered in the Master of Arts in Linguistics at the University of Ottawa may, exceptionally, be allowed to transfer to the doctoral program without completing the master’s. To take advantage of this option, they must:

- Complete 3 compulsory courses (LIN5315, LIN5317 and LIN5318) and an optional course in the master's program with a minimum grade of A- or better in each;
- Provide letters in support of the fast-track from professors in two of the courses mentioned above;
- Provide a letter of recommendation from the Graduate Studies Committee of the Department;
- Provide the name of the professor who has agreed to supervise the doctoral thesis.

The transfer must take place within twelve months of initial registration in the master’s; the student must register in the PhD program in the 4th session at the latest. Please note that the minimal admission average requirements for the doctoral program must also be met. Following the transfer, all the requirements of the doctoral program must be met. The total number of course credits required is 30 (12 at the master’s and 18 at the doctoral level).

Program Requirements

Course requirements: A total of six courses (18 cr.)

All students must successfully complete two of the following courses (or approved equivalents):

LIN6315 PHONOLOGY II (3cr.)
LIN6317 SYNTAX II (3cr.)
LIN6318 SEMANTICS II (3cr.)

All students must take four additional graduate courses, chosen in consultation with their advisory committees. All linguistics graduate courses fulfill this requirement, except those which are prerequisites to required doctoral courses (LIN 5315, LIN 5317, LIN 5318)

All students must pass two FLS (French as a second language) courses, unless:

- they have completed their previous studies in French or have passed at least one university course in French (with the exception of language courses);
- they pass, while in the PhD program, a university course in which all course requirements are completed in French (with the exception of language courses);
- they successfully complete at least one of the two major papers for the qualifying examination in French;
- they write a thesis in French; or
- they obtain at least 4.5 on the TestCAN administered by the Official Languages and Bilingualism Institute.

N.B. Research courses and seminar courses may be repeated if the content of the course is different.

Doctoral seminar

The aim of this seminar is to provide doctoral students with the necessary methodological and professional tools for carrying out research in linguistics. This seminar must be taken in conjunction with their first comprehensive exam. Topics to be covered include: defining a research project; presentation of research results; poster preparation; techniques for writing academic papers, conference abstracts, and reviews; journal submission and review procedures; conference participation; research ethics. Compulsory for doctoral students. Graded S/NS.

Comprehensive examination

All students must satisfy a comprehensive examination requirement. The requirement consists of two substantial research papers, each in a different field, selected in consultation with the student’s advisory committee.

Residence and thesis

All students must spend a minimum of six sessions in residence and present a thesis incorporating the results of original research carried out under the supervision of a member of the Faculty of Graduate and Postdoctoral Studies. Transfer students must complete a total of nine sessions in residence (master's and doctorate combined).

Additional requirements

The requirements listed above are necessary minimums, and the department may impose additional courses if this appears desirable in view of the candidate’s previous preparation. Candidates will be informed of any such additional courses at the beginning of their studies.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

Duration of the program
Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and two to three additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Arts. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

The thesis examining board may include members who are not part of the TAC.

**Courses**

**LIN5302 LABORATORY TECHNIQUES: SOFTWARE, SIGNALS AND STIMULI (3cr.)**
Current laboratory techniques in empirical linguistics.

**LIN5303 SOCIOLINGUISTICS I (3cr.)**
Survey of recent and classical literature on variationist sociolinguistics, and the development of skills to locate, extract and interpret variable phenomena in spontaneous speech.

**LIN5304 PSYCHOLINGUISTICS (3cr.)**
Introduction to the psychological factors governing the acquisition and use of language.

**LIN5308 BILINGUALISM (3cr.)**
Variationist perspectives on the linguistic consequences of language contact in stable bilingual communities.

**LIN5310 DIALECTOLOGY (3cr.)**
Seminar on methods in dialectology, with reference to modern languages.

**LIN5315 PHONOLOGY (3cr.)**
Basic phonological concepts; current problems in phonological research; the goals of phonological theory; fundamentals of theoretical and experimental phonology.

**LIN5317 SYNTAX I (3cr.)**
Current aspects and goals of syntactic research. Development of contemporary syntactic concepts.

**LIN5318 SEMANTICS I (3cr.)**
Introduction to formal semantics with emphasis on the composition of meaning; research goals in formal semantics and overview of some current research questions.

**LIN5323 RESEARCH IN ENGLISH LINGUISTICS (3cr.)**
Current issues in English linguistics.

**LIN5324 RESEARCH IN SOCIOLINGUISTICS (3cr.)**
Current issues in sociolinguistic research.

**LIN5998 TRAVAUX PRATIQUES I / GUIDED RESEARCH I (3cr.)**

**LIN5999 TRAVAUX PRATIQUES II / GUIDED RESEARCH II (3cr.)**

**LIN6301 EXPERIMENTAL PHONETICS: PHYSIOLOGY (3cr.)**
Physiological aspects of speech production.

**LIN6302 EXPERIMENTAL PHONETICS: ACOUSTICS (3cr.)**
Fundamentals of speech acoustics.

**LIN6315 PHONOLOGY II (3cr.)**
Current issues in formal and experimental phonology. Prerequisite: LIN5315 or equivalent.

**LIN6317 SYNTAX II (3cr.)**
Current issues in syntax. Prerequisite: LIN5317 or equivalent.

**LIN6318 SEMANTICS II (3cr.)**
Advanced topics in formal semantics; overview of current debates and technical proposals. Prerequisite: LIN5318 or equivalent.
LIN7301 STATISTICS FOR LINGUISTICS RESEARCH (3cr.)
Specialized statistical methods for linguistic analysis, including both descriptive and inferential statistics (e.g. frequency distribution, standard deviation, ANOVA, MANOVA, Regression, Correlation, and T-tests). Training in statistical software. Reading and writing of reports on statistics results. Practical training with linguistic data sets.

LIN7310 SEMINAR I (3cr.)
Topic to be announced.

LIN7311 SEMINAR II (3cr.)
Topic to be announced.

LIN7312 SEMINAR III (3cr.)
Topic to be announced.

LIN7319 FIRST LANGUAGE ACQUISITION (3cr.)
First language acquisition, concentrating on theoretical, experimental and methodological issues.

LIN7320 SECOND LANGUAGE ACQUISITION I (3cr.)
Second language acquisition, concentrating on theoretical, experimental and methodological issues.

LIN7330 TOPICS IN THEORETICAL LINGUISTICS I (3cr.)
Topic to be announced.

LIN7331 TOPICS IN THEORETICAL LINGUISTICS II (3cr.)
Topic to be announced.

LIN7332 SEMINAR IN THEORETICAL LINGUISTICS I (3cr.)
Topic to be announced.

LIN7333 SEMINAR IN THEORETICAL LINGUISTICS II (3cr.)
Topic to be announced.

LIN7340 SECOND LANGUAGE ACQUISITION II (3cr.)
Current issues in second language acquisition.

LIN7341 PSYCHOLINGUISTICS II (3cr.)
Current issues in psycholinguistics.

LIN7342 SOCIOLINGUISTICS II (3cr.)
Current issues in sociolinguistics.

LIN7343 NEUROLINGUISTICS (3cr.)
Fundamentals of neurolinguistics: concepts, methods and theories.

LIN7913 SÉMINAIRE IV / SEMINAR IV (3cr.)

LIN7921 COURS DE PRATIQUE PSYCHOLINGUISTIQUE / PRACTICUM IN PSYCHOLINGUISTICS (3cr.)

LIN7997 MÉMOIRE DE MAÎTRISE / M.A. RESEARCH PAPER

LIN8398 DOCTORAL SEMINAR
Development of presentational and writing skills (abstracts, articles); the inner workings of the linguistic community (conferences, types of publications, the publication process); the academic job market (applications, interviews); the academic career; the non-academic job market and the transferability of academic skills.

LIN9998 EXAMEN DE CANDIDATURE DU DOCTORAT / PhD QUALIFYING EXAMINATION

LIN9999 RECHERCHE ET THÈSE DE DOCTORAT / PhD THESIS RESEARCH

Management

The Telfer School of Management offers programs leading to graduate diplomas in Organizational Performance Management, Scientific Management and Leadership, and Leadership and Management (offered only in French at the moment), as well as to the degree of Master of Science (MSc) in Management.
The master’s program is designed to train experts who can contribute to academic excellence and influence change in society by undertaking and disseminating rigorous academic, applied and policy research in management, particularly in the fields of innovation management and entrepreneurship.

Students in the program may opt to complete a concentration in either one of these two fields. The concentration appears on the transcript.

The MSc in Management is a participating program in the collaborative program in environmental sustainability at the master’s level.

The PhD program in Management is offered under the auspices of the Faculty of Graduate and Postdoctoral Studies (FGPS) and the Telfer School of Management. It is offered on a full-time basis in the following five fields:

- Accounting and Control
- Entrepreneurship
- Finance
- Health Systems
- Organizational Behavior and Human Resources

Information on the fields and research interests of the professors is posted on the program website.

The program is currently offered in English. In accordance with University of Ottawa regulations, students have the right to produce their work, their thesis, and to answer examination questions in French or in English.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Science Management

Master of Science Management Specialization in Environmental Sustainability

Doctorate in Philosophy Management

**Admission**

To be considered for admission, applicants must:

- Hold a master’s degree with thesis in a relevant discipline. Each field has articulated its own list:
  - Accounting or Finance.
  - Entrepreneurship: Management or Social Sciences, and depending on the area of inquiry, applicants with other academic antecedents may also be admissible.
  - Finance: Finance, or a relevant discipline with a solid understanding of finance theory and how it applies to financial management.
  - Health Systems: Health Systems, Nursing, Health Informatics, or Health sciences. Depending on the area of inquiry, students with a degree in Information systems, EBT, or operations research may also be admissible.
  - Organizational Behavior and Human Resources: OB/HR or Psychology.

- Have an admission average of at least 8.0 (A-) calculated in accordance with FGPS regulations.

- Provide the names of two referees who will provide confidential recommendations.

- Provide a CV.

- Identify at least one professor who is a member of the program and whose research interests correspond to theirs.

- Provide an electronic copy of your statement of intent clearly identifying your chosen field of interest (Accounting and Control, Entrepreneurship, Finance, Health Systems, or Organizational Behaviour and Human Resources). The statement of intent should be between 800 and 1000 words.

- Provide results of either the GMAT (Graduate Management Admissions Test) or the GRE (Graduate Record Examination), scoring at least in the 80th percentile.

- A writing sample, such as a scholarly paper, between 10 and 15 pages in length.

Exceptionally, applicants holding a master’s degree without thesis may be considered provided their file includes scholarly publications or equivalent evidence of their capacity for advanced research.
Additional coursework

Students whose master’s degree was not in a related discipline may be required to take up to 9 credits of additional courses beyond those normally required for the PhD in management. The additional coursework would be selected from:

- MGT5300 Research design methodologies and the conduct of research (3cr.)
- MGT5300 Foundations of management (3cr.)
  and
- one of the following:
  - MGT5301 Multivariate research methods (3cr.)
  - MGT5302 Qualitative research methods (3cr.)
  - MHS6780 Systems analysis, modeling, and decision support in health (3cr.)

The additional coursework is determined by the Admissions Committee, in consultation with the potential supervisor, and is specified in the student’s offer of admission. Students who are asked to complete 3 additional courses may not simultaneously take PhD courses.

Language requirements

The program is currently offered in English. With the body of knowledge in Management being mainly in English, all candidates whose first language is not English must submit evidence of proficiency by providing any of the documents in the following list:

- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) rubrics (Reading, Listening, Writing, Speaking) and at least 6 in the fourth. The IELTS is administered by the British Council: www.ielts.org.
- Proof of completion, within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and employment in an English speaking country (normally at least four of the last six years).

Students whose first language is other than French and who intend to complete the program in French must provide proof of proficiency in that language. The list of acceptable proofs is indicated in the Admission section of the FGPS General Regulations.

Fast-track from master’s to PhD

Students enrolled in the MSc program in Management or Health Systems at the University of Ottawa may be allowed to fast-track to the PhD program without being required to write a master’s thesis, provided they meet the following conditions:

- Completion of 9 credits of master’s courses with a minimum average of 8.5.
- Satisfactory progress in the research program.
- Submission and successful defense of a well-developed research proposal.
- Written recommendation from the proposed PhD thesis supervisor (and co-supervisor if applicable) and another professor in the program.

Students must request permission to fast-track during the third session of registration or earlier and, if approved, must register in the PhD in the fourth session.

Application deadline

- January 15
  Applications for admission are accepted for the Fall session only, and only for full-time study.

Program Requirements

The requirements of the PhD program in Management include successful completion of 27 credits of coursework, a comprehensive examination (oral and written), a thesis proposal, and a thesis, as follows:

Two common compulsory courses (6 credits):

MGT7101 METHODOLOGICAL FOUNDATIONS OF MANAGEMENT RESEARCH (3cr.)
MGT7102 THEORETICAL FOUNDATIONS OF MANAGEMENT (3cr.)

Three field-specific courses (9 credits) selected from the list below:

MGT8101 FINANCIAL ACCOUNTING AND REPORTING (3cr.)
MGT8102 ACCOUNTING AND CONTROL (3cr.)
MGT8103 SPECIAL TOPICS IN ACCOUNTING AND CONTROL RESEARCH (3cr.)

or
MGT8104 THEORETICAL ENTREPRENEURSHIP RESEARCH (3cr.)
MGT8105 ENTREPRENEURSHIP RESEARCH (3cr.)
MGT8106 SPECIAL TOPICS IN ENTREPRENEURSHIP RESEARCH (3cr.)

or

MGT8107 FINANCE (3cr.)
MGT8108 RECENT DEVELOPMENTS IN FINANCE RESEARCH (3cr.)
MGT8109 SPECIAL TOPICS IN FINANCE RESEARCH (3cr.)

or

MGT8110 CURRENT ISSUES IN HEALTH SYSTEMS MANAGEMENT (3cr.)
MGT8111 RESEARCH DESIGN AND METHODS FOR HEALTH SYSTEMS RESEARCH (3cr.)
MGT8112 SPECIAL TOPICS IN HEALTH SYSTEMS RESEARCH (3cr.)

or

MGT8113 FUNDAMENTALS OF HUMAN RESOURCES MANAGEMENT (3cr.)
MGT8114 FUNDAMENTALS OF ORGANIZATIONAL BEHAVIOUR (3cr.)
MGT8115 SPECIAL TOPICS IN ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT RESEARCH (3cr.)

In collaboration with their TAC (thesis advisory committee), students may take a content course offered by another academic unit, in lieu of a Special Topics course, if deemed a better fit for their thesis research.

Three research methods courses (9 credits), chosen from an approved list, including:

- MGT7103 ADVANCED QUANTITATIVE ANALYSES IN MANAGEMENT (3cr.)
- MGT7104 SPECIAL TOPICS IN ANALYSIS FOR MANAGEMENT RESEARCH (3cr.)
- MGT7302 QUALITATIVE RESEARCH METHODS (3cr.)

Optional course (3 credits)
The optional course selected must be from a field of the PhD in Management other than the student’s primary field.

Comprehensive examination (MGT9997)
The Comprehensive Examination is a two-part examination (written and oral) that is overseen by the Thesis Advisory Committee. Once the written exam has been passed, the student proceeds to the oral. A student who fails either component of the exam is allowed to repeat it the following session. A second failure in either component leads to withdrawal from the program. The Comprehensive Examination must normally be completed within 5 sessions of commencing the program and, at the latest, by the end of the sixth session. Failure to sit and pass the examination by the deadline counts as a failure.

Further details about the comprehensive exam are posted on the program website.

Thesis proposal (MGT9998)
The thesis proposal, prepared under the direction of the thesis supervisor, must be defended to the satisfaction of the Thesis Advisory Committee (TAC). The proposal must normally be successfully completed by the end of the seventh session. In the event of failure, the proposal can be resubmitted and defended the following session at the latest. A second failure leads to withdrawal from the program. The proposal must be successfully defended before submitting it to the Research Ethics Board (if required) and before undertaking any independent data collection.

Further details about the thesis proposal are posted on the program website.

Thesis (MGT9999)

Transfer from master's to PhD

To receive the doctorate following the fast-track, students must successfully complete 36 course credits (MSc + PhD), the comprehensive examination, the thesis proposal and the thesis.

Additional requirements

The requirements outlined above are a minimum. For information about additional courses, please see the “Admission” section.

Duration of program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of students fast-tracked from the master’s to the doctorate.

Residence

All students must complete a minimum of six sessions of full-time registration at the beginning of the program or nine sessions in the case of students fast-tracked from the master’s.

Minimum standards

The passing grade in all courses is 70% (B). Students who fail two courses (equivalent to 6 credits), the comprehensive exam, the thesis proposal, the thesis or whose progress is deemed unsatisfactory must withdraw from the program.
**Thesis Advisory Committee (TAC)**

During the first session, a thesis advisory committee (composed of the thesis supervisor and at least two other professors) is assigned in consultation with the student. The three committee members must cover at least two of the fields in the program. The composition of the committee must be approved by the Program Director. This committee is responsible for providing advice throughout the program, including on academic integrity and research ethics. The student meets with the TAC at least twice a year and receives a written report from the Committee following each meeting.

**Courses**

**MGT5100 RESEARCH DESIGN METHODOLOGIES AND THE CONDUCT OF RESEARCH (3cr.)**
Introduction to research and scientific inquiry in order to foster a better understanding of the research discovery process. Planning, designing, and conducting a research project; detailed discussion of the research methods and techniques available; selecting research methods and techniques appropriate for the nature of the problem and the objectives of the project. Exposure to various research methodologies including paradigms of social phenomena modeling, qualitative research, mathematical modeling methods, and experimental design approaches including randomized control trials (RCT) design principles. *Exclusion: MGT7101*

**MGT5101 MULTIVARIATE RESEARCH METHODS (3cr.)**
Analysis of the basic multivariate techniques that are often used in the social and life sciences in order to enable students to apply the correct technique to any given set of data, properly interpret the output of statistical computer packages, and understand and critique scientific papers that use these techniques. Topics will include principal components analysis, factor analysis, multivariate analysis of variance, multiple and logistic regression, log-linear analysis, and introduction to structural equation modeling.

**MGT5102 QUALITATIVE RESEARCH METHODS (3cr.)**
Designing qualitative studies, collecting and analyzing qualitative data, attaining research credibility, and writing a qualitative research report. Topics will include the case study, ethnography, phenomenology and grounded theory. Introduction to the use of qualitative data analysis software (such as N-Vivo). Critical evaluation of qualitative studies. *Exclusion: MGT7302*

**MGT5300 FOUNDATIONS OF MANAGEMENT (3cr.)**
Primary focus on building a strong foundation of the theories and practice of management. Exposure to current research issues and scholarly literature in management. Relevance and application of the various theories to the fields of innovation and entrepreneurship.

**MGT6110 ENTREPRENEURIAL PROCESS AND OPPORTUNITY RECOGNITION (3cr.)**
Current state of research in entrepreneurship, synthesis of scholarly literature, identifying priorities for future research. Topics will include entrepreneurial processes, opportunity and the nature of exploitation, the emergence of new ventures, financing new ventures, entrepreneurship, economic growth and policy.

**MGT6111 VENTURE CAPITAL AND PRIVATE EQUITY (3cr.)**
Role of venture capital and private equity in the enterprise development process and in the commercialization of innovation. Examination of the following: assembly and investment of early-stage risk capital; operation of venture capital firms' equity and that of private firms; evaluation of investments; portfolio management; non-financial forms of value added provided by venture capital funds. Theory and practical exercises.

**MGT6112 SOCIAL ENTREPRENEURSHIP (3cr.)**
Role of social entrepreneurs as change agents striving to create social value through entrepreneurship. Study of the emerging area of social entrepreneurship and related areas where social and economic goals and means are combined. Introduction to the concepts, practices, opportunities, and challenges of social entrepreneurship and related areas. Frameworks and tools for operating effectively in areas of nontraditional entrepreneurship. Engagement of students in a joint learning process to create a deeper understanding of these changing fields.

**MGT6160 SYSTEMS OF INNOVATION (3cr.)**
Examination of the context in which firms and other organizations operate and of the nature and evolution of industries. Survey of research on the nature and evolution of national and regional systems of innovation, and on politically and geographically defined systems that influence the competitiveness of firms and the prosperity of citizens.

**MGT6161 MANAGING CORPORATE INNOVATIONS (3cr.)**
Strategies and practices of innovation at the corporate level. Topics will include innovation processes and practices, R&D (research and development) management, organizational contexts of innovation management; firm-level theories of innovation management and firm performance; relationships between resources, capabilities, knowledge and skills and innovation, and the nature and influence of inter-organizational relationships (e.g., alliances, joint ventures, acquisitions, networks, ecosystems, etc.) on firms’ innovative capacity.

**MGT6169 RECENT TOPICS IN INNOVATION MANAGEMENT (3cr.)**
Seminar course focusing on specific emerging themes in innovation management. Current themes of interest include: commercialization of innovations; inter-organizational collaborations and relationships in innovation management; impact of globally distributed innovation systems on innovation management, innovation performance, and competitiveness.

**MGT6190 RESEARCH TOPICS IN MANAGEMENT (3cr.)**
Seminar course focusing on current research issues and topics in management. Topics may change from year to year.
MGT6990 STAGE DE RECHERCHE / RESEARCH PRACTICUM (3cr.)

Ce stage s'adresse aux étudiants qui désirent effectuer un projet de recherche auprès d'un organisme comme une entreprise, un ministère ou un organisme public, une association à but non lucratif, un groupe de réflexion ou un établissement de recherche. Il a pour but de donner aux étudiants l'occasion d'appliquer les compétences en recherche acquises dans le cadre de ce programme. Ce stage oblige les étudiants à effectuer au cours d'une session des activités de recherche et à rédiger un rapport individuellement ou au sein d'une équipe, selon les besoins de l'organisme et l'étendue du projet. Préalable : L'inscription au stage doit être approuvée par le directeur du programme. Noté S (satisfaisant) ou NS (non satisfaisant). / Completion of a research project with an organization such as a company, a government department or agency, a non-profit organization, a think-tank, and other research institutions. Application of research skills acquired during the program. Practicum to be completed over one session, either individually or within a small group of students, depending on the needs of the particular organization and the scope of the project. Written paper required. Prerequisite: approval by the program director. Graded S (Satisfactory) or NS (Not Satisfactory).

MGT6991 SÉMINAIRES DE RECHERCHE EN GESTION / MANAGEMENT RESEARCH SEMINAR SERIES

Séminaires de recherche avec la participation de conférenciers invités. Les étudiants doivent assister à au moins six des séminaires des conférenciers invités durant leur programme. Noté S (satisfaisant) ou NS (non satisfaisant). / Research seminar series with invited speakers. Students must attend at least six of the invited speakers' seminars over the duration of their program. Graded S (Satisfactory) or NS (Not Satisfactory).

MGT6998 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)

Études avancées dans un domaine de gestion sous la direction d’un professeur et aboutissant à un rapport écrit. L'étudiant peut proposer un sujet de recherche. Préalable : approbation du directeur du programme sur recommandation du directeur de thèse de l'étudiant. / Advanced study in an area of management under the supervision of a professor and leading to a major written report. Students may propose research topics. Prerequisite: approval by the program director on the recommendation of the student's thesis supervisor.

MGT7101 METHODOLOGICAL FOUNDATIONS OF MANAGEMENT RESEARCH (3cr.)

Theoretical and methodological foundations of management research and research ethics are explored. Topics include the purpose of social science research; nature and role of theories; relationship between facts and values; theory construction, testing, falsification and inference; "positivist" and "non-positivist" methods; social studies of science and scientists; and research ethics involving human subjects. Exclusion: MGT5100

MGT7102 THEORETICAL FOUNDATIONS OF MANAGEMENT (3cr.)

The foundations of various management disciplines are examined in the context of emerging and sometimes conflicting theoretical paradigms such as rational exchange process, sustainability, responsible management and need to balance environmental, economic and social outcomes.

MGT7103 ADVANCED QUANTITATIVE ANALYSES IN MANAGEMENT (3cr.)

Topics will include measurement, univariate and simple multivariate statistics such as simple linear regression, multiple linear regression, logistic regression, analysis of variance, analysis of covariance, principal components analysis, and exploratory factor analysis. Selection and application of major statistical packages.

MGT7104 SPECIAL TOPICS IN ANALYSIS FOR MANAGEMENT RESEARCH (3cr.)

Exploration of advanced analytical approaches from the domain perspective. Understanding of the benefits and limitations of each analytical approach and learning about the judgment required across management disciplines in the application of the approach. Application of computer-based implementations of analytical methods. Covering analyses and models used in varied management disciplines.

MGT7302 QUALITATIVE RESEARCH METHODS (3cr.)

Designing qualitative studies, collecting and analyzing qualitative data, attaining research credibility, and writing a qualitative research report. Topics will include the case study, ethnography, phenomenology and grounded theory. Introduction to the use of qualitative data analysis software (such as N-Vivo). Critical evaluation of qualitative studies. Exclusion: MGT5102.

MGT7999 THÈSE DE M.Sc. / MSc THESIS (12cr.)

MGT8101 FINANCIAL ACCOUNTING AND REPORTING (3cr.)

The theoretical foundations of accounting research and methodologies are examined. Topics include the role of accounting information in capital markets, earnings management, voluntary disclosure, the impact of accounting on judgment and decisions, accounting standards setting accounting standards for sustainable development, intangibles and intellectual capital.

MGT8102 ACCOUNTING AND CONTROL (3cr.)

The role of Accounting and other control instruments in ensuring good corporate governance. Topics include executive compensation, ownership structure, the role of the board of directors, effectiveness of internal controls, enterprise risk management, sustainable management, corporate governance requirements and practices in the public and private sectors.

MGT8103 SPECIAL TOPICS IN ACCOUNTING AND CONTROL RESEARCH (3cr.)

Critical evaluation of studies in targeted domains of accounting and control. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar. Topics are offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8104 THEORETICAL ENTREPRENEURSHIP RESEARCH (3cr.)

Foundation theories of entrepreneurship are examined, including risk and uncertainty, rationales for enterprise growth, innovation process, opportunity recognition, market behaviour, financing new and growing ventures, and entrepreneurship as a social construction.
MGT8105 ENTREPRENEURSHIP RESEARCH (3cr.)
This course focuses on selected topics associated with entrepreneurship research, including internationalization processes, entrepreneurial cognition, feminist entrepreneurship, entrepreneurial marketing, financing enterprise growth, public policy issues and entrepreneurship support, science-based, social and environmental entrepreneurship.

MGT8106 SPECIAL TOPICS IN ENTREPRENEURSHIP RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of entrepreneurship. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar. Topics are offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8107 FINANCE (3cr.)
Theoretical foundations of corporate finance and governance; capital budgeting and investment/growth strategies; strategy and finance: risk and risk management: options; financing/capital structure decisions; payout/dividend policies; mergers and acquisitions; derivative theory (including theories of capital structure); derivatives and fixed-income securities; and risk capital financing.

MGT8108 RECENT DEVELOPMENTS IN FINANCE RESEARCH (3cr.)
Issues in modern finance such as behavioural finance; game-theoretic approaches to corporate finance; ethics in finance, agency theory, regulations and securities agency (e.g., security exchange commission) roles; and financial institutions and services.

MGT8109 SPECIAL TOPICS IN FINANCE RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of finance. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar, with topics offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8110 CURRENT ISSUES IN HEALTH SYSTEMS MANAGEMENT (3cr.)
Overview of developments, issues and challenges in health systems management, emphasizing management from a health systems perspective. Emerging innovations and the applications of innovations in health systems.

MGT8111 RESEARCH DESIGN AND METHODS FOR HEALTH SYSTEMS RESEARCH (3cr.)
Study designs used in healthcare informatics and research, such as experimental designs, observational and predictive studies, and qualitative inquiries. Review of appropriate analytical approaches for each study design.

MGT8112 SPECIAL TOPICS IN HEALTH SYSTEMS RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of health systems. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar, with topics offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT8113 FUNDAMENTALS OF HUMAN RESOURCES MANAGEMENT (3cr.)
Examination of the foundational research areas in Human Resources Management practice. Topics include job analysis, employee recruitment, selection and assessment methods, job performance, fairness and bias and psychometric principles.

MGT8114 FUNDAMENTALS OF ORGANIZATIONAL BEHAVIOUR (3cr.)
Overview of managerial/organizational practices aimed at maximizing work motivation and well-being. Theories of work motivation, leadership, team dynamics, mentoring, occupational health psychology, work-life conflict and facilitation, management of change, and organizational theory.

MGT8115 SPECIAL TOPICS IN ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT RESEARCH (3cr.)
Critical evaluation of studies in targeted domains of organizational behaviour and human resources management. Identification and evaluation of new orientations with an in depth analysis of historical developments of the domain. Specific domains explored depend on the professor leading the seminar, with topics are offered on a rotating basis. Presentation and discussion of thesis project and other personal research projects.

MGT9997 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAM

MGT9998 PROJET DE THÈSE / THESIS PROPOSAL
Préalable / Prequisite : MGT9997

MGT9999 THÈSE DE DOCTORAT / DOCTORAL THESIS
Préalables / Prerequisites : MGT9997 et/and MGT9998

EMP5111 CREATIVITY AND INNOVATION (3cr.)

EMP5112 TECHNOLOGY POLICY AND R & D MANAGEMENT (3cr.)
Relationship between R & D and economic progress. Elements of the Canadian policy on technology; R & D activities in the private and public sectors; government incentives and support programs; comparison with the policies of other industrial countries. Technology planning and R & D management in a Canadian setting; technology forecasting, staffing, structure, strategy and support for R and D. Not accessible to students who have taken ADM 6263 or ADM 6264. Prerequisite: MBA 5230
MBA6226 NEW PRODUCT DEVELOPMENT (1.5cr.)
How to develop new products for high-tech applications in an environment of global competition and shrinking cycle times. Topics include creating the climate, generating ideas, screening ideas, product portfolio selection, team building, managing the formal gating process, testing, killing. New product launch. Product migration strategies. Prerequisite: MBA 6225.

MBA6262 ENTREPRENEURSHIP (1.5cr.)
Creating, growing, and sustaining or exiting a new firm in a technology-intensive industry. Issues important to the technology (the scope and nature of technological knowledge and intellectual property protection), financing (seed capital, venture capital, and initial public offerings), and inter-firm relationships (spin-offs, alliances and equity alliances, and acquisitions). The course is practically oriented and will draw upon local expertise to enhance its pertinence and appeal.

Mathematics and Statistics

Ottawa-Carleton Joint Program

The University of Ottawa offers a rich academic environment to study mathematics and statistics under the supervision of professors who have gained an international reputation for their research. Most major fields of research in mathematics and statistics are represented within the Department of mathematics and Statistics. Moreover, the Department is a participating unit in the master's level collaborative programs in bioinformatics and in biostatistics. Additional information about the Department and its programs is posted on the departmental website at www.mathstat.uottawa.ca.

The Department offers a PhD program and an MSc program in mathematics and statistics. There are three options for the MSc program: MSc with thesis, MSc with project or MSc by coursework (i.e. with courses only). The MSc by coursework in the field of probability and statistics and the MSc with project in all fields can be completed in one year by taking courses over three consecutive sessions.

Since 1984, the graduate programs in mathematics and statistics have been under the umbrella of the Ottawa-Carleton Institute of Mathematics and Statistics (OCIMS). The OCIMS consists of the School of Mathematics and Statistics at Carleton University and the Department of Mathematics and Statistics at the University of Ottawa. The two units have pooled together their resources to offer each year a large selection of graduate courses.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have a right to submit their work, thesis, and exams in French or in English.

Programs

Master of Science Mathematics and Statistics Concentration in Mathematics
Master of Science Mathematics and Statistics Concentration in Statistics
Master of Science Mathematics and Statistics Specialization in Bioinformatics
Master of Science Mathematics and Statistics Specialization in Biostatistics
Doctorate in Philosophy Mathematics and Statistics

Admission

Admission to the graduate program in mathematics and statistics is governed by the general regulations of the Ottawa-Carleton Institute of Mathematics and Statistics (OCIMS) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold a master's in mathematics and statistics (or equivalent) with a minimum average of 75% (B+).
- Demonstrate a good academic performance in as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
• Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
• Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Transfer from Master’s to PhD Program

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

• Completion of two graduate courses (six credits) with a grade of A- or better in each.
• Satisfactory progress in the research program.
• Written recommendation by the supervisor and the advisory committee;
• Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Following the transfer, all of the requirements of the doctoral program must be met: a total of 18 course credits (including the credits completed at the master’s); the comprehensive exam; and a thesis.

Program Requirements

The following requirements must be met:

• 18 credits at the 5000 level or above in mathematics and statistics or in related disciplines approved by the Department of Mathematics and Statistics.
• Successful completion of a comprehensive examination (MAT9998) within eighteen months of the initial admission into the program.
• Presentation and successful defense of a thesis (MAT9999) based on an original research carried out under the direct supervision of a faculty member of the Institute.

The department may require students to take additional courses depending on their backgrounds.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

Residence

All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial registration in the program.

Minimum standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), or the thesis proposal, or the comprehensive exam, or whose research progress is deemed unsatisfactory are required to withdraw.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Science. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

**MAT5105 (MATH5818) DISCRETE APPLIED MATHEMATICS I: GRAPH THEORY** (3cr.)
Paths and cycles, trees, connectivity, Euler tours and Hamilton cycles, edge colouring, independent sets and cliques, vertex colouring, planar graphs, directed graphs. Selected topics from one or more of the following areas: algebraic graph theory, topological theory, random graphs.

**MAT5106 (MATH5808) COMBINATORIAL OPTIMIZATION (3cr.)**
Network flow theory and related material. Topics will include shortest paths, minimum spanning trees, maximum flows, minimum cost flows. Optimal matching in bipartite graphs.

**MAT5107 (MATH 5819) DISCRETE APPLIED MATHEMATICS II: COMBINATORIAL ENUMERATION (3cr.)**
Ordinary and exponential generating functions; product formulas; permutations; partitions; rooted trees; cycle index; WZ method. Lagrange Inversions; singularity analysis of generating functions and asymptotics. Selected topics from one or more of the following areas: random graphs, random combinatorial structures, hypergeometric functions.

**MAT5121 (MATH 5009) INTRODUCTION TO HILBERT SPACE (3cr.)**

**MAT5122 (MATH 5003) BANACH ALGEBRAS (3cr.)**

**MAT5125 (MATH 5007) REAL ANALYSIS I (Measure theory and integration) (3cr.)**
General measure and integral, Lebesgue measure and integration on R, Fubini's theorem, Lebesgue-Radon-Nikodym theorem, absolute continuity and differentiation, Lp-Spaces. Selected topics such as: Daniell-Stone theory. Prerequisite(s): Permission of the Program Director. 
Prerequisites: MAT3125 (MATH 3001 and MATH 3002).

**MAT5126 (MATH 5008) REAL ANALYSIS II (Functional analysis) (3cr.)**

**MAT5127 (MATH 5005) COMPLEX ANALYSIS (3cr.)**

**MAT5131 (MATH 5405) ORDINARY DIFFERENTIAL EQUATIONS (3cr.)**

**MAT5133 (MATH 5406) PARTIAL DIFFERENTIAL EQUATIONS (3cr.)**
First-order equations, characteristics method, classification of second-order equations, separation of variables, Green's functions. Lp and Sobolev spaces, distributions, variational formulation and weak solutions, Lax-Milgram theorem, Galerkin approximation. Parabolic PDes. Wave equations, hyperbolic systems, nonlinear PDes, reaction diffusion equations, infinite-dimensional dynamical systems, regularity. Prerequisite: An intermediate level course on Ordinary Differential Equations such as MAT3130 Dynamical Systems or equivalent, or the permission of the School or Department.

**MAT5134 (MATH 5407) TOPICS IN DIFFERENTIAL EQUATIONS (3cr.)**

**MAT5141 (MATH 5107) ALGEBRA I (3cr.)**
Groups, Sylow subgroups, finitely generated abelian groups. Rings, field of fractions, principal ideal domains, modules. Polynomial algebra, Euclidean algorithm, unique factorization. Prerequisites: MAT 3141 and MAT 3143. Prerequisites: MAT3141 and MAT3143.

**MAT5142 (MATH 5109) ALGEBRA II (3cr.)**
Field theory, algebraic and transcendental extensions, finite fields, Galois groups. Modules over principal ideal domains, decomposition of a linear transformation, Jordan normal form. Prerequisite: MAT 5141 (MATH 5107).

**MAT5143 (MATH 5104) LIE ALGEBRAS (3cr.)**

**MAT5144 (MATH 5001) COMMUTATIVE ALGEBRA (3cr.)**
Prime spectrum of a commutative ring (as a topological space); localization of rings and modules; tensor product of modules and algebras; Hilbert's Nullstellensatz and consequences for finitely generated algebras; Krull dimension of a ring; integral dependence, going-up, going-down; Noether Normalization Lemma and dimension theory for finitely generated algebras over a field; noetherian rings and Hilbert Basis Theorem; introduction to affine algebraic varieties and their morphisms. Prerequisite: MAT3143

**MAT5145 (MATH 5106) GROUP THEORY (3cr.)**

**MAT5146 (MATH 5103) RINGS AND MODULES (3cr.)**

**MAT5147 (MATH 5108) HOMOLOGICAL ALGEBRA AND CATEGORY THEORY (3cr.)**

**MAT5148 (MATH 5102) GROUP REPRESENTATIONS AND APPLICATIONS (3cr.)**
MAT5149 (MATH 5002) ALGEBRAIC GEOMETRY (3cr.)
Brief overview of commutative algebra, Hilbert’s Nullstellensatz, algebraic sets, and Zariski topology. Affine and projective varieties over algebraically closed fields. Regular functions and rational maps. Additional topics chosen from: the relation of varieties over complex numbers to complex analytic manifolds, genus, divisors, line bundles, Riemann-Roch Theorem, Bézout’s Theorem. Prerequisite: MAT3143

MAT5150 (MATH 5201) TOPICS IN GEOMETRY (3cr.)

MAT5151 (MATH 5205) TOPOLOGY I (3cr.)
Topological spaces, product and identification topologies, countability and separation axioms, compactness, connectedness, homotopy, fundamental group, net and filter convergence. Prerequisite: MAT 3153 (MATH 3001).

MAT5152 (MATH 5206) TOPOLOGY II (3cr.)
Covering spaces, homology via the Eilenberg-Steenrod axioms, applications, construction of a homology functor. Prerequisites: MAT 3143 and MAT 5151 (MATH 3100 and MATH 5205). Prerequisites: MAT3143 and MAT3151 (MATH 3100 and MATH 5205).

MAT5155 (MATH 5208) DIFFERENTIABLE MANIFOLDS (3cr.)

MAT5158 (MATH 6104) LIE GROUPS (3cr.)

MAT5160 (MATH 5300) MATHEMATICAL CRYPTOGRAPHY (3cr.)
Analysis of cryptographic methods used in authentication and data protection, with particular attention to the underlying mathematics, e.g. Algebraic Geometry, Number Theory, and Finite Fields. Advanced topics on Public-Key Cryptography: RSA and integer factorization, Diffie-Hellman, discrete logarithms, elliptic curves. Topics in current research. Prerequisites: undergraduate honours algebra, including group theory and finite fields. Prerequisite: undergraduate honours algebra, including group theory and finite fields.

MAT5161 (MATH 5301) MATHEMATICAL LOGIC (3cr.)
A basic graduate course in mathematical logic. Propositional and Predicate logic, Proof theory, Gentzen’s Cut-Elimination, Completeness, Compactness, Henkin models, model theory, arithmetic and undecidability. Special Topics (time permitting) depending on interests of instructor and audience. Prerequisites: honours undergraduate algebra, analysis and topology (or permission of the instructor). Prerequisite: Honours undergraduate algebra, analysis and topology (or permission of the instructor).

MAT5162 (MATH 6807) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (3cr.)
Foundations of functional languages, lambda calculi (typed, polymorphically typed, untyped), Curry-Howard Isomorphism, proofs-as-programs, normalization and rewriting theory, operational semantics, type assignment, introduction to denotational semantics of programs, fixed-point programming. Topics chosen from: denotational semantics for lambda calculus, models of programming languages, complexity theory and logic of computation, models of concurrent and distributed systems, etc. Prerequisites: honours undergraduate algebra and either topology or analysis. Some acquaintance with Logic useful. Prerequisite: Honours undergraduate algebra and either topology or analysis. Some acquaintance with Logic useful.

MAT5163 (MATH 5305) ANALYTIC NUMBER THEORY (3cr.)

MAT5164 (MATH 5306) ALGEBRAIC NUMBER THEORY (3cr.)

MAT5165 (MATH 5605) THEORY OF AUTOMATA (3cr.)

MAT5167 (MATH/COMP 5807) FORMAL LANGUAGE AND SYNTAX ANALYSIS (3cr.)

MAT5168 (MATH 5202) HOMOLOGY THEORY (3cr.)

MAT5169 (MATH 5207) FOUNDATIONS OF GEOMETRY (3cr.)

MAT5170 (STAT 5708) PROBABILITY THEORY I (3cr.)
Probability spaces, random variables, expected values as integrals, joint distributions, independence and product measures, cumulative distribution functions and extensions of probability measures, Borel-Cantelli lemmas, convergence concepts, independent identically distributed sequences of random variables. Prerequisites: Permission of Program Director. Prerequisites: MAT3125 and MAT3172 (MATH 3001, MATH 3002 and MATH 3300).

MAT5171 (MATH 5709) PROBABILITY THEORY II (3cr.)
Laws of large numbers, characteristic functions, central limit theorem, conditional probabilities and expectation, basic properties and convergence theorems for martingales, introduction to Brownian motion. Prerequisite: MAT 5170 (STAT 5708).
MAT5172 (STAT 5508) TOPICS IN STOCHASTIC PROCESSES (3cr.)

MAT5173 (STAT 5604) STOCHASTIC ANALYSIS (3cr.)
Brownian motion, continuous martingales and stochastic integration.

MAT5174 (STAT 5704) NETWORK PERFORMANCE (3cr.)
The course will focus on advanced techniques in performance evaluation of large complex networks. Topic may include classical queueing theory and simulation analysis; models of packet networks; loss and delay systems; blocking probabilities. Prerequisites: Some familiarity with probability and stochastic processes and queueing, or permission of the instructor. Prerequisite: Some familiarity with probability and stochastic processes and queueing, or permission of the instructor.

MAT5175 (STAT 5506) ROBUST STATISTICAL INFERENCE (3cr.)

MAT5181 (STAT 5703) DATA MINING I (3cr.)
Visualization and knowledge discovery in massive datasets; unsupervised learning: clustering algorithms; dimension reduction; supervised learning: pattern recognition, smoothing techniques, classification. Computer software will be used. Prerequisite: Permission of the Instructor.

MAT5182 (STAT 5702) MODERN APPLIED / COMPUTATIONAL STATISTICS (3cr.)
Resampling and computer intensive methods: bootstrap, jackknife with applications to bias estimation, variance estimation, confidence intervals, and regression analysis. Smoothing methods in curve estimation; Statistical classification and pattern recognition: error counting methods, optimal classifiers, bootstrap estimates of the bias of the misclassification error.

MAT5185 (MATH 5408) ASYMPTOTIC METHODS OF APPLIED MATHEMATICS (3cr.)

MAT5187 (MATH 5403) TOPICS IN APPLIED MATHEMATICS (3cr.)

MAT5190 (STAT 5600) MATHEMATICAL STATISTICS I (3cr.)
Statistical decision theory; likelihood functions; sufficiency; factorization theorem; exponential families; UMVU estimators; Fisher’s information; Cramer-Rao lower bound; maximum likelihood and moment estimation; invariant and robust point estimation; asymptotic properties; Bayesian point estimation. Prerequisites: MAT 3172 and MAT 3375. Prerequisites: MAT5172 and MAT5375.

MAT5191 (STAT 5501) MATHEMATICAL STATISTICS II (3cr.)
Confidence intervals and pivots; Bayesian intervals; optimal tests and Neyman-Pearson theory; likelihood ratio and score tests; significance tests; goodness-of-fit tests; large sample theory and applications to maximum likelihood and robust estimation. Prerequisite: MAT 5190.

MAT5192 (STAT 5502) SAMPLING THEORY AND METHODS (3cr.)
Unequal probability sampling with and without replacement; unified theory of standard errors; prediction approach; ratio and regression estimation; stratification and optimal designs; multistage cluster sampling; double sampling; domains of study; post-stratification; non-response; measurement errors. Related topics. Prerequisite: (MATH 4502).

MAT5193 (STAT 5503) LINEAR MODELS (3cr.)
Theory of non-full-rank linear models: estimable functions, best linear unbiased estimators, hypothesis testing, confidence regions; multi-way classification; analysis of covariance; variance component models: maximum likelihood estimation, MINQUE, ANOVA methods. Miscellaneous topics. Prerequisite: MAT 4175 (MATH 4500) or MAT 5190 (STAT 5600).

MAT5194 (STAT 5504) STOCHASTIC PROCESSES AND TIME SERIES ANALYSIS (3cr.)

MAT5195 (STAT 5505) DESIGN OF EXPERIMENTS (3cr.)
Overview of linear model theory; orthogonality; randomized block and split plot designs; Latin square designs; randomization theory; incomplete block designs; factorial experiments; confounding and fractional replication; response surface methodology. Miscellaneous topics. Prerequisites: MAT 3375 and MAT 3376 or MAT 5190 (STAT 3505 and STAT 4500 or STAT 5600). Prerequisites: MAT5375 and MAT5376 or MAT5190 (STAT 3505 and STAT 4500 or STAT 5600).

MAT5196 (STAT 5509) MULTIVARIATE ANALYSIS (3cr.)

MAT5197 (STAT 5601) STOCHASTIC OPTIMIZATION (3cr.)
Topics chosen from stochastic dynamic programming, Markov decision processes, search theory, optimal stopping. Prerequisite: STAT 3506 or MAT 4371.

MAT5198 (MATH 5701) STOCHASTIC MODELS (3cr.)
Markov systems, stochastic networks, queuing networks, spatial processes, approximation methods in stochastic processes and queuing theory. Applications to the modelling and analysis of computer-communications systems and other distributed networks.
MAT5301 (MATH 5609) TOPICS IN COMBINATORIAL MATHEMATICS (3cr.)

MAT5303 (MATH 5801) LINEAR OPTIMIZATION (3cr.)

MAT5304 (MATH 5803) NONLINEAR OPTIMIZATION (3cr.)

MAT5307 (MATH 5804) TOPICS IN OPERATIONS RESEARCH (3cr.)

MAT5308 (MATH 5805) TOPICS IN ALGORITHM DESIGN (3cr.)

MAT5309 (MATH 6002) HARMONIC ANALYSIS ON GROUPS (3cr.)

MAT5312 (MATH 6201) TOPICS IN TOPOLOGY (3cr.)

MAT5313 (MATH 6507) TOPICS IN PROBABILITY AND STATISTICS (3cr.)

MAT5314 (MATH 6508) TOPICS IN PROBABILITY AND STATISTICS (3cr.)

MAT5315 ADVANCED DESIGN OF SURVEYS (3cr.)

MAT5317 (STAT 5602) ANALYSIS OF CATEGORICAL DATA (3cr.)
Analysis of one-way and two-way tables of nominal data; multi-dimensional contingency tables, log-linear models; tests of symmetry, marginal homogeneity in square tables; incomplete tables; tables with ordered categories; fixed margins, logistic models with binary response; measures of association and agreement; applications biological.

MAT5318 (STAT 5603) RELIABILITY AND SURVIVAL ANALYSIS (3cr.)

MAT5319 (MATH 6507) TOPICS IN PROBABILITY AND STATISTICS (3cr.)

MAT5324 (MATH 5607) GAME THEORY (3cr.)

MAT5325 (MATH 5802) TOPICS IN INFORMATION AND SYSTEMS SCIENCE (3cr.)

MAT5326 (MATH 6008) TOPICS IN ANALYSIS (3cr.)

MAT5327 (MATH 6101) TOPICS IN ALGEBRA (3cr.)

MAT5328 (MATH 6008) TOPICS IN ANALYSIS (3cr.)

MAT5329 (MATH 6009) TOPICS IN ANALYSIS (3cr.)

MAT5330 (MATH 6102) TOPICS IN ALGEBRA (3cr.)

MAT5331 (MATH 6103) TOPICS IN ALGEBRA (3cr.)

MAT5341 (MATH5821) QUANTUM COMPUTING (3cr.)

MAT5343 MATHEMATICAL ASPECTS OF WAVELETS AND DIGITAL SIGNAL PROCESSING (3cr.)
Lossless compression methods. Discrete Fourier transform and Fourier-based compression methods. JPEG and MPEG. Wavelet analysis. Digital filters and discrete wavelet transform. Daubechies wavelets. Wavelet compression. Prerequisites: Linear algebra and Fourier series, or permission of the School or Department.

MAT5361 (MATH 6806) TOPICS IN MATHEMATICAL LOGIC (3cr.)

MAT5375 (STAT 5610) MATHEMATICAL STATISTICS (3cr.)
Limit theorems; sampling distributions; parametric estimation; concepts of sufficiency and efficiency; Neyman-Pearson paradigm, likelihood ratio tests; parametric and non-parametric methods for two-sample comparisons; notions of experimental design, categorical data analysis, the general linear model, decision theory and Bayesian inference. Prerequisites: MAT2121, (MAT2141 or MAT2342), MAT2375. Exclusion: Students in the MSc program cannot combine this course with MAT5190 (STAT5000) for credit towards the master’s program.

MAT5476 (STAT 5507) ADVANCED STATISTICAL INFERENCE (3cr.)
Pure significance tests; uniformly most powerful unbiased and invariant tests; asymptotic comparison of tests; confidence intervals; large sample theory of likelihood ratio and chi-square tests; likelihood inference; Bayesian inference. Topics such as empirical Bayes inference, fiducial and structural inference, resampling methods. Prerequisites: MAT 4170 or equivalent and MAT 5191. Prerequisite: MAT4170 or equivalent and MAT5191.

MAT5177 (STAT 5500) MULTIVARIATE NORMAL THEORY (3cr.)

MAT5180 (MATH 5806) NUMERICAL ANALYSIS FOR DIFFERENTIAL EQUATIONS (3cr.)

MAT5990 (MATH 5900) SÉMINAIRE / SEMINAR (3cr.)

MAT5996 (MATH 5906) TRAVAUX DIRIGÉS / DIRECTED STUDIES (3cr.)

Cours visant à donner à l’étudiant la possibilité d’entreprendre de la recherche mathématique dans le contexte d’un projet en collaboration avec un organisme parrain des secteurs public ou privé. Inclut des séminaires sur des sujets pertenents au projet de l’étudiant. Note finale S (satisfaisant) ou NS (non satisfaisant), à décider par le professeur responsable du cours en consultation avec le superviseur du stage, fondée sur le contenu mathématique et sur la présentation orale et écrite des résultats. Préalable : Permission de l’Institut. / Project-oriented course affording students the opportunity to undertake research in applied mathematics as a cooperative project with governmental or industrial sponsors. Project work and seminars on related topics. Grade S (satisfactory) or NS (not satisfactory) to be assigned based upon the mathematical content as well as upon the oral and written presentation of results, and to be determined by the professor in charge of the course in consultation with the internship supervisor. Prerequisite: Permission of the Institute.

MAT6990 (MATH 6900) SÉMINAIRE / SEMINAR (3cr.)

MAT6991 (MATH 6901) TRAVAUX DIRIGÉS / DIRECTED STUDIES (3cr.)

MAT6997 (MATH5910) PROJET EN MATHÉMATIQUES ET STATISTIQUE / PROJECT IN MATHEMATICS AND STATISTICS (6cr.)
Projet en mathématiques et statistique dirigé par un professeur approuvé par le directeur des études supérieures et donnant lieu à la rédaction d’un rapport approfondi (30-40 pages approx). Noté S (satisfaisant) ou NS (non satisfaisant) par le directeur du projet et un autre professeur nommé par le directeur des études supérieures en mathématiques et statistique. Le projet est normalement complété en une session. Préalable : approbation du directeur des études supérieures en mathématiques et statistique. / Project in mathematics and statistics supervised by a professor approved by the director of graduate studies and leading to the writing of an in-depth report (approx. 30-40 pages). Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the director of graduate studies in mathematics and statistics. The project will normally be completed in one session. Prerequisite: approval of director of graduate studies in mathematics and statistics.

MAT7999 THÈSE DE MAÎTRISE / MSc THESIS

MAT9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

MAT0999 (MATH 6909) THÈSE DE DOCTORAT / PhD THESIS
**Mechanical Engineering**

**Ottawa-Carleton Joint Program**

Established in 1983, the Ottawa-Carleton Institute for Mechanical and Aerospatial Engineering (OCIMAE) combines the research strengths of the Department of Mechanical Engineering at the University of Ottawa and the Department of Mechanical and Aerospace Engineering at Carleton University.

The Institute offers graduate programs leading to the degrees of Master of Applied Science (MAsc), Master of Engineering (MEng) and Doctor of Philosophy (PhD) in Mechanical Engineering and in Advanced Materials and Manufacturing.

Members of the Institute are involved in six main research fields: thermal and fluid engineering; solid mechanics and design; materials and manufacturing; controls and robotics; biomedical engineering; aeronautical and space engineering. Further information is posted on the departmental websites.

The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research activities can be conducted in either English or French or both depending on the language used by the professor and the members of the research group.

In accordance with the University of Ottawa regulation, students have the right to submit their work, thesis, and exams in French or in English.

**Programs**

- Master of Applied Science Mechanical Engineering
- Master of Engineering Mechanical Engineering
- Doctorate in Philosophy Mechanical Engineering

**Admission**

Admission to the graduate program in Mechanical Engineering is governed by the general regulations of the Ottawa-Carleton Institute for Mechanical and Aerospatial Engineering (OCIMAE) and by the graduate studies regulations of the University of Ottawa.

Applicants for admission must:

- Hold a master's degree in Mechanical or Aerospatial Engineering or a related discipline;
- Demonstrate a good academic research performance;
- Provide at least two confidential letters of recommendation from professors who are familiar with the applicant's work;
- Provide a statement of purpose indicating their career goals and interests in the proposed research area;
- Identify at least one professor who is willing and available to act as thesis supervisor;
- Be proficient (understand, speak and write) in English. Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

Note: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Most of the courses in the graduate programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

**Transfer from master’s to PhD**

Students in a master's program who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Completion of 5 graduate courses (15 credits) with a grade of A- or better in each;
- Satisfactory progress in the research program;
- Written recommendation from the supervisor and the thesis advisory committee;
- Approval by the graduate studies committee.
The programs are governed by the graduate studies regulations of the two universities. Graduate courses are generally offered in English. However, research can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her team.

**Program Requirements**

The requirements of this program are as follows:

- Successful completion of a minimum of 9 course credits*;
- Participation in the Mechanical and Aerospace Engineering departmental seminar series (MCG9900);
- Successful completion of a thesis proposal (MCG9997) and a comprehensive examination (MCG9998);
- Presentation and defense of a thesis (MCG9999) based on original research carried out under the direct supervision of a research faculty member in the Department.

*Students who have been permitted to transfer into the PhD program from a Master’s program must successfully complete a total of 24 course credits (Master’s 15 and PhD 9).

**Minimum Standards**

The passing grade in all courses is B. Students who fail 6 credits, the thesis proposal, the comprehensive exam, the thesis, or whose progress is deemed unsatisfactory must withdraw from the program.

**Residence**

All students must successfully complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial registration in the program.

**Duration of the Program**

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program. In the case of transfer students, the residency is seven full-time sessions from the time of the initial registration in the program.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Engineering. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

**Courses**

In all programs, the student may choose graduate courses from either university with the approval of the Advisor or Advisory Committee. The available graduate courses are listed below. Course descriptions are to be found in the departmental section of the calendar concerned. All courses are of one session duration. Courses of each department are indicated by the prefix of the first number given as follows:

**MCG 5XXX** Department of Mechanical Engineering, University of Ottawa

**MAAJ XXXX** Department of Mechanical and Aerospace Engineering, Carleton University

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN** (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

**GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA** (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection, DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.
GNG5123 ENTERPRISE ARCHITECTURE (3cr.)
Enterprise architecture as a rigorous planning methodology that harmonizes and integrates the needs of society, management, and engineering in both business and government. Based on an analysis of currently available frameworks and standards, the course will address the design of enterprise business architectures and the derivation of supporting information systems infrastructure.

Solid Mechanics and Materials

MCG5101 (MAAJ 5001) THEORY OF ELASTICITY (3cr.)

MCG5102 (MAAJ 5002) ADVANCED STRESS ANALYSIS (3cr.)
Solutions to special beam problems including beams on elastic foundations, curved beams, multispain beams, etc., as well as some axisymmetric problems. The significance of assumptions is discussed and solution techniques including series solutions and energy methods are utilized.

MCG5103 (MAAJ 5003) THEORY OF PERFECTLY PLASTIC SOLIDS (3cr.)

MCG5104 (MAAJ 5004) THEORY OF PLATES AND SHELLS (3cr.)
A general coverage of various approaches to plate problems and the application of these methods to practical cases. A study of the theory of shells including deformation of shells without bending, stresses under various loading conditions, general theory of shells, shells forming surfaces of revolution.

MCG5105 (MAAJ 5505) CONTINUUM MECHANICS (3cr.)

MCG5106 (MAAJ 5006) ADVANCED TOPICS IN ELASTICITY (3cr.)

MCG5107 (MAAJ 5507) ADVANCED DYNAMICS WITH APPLICATIONS (3cr.)

MCG5108 (MAAJ 5008) FINITE ELEMENT ANALYSIS (3cr.)

MCG5109 (MAAJ 5009) ADVANCED TOPICS IN FINITE ELEMENT ANALYSIS (3cr.)

MCG5110 (MAAJ 5100) MICROMECHANICS OF SOLIDS (3cr.)

MCG5114 (MAAJ 5104) ANALYSIS AND DESIGN OF PRESSURE VESSELS (3cr.)

MCG5117 (MAAJ 5107) INTRODUCTION TO COMPOSITE MATERIALS (3cr.)

MCG5118 (MAAJ 5108) INTRODUCTION TO PLASTICITY (3cr.)
MCG5119 (MAAJ 5109) FRACTURE MECHANICS (3cr.)

MCG5126 (MAAJ 5206) DEFORMATION OF MATERIALS (3cr.)
The deformation and fracture properties of metals, ceramics and polymers. Introduction to dislocation theory. Rheological models. Analysis and interpretation of constant strain rate, constant stress and stress relaxation tests in terms of the material structure.

MCG5129 (MAAJ 5209) HOT WORKING OF METALS (3cr.)
High temperature mechanical properties in metals. Types of recovery, recrystallization and precipitation in metals and their effects on hot strength and structure. Hot rolling of metals. Selection of rolling schedules. Influence of as-rolled structures on room temperature tensile and fracture stresses, impact strength.

MCG5137 (MAAJ 5307) SPECIAL STUDIES IN SOLID MECHANICS AND MATERIALS (3cr.)

MCG5138 (MAAJ 5308) ADVANCED TOPICS IN MECHANICAL ENGINEERING (3cr.)

MCG5144 SUPERALLOYS AD CERAMIX-METAL MATRIX COMPOSITES (3cr.)
Manufacture and properties of superalloys and ceramic-metal matrix composites used in aerospace, turbine, mining and energy applications. Powder metallurgy, phase diagrams, mechanical alloying, deformation, creep, fatigue, fracture mechanics, wear and corrosion. Physics-based modelling of materials’ strength including the contribution of solid solution, precipitation and ceramic particle strengthening as a function of application temperature.

MCG5180 (MAAJ 5800) FIBRE COMPOSITE MATERIALS (3cr.)
Computer-automated manufacturing techniques. Advanced topics in composite design: lamination theory. Interlaminar stresses and free edge effects, lamina and laminate failure theories. Principles of non-destructive testing. Individual projects involving the design, manufacturing and testing of a fibre composite component or material. Limited enrolment. Prerequisite: MCG 5117 (MAAJ 5107) or permission of the Institute.

MCG5181 (MAAJ 5801) ADVANCED VIBRATIONS (3cr.)
Kinematics of vibrations, the single degree of freedom system, without and with damping, two degrees of freedom, several degrees of freedom, vibration of shafts, critical speeds, complex presentation, influence coefficients, matrix method, stability of solution, approximate methods.

MCG5182 (MAAJ 5802) THEORY OF ELASTIC INSTABILITY (3cr.)

MCG7355 SPECIAL TOPICS IN ADVANCED MATERIALS (3cr.)
Topics that may be covered include the following: nanocrystalline and amorphous materials; metals and ceramic-metal composites; functional materials; fibre-based engineering materials.

Thermofluids
MCG5111 (MAAJ 5101) GAS DYNAMICS (3cr.)

MCG5131 (MAAJ 5301) HEAT TRANSFER BY CONDUCTION (3cr.)

MCG5132 (MAAJ 5302) HEAT TRANSFER BY CONVECTION (3cr.)

MCG5133 (MAAJ 5303) HEAT TRANSFER BY RADIATION (3cr.)

MCG5134 (MAAJ 5304) HEAT TRANSFER WITH PHASE CHANGE (3cr.)
MCG5136 (MAAJ 5306) SPECIAL STUDIES IN FLUID MECHANICS AND HEAT TRANSFER (3cr.)

MCG5141 (MAAJ 5401) STATISTICAL THERMODYNAMICS (3cr.)

MCG5151 (MAAJ 5501) LAMINAR FLOW THEORY (3cr.)
Derivation and exact solutions of the Navier-Stokes equations. Low Reynolds number flows, Stokes flow. Oseen flow, lubrication theory. Laminar boundary layers. Introduction to hydrodynamic stability.

MCG5152 (MAAJ 5502) THEORY OF TURBULENCE (3cr.)

MCG5155 (MAAJ 5505) INVISCID FLOW THEORY (3cr.)

MCG5156 (MAAJ 5506) MEASUREMENT IN FLUID MECHANICS (3cr.)

MCG5157 (MAAJ 5507) NUMERICAL COMPUTATION OF FLUID DYNAMICS AND HEAT TRANSFER (3cr.)

MCG5158 (MAAJ 5508) INDUSTRIAL FLUID MECHANICS (3cr.)
Application of simple flows to analysis of more complex systems. Pipe and duct systems, flow separation and control, aerosols, separation of particulates from flow, cavitation, unsteady flow.

MCG5161 (MAAJ 5601) ENVIRONMENTAL ENGINEERING (3cr.)

MCG5191 (MAAJ 5901) COMBUSTION IN PREMIXED SYSTEMS (3cr.)
Stoichiometry, thermo-chemistry, ignition, flame propagation, flame stabilization, diffusion flames, turbulent combustion, modelling.

MCG5192 (MAAJ 5902) COMBUSTION IN DIFFUSION SYSTEMS (3cr.)
Gaseous jet flames, combustion of liquid droplets, atomization, spray flames, coal combustion, fluidized bed combustion.

Design - Manufacturing - Industrial Engineering

MCG5115 (MAAJ 5105) NON-LINEAR OPTIMIZATION (3cr.)

MCG5159 (MAAJ 5509) ADVANCED PRODUCTION PLANNING AND CONTROL (3cr.)

MCG5168 (MAAJ 5608) INDUSTRIAL ORGANIZATION (3cr.)

MCG5169 (MAAJ 5609) ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

MCG5170 (MAAJ 5700) COMPUTER-AIDED DESIGN (3cr.)
The design process. Structure of computer-aided drafting software. Analysis and optimization software. Software integration. Parametric design. Major group design project which integrates concepts from all major areas of mechanical engineering. Exclusion: May not be taken for credit with MCG4322.
MCG5171 (MAAJ 5701) APPLIED RELIABILITY THEORY (3cr.)

MCG5172 (MAAJ 5702) INTRODUCTION TO MANAGEMENT OF AUTOMATION (ROBOTICS AND NUMERICAL CONTROLS) (3cr.)

MCG5173 (MAAJ 5703) SYSTEMS ENGINEERING AND INTEGRATION (3cr.)
Introduction to modelling methods employed for the planning and design of sub-systems and complex systems. Discrete and continuous time, lumped and distributed parameters models. State estimation. Parameters identification. Discretization and stochastic effects. Technological systems modelling and simulation examples.

MCG5176 (MAAJ 5706) INDUSTRIAL CONTROL SYSTEMS (3cr.)
Concept, analysis and design of classical and modern industrial control systems. Computer based control systems for robotics, automation, manufacturing and instrumentation applications. Design project of industrial control and automation systems. Not accessible to students who have taken MCG 4108.

MCG5177 (MAAJ 5707) ROBOT MECHANICS (3cr.)
Robotics overview. Transformations. Basics of robot kinematics, statics and dynamics. Introduction to practical robots, control and programming. Project in analysis, design or application of manipulators. Not accessible to students who have taken MCG 4132.

MCG5178 (MAAJ 5708) ADVANCED TOPICS IN CAD/CAM (3cr.)
Overview of totally integrated CAD/CAM systems. Details of design and manufacturing software tools. Methods of linking design and manufacturing tools to form an integrated CAD/CAM system. Students will undertake projects which will provide them with a "hands-on" experience.

MCG5179 (MAAJ 5709) MANUFACTURING SYSTEM ANALYSIS (3cr.)

MCG5184 MECHATRONICS (3cr.)
Models for passive and active components for electro-mechanical systems. Network representation of signals and energy transmission and conversion. Selection of sensors and actuators for the control of mechanical systems. Modelling and simulation for the design of mixed dynamic systems. Precludes additional credit for MCG 4136.

MCG5185 (MAAJ 5805) MULTIVARIABLE DIGITAL CONTROL (3cr.)

MCG5186 (MAAJ 5806) NON-LINEAR DISCONTINUOUS DYNAMICS AND CONTROL (3cr.)

General Course Codes

MCG5900 SÉMINAIRE DE M.A.Sc. / MSc SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars and to make one presentation. Graded S/NS.

MCG5947 SÉMINAIRE DE MAÎTRISE EN INGÉNIEURIE / MASTER OF ENGINEERING SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. Les étudiants doivent assister et participer à au moins dix séminaires. Noté S/NS (Satisfaisant/Non Satisfaisant). // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 10 seminars. Graded S/NS (Satisfactory/Non Satisfactory).

MCG6998 PROJET / PROJECT (6cr.)
Projet en génie mécanique ou en matériaux avancés et fabrication dirigé par un professeur approuvé par le directeur des études supérieures et donnant lieu à la rédaction d'un rapport approfondi (30-40 pages approx). Noté S (satisfaisant) ou NS (non satisfaisant) par le directeur du projet et un autre professeur nommé par le directeur des études supérieures en génie mécanique. Le projet est normalement complété en une session d’études à temps plein. Préalable : approbation du directeur des études supérieures en génie mécanique. // Project in mechanical engineering or in advanced materials and manufacturing supervised by a professor approved by the director of graduate studies and leading to the writing of an in-depth report (approx. 30-40 pages). Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the director of graduate studies in Mechanical Engineering. The project can normally be completed in one session of full-time study. Prerequisite: approval of director of graduate studies in Mechanical Engineering.
MCG7999 THÈSE DE MAÎTRISE / MASc THESIS

MCG9900 SÉMINAIRE DE DOCTORAT / PhD SEMINAR (3cr.)
Une série de séminaires présentés par des étudiants aux cycles supérieurs et des chercheurs invités. En plus d’avoir à présenter un séminaire, les étudiants doivent assister et participer à au moins quinze séminaires. Noté S/NS. // A series of seminars presented by graduate students and invited researchers. Students are required to attend and participate in at least 15 seminars and make one presentation. Graded S/NS.

MCG9997 PRÉPARATION DU PROJET DE THÈSE DE DOCTORAT / PREPARATION FOR PhD THESIS PROPOSAL
À la suite de la réussite à l'examen de synthèse, inscription requise de tous les candidats au doctorat jusqu'à ce que le projet de thèse soit accepté par le Comité consultatif. // Following completion of the comprehensive examination, registration required for all PhD candidates until the thesis proposal is accepted by the Advisory Committee.

MCG9998 PRÉPARATION À L'EXAMEN GÉNÉRAL DE DOCTORAT / PREPARATION FOR PhD COMPREHENSIVE EXAMINATION
Inscription requise de tous les candidats au doctorat jusqu'à la réussite à l'examen de synthèse. // Registration required for all PhD candidates until the comprehensive examination is passed.

MCG9999 THÈSE DE DOCTORAT / PhD THESIS

Department of Mechanical and Aerospace Engineering Carleton University

Not all of the following courses are offered in a given year. For an up-to-date statement of course offerings, please consult the Registration Instructions and Class Schedule booklet published in the summer. Carleton University course numbers (in parentheses) follow the University of Ottawa course number.

MCG5121 (MECH 5106) SPACE MISSION ANALYSIS AND DESIGN (3cr.)
Review of solar system and space exploration. Space mission design and geometry. Analysis of orbit design, transfers, interplanetary trajectories. Effect of environment on spacecraft design. Space propulsion and launch vehicle design. Launch sequence, windows, cost. Reusable launch systems. Also offered at the undergraduate level, with different requirements, as AERO 4908.

MCG5122 (MECH 5202) SMART STRUCTURES (3cr.)
Structural dynamics principles: modal analysis and wave propagation. Linear time invariant systems: feedback, feedforward, SISO, MIMO, digital and adaptive filters. 'Smart' Structures: multifunctional materials, collocation principles, geometric filtering and control authority. Applications in aero-acoustics and aeroelasticity. Precludes additional credit for MECH 5807.

MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS (3cr.)
Essential microstructural features of metals and alloys: crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

MCG5300 (MECH 5000) FUNDAMENTALS OF FLUID DYNAMICS (3cr.)
Differential equations of motion. Viscous and inviscid regions. Potential flow: superposition; thin airfoils; finite wings; compressibility corrections. Viscous flow: thin shear layer approximation; laminar layers; transition; turbulence modelling. Convective heat transfer: free versus forced convection; energy and energy integral equations; turbulent diffusion. Also offered at the undergraduate level, with different requirements, as AERO 4302, for which additional credit is precluded.

MCG5301 (MECH 5001) THEORY OF VISCOUS FLOWS (3cr.)
Navier-Stokes and boundary layer equations; mean flow equations for turbulent kinetic energy; integral formulations. Stability, transition, turbulence, Reynolds stresses; separation. Calculation methods, closure schemes. Compressibility, heat transfer, and three-dimensional effects.

MCG5303 (MECH 5003) INCOMPRESSIBLE NON-VISCOS FLOW (3cr.)
The fundamental equations and theorems for non-viscous fluid flow; solution of two-dimensional and axisymmetric potential flows; low-speed airfoil and cascade theory; wing lifting-line theory; panel methods.

MCG5304 (MECH 5004) COMPRESSIBLE NON-VISCOUS FLOW (3cr.)
Steady isentropic, frictional, and diabatic flow; shock waves; irrotational compressible flow, small perturbation theory and similarity rules; second-order theory and unsteady, one-dimensional flow.

MCG5308 (MECH 5008) EXPERIMENTAL METHODS IN FLUID MECHANICS (3cr.)
Fundamentals of techniques of simulation of fluid dynamic phenomena. Theoretical basis, principles of design, performance and instrumentation of ground test facilities. Applications to aerodynamic testing.

MCG5309 (MECH 5009) ENVIRONMENTAL FLUID MECHANICS RELATING TO ENERGY UTILIZATION (3cr.)
Characteristics of energy sources and emissions into the environment. The atmosphere; stratification and stability, equations of motion, simple winds, mean flow, turbulence structure and dispersion near the ground. Flow and dispersion in groundwater, rivers, lakes and oceans. Physical and analytical modelling of
environmental flows.

MCG5310 (MECH 5100) PERFORMANCE AND ECONOMICS OF AIRCRAFT (3cr.)
Aircraft performance analysis with emphasis on factors affecting take-off, landing and economic performance; high lift schemes; operating economics.

MCG5311 (MECH 5101) DYNAMICS AND AERODYNAMICS OF FLIGHT (3cr.)
Static stability theory. Euler’s equations for rigid body motion; the linearized equations of motion; stability derivatives and their estimation. Longitudinal and lateral dynamic response of an aircraft to control and disturbance. Also offered at the undergraduate level, with different requirements, as AERO 4308, for which additional credit is precluded.

MCG5314 (MECH 5104) GROUND TRANSPORTATION SYSTEMS AND VEHICLES (3cr.)
Performance characteristics, handling and directional stability, ride comfort and safety of various types of ground vehicle systems including road vehicles, terrain-vehicle systems, guided transport systems, and advanced ground transport technology.

MCG5315 (MECH 5105) ORBITAL MECHANICS AND SPACE CONTROL. (3cr.)
Orbital dynamics and perturbations due to the Earth's figure, the sun, and the moon with emphasis on mission planning and analysis. Rigid body dynamics applied to transfer orbit and on-orbit momentum management and control of spacecraft. Effects of flexible structures on a spacecraft control system.

MCG5317 (MECH 5107) EXPERIMENTAL STRESS ANALYSIS (3cr.)

MCG5321 (MECH 5106/MECH 5201) METHODS OF ENERGY CONVERSION (3cr.)
Technical, economic and environmental aspects of present and proposed large-scale systems of energy conversion.

MCG5330 (MECH 5300) ENGINEERING ACOUSTICS (3cr.)
Review of acoustic waves in compressible fluids; acoustic pressure, intensity and impedance; physical interpretation and measurement; transmission through media; layers, in-homogeneous media, solids; acoustic systems; rooms, ducts, resonators, mufflers, properties of transducers; microphones, loudspeakers, computational acoustics.

MCG5331 (MECH 5301) AEROACOUSTICS (3cr.)
The convected wave equation; theory of subsonic and supersonic jet noise; propeller and helicopter noise; fan and compressor noise; boundary layer noise, interior noise; propagation in the atmosphere; sonic boom; impact on environment.

MCG5332 (MECH 5302) INSTRUMENTATION TECHNIQUES (3cr.)
An introduction for the non-specialists to the concepts of digital and analog electronics with emphasis on data acquisition, processing and analysis. Topics covered include operational amplifiers, signal processing, digital logic systems, computer interfacing, noise in electronic systems. Hands-on sessions illustrate theory and practice.

MCG5334 (MECH 5304) COMPUTATIONAL FLUID DYNAMICS OF COMPRESSIBLE FLOWS (3cr.)
Solution techniques for parabolic, elliptic and hyperbolic equations developed for problems of interest to fluid dynamics with appropriate stability considerations. A staged approach to solution of full Euler and Navier-Stokes equations is used. Grid generation techniques appropriate for compressible flows are introduced.

MCG5344 (MECH 5400) GAS TURBINE COMBUSTION (3cr.)
This course covers two major topics: combustion fundamentals and gas turbine combustor design. Combustion fundamentals include fuel evaporation, chemistry of combustion, chemical kinetics and emission formation and introduction to computational combustion modeling. Combustor design addresses the interrelationship between operational requirements and combustion fundamentals. Precludes additional credit for MECH 5800 (MCG 5480) when MECH 5800 was offered with this topic.

MCG5341 (MECH 5401) TURBOMACHINERY (3cr.)
Types of machines. Similarity: performance parameters; characteristics; cavitation. Velocity triangles. Euler equation: impulse and reaction. Radial pumps and compressors: analysis, design and operation. Axial pumps and compressors: cascade and blade-element methods; staging; off-design performance; stall and surge. Axial turbines. Current design practice. Also offered at the undergraduate level, with different requirements, as MECH 4305, for which additional credit is precluded.

MCG5342 (MECH 5402) GAS TURBINES (3cr.)

MCG5343 (MECH 5403) ADVANCED THERMODYNAMICS (3cr.)
The course covers three major topics: review of fundamentals from a consistent viewpoint, properties and equations of state, and applications and special topics. The third topic includes an introduction to statistical thermodynamics.

MCG5347 (MECH 5407) CONDUCTIVE AND RADIATIVE HEAT TRANSFER (3cr.)
Analytical, numerical and analog solutions to steady-state and transient conduction heat transfer in multi-dimensional systems. Radiative heat exchange between black, grey, non-grey diffusive and specular surfaces, including effects of athermanous media.

MCG5348 (MECH 5408) CONVECTIVE HEAT AND MASS TRANSFER (3cr.)
Analogies between heat, mass and momentum transfer. Forced and free convection relations for laminar and turbulent flows analytically developed where possible and otherwise deduced from experimental results, for simple shapes and in heat exchangers. Mass transfer theory and applications.

MCG5350 (MECH 5500) ADVANCED VIBRATION ANALYSIS (3cr.)
General theory of discrete multi-degree-of-freedom vibrating systems. Emphasis on numerical techniques of solving complex vibrating systems, with selected applications from aeronautical, civil, and mechanical engineering.

MCG5125 (MECH 5501) ADVANCED DYNAMICS (3cr.)
Developing and applying the governing equations of motion for discrete and continuous mechanical systems. Includes Newton-Euler and Lagrangian formulations; classical and finite element approaches for continuous systems; and linear stability, frequency response, and propagation solution methods. Precludes additional credit for MECH 5500.

MCG5352 (MECH 5502) OPTIMAL CONTROL SYSTEMS (3cr.)

MCG5353 (MECH 5503) ROBOTICS (3cr.)
The history of and introduction to robotics methodology. Robots and manipulators; homogeneous transformation, kinematic equations, solving kinematic equations, differential relationships, motion trajectories, dynamics. Control; feedback control, compliance, servomotors, actuators, external and internal sensors, grippers and vision systems. Microprocessors and their application to robot control. Programming.

MCG5354 (MECH 5504) GUIDANCE, NAVIGATION AND CONTROL (3cr.)

MCG5355 (MECH 5505) STABILITY THEORY AND APPLICATIONS (3cr.)
Fundamental concepts and characteristics of modern stability definitions. Sensitivity and variational equations; linear variational equations; phase space analysis; Lyapunov's direct method. Autonomous and nonautonomous systems; stability in first approximation; the effect of force type on stability; frequency method.

MCG5356 (MECH 5506) NEURO AND FUZZY CONTROL (3cr.)

MCG5124 (MECH 5507) ADVANCED KINEMATICS (3cr.)
Algebraic-geometry applications: kinematic calibration of serial and in-parallel robots; kinematic synthesis of planar, spherical, spatial mechanisms. Various DH-parameters, Jacobian formulations. Topics in: projective geometry; Cayley-Klein geometries; Plücker line coordinates; Gröbner bases; Grassmannians; kinematic mapping; Burmester theory. Emphasis on practical applications.

MCG5361 (MECH 5601) CREATIVE PROBLEM SOLVING AND DESIGN (3cr.)
Problem-solving processes and how they can be applied in engineering design. Emphasis on learning methodologies rather than accumulating information. Techniques can be successfully applied in any engineering specialty. (Also offered as IDES 5301)

MCG5362 (MECH 5602) FAILURE PREVENTION (FRACTURE MECHANICS AND FATIGUE) (3cr.)
Design of engineering structures to ensure against failure due to fatigue or brittle fracture. Nature of fatigue and brittle fracture; selection of suitable material, geometry, and inspection procedures for the load and environmental conditions.

MCG5364 (MECH 5604) COMPUTATIONAL METALLURGY (3cr.)

MCG5381 (MECH 5603) LIGHTWEIGHT STRUCTURES (3cr.)

MCG5365 (MECH 5605) FINITE ELEMENT ANALYSIS I (3cr.)
An introduction to the finite element methodology, with emphasis on applications to heat transfer, fluid flow and stress analysis. The basic concepts of Galerkin's method, interpolation, numerical integration, and isoparametric elements are taught using simple examples.

MCG5366 (MECH 5606) FINITE ELEMENT ANALYSIS II (3cr.)
Time marching heat flow problems with linear and nonlinear analysis. Static plasticity. Time-dependent deformation problems; viscoplasticity, viscoelasticity, and dynamic analysis. Isoparametric elements and numerical integration are used throughout.

MCG5367 (MECH 5607) THE BOUNDARY ELEMENT (BEM) METHOD (3cr.)
Integral equations. The BEM for potential theory and for elastostatics in two-dimensions. Boundary elements and numerical integration schemes. Practical applications.

MCG5369 (MECH 5701) METALLIC PHASES AND TRANSFORMATIONS (3cr.)
Thermodynamics of crystals, phase diagrams, principles of alloy phases, thermal analysis. Transformation rate and mechanisms. Short and long range diffusional transformations; diffusionless transformations. Phase transformations in engineering systems. Prerequisites: MCG2361/MCG2761 or MCG2142/MCG2542 (MAAE 2700 or the equivalent).

MCG5123 (MECH 5609) MICROSTRUCTURE AND PROPERTIES OF MATERIALS (3cr.)
Essential microstructural features of metals and alloys: crystal structure, dislocations, grain boundaries. The importance of these features in controlling mechanical properties is emphasized. Analytical techniques observing microstructure in metals and other materials: TEM, SEM, electron diffraction, spectrometry. Precludes additional credit for MECH 5804.

MCG5345 (MECH 5700) SURFACES AND COATINGS (3cr.)
Surface characteristics of solid materials and surface degradation/failure mechanisms including wear, fretting, oxidation, corrosion, and erosion are introduced. Coating methods including PVD, CVD, laser, thermal spray and electrochemical deposition are discussed in the context of failure prevention measures.

MCG5374 (MECH 5704) INTEGRATED MANUFACTURING CIMS (3cr.)
Topics essential to CIMS including computer graphics, geometric modelling, numerically controlled machining, and flexible manufacturing. The fundamental data structures and procedures for computerization of engineering design, analysis and production. Also offered at the undergraduate level, with different requirements, as MECH 4704, for which additional credit is precluded.

MCG5375 (MECH 5705) CAD/CAM (3cr.)

MCG5480 (MECH 5800) SPECIAL TOPICS IN MECHANICAL AND AEROSPACE ENGINEERING (3cr.)
In-depth study of a topic in Mechanical and Aerospace Engineering.

MCG5489 (MECH 5801) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)
Topics will vary from year to year.

MCG5483 (MECH 5802) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5488 (MECH 5803) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5482 (MECH 5805) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5486 (MECH 5806) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5487 (MECH 5807) SPECIAL TOPICS IN MECHANICAL ENGINEERING AND AEROSPACE ENGINEERING (3cr.)

MCG5398 (MECH 5908) INDEPENDENT ENGINEERING STUDY (3cr.)
Students pursuing a master's degree by course work carry out an independent study, analysis, and solution of an engineering problem or design project. The results are given in the form of a written report and presented at a departmental seminar. Carried out under the general direction of a faculty member.

Other Courses of Particular Interest

Biomedical Engineering

BMG5300 (BIOM 5300) MODELLING OF RUBBER-LIKE ENGINEERING MATERIALS AND BIOLOGICAL SOFT TISSUES (3cr.)
Overview of the analytical and computational tools necessary for modelling rubber-like engineering materials and soft biological tissues: continuum mechanics for finite deformations, specific hyper-elastic constitutive equations, material characterization and finite element implementation. Ad-hoc review of physiology and microstructure of biological materials.

BMG5319 INTRODUCTION TO MICROFLUIDICS (3cr.)
Physics of liquid transport in micro-fabricated systems including physics at the microscale, hydrodynamics of microfluidic systems, diffusion mixing, introduction to microfabrication, examples of microfluidics devices and Micro PIV techniques, project. Prerequisites: MCG3143 or MCG3341/MCG3741 or equivalent. Strong background in fluid mechanics. Experience with computer-based projects (CAD, Matlab, CFD).

Chemical Engineering

CHG8188 POLYMER PROPERTIES AND CHARACTERIZATION (3cr.)
Polymer properties are described and discussed in the context of their nature, source and means of measurement. Chemical and microstructural properties; physical states and transitions; thermal properties; mechanical properties and viscoelasticity models; degradation and stability; surface, electrical and optical properties, polymer additives; structure-property relationships.

Civil and Environmental Engineering

CVG7120 (CIVE 5101) INTRODUCTORY ELASTICITY (3cr.)

CVG7121 (CIVE 5102) ADVANCED ELASTICITY (3cr.)

CVG7122 (CIVE 5103) FINITE ELEMENT METHODS IN STRESS ANALYSIS (3cr.)

CVG7126 (CIVE 5204) BEHAVIOUR AND DESIGN OF STRUCTURAL STEEL MEMBERS (3cr.)

CVG7150 (CIVE 5304) INTERCITY TRANSPORTATION, PLANNING AND MANAGEMENT (3cr.)

CVG7141 (CIVE 5602) ADVANCED METHODS IN COMPUTER-AIDED DESIGN (3cr.)

Mathematics and Statistics

MATH 4806, MATH 5806

Physics

PHYS 4407, PHYS 5101

Systems and Computer Engineering

ELG6101 (SYSC 5001) SIMULATION AND MODELLING

ELG6104 (SYSC 5004) OPTIMIZATION FOR ENGINEERING APPLICATIONS (3cr.)
Introduction to algorithms and computer methods for optimizing complex engineering systems. Includes linear programming, networks, nonlinear programming, integer and mixed-integer programming, genetic algorithms and search methods, and dynamic programming. Emphasizes practical algorithms and computer methods for engineering applications.

ELG6105 (SYSC 5005) OPTIMIZATION THEORY AND METHODS

ELG6141 (SYSC 5401) ADAPTIVE CONTROL (3cr.)
ELG6142 (SYSC 5402) ADVANCED DYNAMICS WITH APPLICATIONS TO ROBOTICS (3cr.)

ELG6152 (SYSC 5502) ADVANCED LINEAR SYSTEMS (3cr.)

ELG6153 (SYSC 5503) STOCHASTIC PROCESSES (3cr.)
Basic concepts of randomness, as applied to communications, signal processing, and queueing systems; probability theory, random variables, stochastic processes; random signals in linear systems; introduction to decision and estimation; Markov chains and elements of queueing theory. Exclusion: ELG 5119.

Engineering Management

EMP5145 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
2-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach. Case studies and application project.

Microbiology and Immunology

The Department of Biochemistry, Microbiology and Immunology is located in the Faculty of Medicine and offers graduate programs leading to the degrees of Master of Science (MSc) and Doctor of Philosophy (PhD) in Microbiology and Immunology.

The programs refine critical and scholarly skills in fields and areas of specialization and prepare students for a variety of careers in teaching and research both within and outside of academia, including in a governmental, clinical, or industrial setting. Graduates are expected to have acquired autonomy in conducting research, in preparing scholarly publications, through a training that includes course work, research seminars, and independent research leading to a thesis.

Members of the Department are engaged in two main research fields: microbiology and host biology. Additional information is posted in the departmental website.

The Department is a participating unit in the following collaborative programs: the Bioinformatics program (at the master's level) and the Pathology and Experimental Medicine program (at the master's and doctoral levels).

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Microbiology and Immunology and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to submit their work, thesis, and exams in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Science Microbiology and Immunology
Master of Science Microbiology and Immunology Specialization in Bioinformatics
Master of Science Microbiology and Immunology Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Microbiology and Immunology
Doctorate in Philosophy Microbiology and Immunology Specialization in Pathology and Experimental Medicine

Admission

Admission to the graduate program in microbiology and immunology is governed by the general regulations of the FGPS.
Applications are evaluated based on the following criteria:

- Be the holder of a master’s degree in microbiology or immunology (or equivalent) with a minimum average of B+ (75%) calculated in accordance with the FGP5 guidelines.
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

**Transfer from Master’s to PhD Program**

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Successful completion of the seminar and all the core courses required for the master’s program.
- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met.

**Program Requirements**

**PhD in Microbiology and Immunology**

The following requirements must be met:

- Successful completion of compulsory course MED8166 *Professionalism and Professional Skills*.
- Six credits of MIC graduate courses including at least 3 credits at the 8000-level, approved by the Department.
- Enrollment in the seminar course MIC8366, which involves the presentation of a seminar and regular attendance at the departmental seminars.
- Successful completion of a comprehensive examination (MIC9998).
- Successful presentation and defense of a thesis (MIC9999) based on original research carried out under the direct supervision of a research faculty member in the Department.

NOTE: The Department may require students to take additional courses, depending on their backgrounds.

**Collaborative program in Pathology and Experimental Medicine**

The requirements of both the primary program and those of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Successful completion of the Comprehensive Examination as required by the respective primary program.
- Successful preparation and defense of a thesis under the supervision of a professor who is a member of the Pathology and Experimental Medicine program. The thesis must be relevant to the focus of the Pathology and Experimental Medicine program. At least one of the examiners must be a member of the Pathology and Experimental Medicine collaborative program.

**Transfer from master’s to PhD**

Following the transfer, all of the requirements of the doctoral program must be met:

- doctoral seminar (MIC8366)
- six credits of course work
- comprehensive examination (MIC9998)
- pre-thesis seminar (MIC9997)
- thesis (MIC9999)

**Duration of the program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.
Residence

All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial registration in the program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Medicine. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

Regular meetings between the student and thesis committee members will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

**MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS**

Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services. Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

**MIC5100 HOST/PATHOGEN INTERACTIONS AND MOLECULAR IMMUNOLOGY (3cr.)**

This course will examine current issues in microbiology/immunology. Topics to be chosen to allow discussion across the broad areas of virology, immunology and bacteriology. Within each of the modules, the focus will be on host-pathogen interactions at the molecular level, how microorganisms utilize, modify or disrupt host cell functions, including immune cell functions and immune responses, to establish infection and cause diseases, or on immunological diseases which may have an infectious component. **Prerequisite:** At least one undergraduate course in microbiology and/or immunology and one course in molecular biology, or permission of the course coordinator.

**MIC5366 MSc SEMINAR (3cr.)**

Attendance at two half-day symposia with guest speakers, attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Microbiology and Immunology. Students must present at least one poster and one oral presentation during the course of their program. Graded S/NS

**MIC7999 THÈSE DE MAÎTRISE / MSc THESIS**

Avant la soutenance de sa thèse, il faut que chaque étudiant donne un séminaire portant sur ses recherches au Département / Prior to defending their thesis, each student will be required to present a formal seminar about their research to the department.

**MIC8122 ADVANCED TOPICS IN IMMUNOLOGY (3cr.)**

Focus on cellular immunology, including thymocyte maturation, induction and regulation of cellular responses, immune responses to pathogens, immunological memory, tolerance. Student assessments to be conducted by two methods: Weekly assessment of student presentations and participation in class discussions; assessment of take-home assignments such as completion of a research grant on a topic covered in the course. To be offered alternate years subject to sufficient demand. **Prerequisite:** MIC 4125 or equivalent.

**MIC8124 ADVANCED TOPICS IN CELL DEATH (3cr.)**

Molecular mechanisms of cell death. Particular attention to be paid to role of aberrant cell death in human disease. Offered in the Fall of odd numbered years.

**MIC8125 SPECIAL TOPICS IN MICROBIOLOGY AND IMMUNOLOGY (3cr.)**

Discussion of current topics in Microbiology and Immunology. Topics to vary from year to year depending on the interest of faculty members offering the course and students. Student assessments to be conducted by two methods: Weekly assessment of student presentations and participation in class discussions; assessment of take-home assignments such as completion of a research grant on a topic covered in the course. **Prerequisite:** Permission of the course coordinator.

**MIC8126 IMMUNOCHEMISTRY (3cr.)**

Focus is on antigen structure of protein and carbohydrate antigens, receptor structure of B cells and T cells, structure of MHC molecules, accessory molecules and cytokine receptors and cell signalling pathways induced by the antigen and cytokine receptors. Student assessments to be conducted by two methods: Weekly assessment of student presentations and participation in class discussions; assessment of take-home assignments such as completion of a research grant on a topic covered in the course. To be offered alternate years subject to sufficient demand. **Prerequisite:** MIC 4125 or equivalent.
MIC8129 CURRENT TOPICS IN STEM CELLS AND IMMUNE DEVELOPMENT (3cr.)
This course will focus on the haematopoietic system that gives rise to the many cell types of the immune system. Topics to be covered include the developmental processes of embryonic stem cell differentiation into mesoderm and then into haematopoietic and non-haematopoietic progenitors; development of adult haematopoietic and immune systems; symmetric and asymmetric division of cells; intrinsic transcription factors and extracellular microenvironment factors regulating cell fate; immunological aspects of stem-cell based therapy; new technologies and their use in the field, and experimental design. Prerequisite: At least one undergraduate course in immunology or cell biology, or permission of the course coordinator.

MIC8134 STRUCTURE AND EXPRESSION OF EUKARYOTIC AND PROKARYOTIC GENOMES (3cr.)
Sequencing of eukaryote and prokaryote genomes with emphasis on recent technologies, sequence alignments and databases and assembly of genomes from massively parallel sequencing data. Focus on mapping studies, including linkage disequilibrium-based genome-wide association study (GWAS), to characterize functional variants associated with complex traits. Analysis and structure of microbial metagenomes from environmental and human habitats, including structure-function analysis of microbial communities, microbiota-human disease correlations, and molecular phylogeny. Genome expression, including measures of RNA transcripts and proteins and statistical analysis of data. Combination of various -omics data to understand gene-environment interactions.

MIC8236 ADVANCED TOPICS IN VIROLOGY (3cr.)
An in-depth presentation of current topics in virological research. Topics will vary from year to year. To be offered every alternate year subject to sufficient demand. Prerequisite: MIC 4126 or equivalent.

MIC8238 ADVANCED TOPICS IN BACTERIOLOGY - MECHANISMS OF PATHOGENESIS (3cr.)
Recent advances and current topics in selected areas of bacteriology with emphasis on mechanisms of pathogenesis. Students present and discuss journal articles. Offered every alternate year subject to sufficient demand. Prerequisite: MIC 4124 or its equivalent.

MIC8366 PhD SEMINAR (3cr.)
Attendance at two half-day symposia with guest speakers, attendance and participation in the annual BMI Student Symposium and BMI Poster Day, attendance at BMI seminars relevant to Microbiology and Immunology. Students will present a poster in their first and every alternate year, and an oral presentation the second and every alternate year until they have permission to write their thesis. Graded S/NS

MIC8401 ADVANCED TOPICS IN BACTERIAL GENETICS (3cr.)
Microbial genetic and genomic methods: origin, purpose and functioning. Analysis and use of genomes to study bacterial pathogenesis and host-microbe interactions. Prerequisite: MIC5224 or equivalent.

MIC8500 SPECIAL TOPICS IN HEALTH-RELATED ENVIRONMENTAL MICROBIOLOGY (3cr.)
Recent advances and current topics in selected areas of health-related environmental microbiology. Topics reflect student interest. Offered in alternate years subject to sufficient demand. Prerequisite: MIC 5500 or equivalent.

MIC8700 BIOLOGY AND PATHOGENESIS OF HIV INFECTION (3cr.)
Biology and pathogenesis of Human Immunodeficiency Virus (HIV) infection. Genetics, replication, structure, regulation of gene expression, immunopathogenesis, antiviral therapy and vaccine development. Offered in alternate years subject to sufficient demand. Prerequisite: BCH 3170 or equivalent and permission of instructor.

MIC9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)

MIC9999 THÈSE DE DOCTORAT / PhD THESIS

HMG8106 CLINICAL CYTOGENOMICS (3cr.)
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)
Presentation of the biochemical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. Prerequisite: Permission of the course coordinator.

**Neuroscience**

The Department of Cellular and Molecular Medicine is located in the Faculty of Medicine and offers graduate programs leading to the degrees of Master of Science (MSc) and Doctor of Philosophy (PhD) in Neuroscience.

The Department of Cellular and Molecular Medicine is located at the Health Sciences Center of the University of Ottawa. Through its cross-appointed and adjunct members, the Department has research affiliations with the following institutes: the Loeb Research and University of Ottawa Heart Institutes at the Ottawa Hospital (Civic Campus), the Royal Ottawa Hospital, the Canadian Red Cross, Health Canada, National...
Research Council and the Department of National Defense.

The programs help students develop their theoretical knowledge as well as their capacity for critical analysis. This is achieved through reading and critiquing the scientific literature, conducting experiments in the laboratory, analyzing the data and results generated, and presenting their results in the form of research seminars or posters. The programs prepare candidates for a variety of careers in teaching and research both within and outside of academia.

Graduates of the program will acquire autonomy in conducting research and in preparing scholarly publications and grant applications. A comprehensive set of courses, state-of-the-art research facilities and outstanding research opportunities ensure a career in neuroscience.

The Department is a participating unit in the collaborative program in Human and Molecular Genetics and in Pathology and Experimental Medicine at the master’s and doctoral levels.

The doctoral program participates in the Combined MD / PhD Program, which allows students to graduate with both a PhD in Neuroscience and an MD. For more information please see the website of the Faculty of Medicine.

Most of the courses in these programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

### Programs

Master of Science Neuroscience

Master of Science Neuroscience Specialization in Human and Molecular Genetics

Master of Science Neuroscience Specialization in Pathology and Experimental Medicine

Doctorate in Philosophy Neuroscience

Doctorate in Philosophy Neuroscience Specialization in Human and Molecular Genetics

Doctorate in Philosophy Neuroscience Specialization in Pathology and Experimental Medicine

### Admission

Admission to the graduate program in neuroscience is governed by the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Be the holder of a master’s degree in science with a minimum average of B+ (75%) calculated in accordance with the FGPS guidelines.
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills.
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area.
- Identify at least one professor who is willing and available to act as thesis supervisor.

### Transfer from Master’s to PhD Program

Outstanding students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Satisfactory progress in the research program.
- Written recommendation by the supervisor and the advisory committee.
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Following transfer, all of the requirements of the doctoral program must be met: the doctoral seminar (NSC8325), six credits of course work (including either NSC5102 or NSC5104), the comprehensive exam (NSC9998) and the thesis (NSC9999).

### Collaborative Program in Human and Molecular Genetics at the Doctoral Level
The Department of Cellular and Molecular Medicine is a participating unit in the collaborative program in Human and Molecular Genetics at the master’s and doctoral levels. This program has been established for students wishing to include an interdisciplinary component in Human and Molecular Genetics as part of their degree in Neuroscience.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Human and Molecular Genetics program.

Collaborative Program in Pathology and Experimental Medicine at the Doctoral Level

The Department of Cellular and Molecular Medicine is a participating unit in the collaborative program in Pathology and Experimental Medicine at the master’s and doctoral levels. This program has been established for students wishing to include an interdisciplinary component in Pathology and Experimental Medicine as part of their degree in Neuroscience.

Students should indicate in their initial application for admission that they wish to be accepted into the collaborative program. To be accepted, the thesis director must be a member of the collaborative program. Students are normally informed about their acceptance into the collaborative program at the same time as being informed about their admission into the primary program. For further details, see the Pathology and Experimental Medicine program.

Program Requirements

PhD in Neuroscience

- Successful completion of compulsory course MED8166 Professionalism and Professional Skills.
- Six credits of graduate courses including either NSC5102 or NSC5104 or equivalent, approved by the Department.
- Enrollment in the seminar course (NSC8325S), which involves the presentation of a seminar and regular attendance at the departmental seminars.
- Successful completion of a comprehensive examination (NSC9998) in the form of either a defended MRC-style grant application or an oral examination on selected topics within the field.
- Successful presentation and defense of a thesis (NSC9999) based on original research carried out under the direct supervision of a research faculty member in the Department.

NOTE: The Department may require students to take additional courses, depending on their backgrounds.

Collaborative program in Human and Molecular Genetics

The student is responsible for fulfilling both the participating unit requirements for the primary program and the requirements for the collaborative program.

- Six credits of courses, three credits of which must be from the student’s primary program and three of which must be HMG credits.
- Enrollment in the seminar course, presentation of one seminar and active participation in the seminar series in the student’s primary program.
- Presentation and successful defence of a thesis based on original research carried out under the direct supervision of a member of the collaborative program.

Master’s candidates intending to transfer directly to the doctoral program must meet the conditions set by their primary program.

Course selection is subject to the approval of the HMG program director.

Collaborative program in Pathology and Experimental Medicine

The requirements of both the primary program and those of the collaborative program must be met.

The requirements specific to the collaborative program are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course.
- Successful completion of the Comprehensive Examination as required by the respective primary program.
- Preparation and defense of a thesis under the supervision of a professor who is a member of the Pathology and Experimental Medicine program. The thesis must be relevant to the focus of the Pathology and Experimental Medicine program. At least one of the examiners must be a member of the Pathology and Experimental Medicine collaborative program.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.
Residence

All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the initial registration in the program.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Medicine. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

MED8166 PROFESSIONALISM AND PROFESSIONAL SKILLS
Basic professional skills related to academic integrity, proper referencing techniques, avoidance of plagiarism, professional etiquette, public speaking, time and stress management, conflict management, teamwork, knowing when and how to access student support services.
Compulsory for all students enrolled in master’s or doctoral programs at the Faculty of Medicine. Graded S/NS (Satisfactory/Not satisfactory).

NSC5102 CELLULAR AND MOLECULAR NEUROSCIENCE (3cr.)
The molecular and cellular properties of neurons. Emphasis to be placed on the molecular basis of electrical activity of neurons and chemical synaptic transmission.

NSC5104 SYSTEMS NEUROSCIENCE (3cr.)
Structure and function of representative components of the nervous system to be presented in an integrated and comprehensive manner, emphasizing a reductionist approach to the study of neural networks and their behavioral output. Prerequisites: PHS 3240 or equivalent or permission of the program director.

NSC5106 MOLECULAR PSYCHIATRY (3cr.)
Study of genetic and neurochemical bases of mental illnesses using transgenic and gene knockout mouse models, animal behavioral paradigms, in vivo imaging. Gene therapy approaches in psychiatry; influence of environmental stressors. Prerequisites: PHS 3240 or BIO 3170/BIO 3570 or PSY 3301/PSY 3701 or equivalent or permission of the program director.

NSC7100 NEUROTRANSMISSION AND NEUROMODULATION (3cr.)
Molecular and cell biology of neurotransmission including the identity, actions and mechanisms of neurotransmitters and neuromodulators. Use of computer simulations to explore the complex interactions between synaptic input and the electrical architecture of neurons.

NSC7999 THÈSE DE MÂITRISE / Msc THESIS

NSC8103 DEVELOPMENTAL NEUROSCIENCE (3cr.)
Fundamental concepts of development of the nervous system with an emphasis on those aspects unique to this tissue type. Topics to include control of proliferation and differentiation, axonal outgrowth and pathfinding, synaptogenesis and formation of neuronal maps, neuronal plasticity, growth factor action and neural regeneration.

NSC8104 COMPUTATIONAL NEUROSCIENCE (3cr.)
Basic concepts of sensory-motor processing from the cellular level of excitable membranes and synaptic signalling mechanisms to the emergent properties of complex neural networks.

NSC8105 MOLECULAR BIOLOGY AND THE NEURON (3cr.)
Emphasis on how signal transduction regulates neuronal function. Topics to include the role of the cytoskeleton in neuronal function, membrane sorting in exocytosis and endocytic pathways, metabotropic and ionotropic receptor signaling, signaling by the GTP-binding proteins, plasma membrane and vesicular transporters, role of protein-protein interactions in the regulation of neuronal signaling, and genomic and proteomic approaches to study neuronal signaling.

NSC8106 MECHANISMS OF NEUROLOGICAL DISEASE (3cr.)
Current knowledge of select neuropathologies with emphasis on the underlying genetics and biochemistry of these conditions. Examination of some fundamental cellular processes important for understanding neurological diseases.

NSC8324 SEMINAR FOR MSc STUDENTS
All graduate students enrolled in the MSc program or who have been admitted to a PhD program without an MSc must participate in these seminars for one year. Two seminars must be presented by each student during the year.

**NSC8325 SEMINAR FOR PhD STUDENTS**
All graduate students enrolled in the PhD program must participate in these seminars for one year during their doctoral or post MSc training. Two seminars must be presented by each student during the year: one on an assigned subject, the other on his or her research project.

**NSC8340 NEUROMUSCULAR FUNCTION AND DYSFUNCTION (3cr.)**
Topics to be covered include factors controlling muscle- and synapse-specific gene expression, regulation of myogenesis and muscle cell growth, formation of the neuromuscular junction, motor neuron - muscle interactions, the role of the cytoskeleton in organization of post-synaptic domains, functional role of ion channels in muscle, molecular genetics of neuromuscular disease. **Prerequisite: CMM 5340 or equivalent**

**NSC9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAM (PhD)**

**NSC9999 THÈSE DE DOCTORAT / PhD THESIS**

**HMG8106 CLINICAL CYTOGENOMICS (3cr.)**
Comprehensive review of the basic principles and technologies in cytogenomics and their clinical application for diagnostic and prognostic purposes. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG8107 CLINICAL BIOCHEMICAL GENETICS (3cr.)**
Presentation of the biochemical and molecular bases of inborn errors of metabolism. The course consists of a series of lectures followed by student discussion of a related paper assigned the previous week. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

**HMG8108 CLINICAL MOLECULAR GENETICS (3cr.)**
Comprehensive review of all aspects of clinical molecular genetics acquainting students with clinical applications of various molecular technologies. Registrations may be limited depending on enrolment. **Prerequisite: Permission of the course coordinator.**

### Nursing

The School of Nursing offers the following programs: a graduate diplomas in Primary Health Care for Nurse Practitioners (PHCNP), a Master of Science (MSc) in Nursing and a Doctor of Philosophy (PhD) in Nursing.

**Master’s program**

The goal of the master’s program is to educate registered nurses for an advanced practice role and/or doctoral studies. Graduates of the program are prepared to assume leadership roles in improving the quality of nursing care in various health care settings. The program provides rigorous academic preparation based on theory and research to address health-related phenomena experienced by individuals, families, groups, aggregates and communities.

The master’s program is offered in English and French with a thesis option or a clinical option (course based) and on a full-time or part-time basis.

The courses from the master's program can be offered by distance modalities. The courses from the PHCNP Diploma are offered using a combination of face-to-face and distance modalities. Francophones from minority communities on the Canadian west and east coasts and in the Territories benefit from additional privileges thanks to the *Consortium national de formation en santé* (CNFS). CNFS is a nationally-represented organization that comprises ten university- and college-level academic institutions offering French-language education in various health-related fields.

The department offers a collaborative program in Women’s studies at the master’s level. For more information on this program, see ‘Admission’.

**Doctoral program**

The goal of the doctoral program in nursing is to prepare scientists capable of conducting innovative research that results in new and significant contributions to nursing knowledge. The students engage in creative thinking, critical appraisal and synthesis of scholarly work in their field of interest using a wide range of philosophical, theoretical and methodological perspectives.

Admissions are for full-time students only. To be considered as having full-time status, students must register to a minimum of 6 credits per session and must be geographically available and visit the campus regularly. The courses in the program are offered in French and in English.

The PhD program consists of three fields:
- Evidence informed decision making in nursing and health care;
- Sociopolitical, educational and historic contexts of nursing;
- Nursing practice and delivery systems.
In accordance with the University of Ottawa policy, students can write exams, course assignments and the thesis in either language (English or French).

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

### Programs

**Master of Science Nursing**

**Master of Science Nursing Specialization in Women's Studies**

**Doctorate in Philosophy Nursing**

### Admission

Candidates for the PhD in Nursing will be considered for admission under the general regulations of the Faculty of Graduate and Postdoctoral Studies. Applicants must have completed an honors baccalaureate degree and a master's degree in nursing or a related discipline (e.g., education, health administration, psychology) with a minimum overall average of 75% (B+). Students intending to include a clinical practice component in their research must be registered as nurses in the jurisdiction where the clinical component of the research will take place.

Several key areas of knowledge are required: research methods, statistics, and nursing theory. Applicants who do not have a master’s degree in nursing and/or whose knowledge of research methods or statistics is deficient may be asked to take qualifying courses such as NSG5130 (Development of knowledge and theory in nursing as a discipline), NSG5192 (Statistical analysis in nursing) or NSG5440 (Research methods in nursing). Those who require more than two such courses must complete them prior to admission. Those requiring two or less may be allowed to take them after admission to the program. However, these courses would be additional to the 15 credits required of all students in the program.

Research competence can be demonstrated either through the completion of a master’s thesis or through projects completed during nursing practice or as part of a non-thesis program. Non-thesis students must present a dossier that demonstrates their research skills. The dossier might include research reports, publications in peer-reviewed journals, program development and evaluation reports, abstracts, presentations, etc. The proposed thesis supervisor will provide a written evaluation of the dossier to the admissions committee, who will make the final decision about the student's suitability for the program.

Proficiency in English is required. Information on language requirements and tests can be found in Section A-3.e) of the General Regulations of the FGPS.

### Application Deadline

To find the application deadline, please check the "program-specific requirements" under Application Procedures and Information at the following address: www.grad.uottawa.ca/apply. Applications received after that date may be considered on an exceptional basis.

### Documents required for admission to the PhD in Nursing Program

The following documents are to be submitted to the Academic Administrative Officer of the Faculty of Health Sciences, Room RNG 2016, Roger Guindon Hall, 451 Smyth Road, Ottawa, Ontario, K1H 8M5:

- The official "Application for Admission On-line - Graduate Studies" form;
- Official transcripts of all previous undergraduate and graduate studies;
- Three letters of recommendation. One may be from a clinical supervisor, and at least two must be academic references that address your potential for doctoral studies as indicated by your research and leadership;
- An up-to-date curriculum vitae;
- Narrative statement (maximum 3 pages or 900 words) describing: a) How the PhD in Nursing will enable you to achieve your career goals; b) A brief description of your proposed research project including a statement of the research problem, justification of the research project, its relevance for the nursing profession and an overview of the study design.
- A signed letter from a potential thesis supervisor supporting your application and indicating willingness to supervise your research.

### Transfer from Master’s to PhD program

For exceptional students enrolled in the University of Ottawa MScN program, it will be possible to request a transfer into the PhD program. Those students must have completed the four core master’s courses with a CGPA of at least 8.0 and submit the following documents to the graduate studies committee of the school of Nursing:

- Two letters of recommendation. One may be from a clinical supervisor, and at least one must be academic reference that address the candidate's potential for doctoral studies as indicated by their research and leadership;
- An up-to-date curriculum vitae;
- Narrative statement (maximum 3 pages or 900 words) describing: a) How the PhD in Nursing will enable you to achieve your career goals; b) A brief description of the proposed research project including statement of the research problem, justification of research project,
Program Requirements

Five core courses (15 credits):

NSG7100 Theoretical and philosophical perspectives in nursing (3cr.)
NSG7105 Research seminar I (3cr.)
NSG7106 Research seminar II (3cr.)

Advanced qualitative or quantitative research analysis techniques (course selected based on student's need) (3cr.)

Such as NSG6140 Qualitative Research in Nursing and Health Sciences, EDU 7193 Advanced Measurement Theories, EDU 8190 Qualitative Research II, PSY 7901 Program Evaluation, PSY 7101 Causal Modeling in Psychological Research.

NSG7110 Doctorat seminar (3cr.)
NSG9998 Comprehensive examination
NSG9999 PhD Thesis

Minimum Standards

The passing grade in all courses is B. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

Residence

Residency (full-time registration) for six sessions or two years at the beginning of the program.

Duration of the Program

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Health Sciences. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

The following courses are not necessarily offered every year.

NSG5130 Development of knowledge and theory in nursing as a discipline (3cr.)
Prevaling nursing conceptualizations and their links to practice, research and education. Historical development and structure of contemporary nursing knowledge. Critique of middle-range theories appropriate to the study of nursing phenomena.

NSG5140 Research methods in nursing (3cr.)
Critical appraisal of research in nursing. Methodological issues related to research problem conceptualization; design selection; sampling; instrument development; data management and analysis. Creation of a nursing research proposal. Prerequisite: NSG 5130.

NSG5192 Statistical analysis in nursing (3cr.)
Introduction to the planning, analysis and interpretation of quantitative research in nursing including: analysis of inferential statistics; analysis of variance and covariance; and linear regression.
**NSG5210 Advanced nursing practice in primary health care (6cr.)**
Nurses' role in advanced nursing practice. Theoretical foundations, concepts and strategies in primary health care. Clinical practicum as consultant, educator, researcher, leader and clinician in primary health care. Prerequisite or corequisite: NSG 5130.

**NSG5220 Advanced nursing practice in tertiary health care (6cr.)**
Nurses' role in advanced nursing practice. Theoretical foundations, concepts and strategies associated with caring for patients and their families in complex care situations. Clinical practicum as consultant, educator, researcher, leader and clinician in tertiary health care settings. Prerequisite or corequisite: NSG 5130.

**NSG5350 Pathophysiology for the nurse practitioner (3cr.)**
Examine theoretical and practice related concepts in pathophysiology as a basis for advanced nursing practice. Explore alterations in physiological function with an emphasis on age-related, acute, episodic, and chronic conditions found in primary health care practice. Seminar: 3 hours/week. Course for PHCNP students only.

**NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)**
Compare and contrast advanced practice nursing and related frameworks to develop, integrate, sustain, and evaluate the role of the nurse practitioner within primary health care. Critically analyze and develop strategies to implement advanced practice nursing competencies with a focus on the community. Seminar: 3 hours/week Course for PHCNP students only.

**NSG5370 Advanced health assessment and diagnosis I (3cr.)**
Analyze and critique concepts and frameworks essential to advanced health assessment and diagnosis using clinical reasoning skills. Apply clinical, theoretical and research knowledge in comprehensive and focused health assessment for the individual client's diagnostic plan of care. Course for PHCNP students only. Prerequisite or co-requisite: NSG5350.

**NSG5375 Advanced health assessment and diagnosis II (3cr.)**
Integrate knowledge and apply conceptual frameworks integral to advanced health assessment and diagnosis in advanced nursing practice. Demonstrate initiative, responsibility, and accountability in complex decision making for individuals, groups, and/or families within the nurse practitioner scope of practice based on current research findings. Seminar: 3 hours per week. Clinical: 6 hours per week. Course for PHCNP students only. Prerequisite: NSG5370.

**NSG5380 Therapeutics in primary health care I (3cr.)**
Critically appraise and interpret concepts and frameworks integral to pharmacotherapy, advanced counseling, and complementary therapies for common conditions across the lifespan. Develop, initiate, manage, and evaluate therapeutic plans of care that incorporate client values and acceptability, goals of therapy, analysis of different approaches, pharmacotherapeutic principles. Course for PHCNP students only. Prerequisite or co-requisite: NSG5370.

**NSG5385 Therapeutics in primary health care II (3cr.)**
Integrate conceptual frameworks and evidence underlying the study of pharmacotherapy, advanced counseling, and complementary therapies for complex client situations. Demonstrate substantive initiative, responsibility, and accountability in complex decision making. Course for PHCNP students only. Prerequisite: NSG5380. Co-requisite: NSG5375.

**NSG5401 Integrative practicum (12cr.)**
Synthesize the competencies essential to advanced nursing practice to provide primary health care for clients across the life span. Demonstrate autonomy, decision-making, and critical analysis of organizational and system issues that influence scope of practice, professional accountability, and outcomes. Course for PHCNP students only. Prerequisites: NSG 5350, NSG 5360, NSG 5370, NSG 5375, NSG 5380 and NSG 5385.

**NSG6115 Design of multiple interventions in community health (3cr.)**
Theoretical basis for the design and evaluation of multistategy and multi-level community health programs. Key design issues including synergies among interventions, intervention adaptation for contextual environment and implementation barriers. Integrated theories, planning tools and evaluation strategies to be discussed, using multiple intervention case studies. Prerequisites: NSG 5130; NSG 5210 (or NSG 5220); NSG 5140; or equivalents. Prerequisites: NSG5130; NSG5210 (or 5220); NSG5140; or equivalents.

**NSG6133 DECISION MAKING IN CLINICAL PRACTICE (3cr.)**
Examination of decision models as they relate to decision making at the patient, practitioner, and policy maker levels. Study of the patient decision making process. Exploration of decision support strategies and evaluation of practitioner's decision support skills.

**NSG6134 Educator's role in advanced nursing practice (3cr.)**

**NSG6135 Palliative/end of life care: an interprofessional approach (3cr.)**
Philosophy and practice of palliative/end of life care across the lifespan and in diverse health settings. Critical examination of theory, research, practice and policy issues related to care of individuals and families facing life threatening illness. Exploration of concepts of death, dying, bereavement within health care systems, culture, and society using an interprofessional approach. Prerequisite: Permission of Program Director.

**NSG6140 Qualitative Research in Nursing and Health Sciences (3cr.)**
Advanced qualitative research approaches including data analysis methods used in Nursing and other health disciplines. Pre-requisite: NSG5140 Research Methods in Nursing (or equivalent).
NSG6150 Historical context in nursing practice (3cr.)
Historical context for selected nursing practice topics and leadership styles. Nursing and health care from the 19th to the late 20th century from a feminist and social history standpoint. Perspectives and patterns of explanation for past nursing practices. Appraisal of primary and secondary sources, methods and theoretical approaches.

NSG6160 POLICY, POLITICAL ACTION AND CHANGE IN HEALTH CARE (3cr.)
Policy analysis, political action, organization and change theories. Acquisition of advanced nursing practice skills in policy and organizational analysis, application of change theory, lobbying, negotiating and strategizing.

NSG6170 SOCIOCULTURAL HISTORY OF THE BODY (3cr.)
This graduate seminar examines the body in terms of object of history as understood by the health professionals. Topics such as hygiene and the social image of the body, as well as the history of illness and death are covered.

NSG6401 CLINICAL PROJECT IN ADVANCED NURSING PRACTICE (6cr.)
Utilization of theory and evidence based practices relevant to a clinical field. Clinical practicum structured around the design, implementation, and evaluation of a clinical project. Prerequisites: NSG5210 or NSG5220, or NSG5360 (for PHCNP students only) and NSG5410.

NSG6998 Thèmes en sciences infirmières / Special topics in nursing (3cr.)
La recherche et l'expertise dans certains secteurs de spécialisation des soins infirmiers. Peut comporter un practicum. Thèmes à approuver au préalable par la Direction du programme. / Research and advanced practice in a specialized area of nursing. May include a clinical practicum. Program approval required for topic selection.

NSG6999 Études dirigées / Directed study (3cr.)
Approfondissement des connaissances dans un domaine d'intérêt particulier, avec l'approbation du programme. / Study of an area of particular interest in greater depth. Program approval is required.

NSG7100 Theoretical and philosophical perspectives in nursing (3cr.)
Critical analysis of nursing knowledge development and the influence on nursing research and practice. Comparison and contrast of theories and philosophies in nursing with an emphasis on substantive areas of nursing that are of interest to the student. (Course is reserved for PhD students.)

NSG7103 DECISION MAKING IN NURSING (3cr.)
Analysis and synthesis of decision and change models at client, practitioner and policy maker levels. In-depth exploration of selected conceptual, methodological, and design challenges to improve decision-making capacities of populations or to promote uptake of evidence-based nursing practices. (Course is reserved for PhD students.)

NSG7104 EVALUATING COMPLEX NURSING INTERVENTIONS (3cr.)
Discussion of design issues associated with complex interventions. Exploration of strategies for developing, implementing, and evaluating programs targeted to changing multiple levels of health care. Analysis of models, evidence, and policies appropriate to intervention design and examination of barriers to effective change. (Course is reserved for PhD students.)

NSG7105 Research seminar I (3cr.)
In-depth coverage and critical analysis of diverse research problems. Development of the research project through peer discussions, and presentations by experts. (Course reserved for PhD students.)

NSG7106 Research seminar II (3cr.)
In-depth coverage and critical analysis of diverse research design methods. Development of the thesis proposal through peer discussions, and presentations by experts. (Course reserved for PhD students.) Prerequisite: NSG7105

NSG7110 Doctoral seminar (3cr.)
Drafting and finalizing the thesis proposal, which is presented and defended orally. Graded S/NS. Prerequisites: NSG7100, NSG7105, NSG7106 and EDU7193 or EDU8190 or equivalent.

NSG7999 Thèse de maîtrise / Master's thesis
Préalables : NSG 5530, NSG 5540, NSG 5610 ou NSG 5620 (pour étudiantes MSc seulement) et NSG 5592. / Prerequisites: NSG 5130, NSG 5140, NSG 5210 or NSG 5220 (reserved for MSc students) and NSG 5192.

NSG9998 Examen de synthèse / Comprehensive examination
L'examen de synthèse est un élément obligatoire du programme de doctorat et doit être rempli avec succès avant de s'inscrire à la thèse. Il comporte une épreuve écrite et une épreuve orale portant sur un ou des thèmes reliés au champ de recherche de l'étudiant et l'étudiante. Préalable ou concomitant: NSG 7110. / The comprehensive exam is mandatory in the doctoral program and must be successfully completed before registration to the thesis. The exam has a written and an oral component focused on one or several topics related to the student's research field. Prerequisite or co-requisite: NSG 7110.

NSG9999 Thèse de doctorat / PhD thesis
Préalable : NSG 9998. / Prerequisite: NSG 9998.

* Course with a clinical component
Pathology and Experimental Medicine (Collaborative)

The Faculty of Medicine offers graduate programs leading to master’s (MSc) and doctoral (PhD) degrees in several disciplines.

The objective of the Pathology and Experimental Medicine collaborative program is to provide graduate students with the knowledge and skills to examine the basic mechanisms of disease pathology, and to develop new strategies for prevention and treatment. The degree awarded specifies the primary program and indicates “specialization: Pathology and Experimental Medicine.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Participating programs

The following primary programs participate in the collaborative program in Pathology and Experimental Medicine:

- The MSc and the PhD in Cellular and Molecular Medicine of the Department of Cellular and Molecular Medicine.
- The MSc and the PhD in Biochemistry of the Department of Biochemistry, Microbiology and Immunology.
- The MSc and the PhD in Microbiology and Immunology of the Department of Biochemistry, Microbiology and Immunology.
- The MSc and the PhD in Neuroscience of the Department of Cellular and Molecular Medicine.

Programs

Master of Science Biochemistry Specialization in Pathology and Experimental Medicine
Master of Science Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine
Master of Science Microbiology and Immunology Specialization in Pathology and Experimental Medicine
Master of Science Neuroscience Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Biochemistry Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Cellular and Molecular Medicine Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Microbiology and Immunology Specialization in Pathology and Experimental Medicine
Doctorate in Philosophy Neuroscience Specialization in Pathology and Experimental Medicine

Admission

Admission to the collaborative program in Pathology and Experimental Medicine is governed by the general regulations of the FGPS.

Candidates must indicate in their application for admission form that they wish to be accepted in the collaborative program.

To be accepted into the collaborative program students must:

- Be admitted to one of the programs participating in the collaborative program.
- Provide at least one letter of recommendation from a professor who is willing and available to act as thesis supervisor.
- Be sponsored into the collaborative program by a faculty member, normally the thesis supervisor, who must be a member of the Pathology and Experimental Medicine program.

Transfer from master’s to PhD

The regulations for transfer from MSc to PhD without being required to write a master’s thesis are those in effect in the student’s primary program.

Program Requirements

The requirements to be met by students in the collaborative program at the doctoral level are as follows:

- One course (3 credits) in the primary program.
- One Pathology and Experimental Medicine specialization course (3 credits).
- Successful completion of the Pathology and Experimental Medicine seminar course (PME8367).
- Successful completion of the compulsory seminar in the student's primary program.
- Successful completion of the Comprehensive Examination as required by the primary program.
- Preparation and defense of a thesis under the supervision of a professor who is a member of the Pathology and Experimental Medicine program. The thesis must be relevant to the focus of the Pathology and Experimental Medicine program. At least one of the examiners must be a member of the Pathology and Experimental Medicine collaborative program.

**Residence**

As per FGPS regulations, all students must complete a minimum of six sessions of full-time registration at the beginning of the program. All requests for non-consecutive full-time study sessions will need to be approved by the FGPS. The program is intended for full-time students.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or the comprehensive exam or whose research progress is deemed unsatisfactory are required to withdraw.

**Thesis Advisory Committee (TAC)**

The composition of the Thesis Advisory Committee (TAC) and the frequency of committee meetings follow the regulations of the respective primary program. At least one member of the TAC, in addition to the thesis supervisor, must be part of the Pathology and Experimental Medicine collaborative program.

**Courses**

**PME8367 SEMINAR**

Presentation of one poster during the Research Day organized by the Pathology and Experimental Medicine collaborative program. Active participation in the annual Pathology Research Day of the Department of Pathology and Laboratory Medicine. Poster evaluated by Pathology and Experimental Medicine program faculty members. Graded S/NS.

**PME8112 Cell Biology and the Molecular Basis of Pathological Phenotypes (3cr.)**

Molecular principles of cell biology, with a focus on the mechanisms of disease. Disorders in cell biological processes that underlie many pathological phenotypes, such as intracellular transport, mitochondrial dynamics, cell biology of the nucleus and the regulation of the cytoskeleton. Emphasis on emerging experimental techniques, including functional assay design, fluorescence microscopy (multi-photon, confocal, assays like Fluorescence Resonance Energy Transfer (FRET), Fluorescence Lifetime Imaging Microscopy (FLIM), Fluorescence Recovery After Photobleaching (FRAP), photoactivation and uncaling) and electron microscopy. Participants will have hands-on experience and will work to apply these techniques to their own research problems by rotation through participating laboratories. The experiments performed by the students during the course will be assembled into a manuscript-style paper for submission at the end of the term to be graded by the course co-ordinator. Enrolment is limited to 10 students and preference will be given to students whose projects are related directly to these concepts and techniques.

**PME8367 SEMINAR**

Presentation of one poster during the Research Day organized by the Pathology and Experimental Medicine collaborative program. Active participation in the annual Pathology Research Day of the Department of Pathology and Laboratory Medicine. Poster evaluated by Pathology and Experimental Medicine program faculty members. Graded S/NS.

**Courses related to the collaborative program offered by each participating unit.**

**BCH8107 ADVANCED TOPICS IN STRUCTURE AND FUNCTION OF PLASMA LIPOPROTEINS (3cr.)**

Recent advances in our knowledge of the plasma lipoproteins with a special emphasis on their role in the etiology of atherosclerosis. The subject will be introduced by an overview of the general structural properties of lipoproteins which will be followed by detailed discussion of the structure, metabolism and genetics of the apolipoproteins, the proteins and enzymes that modify lipoproteins and cell surface lipoprotein receptors. Other topics will include cholesterol homeostasis, plasma cholesterol transport and disorders of lipoprotein metabolism.

**CMMS001 THE PATHOLOGICAL BASIS OF DISEASE (3cr.)**

Introductory Course for Non-Medical Graduate Students in the Life Sciences. This course will consist of a brief introduction to pathology describing the manifestation of disease at the macroscopic and microscopic level. This will be followed by (i) A description of various types of microscopy and methodology. (ii) Concepts in flow cytometry, tissue/cell fractionation. (iii) Histo-/cytochemistry and immunohisto-/cytochemistry. (iv) Normal cells and tissues. (v) Organs. (vi) The general pathology of cells and tissues including hypertrophy, atrophy, hyperplasia, metaplasia, dysplasia, neoplasia, storage diseases, extracellular space pathologies, necrosis and apoptosis. Blood vessel and cardiac pathologies will be covered as well as concepts in neuropathology, organ/system specific pathologies and genetic diseases.

**CMMS105 INTRODUCTION TO CANCER BIOLOGY (3cr.)**

An introduction to the biology of cancer. Major topics in cancer biology include the following: tumor suppression/oncogenes; apoptosis in cancer; cell
immortalization and senescence; genomic instability; multistep tumorigenesis/inflammation in cancer; biology of angiogenesis; rational therapies.

**CMM5315 CELLULAR AND MOLECULAR BASIS OF CARDIOVASCULAR FUNCTION/DYSFUNCTION (3cr.)**
Mechanism of failing heart and cardiovascular system, its associated functions and associated conditions. Therapies for restoring function. Topics include: regulation of heart development, cell signaling, cellular and molecular mechanisms of atherosclerosis and heart disease, hormonal regulation, hypertension, bioenergetics, cardiovascular genomics and genetics, cell therapy, and regenerative medicine.

**CMM8105 ADVANCED TOPICS IN CANCER BIOLOGY (3cr.)**
Advanced study of recent developments in the field of cancer biology with emphasis on cellular and molecular aspects. Specific topics to be covered include: angiogenesis, apoptosis, cancer genetics, cell signaling, genetic instability, oncogenes and tumour suppressors.

**NSC8101 ADVANCED TOPICS IN NEUROPATHOLOGY (3cr.)**
General histopathological responses of central and peripheral nervous tissue to pathological stimuli including hypoxic-ischemic, traumatic, inflammatory/infectious, demyelinating and toxic. Emerging topics in neurology and neuropathology including the following: the pathology and pathogenesis of protein-based neurodegenerative disorders, the emerging family of RNA-mediated neurological disorders, mendelian and non-mendelian genetic diseases of the nervous system (including the role of microRNA in neurological disease), advances in diseases of skeletal muscle, advances in the molecular pathogenesis of Central Nervous System tumours, and advances in metabolic/mitochondrial/storage diseases.

**Philosophy**

The Department of Philosophy offers MA (with or without thesis) and PhD programs in Philosophy. The programs are offered in English and French. According to the University’s policy, students may pursue their studies in the official language of their choice.

The Department participates in the collaborative programs in Women’s Studies (at the MA level), in Medieval and Renaissance Studies (at the MA level) and in Canadian Studies (at the PhD level). For more information on these programs, see “Admission.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

- Master of Arts Philosophy
- Master of Arts Philosophy Specialization in Medieval and Renaissance Studies
- Master of Arts Philosophy Specialization in Women’s Studies
- Doctorate in Philosophy Philosophy
- Doctorate in Philosophy Philosophy Specialization in Canadian Studies

**Admission**

**Admission requirements**
Candidates are admitted to the PhD on the basis of an MA in Philosophy with a minimum "B+" average.

An application dossier must include official transcripts, two letters of recommendation, a description of the intended field of research, and a sample of written work. For candidates wishing to enter the PhD without an MA the application dossier must include a detailed statement of research plans.

**Language requirements**
Proficiency in both French and English is strongly encouraged so that students may take advantage of the full range of activities - lectures, personal contacts, and courses - available in the Department (graduate courses are normally not duplicated in the two languages).

**Collaborative programs**
The Department of Philosophy is a participating unit in the collaborative program in Canadian Studies at the PhD level. This program has been established for students wishing to enrich their training in Philosophy by including an interdisciplinary component in Canadian Studies. The Canadian Studies Seminar (CDN 6910) fits into the departmental course requirements and does not add to the number of courses required for the PhD in Philosophy.
To be admitted to the program, students must be registered in, or have successfully completed, at least one graduate course in Philosophy with Canadian content. The mention "Specialization in Canadian Studies" will be added to the diploma of students who pass the CDN6910 Seminar and successfully defend a thesis on a Canadian topic in Philosophy.

For further details, see the description of this program posted on the FGPS website.

**Transfer from master's to PhD**

In addition, for those enrolled in the MA in Philosophy, the Department offers an accelerated entrance to the PhD after completing, with a minimum "A-" average, six courses and a major research paper; normally these requirements can be fulfilled within twelve months. Students accepted into the PhD by this accelerated route do not require an MA. Please note that the minimal admission average requirements for the doctoral program must also be met.

**PhD in Philosophy**

The PhD program consists of six (one-session) courses, comprehensive exams, a thesis project, and a thesis, including defence.

Doctoral candidates must also complete a proficiency requirement in the second official language. This requirement can be completed in one of three ways:

- Passing (50%) the FLS 1000 exam; OR
- Completing 6 credits of FLS courses at your level (as determined by the Official Languages and Bilingualism Institute); OR
- Successfully completing a Philosophy graduate seminar given in French. (N.B. As per University regulations, students may write examinations and papers in the official language of their choice.)

Doctoral students must have sufficient mastery of languages to complete their research project; that is, they must be capable of studying texts in the original language and be able to check translations.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

**Residence**

Students in the PhD program must spend at least six sessions (not necessarily consecutive) in residence as full-time students. Students who transfer to the PhD without completing the master’s must spend a minimum of nine sessions in residence, of which at least six must be at the doctoral level.

**Duration of program**

The program is designed to be completed in four years. The maximum time permitted is six years, or seven years in the case of transfer students.

**Thesis Advisory Committee**

For information on the Thesis Advisory Committee, please consult the graduate studies secretariat of the Department of Philosophy.

**Courses**

**NOTE:** Courses are listed in English, unless they are taught bilingually (French/English) or exclusively in French. Some of the courses listed in English have a French-language counterpart. To see when this is so, see the list in the French-language version of this web page by clicking on the “Français” link located in the top right corner of this page.

For a detailed description of the seminars available in any year, please consult the department webpage. Information is normally available early in the winter for the next academic year.

**PHI5331 ANCIENT PHILOSOPHY I (3cr.)**

**PHI5332 MEDIEVAL PHILOSOPHY I (3cr.)**
PHI5333 MODERN PHILOSOPHY I (3cr.)

PHI5334 ANGLO AMERICAN PHILOSOPHY I (3cr.)

PHI5335 FRENCH PHILOSOPHY I (3cr.)

PHI5336 GERMAN PHILOSOPHY I (3cr.)

PHI5341 LOGIC AND PHILOSOPHY OF SCIENCE I (3cr.)

PHI5342 EPISTEMOLOGY I (3cr.)

PHI5343 METAPHYSICS I (3cr.)

PHI5344 PHILOSOPHICAL ANTHROPOLOGY I (3cr.)

PHI5345 ETHICS I (3cr.)

PHI5346 SOCIAL AND POLITICAL PHILOSOPHY I (3cr.)

PHI5347 PHILOSOPHY OF RELIGION I (3cr.)

PHI5348 PHILOSOPHY OF HISTORY I (3cr.)

PHI5349 ANCIENT PHILOSOPHY II (3cr.)

PHI5350 ANCIENT PHILOSOPHY III (3cr.)

PHI5351 MEDIEVAL PHILOSOPHY II (3cr.)

PHI5352 MEDIEVAL PHILOSOPHY III (3cr.)

PHI5353 MODERN PHILOSOPHY II (3cr.)

PHI5354 MODERN PHILOSOPHY III (3cr.)

PHI5355 ANGLO AMERICAN PHILOSOPHY II (3cr.)

PHI5356 ANGLO AMERICAN PHILOSOPHY III (3cr.)

PHI5357 FRENCH PHILOSOPHY II (3cr.)

PHI5358 FRENCH PHILOSOPHY III (3cr.)
PHI5359 GERMAN PHILOSOPHY II (3cr.)

PHI5360 GERMAN PHILOSOPHY III (3cr.)

PHI5361 LOGIC AND PHILOSOPHY OF SCIENCE II (3cr.)

PHI5362 LOGIC AND PHILOSOPHY OF SCIENCE III (3cr.)

PHI5363 EPISTEMOLOGY II (3cr.)

PHI5364 EPISTEMOLOGY III (3cr.)

PHI5365 METAPHYSICS II (3cr.)

PHI5366 METAPHYSICS III (3cr.)

PHI5367 PHILOSOPHICAL ANTHROPOLOGY II (3cr.)

PHI5368 PHILOSOPHICAL ANTHROPOLOGY III (3cr.)

PHI5369 ETHICS II (3cr.)

PHI5370 ETHICS III (3cr.)

PHI5371 SOCIAL AND POLITICAL PHILOSOPHY II (3cr.)

PHI5372 SOCIAL AND POLITICAL PHILOSOPHY III (3cr.)

PHI5373 PHILOSOPHY OF RELIGION II (3cr.)

PHI5374 PHILOSOPHY OF RELIGION III (3cr.)

PHI5375 PHILOSOPHY OF HISTORY II (3cr.)

PHI5376 PHILOSOPHY OF HISTORY III (3cr.)

PHI5377 AESTHETICS II (3cr.)

PHI5378 AESTHETICS III (3cr.)

PHI5319 AESTHETICS I (3cr.)
PHI6101 SELECTED PROBLEMS I (3cr.)

PHI6102 SELECTED PROBLEMS II (3cr.)

PHI6103 SELECTED PROBLEMS III (3cr.)

PHI6904 ÉTUDE DIRIGÉE/DIRECTED STUDY (3cr.)
Travail à préparer sous la direction d’un membre du corps professoral du département. Préalable : permission du comité des études supérieures. / Paper to be prepared under the direction of a professor in the department. Prerequisite: Permission of the Graduate Studies Committee.

PHI6999 RECHERCHE DIRIGÉE (M.A.) / DIRECTED RESEARCH (MA)

PHI7999 RECHERCHE ET THÈSE DE MAÎTRISE / MA THESIS RESEARCH

PHI8995 MÉMOIRE DE RECHERCHE (Ph.D.) / MAJOR RESEARCH PAPER (PhD)

PHI8998 EXAMEN DE CANDIDATURE (Ph.D.) / CANDIDACY-EXAMINATION (PhD)

PHI8999 RECHERCHE DIRIGÉE (Ph.D.) / DIRECTED RESEARCH (PhD)

PHI9999 RECHERCHE ET THÈSE DE DOCTORAT / PhD THESIS RESEARCH

Physics

Ottawa-Carleton Institute for Physics

Established in 1983, the Ottawa-Carleton Institute for Physics (OCIP) combines the research strengths of the University of Ottawa and Carleton University. The Institute offers graduate programs leading to the master’s (MSc) and doctoral (PhD) degrees in Physics.

Research facilities are shared between the two campuses. Students have access to the professors, courses and facilities at both universities; however, they must register at the “home university” of the thesis supervisor.

Members of the Institute are engaged in research in different fields of Physics: condensed matter; high energy and biological physics; medical physics; photonics. Additional information is posted in the departmental website.

Particularly for the medical physics program, research supervision may be provided by members of other institutions in the area such as hospitals, cancer clinics and government laboratories.

Most of the requirements of these programs must be fulfilled in English. Research activities may be conducted in English or in French, or in both languages, depending on the main language of the professor and of the members of the research group.

The programs are governed by the the regulations and procedures for Joint Graduate Programs and the general regulations of the graduate faculty at each of the two universities. The general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS) of the University of Ottawa are posted on the website of the FGPS.

Programs

Master of Science Physics

Master of Science Physics Specialization in Science, Society and Policy

Doctorate in Philosophy Physics
Admission

Admission to the graduate program in Physics is governed by the general regulations of the Ottawa-Carleton Institute for Physics (OCIP) and by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Applications are evaluated based on the following criteria:

- Be the holder of a master's degree in Physics (or equivalent) with a minimum average of 75% (B+);
- Demonstrate a good academic performance in previous studies as shown by official transcripts, research reports, abstracts or any other documents demonstrating research skills;
- Provide at least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work;
- Provide a statement of purpose indicating the career goals and the interests in the proposed research area;
- Identify at least one professor who is willing and available to act as thesis supervisor.

NOTE: The choice of supervisor will determine the primary campus location of the student. It will also determine which university awards the degree.

Transfer from master's to PhD

Students enrolled in the MSc program may be allowed to transfer to the PhD program without being required to write a master's thesis provided they meet the following conditions:

- Achievement of an A- average in the last two years of undergraduate studies;
- Completion of at least two graduate courses (6 credits) with a grade of A- or better in each;
- Satisfactory progress in the research program;
- Written recommendation by the supervisor;
- Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Please note that the minimal admission average requirements for the doctoral program must also be met. Following the transfer, all of the requirements of the doctoral program must be met:

- A total number of 18 credits of graduate coursework (MSc+PhD);
- The comprehensive exam (PHY9998) to be completed within 12 months of the transfer;
- Participation in the departmental seminar series;
- A thesis.

Program Requirements

The following requirements must be met:

- 12 credits at the 5000 level or above in physics or in related disciplines approved by the Department of Physics. Students must take PHY5355 or PHY5170 as one of these courses if not already completed at the master's level;
- Successful completion of a comprehensive examination (PHY9998) within twelve months of the initial admission into the program;
- Presentation and successful defense of a thesis (PHY9999) based on an original research carried out under the direct supervision of a faculty member of the Institute.

The Department may require students to take additional courses depending on their backgrounds.

Minimum standards

The passing grade in all courses is B. Students who fail 6 credits, or the comprehensive exam, or whose research progress is deemed unsatisfactory are required to withdraw from the program.

Residence

All students must complete a minimum of six sessions of full-time registration. In the case of transfer to the PhD, the residency period is nine full-time sessions from the initial registration in the program.

Duration of the program

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.
Courses

Not all of the listed courses are given each year. The course is offered in the language in which it is described.

Course codes in parentheses are for Carleton University. A 3-credit course at the University of Ottawa is equivalent to a 0.5-credit course at Carleton University.

Condensed Matter Physics

PHY5100 (PHYJ 5401) SOLID STATE PHYSICS I (3cr.)

PHY5110 (PHYJ 5402) SOLID STATE PHYSICS II (3cr.)

PHY5151 (PHYJ 5403) TYPE I & II SUPERCONDUCTORS (3cr.)

PHY5167 (PHYS5291) ADVANCED TOPICS IN MEDICAL PHYSICS (3cr.)
Topics may include medical imaging physics, cancer therapy physics, medical biophysics, or radiation protection and health physics. Topics vary from year to year. Prerequisites: PHY 5161 (PHYS 5203) plus, as appropriate to the topic offered, at least one of PHY 5112 (PHYS 5204), PHY 5164 (PHYS 5206), PHY 5165 (PHYS 5207); or permission of the Department.

PHY5320 (PHYJ 5508) INTRODUCTION TO THE PHYSICS OF MACROMOLECULES (3cr.)
The chemistry of macromolecules and polymers; random walks and the static properties of polymers; experimental methods; the Rouse model and single chain dynamics; polymer melts and viscoelasticity; the Flory-Huggins theory; the reptation theory; computer simulation algorithms; biopolymers and copolymers.

PHY5347 (PHYJ 5509) PHYSICS, CHEMISTRY AND CHARACTERIZATION OF MINERAL SYSTEMS (3cr.)
The materials science of mineral systems such as the network and layered silicates. In depth study of the relations between mineralogically relevant variables such as atomic structure, crystal chemistry, site populations, valence state populations, crystallization conditions, etc. Interpretation and basic understanding of key characterization tools such as microprobe analysis, Mössbauer spectroscopy, x-ray diffraction and optical spectroscopy.

PHY5362 (PHYJ 5006) COMPUTATIONAL METHODS IN MATERIAL SCIENCES (3cr.)
Introduction to modern computational techniques used in material science research. Classical molecular dynamics, classical and quantum Monte Carlo methods, plane-wave based electronic band structure calculations, Carr-Parinnello quantum molecular dynamics. Applications to condensed matter systems: basic simulation techniques, force-field based methods in the study of thermodynamic and physical properties of solids, first-principles quantum mechanical methods.

PHY5380 (PHYJ 5407) SEMICONDUCTOR PHYSICS I (3cr.)
Brillouin zones and band theory. E-k diagram, effective mass tensors, etc. Electrical properties of semiconductors.

PHY5381 (PHYJ 5408) SEMICONDUCTOR PHYSICS II: OPTICAL PROPERTIES (3cr.)

PHY5384 (PHYJ 5308) PHYSICS OF FIBER OPTIC SYSTEMS (3cr.)

PHY5387 (PHYJ 5504) PHYSICS OF MATERIALS (3cr.)
Microscopic characteristics related to the physical properties of materials. Materials families: metals and alloys, ceramics, polymers and plastics, composites, layered materials, ionic solids, molecular solids, etc. Specific materials groups. Equilibrium phase diagrams and their relation to microstructure and kinetics. Experimental methods of characterization. Interactions and reactions. Prerequisite: PHY 4382 or equivalent. Cannot be combined for credit with PHY 4387.

PHY5922 (PHYJ 5507) ADVANCED MAGNETISM (3cr.)
Study of some of the experimental and theoretical aspects of magnetic phenomena found in ferro-, ferr-, antiferro-magnetic and spin glass materials. Topics of
current interest in magnetism. Prerequisite: PHY 4385 or equivalent.

PHY5951 (PHYJ 5409) PHYSIQUE DE BASSE TEMPÉRATURES / LOW TEMPERATURE PHYSICS II (3cr.)

PHY6371 (PHYJ 5404) TOPICS IN MÖSSBAUER SPECTROSCOPY (3cr.)
Experimental techniques used to measure Mössbauer spectra. Physics of the Mössbauer effect: recoiless emission/absorption, anisotropic Debye-Waller factors, second order Doppler shifts, etc. Mössbauer lineshape theory with static and dynamic hyperfine interactions. Distributions of static hyperfine parameters. Physics of the hyperfine parameters: origin of the hyperfine field, transferred and supertransferred fields, calculations of electric field gradients, etc. Applications of Mössbauer spectroscopy to various areas of solid state physics and materials science.

PHY6382 (PHYJ 6406) PHYSICS OF SEMICONDUCTOR SUPERLATTICES (3cr.)
Fundamental physics of two-dimensional quantized semiconductor structures. Electronic and optical properties of superlattices and quantum wells. Optical and electronic applications. This course is intended for students registered for the Ph.D. in semiconductor physics research. Prerequisite: Advanced undergraduate or graduate course in solid state physics.

Particle, Nuclear and Atomic Physics

PHY5966 (PHYJ 5601) EXPERIMENTAL TECHNIQUES OF NUCLEAR AND ELEMENTARY PARTICLE PHYSICS (3cr.)
A course intended for students interested in high energy experimental physics. Large accelerators for charged particles. Particle detectors: nuclear emulsion, bubble chamber, spark chamber, Vertex detectors and calorimeters etc. Study of properties of elementary particles through analysis of experimental results. Prerequisite: PHY4360

PHY5967 (PHYS 5602) ELEMENTARY PARTICLE PHYSICS / PHYSIQUE DES PARTICULES (3cr.)

PHY8164 (PHYS 5604) INTERMEDIATE NUCLEAR PHYSICS (3cr.)

PHY8165 (PHYS 6601) PARTICLE PHYSICS PHENOMENOLOGY (3cr.)

PHY8166 (PHYS 6602) ADVANCED TOPICS IN PARTICLE PHYSICS PHENOMENOLOGY (3cr.)

PHY8260 ADVANCED NUCLEAR PHYSICS (6cr.)

Photonics

PHY5310 (PHYJ 5310) ADVANCED OPTICS AND PHOTONICS (3cr.)
Introduction to laser physics: Optical resonators, light-matter interaction, basic operation of lasers, coherence, light control and manipulation, beam optics, Fourier optics. Guided wave optics: light propagation, allowed modes, dispersion. This course cannot be combined for credit with PHY4310.

PHY5311 (PHYJ 5311) QUANTUM OPTICS I (3cr.)
Classical and semi-classical light-matter interaction; gauges and energy conservation; two level systems in the resonant, under-resonant and over-resonant limit; time-dependent perturbation theory and Fermi's golden rule; semi-classical laser theory; Landau Zener tunnelling and multi-photon transitions; tunnel ionization and multi-photon ionization.

PHY5312 (PHYJ 5312) QUANTUM OPTICS II (3cr.)
Quantum light-matter interaction; quantization of the light field and of Schrödinger equation; number states and coherent states; photon emission and absorption; two-photon decay; photoelectric effect; Lamb shift, line-width and renormalization; Casimir effect; multi-photon processes; density operator; quantum theory of decay; quantum laser theory.

PHY5318 (PHYS 5318) MODERN OPTICS (3cr.)
Electromagnetic wave propagation; reflection, refraction; Gaussian beams; guided waves. Laser theory: stimulated emission, cavity optics, gain and bandwidth, atomic and molecular lasers. Mode locking, Q switching. Diffraction theory, coherence, Fourier optics, holoagraphy, laser applications. Optical communication systems, nonlinear effects: devices, fibre sensors, integrated optics. Also offered at the undergraduate level, with different requirements, as PHYS 4208 for which additional credit is precluded. Prerequisite: permission of the Department.

PHY5330 (PHYJ 5330) FIBER OPTICS COMMUNICATIONS (3cr.)
additional credit for ELG 5103.

**PHY5331 (PHYJ 5331) FIBER OPTICS SENSORS** (3cr.)

**PHY5332 (PHYJ 5332) NONLINEAR OPTICS** (3cr.)
Nonlinear optical susceptibility; wave equation description of nonlinear optics processes; second harmonic generation, intensity dependent refractive index, sum- and frequency-generation, parametric amplification; quantum mechanical theory of nonlinear optics; Brillouin and Raman scattering; the electro-optic effect; nonlinear fibre optics and solitons.

**PHY5333 (PHYJ 5333) MODE LOCKED LASERS** (3cr.)

**Medical Physics**

**PHY5112 (PHYS 5204) PHYSICS OF MEDICAL IMAGING** (3cr.)
Physical foundation of, and recent developments in, transmission x-ray imaging, computerized tomography, nuclear medicine, magnetic resonance imaging, and ultrasound, for the imaging physics specialist. Imaging system performance: contrast, resolution, modulation transfer function, signal-to-noise ratio, detective quantum efficiency. Essentials of image display and processing.

**PHY5161 (PHY 5203) MEDICAL RADIATION PHYSICS** (3cr.)

**PHY5163 (PHY 5208) RADIATION PROTECTION** (2cr.)

**PHY5164 (PHY 5206) MEDICAL RADIOTHERAPY PHYSICS** (3cr.)

**PHY5165 (PHY 5207) RADIOBIOLOGY** (3cr.)

**PHY5166 (PHY 5209) MEDICAL PHYSICS PRACTICUM** (3cr.)

**PHY5168 (PHY 5210) ANATOMY AND PHYSIOLOGY FOR MEDICAL PHYSICISTS**
Overview of human anatomy and physiology as background for the application of physics to cancer therapy and medical imaging. Anatomy as depicted by imaging technologies such as CT, MRI, and radiography will be emphasized. Graded: Satisfactory or Not satisfactory (S/N). Prerequisite: Enrollment in the graduate field of medical physics or permission of the Department.

**Physics in Modern Technology**

**PHY5495 (PHYS 5905) PHYSICS IN MODERN TECHNOLOGY WORK TERM**
Practical experience for students in the physics in modern technology stream. Satisfactory / not satisfactory grade, to be based on the grades obtained for the written and oral reports as well as on the evaluations of the employer. Prerequisites: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department. Prerequisite: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department.

**General**

**PHY5130 (PHYJ 5001) EXPERIMENTAL CHARACTERIZATION TECHNIQUES IN MATERIALS SCIENCE, PHYSICS, CHEMISTRY, AND MINERALOGY** (3cr.)
Survey of experimental techniques used in materials science, condensed matter physics, solid state chemistry, and mineralogy to characterize materials and solid substances. Diffraction (X-ray diffraction, neutron diffraction...). Spectroscopy (infra-red spectroscopy, Raman spectroscopy, nuclear magnetic resonance, Mössbauer spectroscopy, electron spin resonance...). Microscopy and imaging (scanning electron microscopy, transmission electron microscopy, optical microscopy, magnetic resonance imaging...). Other analytic techniques (thermal analysis, wet chemistry, bulk thermodynamic properties, linear response and dc susceptibility...).

**PHY5140 (PHY 5801) METHODS IN THEORETICAL PHYSICS I** (3cr.)

**PHY5141 (PHY 5802) METHODS IN THEORETICAL PHYSICS II** (3cr.)
PHYS570 (PHYS 5701) ADVANCED QUANTUM MECHANICS I (3cr.)
Review of operators, motion in a general field and angular momentum. Identical particles and exchange, two electron atoms, Hartree-Fock and statistical models of many particle systems. Angular momentum, Clebsch-Gordan coefficients and scattering theory. Prerequisite: PHY 4370.

PHYS340 (PHYJ 5004) COMPUTATIONAL PHYSICS I (3cr.)

PHYS341 (PHYJ 5005) COMPUTATIONAL PHYSICS II (3cr.)

PHYS342 (PHYJ 5003) COMPUTER SIMULATIONS IN PHYSICS (3cr.)
A course aimed at exploring physics with a computer in situations where analytic methods fail. Numerical solutions of Newton's equations, non-linear dynamics. Molecular dynamics simulations. Monte-Carlo simulations in statistical physics: the Ising model, percolation, crystal growth models. Symbolic computation in classical and quantum physics. Prerequisites: PHY 3355 (PHY 3755), PHY 3370 (PHY 3770) and knowledge of one of the following: FORTRAN, Pascal or C. Prerequisites: PHY3355 (PHY3755), PHY3370 (PHY3770) and familiarity with FORTRAN, Pascal or C.

PHYS5355 (PHYJ 5505) STATISTICAL MECHANICS (3cr.)

PHYS5361 (PHYJ 5102) NONLINEAR DYNAMICS IN THE NATURAL SCIENCES (3cr.)
A multidisciplinary introduction to nonlinear dynamics with emphasis on the techniques of analysis of the dynamic behaviour of physical systems. Basic mathematical concepts underlying nonlinear dynamics, including differential and difference equations, Fourier series and data analysis, stability analysis, Poincaré maps, local bifurcations, routes to chaos and statistical properties of strange attractors. Applications of these concepts to specific problems in the natural sciences such as condensed matter physics, molecular physics, fluid mechanics, dissipative structures, evolutionary systems etc.

PHYS6170 (PHYJ 5703) ADVANCED QUANTUM MECHANICS II (3cr.)

PHY7999 (PHYS 5909) THÈSE DE MAÎTRISE / MSc THESIS

PHY8111 (PHYS 5101) CLASSICAL MECHANICS AND THEORY OF FIELDS (3cr.)

PHY8122 (PHYS 5202) MOLECULAR SPECTROSCOPY (3cr.)

PHY8132 (PHYS 5302) CLASSICAL ELECTRODYNAMICS (3cr.)

PHY8172 (PHYS 5702) RELATIVISTIC QUANTUM MECHANICS (3cr.)

PHY8173 (PHYS 6701) QUANTUM ELECTRODYNAMICS (3cr.)

PHY8191 (PHYS 5901) SELECTED TOPICS IN PHYSICS (MSc) (3cr.)

PHY8290 (PHYS 5900) SELECTED TOPICS IN PHYSICS (MSc) (6cr.)

PHY8391 (PHYS 6901) SELECTED TOPICS IN PHYSICS (PhD) (3cr.)

PHY8490 (PHYS 6900) SELECTED TOPICS IN PHYSICS (PhD) (6cr.)

PHY9998 EXAMEN DE SYNTHÈSE (DOCTORAT) / COMPREHENSIVE EXAMINATION (PhD)
PHY9999 (PHYS 6009) THÈSE DE DOCTORAT / PhD THESIS

Specialized Courses

PHY5100 (PHYJ 5401) SOLID STATE PHYSICS I (3cr.)

PHY5110 (PHYJ 5402) SOLID STATE PHYSICS II (3cr.)

PHY5151 (PHYJ 5403) TYPE I & II SUPERCONDUCTORS (3cr.)

PHY5320 (PHYJ 5508) INTRODUCTION TO THE PHYSICS OF MACROMOLECULES (3cr.)
The chemistry of macromolecules and polymers; random walks and the static properties of polymers; experimental methods; the Rouse model and single chain dynamics; polymer melts and viscoelasticity; the Flory-Huggins theory; the reptation theory; computer simulation algorithms; biopolymers and copolymers.

PHY5322 BIOLOGICAL PHYSICS (3cr.)

PHY5347 (PHYJ 5509) PHYSICS, CHEMISTRY AND CHARACTERIZATION OF MINERAL SYSTEMS (3cr.)
The materials science of mineral systems such as the network and layered silicates. In-depth study of the relations between mineralogically relevant variables such as atomic structure, crystal chemistry, site populations, valence state populations, crystallization conditions, etc. Interpretation and basic understanding of key characterization tools such as microprobe analysis, Mössbauer spectroscopy, x-ray diffraction and optical spectroscopy.

PHY5362 (PHYJ 5506) COMPUTATIONAL METHODS IN MATERIAL SCIENCES (3cr.)
Introduction to modern computational techniques used in material science research. Classical molecular dynamics, classical and quantum Monte Carlo methods, plane-wave based electronic band structure calculations, Carr-Parrinello quantum molecular dynamics. Applications to condensed matter systems: basic simulation techniques, force-field based methods in the study of thermodynamic and physical properties of solids, first-principles quantum mechanical methods.

PHY5380 (PHYJ 5407) SEMICONDUCTOR PHYSICS I (3cr.)
Brillouin zones and band theory. E-k diagram, effective mass tensors, etc. Electrical properties of semiconductors.

PHY5381 (PHYJ 5408) SEMICONDUCTOR PHYSICS II: OPTICAL PROPERTIES (3cr.)

PHY5384 (PHYJ 5308) PHYSICS OF FIBER OPTIC SYSTEMS (3cr.)

PHY5387 (PHYJ 5504) PHYSICS OF MATERIALS (3cr.)
Microscopic characteristics related to the physical properties of materials. Materials families: metals and alloys, ceramics, polymers and plastics, composites, layered materials, ionic solids, molecular solids, etc. Specific materials groups. Equilibrium phase diagrams and their relation to microstructure and kinetics. Experimental methods of characterization. Interactions and reactions. Prerequisite: PHY 4382 or equivalent. Cannot be combined for credit with PHY 4387.

PHY5495 (PHYS 5905) PHYSICS IN MODERN TECHNOLOGY WORK TERM
Practical experience for students in the physics in modern technology stream. Satisfactory / not satisfactory grade, to be based on the grades obtained for the written and oral reports as well as on the evaluations of the employer. Prerequisites: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department. Prerequisite: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department.

PHY5495 (PHYS 5905) PHYSICS IN MODERN TECHNOLOGY WORK TERM
Practical experience for students in the physics in modern technology stream. Satisfactory / not satisfactory grade, to be based on the grades obtained for the
written and oral reports as well as on the evaluations of the employer. Prerequisites: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department. Prerequisite: Acceptance in the physics in modern technology stream of the MSc program and permission of the Department.

**PHY5922 (PHYJ 5507) ADVANCED MAGNETISM** (3cr.)
Study of some of the experimental and theoretical aspects of magnetic phenomena found in ferro-, ferri-, antiferro-magnetic and spin glass materials. Topics of current interest in magnetism. Prerequisite: PHYS 4385 or equivalent.

**PHY5951 (PHYJ 5409) PHYSIQUE DE BASSE TEMPÉRATURES / LOW TEMPERATURE PHYSICS II** (3cr.)

**PHY6371 (PHYJ 5404) TOPICS IN MÖSSBAUER SPECTROSCOPY** (3cr.)
Experimental techniques used to measure Mössbauer spectra. Physics of the Mössbauer effect: recoilless emission/absorption, anisotropic Debye-Waller factors, second order Doppler shifts, etc. Mössbauer lineshape theory with static and dynamic hyperfine interactions. Distributions of static hyperfine parameters. Physics of the hyperfine parameters: origin of the hyperfine field, transferred and supertransferred fields, calculations of electric field gradients, etc. Applications of Mössbauer spectroscopy to various areas of solid state physics and materials science.

**PHY6382 (PHYJ 6406) PHYSICS OF SEMICONDUCTOR SUPERLATTICES** (3cr.)
Fundamental physics of two-dimensional quantized semiconductor structures. Electronic and optical properties of superlattices and quantum wells. Optical and electronic applications. This course is intended for students registered for the Ph.D. in semiconductor physics research. Prerequisite: Advanced undergraduate or graduate course in solid state physics.

In addition, the following courses may be taken for credit at the graduate level at the discretion of chairperson of the Physics Department. However, only one such course may be counted toward the credits required for the master's or doctoral degree:

**PHY4327 APPLICATIONS OF INTEGRATED CIRCUITS IN PHYSICS** (3cr.)
A course designed to introduce students having no formal background of electronics to the use of integrated circuits in designing laboratory apparatus. Both digital and analogue circuits will be covered. Topics are chosen from counters, gates, wave-shaping, microcomputers, D/A and A/D conversion, op amps, filters, lock-in amplifiers, and phase locked loops. This course is offered in alternate years. Prerequisites: PHYS 3902, PHYS 3904.

**PHY4330 ADVANCED DYNAMICS** (3cr.)
Advanced mechanics: Lagrangian and Hamiltonian formulations; canonical transformations: Hamilton-Jacobi theory. Relativity: Lorentz transformation; tensor analysis; relativistic classical mechanics. Prerequisites: PHY 2333, PHY 2361.

**PHY4335 PHYSICS OF CONTINUOUS MEDIA** (3cr.)

**PHY4346 GENERAL RELATIVITY** (3cr.)
An introduction to the mathematical techniques and experimental tests of the general theory of relativity. This course is offered in alternate years. Prerequisites: PHYS 3341, PHYS 2361.

**PHY4361 APPLIED NUCLEAR PHYSICS** (3cr.)
Review of basic nuclear concepts. Semi-empirical mass formula. Nuclear fission. Controlled chain reactions. Types of nuclear reactors. Breeder systems. The advantages and disadvantages of nuclear power. Nuclear fission theory. Possible fusion reactions. Lawson criterion. Analysis of possible fusion power systems. Problems associated with practical fusion systems. Radioactive dating techniques. Selected other topics. This course is offered in alternate years. Prerequisite: PHYS 2361.

**PHY4362 SUBATOMIC PHYSICS I** (3cr.)

**PHY4368 SUBATOMIC PHYSICS II** (3cr.)
Properties of leptons, quarks and hadrons. The fundamental interactions, conservation laws, invariance principles and quantum numbers. Resonances in hadron-hadron interactions. Three body phase space. Duality plots. Quark model of hadrons, mass formulae. Weak interactions, parity violation, decay of neutral kaons, CP violation, Cabibbo theory. Prerequisite: PHYS 4362.

**PHY4370 QUANTUM MECHANICS** (3cr.)
PHY4385 SOLID STATE PHYSICS (3cr.)

PHY4387 PHYSICS OF MATERIALS (3cr.)

PHY4395 ASTROPHYSICS (3cr.)

Political Science

The School of Political Studies offers graduate programs leading to the Graduate Diploma in Public Management and Governance, and to the degrees of Master of Arts (MA) and PhD in Political Science. The MA program is offered both full- and part-time whereas the PhD program is offered full-time only. The programs are offered in French and English.

- It is possible to follow the Master’s or the PhD program exclusively in French.
- Students who register in their program in French (MA or PhD) must take the majority of their courses in French:
  - Master’s with Thesis: students must take at least three of their required courses in French.
  - Master’s with Major Research Paper: students must take at least four of their required courses in French.
  - Ph.D.: students must take at least three courses in French.
- Students who register in their program in English (MA or PhD) must take and pass at least one of their required courses in French.
- All students are permitted to hand in their assignments in French or in English.
- At the time of admission, students must have an active knowledge of French and a passive understanding of English.
- French is the working language of the School’s meetings, including those of the graduate students’ association, and in the School’s internal communications.

Two options are available for the MA, the MA with thesis and the MA with research paper.

The department participates in the collaborative programs in Women’s Studies (at the MA level), in Environmental Sustainability (at the MA level) and in Canadian Studies (at the PhD level). For more information on this program, see “Admission.”

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Political Science
Master of Arts Political Science Specialization in Environmental Sustainability
Master of Arts Political Science Specialization in Women’s Studies
Doctorate in Philosophy Political Science
Doctorate in Philosophy Political Science Specialization in Canadian Studies

Admission

To be admitted to the PhD program, candidates must hold a master’s degree in political science (or the equivalent) with a minimum average of 75% (B+) calculated in accordance with FGPS guidelines. Exceptional students in the master’s program at the University of Ottawa may, under certain conditions (see “Transfer from master’s to PhD”), be allowed to transfer to the PhD without being required to write a master’s thesis.

An active knowledge of French and English is essential. All students admitted will have to take at least one of their courses in French and must be capable of reading texts in English and French. Students must indicate in their application the language in which they plan to take the majority of their courses. Those students who plan to study mainly in English will have to demonstrate in their application an active knowledge of English. All students whose first language is other than English or French must provide proof in their application of their level of competence in both languages. The School of Political Studies reserves the right to require a language test for either language.

Fields
The program offers the following fields:

- International relations
- Canadian and Quebec politics
- Political thought and the analysis of ideologies
- Comparative politics
- Women and politics
- Environmental politics
- Political economy
- Citizenship, diversity and migration

**Additional requirements**

The requirements outlined above are a minimum. The School of Political Studies reserves the right to add any course considered essential in light of the student’s background.

**Collaborative programs**

The School of Political Studies is one of the participating units in the collaborative PhD program in Canadian Studies. This program was created to enable students to enrich their education in political science by adding the interdisciplinary dimension of Canadian Studies. The Seminar in Canadian Studies (CDN 6910) is recognized by the School of Political Studies towards the requirements of the PhD degree. Thus students registered in the collaborative program do not have to take an additional course.

To be accepted into the collaborative program, students must be already registered in at least one graduate course in political science with Canadian content, or have already passed such a course. The degree of those who have successfully completed the interdisciplinary seminar (CDN 6910) and thesis with Canadian content, will indicate a “specialization in Canadian Studies.”

For more information, see the description of this program posted on the FGPS website

**Transfer from master's to PhD**

Students in the MA program at the University of Ottawa who have performed exceptionally well academically, who have demonstrated solid research skills and who are deemed sufficiently mature, may proceed to the doctoral program without completing their master's degree. Please note that the minimal admission average requirements for the doctoral program must also be met. The conditions for transfer are as follows:

- successful completion of at least four POL graduate courses (12 credits) with an A average as well as an A+ in at least one of the courses
- approval of the Graduate Studies Committee of the School of Political Studies. The committee makes its decision on the basis of written reports on the student’s maturity and research skills, from the student’s thesis supervisor and from the professors in the courses taken in the master’s program.

The request for transfer must be made during the third session of full-time registration (or equivalent), and the transfer must take place before the end of the fourth session. The Graduate Studies committee will take into account the student’s grades, thesis plan (or draft plan) and the reports from professors who taught the courses taken at the master’s.

Following the transfer, the student must successfully complete all the requirements of the PhD program. Students who transfer but do not complete the PhD program can however obtain the MA degree provided they meet all of its requirements.

**Program Requirements**

**Degree requirements**

The following courses must be successfully completed:

- One course chosen (6 credits each) from among the following:
  
  - POL9200 THEORIES AND PROBLEMS IN INTERNATIONAL RELATIONS (6cr.)
  - POL9218 THEORIES AND PROBLEMS IN COMPARATIVE POLITICS (6cr.)
  - POL9219 THEORIES AND PROBLEMS IN CANADIAN AND QUEBEC POLITICS (6cr.)
  - POL9220 THEORIES AND PROBLEMS IN POLITICAL THOUGHT (6cr.)

- Two seminars (3 credits each) chosen from among the following:
  
  - POL7102 SELECTED TOPICS IN INTERNATIONAL RELATIONS (3cr.)
  - POL7103 SELECTED TOPICS IN POLITICAL THOUGHT (3cr.)
  - POL7104 SELECTED TOPICS IN CANADIAN AND QUEBEC POLITICS (3cr.)
  - POL7105 POWER, POLITICS, AND SOCIETY (3cr.)
  - POL7106 SUBJECTIVITY AND INTERSUBJECTIVITY (3cr.)
  - POL7107 FOUNDATIONS OF MODERN POLITICAL THOUGHT (3cr.)
  - POL7108 IDEOLOGY AND SOCIAL TRANSFORMATION (3cr.)
Core skills in the provision of evidence-based psychological services for a range of psychological problems in children and youth. The therapeutic

Séminaires accompagnés de simulations des problèmes éprouvés dans le monde du travail. Sujets de discussion: l'action affirmative, les femmes
des contextes sociaux et cognitifs. Analyse des problèmes méthodologiques spécifiques à l'étude de l'interaction.

Statistical methods and the use of advanced computerized data analysis. Focus on the statistical analysis of more than one variable and/or more than two groups. Topics covered include the analysis of variance, multiple linear

components and factor analysis. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director.

Approaches to the systematic review of evidence in the health sciences. Searching for the evidence, selection of studies, quality and validity of included studies,
in epidemiology. Seminars on current topics.

Global burden of illness; epidemiology of major infectious and non-communicable diseases; global environmental health; maternal and child health, global

exposure in the workplace. This course examines the role of work in shaping health and illness. It introduces students to the methodological

issues of conducting a systematic review of research literature. Practical skills in conducting a systematic literature review are developed.

students. The following requirements must also be met:

- All students must successfully complete at least one course given in French.
- To continue in the program, students must pass both comprehensive examinations (the major and the minor). In accordance with the
general regulations of the Faculty of Graduate and Postdoctoral Studies, any student who fails the major or minor comprehensive
examination has the right to one retake. A student who is unsuccessful on the second attempt will be withdrawn.
- Comprehensive examinations are aimed at proving basic knowledge in the fields of study. The major field comprehensive examination usually

takes place towards the end of the third session of registration in the program. The minor field comprehensive examination usually

takes place at the end of the fourth session of registration in the program.
- The thesis proposal must be approved by the thesis committee. A student whose proposal is not accepted on the first submission may be
allowed to submit it a second time. A student whose proposal is rejected a second time will be withdrawn from the program.

Minimum standards

Students are required to maintain a minimum average of B+ during their PhD program. Those who receive a grade lower than B+ in two
courses or more will be required to withdraw.

Residence

All full-time students must complete a minimum of six sessions of full-time registration. In the case of transfer to the PhD, the residency period
for the PhD is nine full-time sessions from the initial registration in the program.

Duration of program

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial
registration in the program.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be
determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of
the thesis committee, in addition to the supervisor, must be from the Faculty of Social Sciences. The TAC is responsible for guiding the student
throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may
include members who are not part of the TAC.

Courses

POL5106 SELECTED TOPICS IN POLITICAL SCIENCE (3cr.)
**POL5123 CANADIAN POLITICS** (3cr.)
Presentation and analysis of a contemporary issue in Canadian politics.

**POL6100 SEMINAR IN INTERNATIONAL RELATIONS** (3cr.)

**POL6101 RESEARCH METHODS IN POLITICAL SCIENCE** (3cr.)
Examination of the methodological approaches used in political analysis, including the epistemological issues surrounding these approaches. A portion of the seminar deals with the challenges of designing a thesis proposal and writing the thesis itself. Reserved for master's students.

**POL6118 CORE SEMINAR IN COMPARATIVE POLITICS** (3cr.)
Critical study of the principal theoretical approaches in comparative politics, the debates about them and the different methodological frameworks in comparative politics.

**POL6119 SEMINAR IN CANADIAN AND QUEBEC POLITICS** (3cr.)

**POL6120 SEMINAR IN POLITICAL THOUGHT** (3cr.)

**POL6999 PROJET DE THÈSE / THESIS PROPOSAL**

**POL7102 SELECTED TOPICS IN INTERNATIONAL RELATIONS** (3cr.)

**POL7103 SELECTED TOPICS IN POLITICAL THOUGHT** (3cr.)

**POL7104 SELECTED TOPICS IN CANADIAN AND QUEBEC POLITICS** (3cr.)

**POL7105 POWER, POLITICS, AND SOCIETY** (3cr.)
Study of the diverse ways that political thought has conceptualized power, the forms it takes, the ways it functions and its impact on/in politics and society. The approach may be historical or thematic. The exact topic is announced at the beginning of the session.

**POL7106 SUBJECTIVITY AND INTERSUBJECTIVITY** (3cr.)
Study of the foundations of subjectivity and intersubjectivity. The approach may be historical or thematic. The exact topic is announced at the beginning of the session.

**POL7107 FOUNDATIONS OF MODERN POLITICAL THOUGHT** (3cr.)
Study of the authors, schools of thought and ideologies that constitute modernity. The exact topic is announced at the beginning of the session.

**POL7108 IDEOLOGY AND SOCIAL TRANSFORMATION** (3cr.)
Study of various ways of understanding nature and of the importance of ideas, values/principles, and ideology in the context of social and political change. The approach may be historical or thematic. The exact topic is announced at the beginning of the session.

**POL7109 GOVERNANCE AND GLOBALIZATION** (3cr.)
Analysis of institutions and practices of regulation at the international level in the context of globalization. Study of major trends in national and international governance, including forces of resistance. Case studies.

**POL7110 INTERNATIONAL POLITICAL ECONOMY** (3cr.)
Analysis of the political aspects of the international economy and how economic issues affect societies and international politics. Case studies. Examination of historical and contemporary theoretical approaches.

**POL7111 SPACE AND TERRITORIALITY** (3cr.)
Analysis of issues relating to the production, control and use of space in world order. Study of diverse contemporary theories concerning space and territoriality.

**POL7112 SECURITY AND CONFLICT: CONTEMPORARY ISSUES** (3cr.)
Analysis of the causes, mechanisms and consequences of inter-state conflicts (wars, crises) and/or intra-state conflicts (civil war, secession). Examination of relevant theoretical literature.

**POL7113 CITIZENSHIP AND IDENTITY** (3cr.)
Analysis of contemporary citizenship and identity issues in Canada. The approach may be historical or thematic, and the exact topic is announced at the beginning of the session.

**POL7114 CONSTITUTION AND INSTITUTIONS** (3cr.)
Analysis of constitutional and institutional issues in contemporary Canadian politics. The exact topic is announced at the beginning of the session.
**POL7115 POLITICAL PARTIES AND MOVEMENTS** (3cr.)
Analysis of current issues affecting political forces in Canada: parties, groups and movements. The exact topic is announced at the beginning of the session.

**POL7116 PUBLIC POLICY** (3cr.)
Analysis of current public-policy issues in Canada. The exact topic is announced at the beginning of the session.

**POL7117 INTER-FIELD SEMINAR** (3cr.)
In this seminar, taught by at least two professors, students examine a topic that draws on knowledge from at least two of the program’s fields of study (political thought, Canadian politics, international politics). The exact topic is announced at the beginning of the session.

**POL7119 CREATION AND TRANSFORMATION OF STATES AND POLITICAL REGIMES** (3cr.)
Study of theories of state-building and transformation (including strategies of adaptation within a context of globalisation; issues of state collapse), as well as the study of democratic and authoritarian regimes and their transformations (transition, consolidation, collapse), in a comparative perspective.

**POL7120 COMPARATIVE POLITICAL ECONOMY** (3cr.)
Study of theoretical approaches concerning the evolution of power relations between states and markets in different regions of the world; of the political economy of social movements; of political struggles regarding socio-economic inequalities. The emphasis will be on the political economy of both developing states and of highly industrialised countries.

**POL7121 COMPARATIVE POLITICS OF IDENTITIES** (3cr.)
Study of theories concerning identity (primordialism, instrumentalism, constructivism) and of the role of ethnic, national, religious, linguistic and gender identities in political processes (violence, accommodation among different identity groups, management of diverse identities by the state).

**POL7122 SPECIAL TOPICS IN COMPARATIVE POLITICS** (3cr.)
Topics to covered in rotation: Africa, Latin America, Asia, Middle East and former Soviet bloc (and possibly Western Europe/United States)

**POL7135 ADVANCED QUANTITATIVE METHODS** (3cr.)
Advanced quantitative methods and their application in political science. Topics include multivariate regression analysis, maximum likelihood estimation and panel analysis. Review of advanced software packages for data organisation and development of tools for data collection.

**POL7136 ADVANCED QUALITATIVE METHODS** (3cr.)
Qualitative research methods and their application in political science. The methods covered include fieldwork, interviews, participant observations, archival research and discourse analysis.

**POL7137 INTERPRETATIVE OR CRITICAL METHODOLOGIES** (3cr.)
Interpretive or critical methodologies and their application in political science: genealogy, deconstructivism, fieldwork approach, feminist analysis, new materialism, and decolonising methodologies.

**POL7366 DOCTORAL METHODOLOGY SEMINAR** (3cr.)
Advanced reflection on the methodological aspects and issues of thesis research (methods of inquiry, practical considerations, data analysis, interpretation of results, etc.). Students acquire the knowledge needed to design and formulate the thesis proposal. This seminar is reserved for PhD students in Political Science. It is offered once every two weeks over two consecutive sessions.

**POL7970 MÉMOIRE / RESEARCH PAPER** (6cr.)

**POL7989 THÈSE DE MAÎTRISE / MA THESIS** (12cr.)

**POL8100 DIRECTED READINGS** (3cr.)

**POL8110 SEMINAR IN THE MINOR FIELD: INTERNATIONAL RELATIONS** (3cr.)
Evolution of theories and concepts in political economy as an approach to studying international affairs. Examination of various schools of thought.

**POL8111 SEMINAR IN THE MINOR FIELD: COMPARATIVE POLITICS** (3cr.)
Study of the evolution of theories, concepts and methods in comparative politics as an approach to studying domestic politics and transnational influences, including states, regimes and institutions; the politics of identity; and political economy.

**POL8112 SEMINAR IN THE MINOR FIELD: CANADIAN AND QUÉBEC POLITICS** (3cr.)
The fundamentals of political economy as an approach to studying political phenomena. Canada's place in the global economy, intergovernmental relations, social movements and changes in the forms of federal intervention are among the topics covered.

**POL8113 SEMINAR IN THE MINOR FIELD: POLITICAL THOUGHT** (3cr.)
Examination of key ideological movements (key questions, main concepts, major texts). Analysis of theories on the formation and transformation of ideologies. Contemporary ideological dynamics.
POL9200 THEORIES AND PROBLEMS IN INTERNATIONAL RELATIONS (6cr.)

POL9218 THEORIES AND PROBLEMS IN COMPARATIVE POLITICS (6cr.)
Study of the evolution of theories, concepts and methods in comparative politics as an approach to studying domestic politics and transnational influences, including states, regimes and institutions; the politics of identity; and political economy. The comprehensive examination in the major field is held at the end of the course.

POL9219 THEORIES AND PROBLEMS IN CANADIAN AND QUEBEC POLITICS (6cr.)

POL9220 THEORIES AND PROBLEMS IN POLITICAL THOUGHT (6cr.)
Examination of key ideological movements (key questions, main concepts, major texts). Analysis of theories on the formation and transformation of ideologies. Contemporary ideological dynamics. The comprehensive examination in the major field is held at the end of the course.

POL9310 COMPREHENSIVE EXAMINATION IN THE MAJOR FIELD

POL9320 COMPREHENSIVE EXAMINATION IN THE MINOR FIELD
Prerequisites: POL8110 or POL8111 or POL8112 or POL8113

POL9350 THESIS PROPOSAL

POL9999 THÈSE DE DOCTORAT / PhD THESIS

Population Health

The population health doctoral program is offered through a collaboration of five faculties: the Faculty of Health Sciences, the Faculty of Medicine, the Faculty of Social Sciences, the Telfer School of Management, and the Faculty of Law (Common Law Section). The program is administratively hosted by the Faculty of Health Sciences and governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). This program is modeled on a framework that encompasses population health issues; determinants and causes of health illness inequities; and population health interventions, including programs, policies and resource distribution systems. Unique in Canada, this program draws on a wide range of disciplines, both basic and applied. It brings together the insights of social, biological, clinical, organizational, and political sciences, among others. It also draws on and combines the strengths of quantitative and qualitative methods. The transdisciplinary approach of the program recognizes the inherent complexity of many population health problems and the need to tackle these issues through both health and other sectors.

This doctoral program brings together expertise from Faculties, Research Centres and Institutes across the University.

The program is designed to meet the needs of a wide variety of candidates, such as health professionals and health administrators; demographers, epidemiologists and biostatisticians; social, behavioural and legal scholars; environmental scientists; and biologists with an interest in human population health. Students are encouraged to apply the science of their individual background disciplines to issues of population health. They acquire a broad knowledge of population health through courses and the comprehensive examination, and pursue in-depth study in an area of specialization within the population health framework. Students undertake their research in a range of settings (from local to global).

Programs

Doctorate in Philosophy Population Health

Admission

Admission Requirements

Students are admitted under the general regulations of the Faculty of Graduate and Postdoctoral Studies. The minimum requirement is a master's degree, with an 80% (A-) or equivalent average, in a field related to population health (for example, epidemiology, human kinetics, interdisciplinary health sciences, audiology, physiotherapy, nursing, medicine, social work, law, environmental studies, sociology, psychology, criminology, and biology). An applicant whose master’s degree did not include a thesis must demonstrate the ability to undertake an independent
research project.

Applicants must be knowledgeable in several of the following key areas:

- health sciences;
- social and behavioural sciences;
- advanced research methods;
- graduate-level statistics; and
- epidemiology.

Those who lack knowledge in three or more of these key areas must successfully complete prerequisite courses prior to admission. Applicants lacking knowledge in two or fewer of these knowledge areas may be offered admission on condition that they take a course or courses as corequisites. These courses would be additional to the 18 credits required of all students in the program.

Applicants must have an active knowledge of either English or French, and a passive knowledge of the other language. Passive knowledge is defined as both oral and reading comprehension ability. As part of the application process, students are required to complete a second language test. For international students, the Faculty of Graduate and Postdoctoral Studies English language requirements also apply.

**Language of the program**

The core courses are offered in a bilingual format which requires students' passive understanding of both official languages. Students may express themselves orally in either official language. Several of the suggested elective courses are offered in both English and French. In accordance with University of Ottawa regulations, all students have the option of writing exams, course assignments and theses in either English or French.

**Program Requirements**

**PhD degree requirements (18 course-credits)**

- Compulsory courses: 9 credits
  - POP8910 PARADIGMES SCIENTIFIQUES EN SANTÉ DES POPULATIONS / SCIENTIFIC PARADIGMS IN POPULATION HEALTH (3cr.)
  - POP8920 MÉTHODES DE RECHERCHE EN SANTÉ DES POPULATIONS / INVESTIGATIVE METHODS IN POPULATION HEALTH (3cr.)
  - POP8930 INTERVENTIONS EN SANTÉ DES POPULATIONS / POPULATION HEALTH INTERVENTIONS (3cr.)
- Electives: 9 credits

Nine other graduate credits related to the student's research area. (See "Electives" list below, under "Courses.") These are assigned following deliberations by the graduate program committee. Any prerequisites must be completed prior to taking the assigned electives.

- POP9998 COMPREHENSIVE EXAMINATION
- POP9997 THESIS PROPOSAL
- POP9999 PhD THESIS

**Minimum standards**

The passing grade in all courses is C+. Students who incur two failures in courses, the comprehensive exam or the thesis proposal, or whose research progress is deemed unsatisfactory are withdrawn from the program.

**Residence**

All students must complete a minimum of six sessions of full-time registration at the beginning of the program.

**Duration of the program**

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Courses**

**POP8900 ÉTUDES DIRIGÉES EN SANTÉ DES POPULATIONS / DIRECTED STUDIES IN POPULATION HEALTH (3cr.)**

Cours traitant des domaines de connaissance stipulés comme corequis pour le programme de doctorat en santé des populations. Le choix du sujet nécessite l'approbation du comité du programme. Préalable : Approbation de l'unité scolaire. / Course content to cover one of the defined corequisite knowledge areas for the Population Health PhD Program. Program approval required for topic selection. Prerequisite: Approval of the Academic Unit.
PSY8910 PARADIGMES SCIENTIFIQUES EN SANTÉ DES POPULATIONS / SCIENTIFIC PARADIGMS IN POPULATION HEALTH (3cr.)
Aspects épistémologiques de la science de la santé des populations. Examen du processus d’élaboration des théories et de leur application selon différentes disciplines. Étude des concepts, des théories, de la philosophie des sciences et des modes de raisonnement dans le domaine de la santé des individus et des populations. L’accent est mis sur les inégalités sociales en tant que déterminants de la santé. / Epistemological aspects of the science of population health. Review of the process whereby theories are developed and applied in different disciplines. Study of concepts, theories, philosophy of science and methods of reasoning in relation to the health of individuals and populations. The focus is on social inequalities as determinants of health. Corequisite: POP8920 / Co-requisite: POP8920

POPOP8920 MÉTHODES DE RECHERCHE EN SANTÉ DES POPULATIONS / INVESTIGATIVE METHODS IN POPULATION HEALTH (3cr.)
Méthodes de recherche utilisées selon les disciplines : points communs et différences. Critique de l’information actuelle sur la santé des populations; intégration de méthodes quantitatives et qualitatives pour analyser les questions complexes de santé des populations; stratégies pour incorporer les données à la planification et à la prise de décision centrées sur les résultats. / Investigation of research methods used by contributing disciplines, their commonalities and distinctions. Critique of existing population health information; integration of qualitative and quantitative methods for analyzing complex population health issues; strategies for incorporating results into evidence-based planning and decision-making. Corequisite: POP8920 / Co-requisite: POP8910

POPOP8930 INTERVENTIONS EN SANTÉ DES POPULATIONS / POPULATION HEALTH INTERVENTIONS (3cr.)
Analyse des modes d’intervention qui peuvent avoir un effet sur la santé des populations. Influences du contexte sur les méthodes de promotion de la santé, prévention des maladies et gestion des risques pour les individus et les populations ainsi que leurs interactions. Établissement d’équipes interdisciplinaires et de partenariats intersectoriels. Changements durables dans les systèmes, y compris la réforme des soins de santé et le développement de politiques. / Examination of approaches to influence population health. Contextual influences on, and interactions between individual and population health approaches for health promotion, disease prevention, and risk management. Process for establishing transdisciplinary teams and intersectoral partnerships. Sustainable systems change including health care reform and policy development. Préalables : POP8910 et POP8920 / Prerequisites: POP8910 and POP8920

POPOP8940 STAGE EN POLITIQUE DE SANTÉ DES POPULATIONS / POPULATION HEALTH POLICY PRACTICUM (3cr.)
Stage de trois mois permettant aux étudiants d’être en contact et d’avoir des discussions en classe avec des décideurs au niveau des politiques nationales; stage se déroulant habituellement sous la responsabilité de deux mentors, un chercheur associé à l’Université et un décideur. Examen des préalables et des procédés de formulation pour la mise en place et l’évaluation des politiques de santé des populations. Analyse et dépouillement des résultats de la recherche et communication aux décideurs clés des conclusions pertinentes. Préparation et critique de notes de synthèse, présentation d’un séminaire et rédaction d’un rapport é valué par le chercheur associé à l’Université. Préalables : POP 8910, POP 8920 et POP 8930. / Three-month practicum providing opportunities for interactions and class discussions with policy makers in a national policy setting, usually with co-mentors, one being a university-based researcher, the other a policy maker. Examination of prerequisites and processes for formulating, implementing and evaluating population health policies. Analysis and distillation of research findings and communication of relevant conclusions to key policy makers. Preparation and critique of briefing notes, presentation of a seminar and submission of a report to be evaluated by the university-based researcher. Prerequisites: POP 8910, POP 8920 and POP 8930. Prerequisite: completion of three core courses for Population Health PhD Program; EPI 7181 Epidemiology and Health Policy (or equivalent).

POPOP8950 THÈMES CHOISIS EN SANTÉ DES POPULATIONS / SPECIAL TOPICS IN POPULATION HEALTH (3cr.)
Thèmes variables selon les intérêts des étudiants et des professeurs. Préalable : Approbation de l’unité scolaire. / Topics vary depending on student and professorial interests. Prerequisite: Approval of the Academic Unit.

POPOP9997 PROJET DE THÈSE / THESIS PROPOSAL
Les étudiants, encadrés par leur directeur et leur co-directeur (s’il y a lieu) et un comité approuvé par la direction du programme, rédigent leur projet de thèse, le présentent et défendent oralement. Après la réussite de la défense orale, ils doivent obtenir l’approbation du comité d’éthique (si nécessaire) avant d’entamer la collecte de données. Règle générale, le projet de thèse est défendu vers le milieu de la deuxième année et au plus tard à la fin de la sixième session d’inscription au programme. Un étudiant qui échoue à la première tentative peut se voir accorder la permission de la répéter une seule fois. L’échec de la deuxième tentative mène à une note NS (non satisfaisant) et au retrait de l’étudiant du programme. Préalable : POP 9998. / Students write their thesis proposal under the guidance of their thesis supervisor and cosupervisor if applicable and then present and defend it orally. After passing the oral defence, student must obtain ethics approval (if required) before proceeding to data collection. The proposal will normally have been defended towards the middle of the second year and, at the latest, by the end of the sixth session of registration in the program. A student who is unsuccessful on the first attempt may be allowed to repeat it once. Failure on the second attempt leads to a grade of NS (not satisfactory) and withdrawal from the program. Prerequisite: POP 9998.

POPOP998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION
Préalables : POP 8910, POP 8920 et POP 8930. / Prerequisites: POP 8910, POP 8920 and POP 8930.

POPOP999 THÈSE DE DOCTORAT / PhD THESIS
Préalable : POP 9997. / Prerequisite: POP 9997.

Electives
The following graduate courses can be taken by students in the population health program. Other courses may be added with the permission of the program committee.

APA5104 SPORT AND PHYSICAL ACTIVITY IN CANADIAN LIFE (3cr.)
Sociological analysis of sport and physical activity. Socio-historical determinants of sport and physical activity. Emphasis on the organizational structure of sport
and physical activity, ideologies, and current practices. Different themes may also be examined: sociology of sport organizations, social movements, and social problems.

**APA5305 POLICY ANALYSIS OF SPORT AND PHYSICAL ACTIVITY IN CANADA** (3cr.)
Critical examination of the role of government in policy development. An analysis of sport and physical activity policies as related to amateur and professional sport organizations in Canada as well other organizations involved in sport and physical activity in the public and private sectors.

**APA6905 THÈMES CHOISIS / SELECTED TOPICS** (3cr.)
Analyse critique et discussion des recherches récentes publiées dans le domaine de l’intervention et de la psychologie du sport, de l’activité physique et de la santé. / A critical analysis and discussion of recent theoretical and empirical papers presented and published in intervention as well as in psychology of sport, physical activity and health.

**DCL5305 FEMINIST ANALYSIS OF LAW** (3cr.)
Exploration of feminist perspectives, theories and themes and the application of these to particular problems or issues. Development of techniques for analyzing social meaning of law.

**DCL5505 ANALYSE FÉMINISTE DU DROIT** (3cr.)
Statut juridique, droits et obligations des femmes dans les domaines de la santé, de la famille, du travail, de la criminalité, de la fiscalité, du commerce, etc. Analyse critique du droit à partir d’une perspective féministe. Étude des différentes théories féministes du droit.

**DCL5721 PERSPECTIVES FÉMINISTES DU DROIT** (3cr.)

**DCL7306 LEGAL PERSPECTIVES ON CYBERFEMINISM** (3cr.)
This course analyzes issues relating to application of feminist principles to the legal regulation of communication technologies. Topics covered include the gendered dynamics of networked capitalist society; women’s relationships with communication technologies; technology’s potential impact on equality for women; and questions surrounding whether and how to legally regulate communication technologies.

**ECO5136 (ECON 5307) LABOUR ECONOMICS** (3cr.)
Selected topics in the areas of human resources, wage determination and Canadian labour policy. The topics will vary from year to year depending on the interests of the professor and the students. Prerequisites: ECO 3152, ECO 3153. Prerequisites: ECO3152, ECO3153

**ECO6108 ECONOMIC SYSTEM DESIGN** (3cr.)
Deterministic dynamic optimization methods: economic and managerial applications of the maximum principle of Pontryagin and of dynamic programming. Discrete time stochastic dynamic optimization methods: Bayesian and Markovian decision theory, measures of risk-aversion and risk, portfolio theory, elements of search theory, applications of discrete time stochastic control to economics. Prerequisites: ECO3141 and ECO4186 or MAT2341, MAT2324, MAT2171 or (MAT2371 and MAT2375).

**EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION** (3cr.)
Exploration of the concepts and strategies, methods of instruction in health education; examination of how instruction supports student learning.

**EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION** (3cr.)
Examination of theory for current practices related to curriculum design in health professions.

**EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION** (3cr.)
Study of the impact of computer technology on communication and instructional techniques for health professions education; exploration of distance education, on-line learning, and low and high fidelity simulation.

**EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION** (3cr.)
Exploration of the assessment formats used to evaluate the domains of clinical competence in health care professional training at both the undergraduate and postgraduate levels; analysis of written and oral examinations, oral and performance-based testing.

**EDU5399 DEVELOPMENT OF ASSESSMENT INSTRUMENTS** (3cr.)
Study of the modalities of assessment of knowledge, skills, attitudes and performance; strategies for developing instruments to assess students learning; examination of instrument quality.

**EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE** (3cr.)
Exploration of principles of effective program evaluation methods; planning; instrument development; data collection, processing and analysis; reporting and follow-up; survey of diverse models of evaluation. Prerequisite: EDU5190

**EDU6191 QUANTITATIVE RESEARCH** (3cr.)
Planning, analysis and interpretation of quantitative research within experimental and quasi-experimental frameworks; application of analysis of variance, analysis
of covariance and techniques of linear regression (explanation, prediction) to educational contexts. Prerequisite: EDU5191 or equivalent.

EDU7190 QUALITATIVE RESEARCH I (3cr.)
Critical review of fundamental aspects of qualitative research in education: approaches, characteristics and strategies.

EDU7296 TECHNIQUES OF DOCUMENT ANALYSIS IN EDUCATIONAL RESEARCH (3cr.)
Study of educational documents and approaches to textual research including historical criticism, discourse analysis and narrative theory.

EDU8190 QUALITATIVE RESEARCH II (3cr.)
Examination of methodological, organizational, ethical and political issues within qualitative research.

EPIS126 INTRODUCTION TO HEALTHCARE EPIDEMIOLOGY (3cr.)
Applications of epidemiologic and statistical methods within the healthcare setting; issues specific to infection control; roles and administration of infection control, risk management and quality assurance within healthcare facilities; surveillance mechanisms for nosocomial infections; outbreak investigation methods; infection risks in special populations and settings; prevention and risk management of adverse outcomes; regulatory guidelines and accreditation; emerging issues in infection control.

EPIS142 HEALTH SERVICES EVALUATION (3cr.)
The theory and practice of health services evaluation, including specification of objectives, research designs, measures of process and outcome, and practical problems in conducting evaluations. The focus is on scientific (research) evaluation, but other evaluation strategies and techniques are discussed. Lectures and student presentations. Prerequisite: EPI 5240 or equivalent and permission of the program director.

EPIS143 EPIDEMIOLOGICAL RESEARCH USING LARGE DATABASES (3cr.)
A practical approach to using administrative and other large databases for epidemiological research. Basic and advanced statistical techniques to manipulate, link, and examine datasets; large health surveys; coding systems; data warehouses; data mining; birth and death registries; use of census data; linking postal codes to geographical files; geographical information systems. Extensive use of SAS as the primary application package. Prerequisite: Permission of the program director.

EPIS144 GLOBAL HEALTH EPIDEMIOLOGY AND PRACTICE (3cr.)
Global burden of illness; epidemiology of major infectious and non-communicable diseases; global environmental health; maternal and child health, global nutrition, one health. Global health practice, research methods, systematic reviews, knowledge translation, communication, ethics, collaboration, funding, sustainability, publication, evaluation, and evidence for global health action.

EPIS145 GLOBALIZATION AND HEALTH EQUITY (3cr.)
Keys to understanding how globalization processes are affecting health. Policy options for creating a fairer and more health equitable globalization. Review of relevant theories from sociology, political science (international relations) and political economy; and of evidence derived from all three disciplines, as well as from public health and epidemiology. Explanatory models for public health practice on a global scale.

EPIS180 INTERNATIONAL HEALTH AND DEVELOPMENT (3cr.)
Presentations and seminars on philosophy of international development, international health and demographics, determinants of health, international health and human rights and humanitarian emergencies, tropical diseases and emerging pathogens, aboriginal health issues, impact of new health technologies on international health, cross cultural communication, management methods for international health. Seminar presentation required. Prerequisite: Permission of the program director.

EPIS181 POPULATION HEALTH RISK ASSESSMENT I (3cr.)
National and international policy frameworks for health risk assessment and management, including determinants of population health; epidemiological, clinical, and toxicological methods for identifying health hazards; population health surveillance; methods of population health risk assessment; regulatory, economic, advisory, and technological approaches to population health risk management; community action and social marketing; selection of risk management strategies; risk perception and risk communication. Lectures and case studies. Preparation of term paper on a current issue in population health risk assessment. Co-requisites: EPI 5240 and EPI 5242 or equivalents. Exclusion: PHR 5181. Prerequisite: Permission of the program director.

EPIS182 SAMPLE SURVEY RESEARCH METHODS (3cr.)

EPIS183 APPROACHES TO COMMUNITY/PUBLIC HEALTH PROGRAM EVALUATION (3cr.)
Critical review and practical application, in collaboration with a health care community partner, of approaches to community and public health program evaluation. Community partners include representatives of the community agencies whose mandate or remit includes evaluation of their community/public health program(s). Evaluation based on student’s ability to (a) identify most appropriate approaches to evaluation, (b) critically review strengths and limitations of chosen approaches, (c) apply the selected approach appropriately to examine and quantify impact of the program(s).

EPIS188 HEALTH TECHNOLOGY ASSESSMENT (3cr.)
Definition and scope of health technology assessment; needs assessment; practice variations; use of administrative databases; evaluation of diagnostic tests;
development and use of practice guidelines and clinical prediction rules; health technology assessment in the developing world. Lectures, seminars and case studies. Prerequisite: Permission of the program director.

EPI5189 HEALTH ECONOMIC EVALUATION (3cr.)
Brief overview of economics and health economics; examination of analyses used in epidemiologic and clinical research: cost-effectiveness analysis, cost-minimization analysis, cost-utility analysis (including determination of utilities), cost-benefit analysis, cost of illness studies and use of economic methods in priority-setting. Lectures and seminars. Written report required, presenting an economic evaluation or a detailed review of the economic literature in a particular area. Prerequisite: Permission of the program director.

EPI5210 PUBLIC HEALTH ADMINISTRATION (3cr.)
Introduction to practical aspects of managing a health unit from the viewpoint of a Medical Officer of Health. The organization of public health services, relationships with the Board, leadership and management, budgeting and human resource issues including labour relations. Problem-based approach in a seminar format. Prerequisite: Permission of the program director.

EPI5212 COMMUNICABLE DISEASE EPIDEMIOLOGY (3cr.)
Consideration of the specialized methods used in the investigation and control of communicable disease. Detailed review of the epidemiology of the major communicable diseases. Lectures, presentations by invited experts, and student presentations. Prerequisite: A basic knowledge of epidemiologic methods and permission of the program director.

EPI5213 CHRONIC DISEASE EPIDEMIOLOGY (3cr.)
Review of the descriptive epidemiology (distribution, trends, risk factors) of the major chronic diseases, with emphasis on circulatory diseases, cancer, injuries, and mental health problems. Approaches to primary and secondary prevention. Lectures, presentations by invited experts, and student presentations. Prerequisite: Permission of the program director.

EPI5240 EPIDEMIOLOGY I - INTRODUCTORY EPIDEMIOLOGY (3cr.)
An overview of epidemiology - uses, methods, and data sources. Descriptive and analytical epidemiology. Lectures and assignments in which students will work with data and will gain experience in critically reviewing epidemiologic literature. Prerequisites: EPI 5242 (Biostatistics I) or equivalent; may be taken concurrently with the permission of the program director. Prerequisites: EPI5242 (Biostatistics I) or equivalent; may be taken concurrently. Permission of instructor.

EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
This second level epidemiology course covers major principles of design, analysis, and interpretation of epidemiologic research. Material presented in a quantitative manner. Prerequisites: EPI 5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology); EPI 6276 may be taken concurrently with the permission of the program director. Prerequisites: EPI5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology).

EPI5243 GUIDED RESEARCH PROJECTS (3cr.)
Practical experience of the application of epidemiologic methods. The student will participate in one or more research projects underway in the Department, and will gain experience in the day-to-day management of the project, in data collection, in data analysis and report preparation.

EPI5244 SPECIAL TOPICS IN EPIDEMIOLOGY (3cr.)
The content of this seminar course is flexible, covering issues of current debate in communicable and non-communicable disease epidemiology: Presentations by participants and invited experts and seminar discussion. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5240 and EPI5242 and permission of instructor.

EPI5251 MEASUREMENT IN HEALTH (3cr.)
An overview of measurement theory as applied to health measurement; a review of existing measurements of health status in clinical and research applications, plus practical experience of how to develop and test new measurement methods. Prerequisite: Permission of the program director.

EPI5271 HEALTH PROMOTION (3cr.)
Origins, theories and techniques of health promotion at the individual and community levels. Examination of current health promotion activities in Canada and elsewhere. Prerequisite: Permission of the program director.

EPI5281 DEVELOPMENTS IN EPIDEMIOLOGY (3cr.)
Major new developments in epidemiology, conceptualization of research topics and objectives for the thesis. Critical appraisal of current and classical literature in epidemiology. Seminars on current topics. Prerequisite: Permission of the program director.

EPI5330 VITAL AND HEALTH STATISTICS AND DEMOGRAPHY (3cr.)
Techniques of demography, health and vital statistics with particular reference to health care and epidemiologic research. The Canadian demographic structure and trends, vital registration procedures, calculation and interpretation of vital rates, life table analysis and record linkage. Lectures and exercises. Prerequisite: Permission of the program director.

EPI5340 EPIDEMIOLOGICAL METHODS (1.5cr.)
Major principles of study design and analysis: validity in epidemiologic studies; precision and statistics in epidemiology studies; confounding; additive and multiplicative interaction; stratified analysis; regression models; regression modeling; bias analysis; analytical strategy. Prerequisites: EPI 5240 and EPI 5242
EP15341 EPIDEMIOLOGICAL APPLICATIONS (1.5cr.)
Interpretation of epidemiologic research and some specific topics: complex survey data analysis; attributable risk, odds ratio and relative risk estimation in multivariate analysis; combined effect of multiple exposures and interaction measures; chronic disease screening and surveillance; environmental epidemiology. Prerequisite: EP15340

EP15342 GENETIC EPIDEMIOLOGY (1.5cr.)
Scope of genetic epidemiology, including an overview of types of human genetic variation, approaches to gene discovery vs. gene characterization. Specific issues include: assessment of effect of family history on disease risk; measurement of genetic variation, genotyping errors and factors affecting these; study designs specially adapted to genetic epidemiology – family based designs (e.g. case-parent trio, case-sib designs), case-only designs; candidate gene and genome-wide association approaches to genetic association; gene-environment and gene-gene interaction; integration of evidence; evaluation of potential value of genetic information in screening (e.g. newborn screening), family history tools and genetic testing. Prerequisite: EP15340

EP15343 OUTCOME MEASURES IN HEALTH RESEARCH (1.5cr.)
Technical review of the design requirements for outcome measures in health research and clinical trials; a historical review of the evolution of such measures and a survey of the quality of existing instruments in various fields of health research (disability, quality of life, mental health, pain, etc.). This course is designed for students who will need to use and interpret health measures in their research. Prerequisite: EP15340

EP15344 SURVIVAL ANALYSIS IN THE HEALTH SCIENCES (1.5cr.)
Exploration of methods for the analysis of data which includes information about the time when an event occurred. Non-regression methods of analyzing survival data, including actuarial life tables, the Kaplan-Meier method, the log-rank test, and person-time. The hazard curve and its links to incidence rate/density. Proportional hazards regression modelling (Cox modelling) including interpretation of model parameters, model building strategies and assessing the fit of the model. Methods to handle time varying covariates and non-proportional hazards will be discussed. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EP15340

EP15345 APPLIED LOGISTIC REGRESSION (1.5cr.)
Foundation of model estimation: maximum likelihood; modeling dichotomous outcome (dependent) variables: logistic regression; logistic models with several independent variables; interpretation of model parameters; model-building strategies; assessing the fit of the model; regression diagnostics. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EP15340

EP15346 APPLIED LONGITUDINAL AND CLUSTERED DATA ANALYSIS (1.5cr.)
Introduction to longitudinal (repeated measures) and clustered data and overview of regression models for correlated data; linear mixed effects models: modelling the mean; modelling the covariance structure; generalized estimating equations and generalized linear mixed effects models; regression diagnostics; missing data and drop-out; case studies. Classes will include hands-on modeling examples using SAS statistical software. Prerequisite: EP15340

EP15242 BIOSTATISTICS I (3cr.)
Building on the students' prior background in statistics, this course explores the use of mathematical models in statistical data analysis. Topics include analysis of categorical data, choice of linear vs non-linear models, estimation of parameters, testing of hypotheses by parametric and non-parametric methods, analysis of variance, linear and logistic regression models, introduction to survival analysis. This course may also be offered in French: EPI 5642. Prerequisite: Basic course in Statistics and permission of the program director.

EP16126 ADVANCED HEALTHCARE EPIDEMIOLOGY (3cr.)
Exploration of advanced healthcare epidemiology topics including pandemic planning, emergency preparedness, environmental considerations, healthcare surveillance techniques, quality improvement and patient safety initiatives, antimicrobial control programs, blood safety, developing and delivering educational programs, healthcare organization and administration, healthcare epidemiology research design. Lectures, presentations by invited experts, workshops and student presentations. Pre-requisites: EPI 5240, EPI 5126.

EP16178 INTERVENTION STUDIES IN HEALTH RESEARCH (3cr.)
Practical introduction to intervention studies in the health field, including experimental and quasi-experimental studies and clinical and community trials. Question formulation; conduct of literature reviews; design issues (choice of research design and study population, implications for validity of results); ethical issues, instrument development; data collection and management; approach to data analysis; report writing and presentation. Examples drawn from both population and clinical research. Development and presentation of proposal for an intervention study. Prerequisite: Permission of the program director.

EP16179 COMPUTER APPLICATIONS IN MEDICINE (3cr.)
A laboratory course introducing health researchers to packaged computer programs for data analysis. Applications of these programs to the participants' own research, the organization of large data files and the choice between different types of computers. Prerequisite: Permission of the program director.

EP16181 SOCIAL ASPECTS OF EPIDEMIOLOGY (3cr.)
This course will analyze the way in which behavioural, social and emotional forces influence patterns of disease. The links between these processes and physiological changes; inferences on how best to intervene to modify "lifestyle" risk factors; recent prevention and health promotion trials will be reviewed. May also be offered in French: EPI 6581. Prerequisite: Permission of the program director.

EP16182 POPULATION HEALTH RISK ASSESSMENT II (3cr.)
Scientific methods for population health risk assessment; characterization of population health risks, and attendant uncertainties; risk modeling; combining risk
Core skills in the provision of evidence-based psychological services for a range of psychological problems in children and youth. The therapeutic

EPI6188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
Approaches to the systematic review of evidence in the health sciences. Searching for the evidence, selection of studies, quality and validity of included studies, heterogeneity, statistical analysis and other quantitative and qualitative methods. Students will be required to do a meta-analysis on a topic of their own interest. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5240 and EPI5242 and permission of instructor.

EPI6189 CLINICAL DECISION MAKING (3cr.)
Theories of decision making and their validity in health care applications. Comparison of decision support methods: decision analysis, utility assessment techniques, patient aids, practice guidelines, care maps. Methods for developing, evaluating, and disseminating decision support tools in clinical practice. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5242 or equivalent, and EPI 5241 (may be done concurrently), or permission of the professor.

EPI6276 QUANTITATIVE METHODS IN EPIEMIOLOGY (3cr.)
Application of advanced topics in statistical methods for epidemiologic data analysis: logistic regression and discriminant analysis, Poisson regression, contingency table analysis (including log-linear modelling), time series, survival analysis, Cox regression with and without time-dependent covariates, principle components and factor analysis. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5242 or equivalent, and EPI 5241 (may be done concurrently), or permission of the professor.

EPI6277 BIOSTATISTICS II (3cr.)
Focus on the statistical analysis of more than one variable and/or more than two groups. Topics covered include the analysis of variance, multiple linear regression and multivariate analysis topics such as the linear discriminant analysis. Statistical analysis relevant to clinical medicine will be discussed in detail with relevant examples from clinical research papers. Prerequisite: EPI 5242 or equivalent and permission of the program director.

EPI6278 ADVANCED CLINICAL TRIALS (3cr.)
Lectures and laboratories on the detailed principles, design, methodology and statistical techniques associated with clinical trials. Emphasis on emerging topics and procedures. Prerequisites: EPI 5242 and EPI 6178 and permission of the program director. Prerequisites: EPI5242 and EPI6178 and permission of instructor.

EPI6282 SPECIAL TOPICS IN COMMUNITY MEDICINE (3cr.)
Current Community Health topics will be reviewed. Weekly seminars, written assignments, discussions, research meetings and presentations by students and invited speakers. Each student must present two seminars. Prerequisite: Permission of the program director.

EPI6283 PHARMACOEPIDEMIOLOGY (3cr.)
Issues in and methodology of pharmacoepidemiology. Discussion on the biases and confounders possible at every stage of a pharmacoepidemiological study, in drug utilization review, drug effectiveness, risk/benefit assessment and other topics. This course will normally be given every second year. Prerequisites: EPI 5240 or equivalent and permission of the program director. Prerequisite: EPI5240 or equivalent and permission of instructor.

EPI6344 CURRENT ISSUES IN EPIEMIOLOGY (1.5cr.)
Topics will be selected based on student and faculty interests. Depending on the topics, the course may be given as formal lectures or in seminar format with presentations by participants and invited experts followed by in-class discussion. Prerequisites: EPI 5240 and EPI 5242 or permission of the program director.

EPI6181 SOCIAL ASPECTS OF EPIEMIOLOGY (3cr.)
This course will analyze the way in which behavioural, social and emotional forces influence patterns of disease. The links between these processes and physiological changes; inference on how best to intervene to modify "lifestyle" risk factors; recent prevention and health promotion trials will be reviewed. May also be offered in French: EPI 6581. Prerequisite: Permission of the program director.

EPI7184 HEALTH POLICY (3cr.)
Exploration of key issues relating to health policy within and outside Canada. Topics covered: rationale for public provision and funding of health care in Canada; historical and current perspectives regarding structure and process of the Canadian health care system; specific micro and macro policy issues relating to health and health care provision (Canadian and international).

ERG5523 L'ENVIRONNEMENT PHYSIQUE, SOCIAL, CULTUREL ET INSTITUTIONNEL (1.5cr.)
Etude théorique et pratique des multiples environnements qui exercent une influence sur, et qui sont influencés par, l'activité humaine. Concomitant: ERG 5511.

ERG5721 DIMENSIONS DE LA PERSONNE (3cr.)
Etude du développement de l'être humain de la naissance à la mort, dans ses dimensions physiques, cognitives, perceptuelles, affectives, ainsi que de l'importance relative de chacune de ces dimensions pour l'activité humaine. Concomitant: ERG 5511.

ERG5731 ATTEINTES À LA SANTÉ PHYSIQUE DES PERSONNES (3cr.)
Analyse des processus pathogènes qui portent atteinte à la santé physique ainsi que des problèmes fonctionnels connexes.
ERG5732 ATTEINTES À LA SANTÉ MENTALE DES PERSONNES (3cr.)
Analyse des processus pathogènes qui portent atteinte à la santé mentale ainsi que des problèmes fonctionnels connexes.

MGT5102 QUALITATIVE RESEARCH METHODS (3cr.)
Designing qualitative studies, collecting and analyzing qualitative data, attaining research credibility, and writing a qualitative research report. Topics will include the case study, ethnography, phenomenology and grounded theory. Introduction to the use of qualitative data analysis software (such as N-Vivo). Critical evaluation of qualitative studies. Exclusion: MGT7302

MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)
Governance models for health care organizations. Definition, resolution and handling of ethical problems of administrators, professionals and researchers in health organizations. Reconciliation of conflicting interests of the stakeholders according to ethical principles.

MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
Provides a survey of epidemiology, viewed through a "population health" lens. Course will provide a survey of: measures of health status (including measures of mortality and morbidity); and measures of association. The basic epidemiological designs (observational, case-control, cohort, time series, and randomized control studies) will be reviewed. The factors affecting the precision and validity of these studies (e.g. statistical power, confounding, effect modification, and causality criterion) will be reviewed. Emphasis will be placed on equipping students with an ability to critically evaluate clinical, epidemiological, and health administration evidence in support of decisions. Guidance will also be provided to help select appropriate outcome indicators and critically evaluate interventions/programs. Students will get hands on experience computing effect measures (e.g. odds, ratios) from study results, as well as with assessing the precision and validity of results. Prerequisite: MBA 5300

MHA6351 HEALTH ECONOMICS (3cr.)
The course provides a macro-economic perspective on the demand and supply of healthcare, highlighting the market failures that are archetypical within the health domain. It contrasts Welfarist and Extra-Welfarist perspectives on resource allocation (contrasting technical versus allocative efficiency). The course will also review cost-benefit, cost-effectiveness, and cost-utility approaches of evaluating health interventions; and in so doing the course will provide students an opportunity for hands-on computation (workshops). The course will also consider the issue of equity and methods for incorporating equity into health economic evaluations.

MHA6360 HEALTH CARE IN CANADA - OVERVIEW (3cr.)

MHA6361 LEADING STRATEGY AND CHANGE IN HEALTH CARE ORGANIZATIONS (3cr.)

MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
Overview of current developments, issues and challenges in the emerging field of health informatics. Historical development as well as basic foundations of health informatics including theoretical, methodological and ethical/legal underpinnings will be studied. Critical examination of information management principles and methods in Canadian health care organizations both public and private. Emerging applications in health informatics as well as approaches to understanding and evaluating these applications. Identification of the issues that CIO’s face in their attempts to provide the right information to the right people, at the right time.

MIC8122 ADVANCED TOPICS IN IMMUNOLOGY (3cr.)
Focus on cellular immunology, including thymocyte maturation, induction and regulation of cellular responses, immune responses to pathogens, immunological memory, tolerance. Student assessments to be conducted by two methods: Weekly assessment of student presentations and participation in class discussions; assessment of take-home assignments such as completion of a research grant on a topic covered in the course. To be offered alternate years subject to sufficient demand. Prerequisite: MIC 4125 or equivalent.

MIC8227 ADVANCED TOPICS IN MOLECULAR BIOLOGY OF HUMAN DISEASES (3cr.)
Topics to include structure and function of the human genome, i.e. genetic and physical mapping of the human genome, the human genome project, disease gene cloning, and the genetics of host resistance. Topics on selected diseases will focus on pathogenetic mechanisms, genetic diagnostics and gene therapy. Same course as BCH8105. Offered alternate years; alternates with BCH8103. Prerequisite: BPS4101 or equivalent with the permission of the instructor.

MIC8236 ADVANCED TOPICS IN VIROLOGY (3cr.)
An in-depth presentation of current topics in virological research. Topics will vary from year to year. To be offered every alternate year subject to sufficient demand. Prerequisite: MIC 4126 or equivalent.

MIC8238 ADVANCED TOPICS IN BACTERIOLOGY - MECHANISMS OF PATHOGENESIS (3cr.)
Recent advances and current topics in selected areas of bacteriology with emphasis on mechanisms of pathogenesis. Students present and discuss journal
articles. Offered every alternate year subject to sufficient demand. **Prerequisite: MIC 4124 or its equivalent.**

**MIC8401 ADVANCED TOPICS IN BACTERIAL GENETICS** (3cr.)
Microbial genetic and genomic methods: origin, purpose and functioning. Analysis and use of genomes to study bacterial pathogenesis and host-microbe interactions. **Prerequisite: MIC5224 or equivalent.**

**MIC8500 SPECIAL TOPICS IN HEALTH-RELATED ENVIRONMENTAL MICROBIOLOGY** (3cr.)
Recent advances and current topics in selected areas of health-related environmental microbiology. Topics reflect student interest. Offered in alternate years subject to sufficient demand. **Prerequisite: MIC 5500 or equivalent.**

**NSG6133 DECISION MAKING IN CLINICAL PRACTICE** (3cr.)
Examination of decision models as they relate to decision making at the patient, practitioner, and policy maker levels. Study of the patient decision making process. Exploration of decision support strategies and evaluation of practitioner’s decision support skills.

**NSG6160 POLICY, POLITICAL ACTION AND CHANGE IN HEALTH CARE** (3cr.)
Policy analysis, political action, organization and change theories. Acquisition of advanced nursing practice skills in policy and organizational analysis, application of change theory, lobbying, negotiating and strategizing.

**NSG7103 DECISION MAKING IN NURSING** (3cr.)
Analysis and synthesis of decision and change models at client, practitioner and policy maker levels. In-depth exploration of selected conceptual, methodological, and design challenges to improve decision-making capacities of populations or to promote uptake of evidence-based nursing practices. (Course is reserved for PhD students.)

**NSG7104 EVALUATING COMPLEX NURSING INTERVENTIONS** (3cr.)
Discussion of design issues associated with complex interventions. Exploration of strategies for developing, implementing, and evaluating programs targeted to changing multiple levels of health care. Analysis of models, evidence, and policies appropriate to intervention design and examination of barriers to effective change. (Course is reserved for PhD students.)

**PSY6202 ADVANCED SEMINAR IN BEHAVIOURAL NEUROSCIENCE** (6cr.)
Advanced seminar course integrating behavioural analyses with aspects of neural circuits mediating and regulating these behaviours. **Prerequisite: Adequacy in background knowledge as assessed by one of the coordinators prior to commencement of course.**

**PSY6905 PSYCHOLOGIE COMMUNAUTAIRE / COMMUNITY PSYCHOLOGY** (3cr.)

**PSY6923 RECHERCHE SUR LE STRESS PSYCHOSOCIAL / PSYCHOSOCIAL STRESS RESEARCH** (3cr.)

**PSY6982 LA PSYCHOLOGIE ET LA SANTÉ / PSYCHOLOGY AND HEALTH** (3cr.)

**SOC5501 THÈMES EN SOCIOLOGIE OU EN ANTHROPOLOGIE** (3cr.)
Examen approfondi d'une problématique, d'un courant théorique ou d'une auteure ou d'un auteur contemporain en sociologie ou en anthropologie. **Préalable : pour les étudiantes et les étudiants de 1:SUP:er:ESUP. cycle: SOC2704, SOC3504, SOC3506.**

**SOC7110 CONTEMPORARY SOCIOLOGICAL THEORIES** (3cr.)
In depth examination of the main theoretical currents in sociology.

**SOC7150 INTERETHNIC RELATIONS: CRITICAL EXAMINATION OF THEORIES AND RESEARCH** (3cr.)
Principal sociological theories in interethnic relations, and the use of these theories in the analysis of the social structure of a number of multiethnic societies, especially Canada.

**SOC7170 POLITICAL SOCIOLOGY: CRITICAL EXAMINATION OF THEORIES AND RESEARCH** (3cr.)
In depth examination of the main concepts of political sociology such as power, the state, social classes, civil society, democracy, political space, political culture, and citizenship.

**Psychology**
The School of Psychology offers graduate programs leading to the degree of Doctor of Philosophy (PhD). Specializations are offered in Clinical Psychology and Experimental Psychology in the following fields approved by the Ontario Council on Graduate Studies:

- Clinical Psychology
- Social Psychology
- Developmental Psychology
- Cognition
- Behavioural Neurosciences

Only students who intend to complete a doctorate are admitted. In special circumstances, students may be requested to complete the MA program after their first year of enrolment.

The School participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see “Admission.”

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Program objectives**

**MA - PhD with specialization in Experimental Psychology**

The objective of this program is to train researchers in experimental psychology with emphasis on one of the following areas: behavioural neurophysiology, psychopharmacology, psychophysiology, human and animal cognition, learning, language, sleep and dreams, social, cognitive and emotional development, perception, intergroup relations, motivation, and the social psychology of health and work.

**MA - PhD with specialization in Clinical Psychology**

The purpose of this program is to provide doctoral training in the area of clinical psychology and prepare students to work with adults and children. Professional training includes exposure to cognitive-behavioural, experiential, systemic/interpersonal, and community consultation approaches. Thesis supervisors within the clinical program have special expertise in areas such as the social development of children, behaviour problems in children, social skills training, depression, psychotherapy, marital therapy, family psychology, correctional psychology, community psychology and program evaluation. Students may also elect to choose a thesis supervisor from the Experimental program.

This program is fully accredited by the Canadian Psychological Association (CPA).

In Ontario, practice as a psychologist is governed by statute law; graduation from the doctoral program in clinical psychology does not by itself qualify a person to practice as a psychologist. For further information, the College of Psychologists of Ontario should be contacted, at the following address: The Registrar, The College of Psychologists of Ontario, 110 Eglinton Avenue West, Suite 500, Toronto, Ontario, M4R 1A3; Tel: 416-961-8817, Fax: 416-961-2635.

Regulations of the School of Psychology prohibit students from being involved in the private practice of psychology, outside of practica and internships, unless they have received explicit permission from the director of the clinical psychology program to do so.

**Co-ordination of the programs**

The Graduate Studies Committee, and its two permanent subcommittees (for the programs in experimental and clinical psychology, respectively) ensure the ongoing co-ordination of the programs, in keeping with the regulations of the Faculty of Graduate and Postdoctoral Studies.

**Programs**

- Doctorate in Philosophy Clinical Psychology
- Doctorate in Philosophy Psychology
- Doctorate in Philosophy Psychology Specialization in Canadian Studies

**Admission**

The normal minimum requirement for admission into either of the two programs (MA - PhD in Clinical Psychology or MA - PhD in Experimental Psychology) is the Honours Baccalaureate in Psychology, or its equivalent, including an Honour’s thesis or an equivalent individual research project. In addition, course requirements are a course in History and Systems of Psychology (or its equivalent), and two courses in statistical analysis (or their equivalents). If these course requirements are not met at the time of admission, the candidates will be required to complete them within the first two years of graduate studies. (For the program in Clinical Psychology, in order to meet a component of the academic requirements for registration with the College of Psychologists of Ontario, a minimum of twenty undergraduate psychology
Each file is assessed to determine whether equivalences will be granted on the basis of courses completed at the master's level. Candidates for the clinical program with fewer than 21 credits of equivalencies will be admitted to the MA level while those with 21 or more credits of equivalencies will be admitted directly to the PhD.

Exceptionally, admission to the Experimental Psychology program is possible on the basis of a four-year Honour's degree in another discipline relevant to Psychology, with a letter of support from the prospective supervisor. The degree must include a thesis or an equivalent individual research project and the equivalent of at least 30 credits (12 one-session courses) in Psychology, including statistics and some research experience.

Note: Students with a strong background in mathematics, physical sciences, biological science or computer science are especially encouraged to apply.

Only students who intend to complete the doctorate are admitted. Those holding an honours baccalaureate in psychology are admitted to the MA program and are permitted to transfer to the PhD after one year, provided their performance in courses and research is satisfactory. Those already holding a master's in psychology are admitted directly to the PhD program.

Requests for admission are examined by an Admissions Committee in accordance with the admissions policy of the Council of the School of Psychology.

**Collaborative programs**

The School of Psychology is a participating unit in the collaborative program in Canadian Studies at the PhD level. This program provides students in psychology with the opportunity to enrich their training by including an interdisciplinary component in Canadian Studies. The Canadian Studies Seminar (CDN9010) fits into the program course requirements and does not add to the number of courses required for the doctorate in psychology.

For further details, please consult the Canadian Studies program on the Faculty of Graduate and Postdoctoral Studies website.

**Second language requirements**

Students who, at the time of admission, can provide proof of their competence in both languages (e.g., prior education in both languages, certificate of linguistic competency) are deemed to meet the language requirement.

All students must meet certain second language requirements (in English or in French) in order to obtain their doctoral degree. These requirements can be met in one of five ways:

- passing the FLS1000 proficiency test administered by the Official Languages and Bilingualism Institute (ILOB)
- successfully completing a compulsory graduate course in which all course requirements will have been met in the second language
- passing the Comprehensive Examination in the second language (Experimental program only)
- writing the Thesis in the second language, or
- successfully completing a second year course designated by the Official Languages and Bilingualism Institute (FLS2511 or ESL2511). The grade received for this course will appear as a "P" (Pass) or "F" (Fail) on the official transcript. In this case, as this is an undergraduate course, a Pass is considered to be a 50% or higher. Note that this is different from the PhD Degree with recognition of Professional Bilingual Competence.

**Program Requirements**

**PhD degree requirements**

**A) CLINICAL PSYCHOLOGY**

The program in Clinical Psychology includes 17 courses. In addition to required clinical courses, students in Clinical Psychology must complete four fundamental courses in psychology to meet CPA accreditation criteria for the core content areas of psychology (although equivalencies may be granted for some fundamental courses by the Director of the clinical program) and four supplementary clinical courses. For students entering the program with courses completed at the master's level, at the discretion of the Director of the clinical program, equivalencies may be granted for up to a maximum of 30 credits. Although the program may be completed in 5 years (as outlined below), most students complete in 6 years.

**Typical Program Sequence**

**Year 1**

a) Fall session:

- **PSY4130 HISTORY AND SYSTEMS OF PSYCHOLOGY (3cr.)**
  Only students who have not completed an undergraduate course in history of psychology must register for History and Systems of Psychology (PSY4130). We recommend that this course be taken during the first year, but it can be taken later in the program.

- **PSY5025 PRACTICUM DE RECHERCHE DE NIVEAU MAITRIZE / MASTER’S LEVEL RESEARCH PRACTICUM (1cr.)**
  Students entering with master's degrees in psychology are not required to enroll in this practicum.
PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS (3cr.)
PSY5207 PSYCHOLOGICAL INTERVENTION AND CONSULTATION (6cr.)
(6-credit course continuing over two consecutive sessions)
PSY5202 PSYCHODIAGNOSTIC ASSESSMENT OF ADULTS AND CHILDREN (6cr.)
(6-credit course continuing over two consecutive sessions)
PSY6170 ETHICS AND PROFESSIONAL ISSUES (3cr.)

b) Winter session:
PSY5023 PRACTICUM DE RECHERCHE DE NIVEAU MAÎTRISE / MASTER’S LEVEL RESEARCH PRACTICUM (1cr.)
Students entering with master's degrees in psychology are not required to enrol in this practicum.
PSY5102 APPLIED PSYCHOPATHOLOGY (3cr.)
PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS (3cr.)
PSY5207 PSYCHOLOGICAL INTERVENTION AND CONSULTATION (6cr.)
(continuing from the first session)
PSY5202 PSYCHODIAGNOSTIC ASSESSMENT OF ADULTS AND CHILDREN (6cr.)
(continuing from the first session)

Year 2
PSY7103 PROGRAM EVALUATION (3cr.)
PSY5133 CLINICAL RESEARCH METHODS (3cr.)
PSY6007 PRACTICUM CLINIQUE / CLINICAL PRACTICUM (1cr.)
(1 cr./30 hours)
PSY6008 PRACTICUM CLINIQUE EXTERNE / EXTERNAL CLINICAL PRACTICUM (1cr.)
(1 cr./30 hours)

One or more foundational courses (see list of courses below):
PSY5103 FUNDAMENTALS OF BEHAVIOURAL NEUROSCIENCE (3cr.)
PSY5105 FUNDAMENTALS OF COGNITIVE PSYCHOLOGY (3cr.)
PSY5113 FUNDAMENTALS OF SOCIAL PSYCHOLOGY (3cr.)
PSY5114 FUNDAMENTALS OF DEVELOPMENTAL PSYCHOLOGY (3cr.)

One or more supplementary clinical courses.

Years 3 and 4
PSY6007 PRACTICUM CLINIQUE / CLINICAL PRACTICUM (1cr.)
(1 cr./30 hours)
PSY6008 PRACTICUM CLINIQUE EXTERNE / EXTERNAL CLINICAL PRACTICUM (1cr.)
(1 cr./30 hours)
PSY6009 PRACTICUM CLINIQUE EXTERNE AVANCÉ / ADVANCED EXTERNAL CLINICAL PRACTICUM (1cr.)
(1 cr./30 hours) (If necessary.)
PSY6010 PRACTICUM CLINIQUE INTERNE AVANCÉ / ADVANCED INTERNAL CLINICAL PRACTICUM (1cr.)
(1 cr./30 hours) (If necessary.)
PSY9999 THÈSE DE DOCTORAT / DOCTORAL THESIS
Completion of remaining foundational course requirements.
Completion of remaining supplementary clinical courses requirements.

Year 5
Predoctoral Internship
PSY9999 THÈSE DE DOCTORAT / DOCTORAL THESIS

NOTE: Students are free to take courses in both languages. Please refer to the equivalent French course code.

B) EXPERIMENTAL PSYCHOLOGY

The program of courses is individually tailored to the research interests and needs of the student. With the exception of the statistics course (PSY5120 and PSY5121), the first-year seminar (PSY5424), and the research courses (PSY5023 and PSY6042), the schedule below is intended to serve as a guideline and is not mandatory. The four optional courses may be spread over several years, depending on availability and level of the student's research involvement.

Note that students admitted on the basis of a master’s degree in psychology may receive exemptions for some of the following courses as
determined by the director of the Experimental Program.

**Year 1**

- PSY4130 HISTORY AND SYSTEMS OF PSYCHOLOGY (3cr.)
  Only students who have not completed an undergraduate course in the history of psychology must register for History and Systems of Psychology (PSY4130). We recommend that this course be taken during the first year in the program.
- PSY5023 PRACTICUM DE RECHERCHE DE NIVEAU MAÎTRISE / MASTER'S LEVEL RESEARCH PRACTICUM (1cr.)
  Students entering with master’s degrees in psychology are not required to enrol in this practicum.
- PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS (3cr.)
- PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS (3cr.)
- PSY5424 CONTEMPORARY ISSUES AND PROFESSIONAL SKILLS IN THE PSYCHOLOGICAL SCIENCES (6cr.)

**Year 2**

- PSY6042 PRACTICUM EN RECHERCHE FONDAMENTALE / PRACTICUM IN BASIC RESEARCH (3cr.)
  The equivalent of two 3-credit courses from the list of optional courses.

**Year 3**

The equivalent of two 3-credit courses from the list of optional courses.

Of the optional courses, two of the four courses must be taken from the course cluster most relevant to the student's doctoral research. The remaining two optional courses must be taken from one of the other course clusters.

The list of courses pertaining to each cluster is available from the School of Psychology. The course clusters are as follows:

- Behavioural Neuroscience
- Cognitive Psychology
- Developmental Psychology
- Social and Community Psychology
- Quantitative Psychology and Research Methods

**Years 4 and 5**

Normally, all formal course requirements should have been met by the end of year 3, with the thesis as the only remaining requirement. What should remain are the thesis proposal, comprehensive examination and the thesis itself.

The composition of the thesis committee must be approved by the director of the experimental program and should be determined shortly before submission of the thesis proposal.

NOTE: Students are free to take courses in both languages; please refer to the equivalent French course code.

**PhD degree with recognition of professional bilingual competence**

The student will have completed a portion of the program requirements in each of Canada’s official languages. More specifically, the following conditions must be met:

**Clinical program:**

- Completion of one formal course (lecture or seminar format) in each of the official languages with assignments to be completed in the language of the course and completion in the student’s second language of a significant portion of the thesis (e.g. general introduction and general discussion).
- Completion of at least two formal courses (lecture or seminar format) in each of the official languages with assignments to be completed in the language of the courses.
- Clinical training: Completion of provision of psychological services to at least one client during the practica or internship in each of the two official languages.

**Experimental program:**

- Courses: Completion of at least one formal course (lecture or seminar format) in each official language with assignments to be completed in the language of the course.
- Thesis: Completion of a significant portion of the thesis in the student’s second language (e.g. general introduction and general discussion).
- Teaching: Satisfactory completion of one teaching assistantship of no less than 60 hours in each official language including in each case a minimum of three hours of formal lecturing. Equivalent substitutes may be approved by the director of the experimental program.

The satisfactory fulfillment of the above requirements (re: courses) will be monitored by the program directors.

Note: In the experimental program, the first of these requirements must be completed before the other two.

**Master of Arts (MA) in Psychology**

While students are accepted only into the MA - PhD programs, an MA degree may, in special circumstances, be awarded to students who have met the requirements. The Graduate Studies Committee will decide in each case whether this alternative is feasible.
In the case of a Master of Arts in Psychology (MA), the minimum requirements for the degree are as follows:

**A) CLINICAL PSYCHOLOGY**

- **PSY4130 HISTORY AND SYSTEMS OF PSYCHOLOGY (3cr.)**
  Only students who have not completed an undergraduate course in history of psychology must register for History and Systems of Psychology (PSY4130). We recommend that this course be taken during the first year, but it can be taken later in the program.
- **PSY5023 PRACTICUM DE RECHERCHE DE NIVEAU MAÎTRISE / MASTER'S LEVEL RESEARCH PRACTICUM (1cr.)**
  Students entering with master's degrees in psychology are not required to enrol in this practicum.
- **PSY9999 THÈSE DE MAÎTRISE / MASTER'S THESIS**
  - At least four sessions of full-time residence.
  - A minimum of 750 hours of applied clinical training (PSY6007, and, if necessary, PSY6008 or PSY6009), to be worked out on an individual basis with the Coordinator of Practica and Internships.
  - Six three-credit courses, and one six-credit course:
    - PSY5102 APPLIED PSYCHOPATHOLOGY (3cr.)
    - PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS (3cr.)
    - PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS (3cr.)
    - PSY5133 CLINICAL RESEARCH METHODS (3cr.)
    - PSY5202 PSYCHODIAGNOSTIC ASSESSMENT OF ADULTS AND CHILDREN (6cr.)
    - PSY6170 ETHICS AND PROFESSIONAL ISSUES (3cr.)
  - One supplementary three-credit clinical course.

**B) EXPERIMENTAL PSYCHOLOGY**

- **PSY4130 HISTORY AND SYSTEMS OF PSYCHOLOGY (3cr.)**
  Only students who have not completed an undergraduate course in history of psychology must register for History and Systems of Psychology (PSY4130). We recommend that this course be taken during the first year, but it can be taken later in the program.
- **PSY5023 PRACTICUM DE RECHERCHE DE NIVEAU MAÎTRISE / MASTER'S LEVEL RESEARCH PRACTICUM (1cr.)**
  Students entering with master's degrees in psychology are not required to enrol in PSY5023.
- **PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS (3cr.)**
- **PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS (3cr.)**
- **PSY5424 CONTEMPORARY ISSUES AND PROFESSIONAL SKILLS IN THE PSYCHOLOGICAL SCIENCES (6cr.)**
- **PSY9999 THÈSE DE MAÎTRISE / MASTER'S THESIS**
  - At least four sessions of full-time residence.

**Duration of the program**

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Residence**

Minimum requirements for the Clinical Psychology Program are 12 consecutive sessions in full-time residence, and minimum requirements for the Experimental Program are nine consecutive sessions in full-time residence.

While the Clinical Psychology Program may be completed in four years (12 sessions), completion of all requirements of the program of studies typically requires further sessions. Residency must be completed at the beginning of the program.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

**Second language requirements**

Students who, at the time of admission, can provide proof of their competence in both English and French (e.g., prior post-secondary education in both languages, certificate of linguistic competency) are deemed to meet the language requirement.

All students must meet certain second language requirements (English or French) in order to obtain their doctoral degree. These requirements can be met in one of four ways:

- by passing the FLS 1000 proficiency test administered by the Official Languages and Bilingualism Institute (ILOB)
- successfully completing a compulsory graduate course in which all course requirements will have been met in the second language
- writing the Thesis in the second language, or
- successfully completing a second year course designated by the Official Languages and Bilingualism Institute (FLS 2511 or ESL 2511). The grade received for this course will appear as a 'S' (satisfactory) or 'NS' (not satisfactory) on the official transcript. In this case, as this is an undergraduate course, a Satisfactory is considered to be a 50% or higher.

A candidate holding a student visa, and whose first language and language of instruction prior to university studies were neither English nor French, is considered by the School of Psychology to have fulfilled the second language requirement.
Note that this is different from the Ph.D. degree with recognition of professional bilingual competence.

**Thesis Advisory Committee**

A thesis advisory committee (also referred to as the thesis proposal committee) is formed a few months before the student submits the thesis proposal for evaluation. The committee's membership is determined by the specific research content of the thesis proposal. The committee comprises four members including the thesis supervisor. At least one member, other than the supervisor, must be a regular full-time member of the School of Psychology. Depending on the thesis topic, other members may be associated with other departments or have adjunct, cross-appointed, or clinical appointments in Psychology. However, all members, regardless of affiliation, must be members of the Faculty of Graduate and Postgraduate Studies.

The thesis proposal is approved by committee consensus following a formal oral presentation to the committee members. Following the meeting, informal meetings may be held with the student and individual members or all members with the goal of guiding the student towards successful completion of the thesis.

**Courses**

The following courses are not all offered in the same year:

**PSY5102 APPLIED PSYCHOPATHOLOGY** (3cr.)
Major conceptual and empirical issues in the field of psychopathology. Contemporary diagnostic systems and procedures (e.g. DSM.)

**PSY5103 FUNDAMENTALS OF BEHAVIOURAL NEUROSCIENCE** (3cr.)
Critical analysis of research trends in behavioural neuroscience and of the relations between neuroanatomy, functional systems, and complex behaviours (e.g. spatial orientation, memory, language, reasoning.)

**PSY5104 INTEGRATION SEMINAR IN PROGRAM EVALUATION** (3cr.)
Integration of program evaluation practice, research and theory leading to a written report related to advances in program evaluation practice and theory. Exclusion: EDU5504. Prerequisites: a) EDU5299 or EDU5699 or PSY7103 or PSY7503 or CRM6359 or CRM6759; b) EDU6299 or EDU6699; c) PSY7102 or PSY7502. It is preferable that the student have completed, in addition, one elective course approved by the director of the diploma.

**PSY5105 FUNDAMENTALS OF COGNITIVE PSYCHOLOGY** (3cr.)
Critical analysis of research trends in cognitive psychology. Topics to include cognitive architectures and their underlying principles, the interpretation of sensory signals, attention, memory, language, mental computation, reasoning and problem-solving.

**PSY5111 THEORIES OF PERSONALITY** (3cr.)
Contemporary personality theory and research concerning the structure, heritability, social and biological determinants, and social and psychiatric manifestation of fundamental personality traits.

**PSY5113 FUNDAMENTALS OF SOCIAL PSYCHOLOGY** (3cr.)
Critical analysis of research trends in contemporary social psychology. Topics to include the units of analysis in social psychology, social influence, formation and functions of attitudes, stereotypes, social motivation, leadership, social organizations, and inter-group relations.

**PSY5114 FUNDAMENTALS OF DEVELOPMENTAL PSYCHOLOGY** (3cr.)
Critical analysis of research trends in developmental psychology. Topics to include current issues in emotional, cognitive, and social development during childhood and adolescence and an evaluation of current conceptualizations, measurement techniques, and research methodologies.

**PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS** (3cr.)
Topics covered include general linear approaches to analysis of variance and covariance, basic assumptions of parametric techniques, expected mean square and error term selection, multiple comparison and trend procedures, power of statistical tests. Attention to be paid to selected factorial designs including repeated measures, regression, and log-linear analyses. Prerequisite: PSY 3104 or its equivalent.

**PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS** (3cr.)
Principles of multivariate statistics in general, and of those of multiple regression, discriminant function analysis, multivariate analysis of variance and canonical correlation, in particular. Each statistical procedure to be accompanied by required computer application work involving major statistical packages. Prerequisite: PSY5120

**PSY5125 PRINCIPLES OF NEUROPSYCHOLOGY** (3cr.)
Focus on understanding brain-behavioral relationships by examining major neurobehavioural syndromes and associated neuropsychological deficits. Review of the current theoretical assumptions underlying the syndromes. Topics include: History and principles of neuropsychology, gross neuroanatomy and neuropathology, aphasia, apraxia, agnosia, alexia, agraphia, visuo-spatial/perceptual/construction disorders, attention/neglect, memory and learning, limbic system functions, callosal syndromes, and executive functions. Prerequisite: knowledge of neuroanatomy.

**PSY5133 CLINICAL RESEARCH METHODS** (3cr.)
General research principles as they apply to research with clinical populations and to research on clinical services. Strategies for enhancing both the internal and external validity of research. Sampling, measurement, statistical power, and the selection of appropriate research designs.
PSY5158 RESEARCH PRACTICUM IN SOCIAL AND INTERPERSONAL RELATIONS (3cr.)
Current research in assertion and social skills training is studied through student and staff participation in research projects.

PSY5202 PSYCHODIAGNOSTIC ASSESSMENT OF ADULTS AND CHILDREN (6cr.)
Assessment of intellectual, behavioural and emotional functioning of children and adults. Administration, scoring, and interpretation of selected instruments. Integration of data for communication of assessment findings to clients and others (e.g. parents, teachers.)

PSY5207 PSYCHOLOGICAL INTERVENTION AND CONSULTATION (6cr.)
Development of basic intervention skills. Models of psychological intervention. Consultation with individuals, organizations, and systems.

PSY5424 CONTEMPORARY ISSUES AND PROFESSIONAL SKILLS IN THE PSYCHOLOGICAL SCIENCES (6cr.)
Critical examination of contemporary issues and methodological approaches in the psychological sciences from the perspective of multiple research traditions, as well as the development of professional skills. In-class activities include lectures in each of the program’s four areas of study (behavioural neuroscience, cognitive, developmental, and social/community). Professional skills modules and workshops about future career possibilities.

PSY5911 THÉORIES DE LA PERSONNALITÉ / THEORIES OF PERSONALITY (3cr.)
Analyse critique et comparative des principales théories de la personnalité, depuis la psychanalyse et la psychologie analytique jusqu’aux approches phénoménologiques et existentielles, le néo-behavioriste, sociale, dialectique, et autres. Contemporary personality theory and research concerning the structure, heritability, social and biological determinants, and social and psychiatric manifestation of fundamental personality traits.

PSY5924 PRINCIPES DE NEUROPSYCHOLOGIE / PRINCIPLES OF NEUROPSYCHOLOGY (3cr.)
Étude de la neuroanatomie fonctionnelle par le biais de la description de différents syndromes neurocomportementaux et déficits neuropsychologiques. Vue d’ensemble sur les fondements théoriques proposés pour chacun des troubles neuropsychologiques décrits. Les sujets traités incluent : Histoire et principes de la neuropsychologie, neuroanatomie et neuropathologie, aphasie, apraxie, agnosie, alexie, agraphie, troubles visuo-spatiaux / perceptuels / constructifs déficits attentionnels et négligence, mémoire et apprentissage. Fonctions du système limbique, atteintes du corps calleux et fonctions exécutives. Préalable : une connaissance de la neuroanatomie. Focus on understanding brain behaviour relationships by examining major neurobehavioural syndromes and associated neuropsychological deficits. Review of the current theoretical assumptions underlying the syndromes. Topics include: History and principles of neuropsychology, gross neuroanatomy and neuropathology, aphasia, apraxia, agnosia, alexia, agraphia, visuo-spatial/perceptual/construction disorders, attention/neglect, memory and learning, limbic system functions, callosal syndromes, and executive functions. Prerequisite: knowledge of neuroanatomy.

PSY5958 PRACTICUM DE RECHERCHE EN RELATIONS INTERPERSONNELLES / RESEARCH PRACTICUM IN SOCIAL AND INTERPERSONAL RELATIONS (3cr.)
Current research in assertion and social skills training is studied through student and staff participation in research projects. Les étudiants et les professeurs réalisent des projets de recherche en collaboration sur l’entraînement de l’affirmation de soi et des habiletés sociales.

PSY6102 SOCIAL DEVELOPMENT (3cr.)
A review of current issues in the literature on social development in childhood. Topics to include the development of attachment, influence of parents and peers, social competence, and social cognition.

PSY6103 SOCIALIZATION AND INDIVIDUAL DIFFERENCES (3cr.)
Review and critical evaluation of theoretical models and empirical research in the study of socialization, gender differences, and other individual differences during childhood and adolescence.

PSY6105 FACTOR ANALYSIS IN PSYCHOLOGICAL RESEARCH (3cr.)
Focus on the underlying rationale, conceptual understanding, basic design requirements, mathematical/inferential procedures, and range of applications related to both exploratory and confirmatory factor analyses. Students are introduced to both the LISREL and EQS statistical packages and each factor analytic example studied is accompanied by required computer application work. Prerequisite: PSY5121 Advanced Statistics in Psychology: Multivariate Data Analysis or its equivalent.

PSY6106 THE EVALUATION OF PSYCHOTHERAPY AND BEHAVIOUR CHANGE (3cr.)

PSY6107 CLINICAL APPLICATIONS OF INTERPERSONAL THEORY (3cr.)
Survey of the major interpersonal theories and introduction to the major assessment tools associated with these approaches. Applications of interpersonal theory to the treatment of specific clinical problems.

PSY6109 NEUROBEHAVIORAL DETERMINANTS OF MOTIVATION (3cr.)
Seminars on biological motivation, from behaviours essential to homeostasis to hedonic experiences, and on its roots from ontogenic evolvement to phylogenetic development. The goal will be to describe the physiological mechanisms underlying individual behaviours and the governing principles that unify them.

PSY6113 REHABILITATION PSYCHOLOGY (3cr.)
Introduction to the roles and functions of psychologists in medical rehabilitation and other rehabilitation settings, to acquaint students with the major assessment, intervention, and evaluation issues posed by chronic illness, disability, and handicaps.

PSY6114 COGNITIVE PSYCHOPHYSIOLOGY (3cr.)
Seminars on the neurophysiology of human behaviour. Selected topics for discussion include basic EEG and evoked potential recording techniques, measurement and analysis of EEG (e.g., filtering, spectral analysis), sensory and cognitive evoked potentials and their component structure, the timing of mental events, sources of influence on evoked potentials (e.g., attention, consciousness, lexical-semantic processing).

**PSY6115 EVOLUTION OF THE MIND** (3cr.)
Review of the historical foundation, concepts and principles associated with the evolution of the mind. Topics to include the evolution of cognitive abilities (e.g., memory, decision-making, language and communication) and social behaviour (e.g., cooperation, competition, aggression, parental behaviour, mate selection).

**PSY6116 COMMUNITY PSYCHOLOGY** (3cr.)
Study of the socio-historical context of community psychology. Values, paradigms, and objectives of community psychology. Community mental health, primary prevention, and intervention strategies.

**PSY6117 COMPARATIVE COGNITION** (3cr.)
Examination of the goals of comparative analysis of cognitive processes and the contribution of behavioural ecologists to the study of cognition in non-human species. Topics to include the dynamics of choice and timing, memory and place learning, and concept formation.

**PSY6118 REASONING, JUDGEMENT AND DECISION MAKING** (3cr.)
Seminars on causal reasoning, deductive and inductive inference, hypothesis formation and evaluation, probabilistic judgment, and covariation detection. Examination of these cognitive activities in the light of theoretical models based on various concepts such as logic, formal or natural, heuristics, or connectionist mechanisms.

**PSY6122 CLINICAL HEALTH PSYCHOLOGY** (3cr.)
Historical and theoretical foundations in Health Psychology. Health promotion issued and practices. Treatment of specific disorders. Role in the delivery of medical services.

**PSY6123 PSYCHOSOCIAL STRESS RESEARCH** (3cr.)
Constructs and measurements of stress and stressors. Critical analysis of theoretical models and empirical research of life events, cognitive appraisal, anticipation and coping strategies.

**PSY6126 NEUROPSYCHOLOGICAL ASSESSMENT** (3cr.)
A theoretical and practical review of prominent neuropsychological procedures including the Halstead-Reitan, the Luria-Nebraska, and the Boston process approach.

**PSY6127 RESEARCH SEMINARS IN SOCIAL PSYCHOLOGY** (3cr.)
Critical evaluation of studies in targeted domains of social psychology. Identification and evaluation of new orientations. Presentation and discussion of thesis project and other personal research projects. Similarities and differences in the work of researchers working in academic and private sectors.

**PSY6132 CHILD PSYCHOPATHOLOGY** (3cr.)
Patterns of child development and childhood psychopathology. Study of specific psychopathological conditions and implications for appropriate treatment.

**PSY6133 ETHICS OF RESEARCH IN PSYCHOLOGY** (3cr.)
Overview of the basic problems that pertain to the legitimacy of the practice of scientific psychology. Theoretical issues that pertain to philosophical ethics and pragmatic issues associated with ethical norms.

**PSY6134 TEST CONSTRUCTION AND PSYCHOMETRIC THEORY** (3cr.)
Issues relevant to the design, construction, and validation of psychometric assessment devices with applications to research. Special topics to include item construction, open-ended items, multiple-choice items, applications of exploratory and confirmatory factor analysis, construct validity, measures of internal consistency and reliability, item analysis, and cross-linguistic adaption of assessment devices.

**PSY6143 ADVANCED TOPICS IN PSYCHODIAGNOSTIC ASSESSMENT** (3cr.)
Advanced seminars on current topics in Psychological Assessment such as: Diagnostic Interviewing with Children, Family Assessment, Behavioural Assessment, Neuropsychological Assessment, Consultation and Problem solving, etc.

**PSY6144 APPLICATION OF MICROCOMPUTERS TO HUMAN EXPERIMENTAL PSYCHOLOGY** (3cr.)
Use of micro-computers in behavioural data acquisition and file organization for purposes of statistical treatment. Subjects to be covered include: writing instructions for video display, video display techniques, techniques for recording answers, statistical properties of various answers. Applied assignments are important components of this course.

**PSY6145 COGNITIVE PSYCHOLOGY OF LANGUAGE** (3cr.)
This seminar studies the perceptual and cognitive processes underlying language behaviour. The course is divided into five parts: 1) introduction to the study of language behaviour; 2) language comprehension; 3) language production; 4) language acquisition; and 5) the relation between language and thought. The main objective is to survey contemporary knowledge of this field of research.

**PSY6146 SOCIAL PSYCHOLOGY OF LANGUAGE** (3cr.)
The study of language as an interactive communication process. Integrated review of the production and interpretation mechanisms as a function of social and cognitive contexts. Analysis of the methodological problems posed by the study of interaction.

**PSY6147 SCHOOL PSYCHOLOGY** (3cr.)

**PSY6151 DRUGS AND BEHAVIOUR (3cr.)**
A study of current neurochemical and neuropharmacological techniques applicable to the study of normal and pathological behaviour. A critical evaluation of these techniques as they relate to animal and human behaviour.

**PSY6152 RESEARCH AND APPLICATION OF LEARNING PRINCIPLES (3cr.)**
Recent development in classical and instrumental conditioning stimulus control, and aversively-motivated learning. Theoretical relevance of laboratory findings for application.

**PSY6154 CHILD PSYCHOTHERAPY (3cr.)**

**PSY6155 APPLIED SOCIAL PSYCHOLOGY IN THE WORK PLACE (3cr.)**
Seminars with simulations of problems people face in the work place. Topics for discussion include affirmative action, women in management, work/family conflict, corporate culture, quality of work life, flextime, psychological services in organizations, and program evaluation

**PSY6158 RESEARCH METHODS IN SOCIAL PSYCHOLOGY (3cr.)**
Critical review of research methods used in social psychology and their applications in contemporary research. Elaboration of a research project on a social problem using different data collection methods.

**PSY6166 HUMAN AND SOCIAL MOTIVATION: THEORY AND RESEARCH (3cr.)**
Epistemological, theoretical and experimental aspects of the concept of motivation as an explanatory construct of social behaviour. Study of its development.

**PSY6167 EXPERIMENTAL TECHNIQUES IN SLEEP RESEARCH (3cr.)**
Seminars/tutorials on the experimental techniques that apply to the psychophysiological and cognitive study of sleep. Selected topics to include the use of these techniques in the study of the time course of sleeping episodes, neurophysiological correlates of sleep stages, the phenomenon of dreaming, and sleep disorders.

**PSY6168 COMPUTER SIMULATION OF COGNITIVE PROCESSES (3cr.)**
Overview of the main computer simulation techniques of cognitive processes with hands-on exercises on the microcomputer. Detailed analysis of object-oriented programming and its potential as a simulation tool in cognitive science.

**PSY6170 ETHICS AND PROFESSIONAL ISSUES (3cr.)**
Systematic review of ethical principles, codes of ethics and standards of practice related to the psychological enterprise in research and clinical practice. Introduction to the organization of psychology as a profession and to recent professional issues.

**PSY6176 CLINICAL GEROPSYCHOLOGY (3cr.)**
Normal aspects of physical and psychological aging, psychological assessment and interventions with older adults.

**PSY6182 PSYCHOLOGY AND HEALTH (3cr.)**

**PSY6190 COUNSELLING WITH DYING AND BEREAVED (3cr.)**
Phases of dying and bereavement, normal and abnormal. Counseling the patient, the family. Development of the concept of death; how to deal with dying or bereaved children, adolescents. Euthanasia, untimely deaths, etc.

**PSY6191 SEMINARS IN PSYCHOLOGY (3cr.)**
Selected topics on contemporary psychology presented and discussed as graduate seminars.

**PSY6201 BASICS OF NEUROSCIENCE (6cr.)**
Comprehensive neuroscience course from the membrane and the cellular levels through the behavioural aspects of invertebrates and vertebrates. Lectures and tutorials on aspects of neuroscience such as neuroanatomy, neurophysiology, behavioural neuroscience and neuropharmacology.

**PSY6202 ADVANCED SEMINAR IN BEHAVIOURAL NEUROSCIENCE (6cr.)**
Advanced seminar course integrating behavioural analyses with aspects of neural circuits mediating and regulating these behaviours. 
*Prerequisite: Adequacy in background knowledge as assessed by one of the coordinators prior to commencement of course.*

**PSY6391 PSYCHOPHYSIOLOGY OF INDIVIDUAL DIFFERENCES (3cr.)**
Seminar/tutorial examining psychophysiological research on the nature of individual differences in personality, intelligence and learning disabilities.

**PSY6901 DÉTERMINANTS NEUROCOMPORTEMENTAUX DE LA MOTIVATION / NEUROBEHAVIORAL DETERMINANTS OF MOTIVATION (3cr.)**
Séminaires sur la motivation biologique, des comportements essentiels à l’équilibre homéostatique aux expériences hédoniques, et sur ses origines ontogénétiques aussi bien que phylogénétiques. L’objectif principal poursuivi sera de décrire les mécanismes physiologiques sous-jacents aux comportements individuels ainsi que leurs principes unificateurs. Seminars on biological motivation, from behaviours essential to homeostasis to
PSY6903 PSYCHOPHYSIOLOGIE COGNITIVE / COGNITIVE NEUROPHYSIOLOGY (3cr.)
Séminaires sur la neurophysiologie du comportement humain. Sujets abordés : les techniques d’enregistrement du EEG et des potentiels évoqués, la mesure et l’analyse du EEG (ex. filtrage, analyse spectrale), potentiels évoqués liés à des événements sensoriels ou cognitifs, le cours temporel des événements mentaux, les sources d’influence sur les potentiels évoqués (ex. l’attention, la conscience, le traitement lexico-sémantique). Séminars on the neurophysiology of human behaviour. Selected topics for discussion include basic EEG and evoked potential recording techniques, measurement and analysis of EEG (e.g., filtering, spectral analysis), sensory and cognitive evoked potentials and their component structure, the timing of mental events, sources of influence on evoked potentials (e.g., attention, consciousness, lexical-semantic processing).

PSY6904 ÉVOLUTION DE LA PENSEÉ / EVOLUTION OF THE MIND (3cr.)
Retour sur les fondements historiques, les concepts et principes liés à l’évolution de la pensée. Les thèmes incluent l’évolution des habiletés cognitives (ex. la mémoire, la prise de décision, le langage et la communication) et du comportement social (ex. la coopération, la compétition, l’agression, le comportement parental, la sélection des partenaires). Review of the historical foundation, concepts and principles associated with the evolution of the mind. Topics to include the evolution of cognitive abilities (e.g., memory, decision-making, language and communication) and social behaviour (e.g., cooperation, competition, aggression, parental behaviour, mate selection).

PSY6905 PSYCHOLOGIE COMMUNAUTAIRE / COMMUNITY PSYCHOLOGY (3cr.)

PSY6906 COGNITION COMPARÉE / COMPARATIVE COGNITION (3cr.)
Examen des objectifs de l’analyse comparée des processus cognitifs et de la contribution de l’écologie du comportement dans l’étude de la cognition chez les espèces non humaines. Les thèmes incluent la dynamique des choix et de la coordination temporelle, la mémoire et l’apprentissage des lieux, la formation des concepts. Examination of the goals of comparative analysis of cognitive processes and the contribution of behavioural ecologists to the study of cognition in non-human species. Topics to include the dynamics of choice and timing, memory and place learning, and concept formation.

PSY6918 LE RAISONNEMENT, LE JUGEMENT ET LA PRISE DE DÉCISION / REASONING, JUDGEMENT AND DECISION MAKING (3cr.)
Séminaires sur le raisonnement causal, l’inférence déductive et inductive, la formation et l’évaluation d’hypothèses, le jugement probabiliste et la détection des covariations. Examen de ces activités cognitives à la lumière de modèles théoriques faisant appel à des concepts variés tels que la logique, formelle ou naturelle, les processus heuristiques ou les mécanismes connexionnistes. Séminars on causal reasoning, deductive and inductive inference, hypothesis formation and evaluation, probabilistic judgement, and covariation detection. Examination of these cognitive activities in the light of theoretical models based on various concepts such as logic, formal or natural, heuristics, or connectionist mechanisms.

PSY6920 PSYCHOPSYCHOLOGIE CLINIQUE DE LA SANTÉ / CLINICAL HEALTH PSYCHOLOGY (3cr.)

PSY6923 RECHERCHE SUR LE STRESS PSYCHOSOCIAL / PSYCHOSOCIAL STRESS RESEARCH (3cr.)

PSY6926 ÉVALUATION NEUROPSYCHOLOGIQUE / NEUROPSYCHOLOGICAL ASSESSMENT (3cr.)

PSY6927 SÉMINAIRES DE RECHERCHE EN PSYCHOLOGIE SOCIALE / RESEARCH SEMINARS IN SOCIAL PSYCHOLOGY (3cr.)

PSY6930 ÉTHIQUE DE LA RECHERCHE EN PSYCHOLOGIE / ETHICS OF RESEARCH IN PSYCHOLOGY (3cr.)
Tour d’horizon des problèmes fondamentaux liés à la légitimité de la pratique de la psychologie scientifique. Questions théoriques relevant de l’éthique philosophique aux questions pragmatiques associées aux codes déontologiques. Overview of the basic problems that pertain to the legitimacy of the practice of scientific psychology. Theoretical issues that pertain to philosophical ethics and pragmatic issues associated with ethical norms.

PSY6931 CONSTRUCTION DE TESTS ET THÉORIE PSYCHOMÉTRIQUE / TEST CONSTRUCTION AND PSYCHOMETRIC THEORY (3cr.)
Sujets afférents à la planification, la construction et la validation d’un instrument de mesure dans le cadre de son application à la recherche. Thèmes spécifiques comprenant la conception d’items, les questions à réponse construite, les questions à réponse choisie, les applications de l’analyse factorielle exploratoire et confirmatoire, la validité théorique, les mesures de cohérence interne et de fidélité, l’analyse d’items et l’adaptation interlinguistique des instruments de mesure. Issues relevant to the design, construction, and validation of psychometric assessment.
PSY6932 PSYCHOPATHOLOGIE DE L’ENFANT / CHILD PSYCHOPATHOLOGY (3cr.)


PSY6941 APPLICATIONS DE LA MICRO-INFORMATIQUE À LA PSYCHOLOGIE EXPÉRIMENTALE HUMAINE / APPLICATION OF MICROCOMPUTERS TO HUMAN EXPERIMENTAL PSYCHOLOGY (3cr.)

Utilisation des micro-ordinateurs dans l’acquisition des données comportementales et organisation des fichiers de données pour le traitement statistique. Sujets abordés : la rédaction de consignes adaptées à l’affichage vidéographique, les techniques d’affichage vidéographique, les techniques d’enregistrement des réponses, les propriétés statistiques de divers types de réponses. Les travaux pratiques constituent une composante importante de ce cours. Use of micro-computers in behavioural data acquisition and file organization for purposes of statistical treatment. Subjects to be covered include: writing instructions for video display, video display techniques, techniques for recording answers, statistical properties of various answers. Applied assignments are important components of this course.

PSY6945 PSYCHOLOGIE COGNITIVE DU LANGAGE / COGNITIVE PSYCHOLOGY OF LANGUAGE (3cr.)

Ce séminaire étudie les processus perceptuels et cognitifs sous-jacents au comportement langagier. Le cours est divisé en cinq parties : 1) une introduction à l’étude du comportement langagier; 2) la compréhension du langage; 3) la production du langage; 4) l’acquisition du langage; et 5) la relation entre langage et pensée. L’objectif principal du cours est de faire un bref bilan de l’état actuel des connaissances sur les sujets abordés. This seminar studies the perceptual and cognitive processes underlying language behaviour. The course is divided into five parts: 1) introduction to the study of language behaviour; 2) language comprehension; 3) language production; 4) language acquisition; and 5) the relation between language and thought. The main objective is to survey contemporary knowledge of this field of research.

PSY6946 PSYCHOLOGIE SOCIALE DU LANGAGE / SOCIAL PSYCHOLOGY OF LANGUAGE (3cr.)


PSY6947 PSYCHOLOGIE SCOLAIRE / SCHOOL PSYCHOLOGY (3cr.)


PSY6951 DROGUES ET COMPORTEMENT / DRUGS AND BEHAVIOUR (3cr.)

Les techniques neurochimiques et neuropharmacologiques utiles à l’étude du comportement normal et pathologique. Évaluation critique des techniques appliquées au comportement animal et humain. A study of current neurochemical and neuropharmacological techniques applicable to the study of normal and pathological behaviour. A critical evaluation of these techniques as they relate to animal and human behaviour.

PSY6952 LA RECHERCHE SUR LES PRINCIPES D’APPRENTISSAGE ET LEURS APPLICATIONS / RESEARCH AND APPLICATION OF LEARNING PRINCIPLES (3cr.)


PSY6954 PSYCHOLOGIE SOCIALE APPLIQUÉE AU MONDE DU TRAVAIL / APPLIED SOCIAL PSYCHOLOGY IN THE WORK PLACE (3cr.)

Séminaires accompagnés de simulations des problèmes éprouvés dans le monde du travail. Sujets de discussion : l’action affirmative, les femmes et la gestion, les conflits entre travail et famille, la culture des grandes sociétés, la qualité de vie au travail, les horaires de travail flexibles, les services psychologiques dans les grandes sociétés et l’évaluation de programme. Topics for discussion include affirmative action, women in management, work/family conflict, corporate culture, quality of work life, flextime, psychological services in organizations, and program evaluation.

PSY6958 MÉTHODES DE RECHERCHE EN PSYCHOLOGIE SOCIALE / RESEARCH METHODS IN SOCIAL PSYCHOLOGY (3cr.)

Étude critique des différentes méthodes de recherche et de leur mise en œuvre dans la recherche contemporaine en psychologie sociale. Élaboration d’un projet d’étude sur une question sociale spécifique et application de différentes méthodes de collecte des données. Critical review of research methods used in social psychology and their applications in contemporary research. Elaboration of a research project on a social problem using different data collection methods.

PSY6962 MOTIVATION HUMAINE ET SOCIALE : THÉORIES ET RECHERCHE /HUMAN AND SOCIAL MOTIVATION: THEORY AND RESEARCH (3cr.)

Aspects épistémologiques, théoriques et expérimentaux du concept de motivation en tant que déterminant du comportement social. Étude de son développement. Epistemological, theoretical and experimental aspects of the concept of motivation as an explanatory construct of social behaviour. Study of its development.
PSY6963 TECHNIQUES EXPÉRIMENTALES EN RECHERCHE SUR LE SOMMEIL / EXPERIMENTAL TECHNIQUES IN SLEEP RESEARCH (3cr.)
Séminaires/tutoriels sur les techniques expérimentales pertinentes à l'étude psychophysiologique et cognitive du sommeil. Sujets abordés : l'application de ces techniques à l'étude du cours temporel des épisodes de sommeil, des corrélatifs neurophysiologiques des stades du sommeil, du phénomène du rêve et des troubles du sommeil. Seminars/tutorials on the experimental techniques that apply to the psychophysiological and cognitive study of sleep. Selected topics to include the use of these techniques in the study of the time course of sleeping episodes, neurophysiological correlates of sleep stages, the phenomenon of dreaming, and sleep disorders.

PSY6964 SIMULATION INFORMATIQUE DES PROCESSUS COGNITIFS / COMPUTER SIMULATION OF COGNITIVE PROCESSES (3cr.)
Tour d'horizon des principales techniques de simulation informatique des processus cognitifs, avec exercices pratiques sur micro-ordinateur. Analyse détaillée de la programmation axée sur l'objet et de son potentiel comme outil de simulation en sciences de la cognition. Overview of the main computer simulation techniques of cognitive processes with hands-on exercises on the microcomputer. Detailed analysis of object-oriented programming and its potential as a simulation tool in cognitive science.

PSY6975 PSYCHOLOGIE CLINIQUE DE LA PERSONNE ÂGÉE / CLINICAL GEROPSYCHOLOGY (3cr.)

PSY6982 LA PSYCHOLOGIE ET LA SANTÉ / PSYCHOLOGY AND HEALTH (3cr.)

PSY6991 SÉMINAIRES EN PSYCHOLOGIE / SEMINARS IN PSYCHOLOGY (3cr.)
Sujets choisis de psychologie contemporaine présentés et discutés en séminaires au niveau gradué. Selected topics on contemporary psychology presented and discussed as graduate seminars.

PSY7101 CAUSAL MODELING IN PSYCHOLOGICAL RESEARCH (3cr.)
Focus on the conceptual framework and analytic procedures associated with causal modeling, as it relates to psychological research. Specific applications include path analysis based on both multiple regression and analysis of covariance structures, and full structural equation modeling applied to cross-sectional as well as longitudinal designs. Each example studied is accompanied by required computer application work. Prerequisite: PSY 6105 Factor Analysis in Psychological Research.

PSY7102 FIELD RESEARCH IN SOCIAL AND COMMUNITY INTERVENTIONS (3cr.)
Practical experience in carrying out applied research and program evaluation in a community agency or organization. Prerequisite: PSY 7103

PSY7103 PROGRAM EVALUATION (3cr.)

PSY7104 SYSTEMIC THERAPY (3cr.)
An introduction to concepts and practices in systemic therapy that may be used with individuals, couples or families. Emphasis on the context of problems and therapeutic practices enabling clients to have more choices in their lives.

PSY7105 EVIDENCE-BASED PSYCHOLOGICAL SERVICES FOR CHILDREN, ADOLESCENTS, FAMILIES (3cr.)
Core skills in the provision of evidence-based psychological services for a range of psychological problems in children and youth. The therapeutic relationship with children, adolescents, and their parents.

PSY7106 SEMINARS IN GENERAL PSYCHOLOGY (3cr.)
Research topics are regularly reported and studied by staff members and occasionally with visiting researchers.

PSY7107 PSYCHOLOGY OF THE FAMILY (3cr.)
Examination of the empirical literature on how families deal with normative and non-normative life transitions across the family life cycle, with discussion of major challenges facing families.

PSY7108 MULTICULTURAL CLINICAL PSYCHOLOGY (3cr.)
Issues related to the assessment and treatment of multicultural populations. Theoretical frameworks and practical aspects of multicultural counseling.

PSY7109 PSYCHOLOGICAL EFFECTS AND TREATMENT OF TRAUMA (3cr.)
Theoretical, empirical, and clinical aspects of traumas such as sexual or physical abuse, violent crime, torture, or war experiences. Effects of trauma, including post-traumatic stress disorder, the assessments of such effects, and methods of treatment.

PSY7112 RESEARCH SEMINARS IN CONTEMPORARY PSYCHOLOGY (3cr.)
Advanced seminars offered on different topics each year.

PSY7114 SEMINARS IN PROFESSIONAL PSYCHOLOGY (3cr.)
Advanced Seminars offered on different topics each year.

PSY7123 COGNITIVE AND BEHAVIOUR THERAPIES (3cr.)
Critical review of contemporary theories and practices in cognitive-behaviour therapy with a focus on depression and anxiety disorders.

**PSY7124 COUPLES THERAPY** (3cr.)

**PSY7167 FAMILY PSYCHOTHERAPY** (3cr.)

**PSY7190 SEMINARS IN PSYCHOLOGY II** (3cr.)
Selected topics on contemporary psychology presented and discussed as graduate seminars.

**PSY7904 THÉRAPIE SYSTÉMIQUE / SYSTEMIC THERAPY** (3cr.)
Introduction aux concepts et pratiques en thérapie systémique que l'on peut utiliser avec les individus, les couples, ou les familles. Discussion du contexte des problèmes psychosociaux. Présentation des approches qui ont pour but de faciliter le choix chez les clients. An introduction to concepts and practices in systemic therapy that may be used with individuals, couples or families. Emphasis on the context of problems and therapeutic practices enabling clients to have more choices in their lives.

**PSY7905 SERVICES PSYCHOLOGIQUES BASÉS SUR DES DONNÉES PROBANTES POUR ENFANTS, ADOLESCENTS, FAMILLES / EVIDENCED-BASED PSYCHOLOGICAL SERVICES FOR CHILDREN, ADOLESCENTS, FAMILIES** (3cr.)
Éléments clés des services psychologiques basés sur des données probantes pour une gamme de problèmes chez les enfants et les adolescents. L'établissement d'une relation thérapeutique avec les enfants, les adolescents et leurs parents. Core skills in the provision of evidence-based psychological services for a range of psychological problems in children and youth. The therapeutic relationship with children, adolescents, and their parents. Préalable : connaissance passive de l'anglais. Prerequisite: passive knowledge of French.

**PSY7906 SÉMINAIRES EN PSYCHOLOGIE GÉNÉRALE / SEMINARS IN GENERAL PSYCHOLOGY** (3cr.)
Les sujets de recherche sont présentés et discutés à dates fixées par les membres du personnel enseignant, et occasionnellement avec la participation d'un chercheur invité. Research topics are regularly reported and studied by staff members and occasionally with visiting researchers.

**PSY7907 PSYCHOLOGIE DE LA FAMILLE / PSYCHOLOGY OF THE FAMILY** (3cr.)
Présentation de la recherche empirique qui porte sur l'adaptation des familles aux transitions, à partir de la perspective du cycle de vie familiale, avec discussion des défis auxquels font face les familles. Examination of the empirical literature on how families deal with normative and non-normative life transitions across the family life cycle, with discussion of major challenges facing families.

**PSY7908 PSYCHOLOGIE CLINIQUE MULTICULTURELLE / MULTICULTURAL CLINICAL PSYCHOLOGY** (3cr.)
Étude de questions relatives à l'évaluation et au counselling de populations multiculturelles. Aspects théoriques et appliqués du counselling multiculturel. Issues related to the assessment and treatment of multicultural populations. Theoretical frameworks and practical aspects of multicultural counselling.

**PSY7909 EFFETS ET TRAITEMENT PSYCHOLOGIQUES DU TRAUMATISME / PSYCHOLOGICAL EFFECTS AND TREATMENT OF TRAUMA** (3cr.)
Étude des aspects théoriques, empiriques, et cliniques du traumatisme, tel que l’abus physique ou sexuel, le crime violent, la torture, et les expériences de guerre. Les effets de tels traumatismes (ex. le « post-traumatic stress disorder »), l’évaluation de ces effets, et les approches thérapeutiques. Theoretical, empirical, and clinical aspects of traumas such as sexual or physical abuse, violent crime, torture, or war experiences. Effects of trauma, including post-traumatic stress disorder, the assessments of such effects, and methods of treatment.

**PSY7912 SÉMINAIRES DE RECHERCHE EN PSYCHOLOGIE CONTEMPORAINE / RESEARCH SEMINARS IN CONTEMPORARY PSYCHOLOGY** (3cr.)

**PSY7914 SÉMINAIRES EN PSYCHOLOGIE PROFESSIONNELLE / SEMINARS IN PROFESSIONAL PSYCHOLOGY** (3cr.)

**PSY7916 LECTURES DIRIGÉES EN PSYCHOLOGIE I / DIRECTED READINGS IN PSYCHOLOGY I** (3cr.)
Directed readings on selected topics in Psychology. Lectures dirigées sur des thèmes choisis en psychologie.

**PSY7923 THÉRAPIES COMPORTEMENTALES ET COGNITIVES / COGNITIVE AND BEHAVIOUR THERAPIES** (3cr.)

**PSY7967 PSYCOPTHÉRAPIE FAMILIALE / FAMILY PSYCHOTHERAPY** (3cr.)

**PSY7990 SÉMINAIRES EN PSYCHOLOGIE II** (3cr.)

**PSY8916 LECTURES DIRIGÉES EN PSYCHOLOGIE II** (3cr.)
Directed readings on selected topics in Psychology (topic must be different from that of PSY7916). Lectures dirigées sur des thèmes choisis en psychologie (le thème doit être différent de celui traité dans le cours PSY7916).

Practica and Internships
Public Administration

The School of Political Studies located in the Faculty of Social Science offers graduate programs leading to the Master of Arts (MA) and the Doctor of Philosophy (PhD) degrees in Public Administration.

The main objective of the master programs is to provide students with leading-edge theoretical and conceptual knowledge to enable them to understand and analyze public administration, as well as equipping them with the know-how and skills necessary for success in a constantly changing organizational environment. Emphasis is placed on the development of research skills.

The MA program aims to familiarize students with critical methods of knowledge production and to develop their capacity for conducting basic and applied research. Furthermore, they will develop the ability to extract from research the learning necessary for undertaking their responsibilities as public managers and policy analysts.

The PhD program aims to prepare students for academic and research careers. The various components of the doctoral program (courses, comprehensive examination, thesis proposal, thesis and defence) are all designed to develop the student’s capacity for high level independent research in social sciences.

The programs offer two fields or concentrations in public administration: public management and public policy. These fields are not mutually exclusive, but constitute the two main components of public administration studies.

The MA program is offered both full- and part-time, whereas the PhD program is offered full-time only. The programs are offered in French and English and the use of both languages is encouraged. Students can choose the master’s with thesis or the master’s with research paper.

Public Administration is a participating unit in the collaborative programs in Women’s Studies and in Environmental Sustainability (at the master’s level). For more information on this program, see Admission.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).
Programs

Master of Arts Public Administration
Master of Arts Public Administration Specialization in Environmental Sustainability
Master of Arts Public Administration Specialization in Women's Studies
Doctorate in Philosophy Public Administration

Admission

Admission to the graduate program in Public Administration is governed by the general regulations of the FGPS.

To be considered for admission, applicants must hold a master’s degree in Public Administration or in a related discipline with a minimum average of 75% (B+).

An active knowledge of French and English is essential. All students must successfully complete the course PAP8510 (Séminaire de recherche en administration publique I) given in French only and must be able to read texts in French and in English.*

*Students whose first language is other than French or English must provide proof in their application of their level of competence in these languages. The Public Administration Program reserves the right to conduct an interview and to require a test in either language. If a student’s research interests require comprehension of a language other than French or English, the Public Administration Program may require proof of such competency.

In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English.

Transfer from master’s to PhD

Students enrolled in the MA program in public administration who have performed exceptionally well academically, who have demonstrated solid research skills and who are deemed sufficiently mature, may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Successful completion of at least four PAP graduate courses (12 credits) with a minimum average of 85% (A) and with an A+ in at least one of the courses.
- Approval of the Graduate Studies Committee in public administration. The committee makes its decision on the basis of written reports on the student’s maturity and research skills, from the student’s thesis supervisor and from the professors in the courses taken in the master’s program.

The request for transfer must be made during the third session of full-time registration (or equivalent), and the transfer must take place before the end of the fourth session. The Graduate Studies Committee will take into account the student’s grades, thesis plan (or draft plan) and the reports from professors who taught the courses taken at the master’s level. Following the transfer, all of the requirements of the doctoral program must be met. Students who transfer but do not complete the PhD program can however obtain the MA degree provided they meet all of its requirements.

Program Requirements

The program is structured around two fields: public management and public policy. Students must choose one as their major field and the other as their minor field. The choice of major field will be linked to their research interests.

The following requirements must be met:

- 12 compulsory credits: PAP8510, PAP8111, PAP9310 and PAP9311.
- Successful completion of the seminar course PAP9320 (in major field: public management) or of the seminar course PAP9330 (in major field: public policy).
- Successful completion of both comprehensive examinations* (PAP9988 and PAP9989) and of a thesis proposal (PAP9997).
- Presentation and defense of a thesis (PAP9999) based on original research carried out under the direct supervision of a faculty member in the program.

NOTE: Students who have not completed a master’s level course in research methods must register in PAP6103 (3cr.) in addition to the other courses listed above.
* Comprehensive examinations are aimed at demonstrating basic knowledge in both fields. They usually take place towards the end of the third session of registration in the program. To continue in the program, students must pass both comprehensive examinations.

**Duration of program**

The requirements of the program are usually fulfilled within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

**Residence**

All students must complete a minimum of six sessions of full-time registration. In the case of transfer students, the residency period is nine full-time sessions from the date of initial registration in the program.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Social Sciences. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

The thesis examining board may include members who are not part of the TAC.

**Courses**

**PAP6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)**

Expérience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report.

**PAP6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)**

Expérience en milieu de travail. Le stage est évalué P (réussite) / F (échec) par un professeur du programme basé sur l’évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l’étudiant. Préalable : PAP6001. / Experience in a workplace setting. Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Prerequisite: PAP6001.

**PAP6101 GLOBALIZATION AND CONTINENTAL INTEGRATION (3cr.)**

Examination of the impacts of socio-economic, technological and cultural globalization on our systems of governance both internationally and domestically. Analysis of the role of the nation-state in a context of simultaneous decentralization and internationalization, with a particular focus on global institutions and North American integration.

**PAP6102 DEMOCRATIC GOVERNANCE (3cr.)**

This seminar provides an examination of how democratic governments structure their decision-making processes for effectiveness, representation and accountability. A particular focus of this seminar is a critical evaluation of the New Public Management reforms, and an in-depth review of different models of government intervention and policy-making from a comparative perspective.

**PAP6103 RESEARCH METHODS (3cr.)**

Study of different methodological approaches used in public administration, conceptual tools and research methods (discourse analysis, content analysis, quantitative methods (statistics and probability), interview techniques, etc.) necessary for leading-edge research in public management and policy public. Epistemological and ontological questions related to the different approaches. Development of major research paper or thesis proposal.

**PAP6110 THEORIES OF PUBLIC MANAGEMENT (3cr.)**

(Core course for students in the field of public management.) Presentation of major components of public management (managerial roles and functions, planning, organizational cultures, leadership and motivation, human resources management, change management, etc.). Study of the main theoretical approaches in public management, with the aim of relating them critically to one another and undertaking a critical analysis of the methodological and theoretical contributions of the various approaches.

**PAP6111 THEORIES OF PUBLIC POLICY (3cr.)**

(Core course for students in the field of public policy.) Presentation of the different stages of the policy process, notably emergence, development, implementation and evaluation, as well as the influence of institutions, ideas and interests on public policy. The objective is to present the main theoretical approaches (neo-institutionalism, post-positivism, political economy, etc.) with the aim of relating them critically to one another and critically analyzing their methodological and theoretical contributions.
**PAP6120 ETHICS IN THE PUBLIC SECTOR** (3cr.)
Study of the theoretical and empirical issues related to ethics in the public sector, analysis of the literature on the philosophical and political foundations of ethical reflection and the literature on ethics and public administration. Themes addressed include citizenship and democracy, responsibility and accountability, the public interest, contemporary issues in ethics in the public sector and social justice in public decision-making.

**PAP6121 PUBLIC ADMINISTRATION: COORDINATION AND CONSISTENCY** (3cr.)
Examination of the influence of structural and social processes on the theory and practice of public administration. The course will examine the mechanisms and issues of coordination in its multiple forms: multi-level coordination, coordination across the public, private and community sectors, horizontal and vertical coordination. The course will also address the challenges and issues of consistency in the process of public policy development and implementation and will examine a number of cases and international comparisons.

**PAP6122 CULTURE AND POWER IN PUBLIC ORGANIZATIONS** (3cr.)
Informal dimensions of public organizations, including organizational cultures and power relations that mesh with organizational issues. Sociopolitical analysis of organizations to improve understanding of factors of inertia, resistance and blockage that influence, to different degrees, possibilities for innovation and change in public administration.

**PAP6130 SELECTED THEMES IN PUBLIC ADMINISTRATION** (3cr.)

**PAP6980 LECTURE DIRIGÉE / DIRECTED READING** (3cr.)

**PAP7998 PROJET DE THÈSE DE MAÎTRISE / MASTER'S THESIS PROPOSAL**

**PAP7999 THÈSE DE MAÎTRISE / MA THESIS** (12cr.)

**PAP8111 RESEARCH SEMINAR IN PUBLIC ADMINISTRATION II** (3cr.)
Preparation for writing the thesis (including the thesis proposal) in public administration. Continuation of the themes presented in the previous seminar (PAP8110 Séminaire de recherche en administration publique I). Different stages of research in public management and public policy, notably the development of the research question, literature review, theoretical framework, methodological approach and the development of empirical data. Different strategies of knowledge diffusion (conferences, articles, book chapters, etc.) and preparation for the thesis proposal defence. Prerequisite: PAP8110

**PAP8510 SÉMINAIRE DE RECHERCHE EN ADMINISTRATION PUBLIQUE I** (3cr.)
Préparation à la rédaction de la thèse (incluant le projet de thèse) en administration publique. Présentation des dimensions ontologiques (qu’est-ce qui compose le domaine du savoir?) et épistémologique (comment savons-nous ce que nous savons ?) caractérisant la recherche en gestion publique et en politiques publiques. Initiation aux différentes étapes de la production de connaissances (formulation de la problématique de recherche, revue de littérature, cadre théorique, etc.).

**PAP9310 PUBLIC MANAGEMENT** (3cr.)
In-depth study of the field of public management. Presentation of the formal dimensions (direction, organization, budgeting, strategy, planning, control, etc.) and informal dimensions (leadership, motivation, mobilization, organizational culture, coordination, power relations, etc.) in public management. Critical analysis of the principal theoretical approaches and tendencies of public management and their theoretical and methodological contributions.

**PAP9311 PUBLIC POLICY** (3cr.)
In-depth study of the field of public policy. Different stages in the policy process (emergence, development, implementation and evaluation). The objective is to present the main theoretical approaches and tendencies (neo-institutionalism, post-positivism, political economy, etc.), relating them critically to one another and critically analyzing their methodological and theoretical contributions.

**PAP9320 SEMINAR IN MAJOR FIELD: PUBLIC MANAGEMENT** (3cr.)
This course deepens the knowledge acquired in the course PAP9310 Public Management for doctoral candidates with public management as the Major Field.

**PAP9330 SEMINAR IN MAJOR FIELD: PUBLIC POLICY** (3cr.)
This course deepens the knowledge acquired in the course PAP9311 Public Policy for doctoral candidates with public policy as the Major Field.

**PAP9980 LECTURE DIRIGÉE / DIRECTED READING** (3cr.)
Étude indépendante, sous la direction d’un professeur membre du programme. Le sujet et les exigences doivent être approuvés par le directeur des études supérieures. / Independent study under the direction of a faculty member in the program. The topic and requirements must be approved by the director of graduate studies.
Rehabilitation Sciences

The Ph.D. degree in Rehabilitation Sciences (REA) is offered by the School of Rehabilitation Sciences located within the Faculty of Health Sciences. The degree prepares candidates from both professional and research backgrounds for a career involving research in rehabilitation sciences, including issues ranging from basic science questions to psychosocial repercussions of health conditions in a rehabilitation context. PhD graduates will develop independent and collaborative research skills and will be equipped to contribute to the knowledge base that informs the practice of rehabilitation professionals. The program is offered in English and French and students may write examinations, papers and theses in one or the other language.

The PhD program involves three fields of research:

- Impairment and rehabilitation: This field concerns the impact of motor, sensory, cognitive, and mental health impairments on the individual's daily functioning. It includes research on fundamental views of disease and disease etiology as risks factors for eventual difficulties in functioning.
- The environment and rehabilitation: This field focuses on the way social and physical environmental factors can either enable or hinder an individual's functioning.
- Participation in life situations and rehabilitation: This field focuses on how the individual is re-integrated into the community and takes part in life activities while gaining functional autonomy following the onset of disease, disorder, or trauma.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Doctorate in Philosophy Rehabilitation Sciences

Admission

Admission to the PhD program in rehabilitation sciences is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). Applicants must have a master’s degree in Health Sciences or in a related discipline (e.g., education, health administration, psychology) with a minimum average of 75% (B+) calculated in accordance with FGPS guidelines. Proficiency in either English or French is required. Applicants whose first language is neither English nor French should provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the admission section of the general regulations of the FGPS.

Applications are evaluated based on the following criteria:

- Academic performance in previous studies including the official transcripts, research reports, abstracts or any other documents demonstrating research skills;
- At least two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work;
- An up-to-date curriculum vitae including a list of relevant publications;
- Statement of purpose indicating the reasons for PhD study, career goals, interests in the proposed research area;
- Identification of a professor (member of the FGPS) who is willing and available to act as thesis supervisor.

Transfer from Master’s to PhD Program

Students in a Health Sciences research master’s program at the University of Ottawa (for instance, Nursing, Human Kinetics) who have achieved an 80% (A-) average in their last two years of undergraduate studies may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:
Completion of 5 graduate courses (15 credits) with a grade of A- or better in each;
Satisfactory progress in the research program;
Written recommendation from the supervisor and the thesis advisory committee;
Approval by the graduate studies committee.

The transfer must take place within sixteen months of initial registration in the master’s. Following transfer, all the requirements of the doctoral program must be met.

Program Requirements

Degree Requirements

The PhD program in rehabilitation sciences requires successful completion of the following: a minimum of 12 credits and a maximum of 18 credits of coursework, with 9 compulsory credits (REA 7101, REA 7102 and REA 7103) within the School of Rehabilitation Sciences; a comprehensive examination; a thesis proposal; and a thesis. The type and amount of coursework depends on the student’s background (research experience and skills) and chosen field of research.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

Residence

As per FGPS regulations, all students must complete a minimum of six sessions of full-time registration at the beginning of the program. All requests for non-consecutive full-time study sessions will need to be approved by the FGPS. The program is intended for full-time students. In the case of transfer students, the residency period is nine sessions from the initial registration in the master’s program.

Duration of the Program

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Health Sciences. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

In addition to the compulsory REA courses, students must complete an additional three-credit course. It is possible that the chosen course has a prerequisite and this may increase the number of credits required. The additional course or courses can be taken outside of the Faculty of Health Sciences and will be identified by the thesis committee in consultation with the thesis supervisor.

The admission committee can request that the student take an additional 6 credits based on the student’s previous training.

REA 7101 TEAM RESEARCH AND INTERDISCIPLINARY METHODOLOGY (3cr.)
Challenges and solutions of working in interdisciplinary research teams using a patient-centered collaborative approach.

REA 7102 RESEARCH SEMINAR ON INDIVIDUAL FUNCTIONING AND REHABILITATION MODELS (3cr.)
Relevance and discussion of current and past rehabilitation models of individual functioning.

REA 7103 KNOWLEDGE TRANSFER AND EXCHANGE SEMINAR (3cr.)
Theoretical training and practical application of knowledge transfer and exchange principles.

REA 7101 TEAM RESEARCH AND INTERDISCIPLINARY METHODOLOGY (3cr.)
Challenges and solutions of working in interdisciplinary research teams using a patient-centered collaborative approach.
REAA997 PROPOSITION DE THÈSE / THESIS PROPOSAL
La proposition de recherche du candidat doit avoir été soumise et acceptée avant la fin de la sixième session. Les étudiants rédigent leur proposition de thèse sous la supervision du directeur de thèse et la présentent et défendent oralement devant le CCT. Après la soutenance orale de la proposition de thèse, l’étudiant doit obtenir l’approbation déontologique (si requise) avant la collecte des données. La proposition doit normalement être soumise au milieu de la deuxième année, et au plus tard, à la fin de la deuxième année au programme de doctorat. Un étudiant qui échoue à la première tentative de soutenance peut se voir accorder la permission de la répéter une seule fois. L’échec de la deuxième tentative mène à une note NS (non satisfaisant) et au retrait du programme. / The candidate’s research proposal must have been submitted and accepted prior the end of the sixth session. Students write their thesis proposal under the guidance of their thesis supervisor and present and defend it orally before the TAC. After successfully defending the oral thesis proposal, the student must obtain ethics approval (if required) before proceeding to data collection. The proposal will normally have been defended towards the middle of the second year and, at the latest, by the end of that year. A student who is unsuccessful on the first attempt may be allowed to repeat it once. Failure on the second attempt leads to a grade of NS (not satisfactory) and withdrawal from the program.

REAA998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAM
L’examen de synthèse a lieu une fois tous les cours réussis (habituellement à la fin de la première année pour les étudiants détenteurs d’une maîtrise). L’examen de synthèse permet aux étudiants de démêler l’étendue et la profondeur des connaissances acquises lors des cours et de leurs lectures. Il devrait refléter leur capacité à intégrer divers concepts et théories reliés à leur domaine dans le contexte global des sciences de la réadaptation. Cet examen doit être présenté par écrit et soutenu oralement. L’examen doit être complété, au plus tard, avant la fin de la deuxième année suivant l’inscription initiale. Celui-ci comporte une partie écrite et une partie orale. Le CCT en assure l’évaluation. La réussite de l’examen de synthèse est une condition préalable à la présentation et la soutenance de la proposition de thèse. Un étudiant qui échoue à la première tentative à l’examen peut se voir accorder la permission de la répéter une seule fois. L’échec de la deuxième tentative mène à une note NS et au retrait du programme. Il est possible d’obtenir sur le site Web du programme plus de renseignements sur l’examen. / The comprehensive examination takes place after successful completion of coursework (typically by the end of the first year for students admitted with a completed master’s degree). The comprehensive examination allows students to demonstrate the depth and breadth of knowledge gained from readings and coursework, and it should be an indication of their ability to integrate concepts, principles and theories related to their area of interest within the larger context of rehabilitation sciences. In addition, the comprehensive exam requires students to defend their written work orally. It must be completed at the latest within two years of initial registration. It is a two-part examination (written and oral) that is overseen by the TAC. Successful completion of the comprehensive examination is a prerequisite for the presentation and defense of the PhD thesis proposal. A student who is unsuccessful on the first attempt at the comprehensive exam may be allowed to repeat it once. Failure on the second attempt leads to a grade of NS and withdrawal from the program. Details on the examination are available on the program website.

REAA999 THÈSE DE DOCTORAT / PhD THESIS
La thèse constitue une contribution importante aux connaissances dans le domaine traité et est fondée sur des travaux de recherche originaux effectués dans le cadre du programme. La qualité de la thèse doit être telle qu’elle mérite d’être publiée. Elle doit aussi montrer la connaissance détaillée du champ par l’étudiant, ainsi que sa capacité à appliquer la méthodologie appropriée pour répondre à la question de recherche. / The thesis constitutes a significant contribution to knowledge, embodies the results of original investigation and analysis on the part of the student and is of such quality as to merit publication. The thesis demonstrates the student’s detailed understanding of the field of study and the ability to apply appropriate methods to address the research question(s).

Religious Studies

The Department of Classics and Religious Studies offers programs of study leading to the degrees of Master of Arts (MA) in Religious Studies and Doctor of Philosophy (PhD) in Religious Studies.

Objectives and methods

The Department of Classics and Religious Studies (sector: Religious Studies) focuses on the study of the religious phenomenon through teaching and research in the same manner and on the same level as any other category of facts accessible to human experience and observation.

The disciplines that play a role in the study of religions are primarily of a historical, sociological, psychological and anthropological nature. Such a study must take into account the plurality of religious traditions and expressions in society and examine the relationships among them.

Research on the meaning of religious phenomena is accomplished through analysis and comparison of the various means of religious expression, both in the past and present. No tradition is considered normative.

Areas of research

The programs focus on religions in Canada, including Amerindian and Inuit traditions, and on religions in the comparative cultural context as well as religions in the Graeco-Roman World. The comparative cultural approach provides an opportunity to explore religious phenomena across different religious traditions expressly within their specific cultural contexts. The program favours the methods of anthropology, history, psychology and sociology.

The Department participates in collaborative programs in Women’s Studies and in Medieval and Renaissance Studies at the MA level. For more information on these programs, see "Apply now."

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).
Programs

Master of Arts Religious Studies
Master of Arts Religious Studies Specialization in Medieval and Renaissance Studies
Master of Arts Religious Studies Specialization in Women's Studies
Doctorate in Philosophy Religious Studies
Doctorate in Philosophy Religious Studies Specialization in Canadian Studies

Admission

Candidates must have a Master of Arts in Religious Studies or the equivalent, and must meet the requirements of the FGPS. When they apply, candidates must indicate their preferred area of research, consult a full-time professor of the department whom they hope to have as a supervisor, and submit a two-page statement of their doctoral research project.

Official applications should be submitted by the deadlines listed on the website of the Faculty of Graduate and Postdoctoral Studies. Applications received after a deadline will be considered only if positions are available.

All applicants must be able to understand speak and write either English or French proficiently. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

In accordance with the University of Ottawa regulation, assignments, examinations, research papers and theses can be produced in either English or French.

Collaborative programs

The doctoral program in Religious Studies participates in the collaborative program in Canadian Studies at the doctoral level. This program has been established for students wishing to enrich their training in religious studies by including an interdisciplinary component in Canadian studies. The Seminar in Canadian Studies (CDN6910) fits into the departmental course requirements and does not add to the number of courses required for the doctorate in religious studies.

For further details, see the description of the program posted on the FGPS website.

Transfer from master’s to PhD

Students enrolled in the MA program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

- Hold an honours BA in Religious Studies with a minimum average of 8.0 (A-) in the last eight relevant courses of the undergraduate transcript and a minimum of 9.0 (A) in four of these eight courses, or hold a master’s degree in a field other than religious studies;
- Have completed the mandatory MA course SRS5915/5115 and three other MA courses with a minimum grade of A- in two courses and a minimum grade of A in two courses;
- Have completed a 40-page research paper (SRS5999);
- Provide a written recommendation in support of the transfer from the supervisor of the research paper and from the Graduate Studies Committee;
- Provide an agreement on the part of a faculty member of the Religious Studies program to supervise the student’s doctoral thesis.

The transfer must be completed by the end of the fourth session following initial registration in the master’s program. Please note that the minimal admission average requirements for the doctoral program must also be met. Following transfer, all of the usual requirements of the PhD must be met: a total of 30 credits of graduate coursework (MA and PhD combined); the comprehensive exam (SRS9998); and, the thesis (SRS9989).

Program Requirements

The doctoral program consists of 18 credits in courses and directed studies, a comprehensive examination, and the writing and defence of a thesis.

The 18 credits in courses comprise:

SRS8115 SEMINAR IN RELIGIOUS STUDIES (3cr.)
or
SRS8915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)
SRS9528 PROJET DE THÈSE / THESIS PROPOSAL (3cr.)

four graduate courses or directed studies in religious studies (12cr.)

For students in the collaborative program in Canadian Studies, the 18 credits in courses comprise:
SRS8115 SEMINAR IN RELIGIOUS STUDIES (3cr.)
or
SRS9515 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)
SRS9528 PROJET DE THÈSE / THESIS PROPOSAL (3cr.)
CDN6910 SÉMINAIRE EN ÉTUDES CANADIENNES / SEMINAR IN CANADIAN STUDIES (3cr.)
or
CDN6520 SÉMINAIRE SUR LA FRANCOPHONIE CANADIENNE (3cr.)

three graduate courses or directed studies in religious studies (9cr.)

Students who have completed a master’s degree with thesis or the equivalent in terms of research and writing may substitute a three-credit course or directed study for SRS9528.

The Graduate Studies Committee may require additional courses from the student depending on the nature of the research.

**Comprehensive examination**
Students must successfully complete a comprehensive examination in which they demonstrate their knowledge of the general and the specific fields of research to which the doctoral thesis is related. Instructions regarding the examination can be obtained from the Director of Graduate Studies in the department.

After consulting with the research supervisor, the student shall submit a comprehensive examination proposal to the Committee of Studies for approval at least two months before the proposed examination date. After approving the plan, the Committee shall designate two examiners in addition to the research supervisor, taking into account the suggestions of the student, and set the examination date. The department shall forward a written confirmation of the examination date to the student one month in advance. Any student who decides to withdraw must advise the department in writing at least two weeks prior to the date scheduled for the examination.

**Thesis**
After consultation with their research supervisor, students must submit their thesis topic to the Committee of Studies for approval.

Before the end of the second year of studies, the thesis project must be presented for examination and discussion at a colloquium attended by professors and students of the department. After the colloquium, the project must be submitted to the Committee of Studies for approval. Instructions regarding the colloquium and the thesis project can be obtained from the Director of Graduate Studies in the department.

For additional information on deadlines and on the writing, submission, examination, and revision of the thesis, please consult the general regulations of the Faculty of Graduate and Postdoctoral Studies as well as the guide *Preparing a Thesis or a Research Paper*.

**Colloquium**
Participation in the department’s regular research colloquia is compulsory for all registered graduate students.

**Minimum standards**
The passing grade in all courses is C+.

Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

**Residence**
Doctoral students must register for a minimum of six full-time sessions.

**Duration of program**

Students are expected to fulfill all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

**Courses taken outside the department**

Subject to the approval of the director of graduate studies, students registered in a graduate program may receive credit for two graduate courses (equivalent to six credits) taken outside the department.

**Courses**
SRS5101 SECOND TEMPLE JUDAISM (3cr.)
Central questions and recent developments in the study of Judaism in the period of the Second Temple.

SRS5102 PSYCHOANALYSIS AND RELIGION (3cr.)
Psychoanalytic thought relating to religion since the work of Sigmund Freud; therapeutic traditions and theories derived from the writings of Melanie Klein, D.W. Winnicott, W.R.D. Fairbairn and Jacques Lacan.

SRS5103 FREUD, JUNG AND RELIGION (3cr.)
An examination of Sigmund Freud's and Carl Jung's writings pertaining to religion and mythology.

SRS5107 ORIGINS OF CHRISTIANITY (3cr.)
Current questions and recent developments in the study of the origins of Christianity.

SRS5115 SEMINAR IN RELIGIOUS STUDIES (3cr.)
An orientation to the study of religion at an advanced level.

SRS5116 CURRENT APPROACHES TO THE STUDY OF RELIGION (3cr.)
The methodological terrain of the current study of religion: the history, theoretical and methodological contributions, and influence of various approaches.

SRS5305 RELIGION AND SOCIETY IN CROSS-CULTURAL ANALYSIS (3cr.)
Comparative sociological analysis of the relations between religion and society in different cultures and regions.

SRS5320 RELIGION AND ANTHROPOLOGY - SELECTED TOPICS (3cr.)
Major theories and debates in anthropological analyses of religion and the associated methodology of ethnography.

SRS5520 RELIGION ET ANTHROPOLOGIE - THÈMES CHOISIS (3cr.)
Théories et débats à la base des analyses anthropologiques du religieux, et de la méthodologie ethnographique dont elles sont inséparables.

SRS5901 HISTOIRE DES SCIENCES DES RELIGIONS / HISTORY OF RELIGIOUS STUDIES (3cr.)
Analyse historique des théories et des approches méthodologiques de l'étude de la religion; développement institutionnel des sciences des religions.
/ Analysis of theories and methodological approaches in the historical study of religion; the institutional development of religious studies.

SRS5902 TEXTES ET RÉCITS RELIGIEUX / RELIGIOUS TEXTS AND NARRATIVES (3cr.)
Approches actuelles dans l'étude des textes et récits religieux. Études d'aspects tels que l'oralité, l'intertextualité, l'expression, l'aréception et l'idéologie. / Current approaches to the study of religious texts and narratives, exploring such aspects as orality, intertextuality, performance, reception, and ideology.

SRS5903 RITES ET SYMBOLES RELIGIEUX / RELIGIOUS RITES AND SYMBOLS (3cr.)
Approches actuelles dans l'étude des rites et symboles religieux. Étude de la dynamique du symbolisme, de la corporalité, de la communauté, de l'expression et de l'identité. / Current approaches to the study of religious rites and symbols, exploring the dynamics of symbolism, embodiment, performance, community, and identity.

SRS5915 SÉMINAIRE EN SCIENCES DES RELIGIONS / SEMINAR IN RELIGIOUS STUDIES (3cr.)
Introduction approfondie à l'étude savante du religieux. / An orientation to the study of religion at an advanced level.

SRS5918 RELIGION, ART ET CULTURE / RELIGION, ART AND CULTURE (3cr.)
Étude de la représentation du religieux dans les arts (arts visuels, musique, théâtre, littérature, cinéma) ou de la contribution des arts à la religion. / An examination of the representation of religion in the arts (visual art, music, drama, literature, and film) or of the contribution of the arts to religion.

SRS5920 APPROCHES ACTUELLES DANS L'ÉTUDE DE LA RELIGION / CURRENT APPROACHES TO THE STUDY OF RELIGION (3cr.)
Le domaine méthodologique de l'étude contemporaine de la religion, y compris l'historicité, les contributions théoriques ou méthodologiques et l'influence de diverses approches. / The methodological terrain of the current study of religion: the history, theoretical and methodological contributions, and influence of various approaches.

SRS5923 LES DÉÉSSES ET LES FEMMES DANS LE MYTHE ET LE SYMBOLE / GODDESSES AND WOMEN IN MYTH AND SYMBOL (3cr.)
Étude des théoriciens actuels qui fondent leur analyse critique de l'idéologie et de la culture sur les représentations féminines dans l'imagerie religieuse. / An examination of the work of current theorists who make use of female representations in religious imagery for the purpose of critical analysis of ideology and culture.

SRS5924 LE JUDAÏSME DU SECOND TEMPLE / SECOND TEMPLE JUDAISM (3cr.)
Questions essentielles et développements récents dans l'étude du judaïsme du Second Temple. / Central questions and recent developments in the study of Judaism in the period of the Second Temple.

SRS5925 ORIGINES DU CHRISTIANISME / ORIGINS OF CHRISTIANITY (3cr.)
Questions actuelles et développements récents dans l'étude des origines du christianisme. / Current questions and recent developments in the study of the origins of Christianity.
SRS5926 RELIGION DANS L’ANTIQUITÉ TARDIVE / RELIGION IN LATE ANTIQUITY (3cr.)
Étude de la religion dans le monde méditerranéen de l’Antiquité tardive, en particulier des questions de transformation religieuse, de discours, de conflit, de pluralisme et d’identité. / An examination of religion in the Mediterranean world in Late Antiquity, with particular attention to religious transformation, discourse, conflict, pluralism, and identity.

SRS5927 TRADITIONS CHAMANIQUES / SHAMANIC TRADITIONS (3cr.)
Étude anthropologique des visions du monde chamane et des religions utilisant la transe, ainsi que des pratiques rituelles, thérapeutiques ou artistiques qui y sont associées. / Anthropological study of shamanic worldviews and trance-based religions, and the associated ritual, therapeutic and artistic practices they inform.

SRS5928 PROJET DE THÈSE / THESIS PROPOSAL (3cr.)
La planification et réalisation d’une thèse : définition d’un cadre théorique, formulation de la problématique, mise au point de la méthodologie, détermination des hypothèses et de l’argumentation, préparation d’une description détaillée du projet de thèse, présentation du projet dans un colloque, évaluation et approbation déontologiques, planification et exécution de la recherche et de la rédaction. Réservé aux étudiants inscrits à un programme avec thèse. Préalables: SRS5115/SRS5915 ou SRS8115/SRS8915. / The planning and implementation of a thesis: establishing a theoretical framework, formulating the question, refining the methodology, defining the hypotheses and lines of argumentation, preparing a detailed description of the thesis project, presenting the project in a colloquium, obtaining ethics approval, planning and carrying out the research and writing. Restricted to students registered in a program with thesis. Prerequisites: SRS5115/SRS5915 or SRS8115/SRS8915.

SRS5999 MÉMOIRE / RESEARCH PAPER (6cr.)

SRS6100 RELIGION AND LAW (3cr.)
An examination of the ways in which law defines and regulates religion, focusing especially on the treatment of minority religious groups and the concept of religious diversity.

SRS6101 RELIGION AND HUMAN RIGHTS (3cr.)
An examination of the intersection of human rights regimes and the ways in which they define and delimit religion in the context of current issues.

SRS6900 ÉTUDE COMPARATIVE DU RELIGIEUX / COMPARATIVE STUDY OF RELIGION (3cr.)
Étude comparative d’un thème ou d’un aspect du religieux tel qu’il se manifeste dans diverses cultures. / A comparative study of a theme or aspect of religion as manifested in diverse cultures.

SRS6905 RELIGION ET SOCIÉTÉ / RELIGION AND SOCIETY (3cr.)
Étude de diverses perspectives méthodologiques et théoriques s’appliquant à la dynamique entre religion et société. / An examination of the dynamic between religion and society through a variety of theoretical and methodological perspectives.

SRS6906 RELIGION ET PSYCHOLOGIE / RELIGION AND PSYCHOLOGY (3cr.)
Étude de théories psychologiques actuelles telles que la psychologie critique, la psychologie des profondeurs et la psychologie de l’ego, et de leur rapport aux sciences des religions. / An examination of current psychological theories, such as critical psychology, depth psychology, and ego psychology, as they relate to topics in religious studies.

SRS6907 THÉMES CHOISIS EN CHRISTIANISME / SELECTED TOPICS IN CHRISTIANITY (3cr.)
Étude d’un sujet particulier concernant le christianisme, circonscrit dans un cadre temporel, géographique ou thématique. / Examination of a specific topic in Christianity, defined temporally, geographically or thematically.

SRS6915 THÉMES CHOISIS EN HISTOIRE DES RELIGIONS AU CANADA / SELECTED TOPICS IN THE HISTORY OF RELIGIONS IN CANADA (3cr.)
Étude approfondie des aspects particuliers de l’histoire des religions dans un contexte canadien. / An in-depth examination of particular aspects of the history of religions in a Canadian context.

SRS6915 SYSTÈMES RELIGIEUX DES AMÉRindiens ET DES INUIT / AMERINDIAN AND INUIT RELIGIOUS SYSTEMS (3cr.)
Étude de l’expression et de la conceptualisation de la religion chez les Amérindiens et les Inuits. / An examination of the expression and conceptualization of religion in Amerindian and Inuit cultures.

SRS6920 LES RELIGIONS DANS LE CONTEXTE MONDIAL / RELIGIONS IN A GLOBAL CONTEXT (3cr.)
Analyse critique des formes, des concepts et du contenu des religions dans le contexte mondial; théories et débats actuels en sciences des religions. / Critical examination of the forms, concepts, and content of religions in a global context; current theories and discussions in religious studies.

SRS6921 LA RELIGION DANS LE CANADA D’Aujourd’hui / RELIGION IN CONTEMPORARY CANADA (3cr.)
La religion au Canada depuis la Deuxième Guerre mondiale; analyses sociologiques, anthropologiques ou historiques. / Religion in Canada since the Second World War; sociological, anthropological or historical analyses.

SRS6922 THÉMES CHOISIS EN JUDAïSME / SELECTED TOPICS IN JUDAISM (3cr.)
Étude approfondie d’un sujet particulier relevant du judaïsme, depuis les traditions rabbiniques jusqu’à la vie des juifs d’aujourd’hui. / A close examination of a specific topic in Judaism from Rabbinic traditions to contemporary Jewish life.

SRS6923 RELIGIONS DE L’ASIE / RELIGIONS OF ASIA (3cr.)
Étude d’un ou plusieurs systèmes religieux de l’Asie, à partir de théories et méthodes actuelles en sciences des religions, telles que les approches
Social Work

The School of Social Work offers a master’s program (offered in French only) and a doctoral program (PhD) in social work. The School is a member of the Canadian Association for Social Work Education (CASWE) and the MSS program is approved by the Program Accreditation Bureau of that association.

Master’s program

The master’s program in social work offers professional training focused on the analysis of social inequality, minority contexts and the needs and characteristics of the French-speaking population in Ontario.

The aim of the program is to prepare social workers to assume a leadership role in terms of the development, delivery and evaluation of practices and social policies. The program also aims to promote, through social action, the recognition of the rights of marginalized populations or of those living in minority contexts, as well as their access to social services.

The master’s program aims to train “practitioner-researchers” who will acquire analytical and critical thinking related to the practice of social work and the knowledge associated to it.

The School of Social Work aims to achieve these objectives through a research -intervention dynamic in the two following fields of study: family-child and health.

The MSS program consists of two years of training. The first provides students with the theoretical and practical foundations of the social work profession. The second aims to deepen knowledge in one of the two fields of study: health or family - children.
**Doctoral program**

The objective of the PhD program is to train high-calibre researchers or professionals, to provide them with tools to analyze the articulation of the dimensions of micro- and macro intervention practices in social work, and to significantly contribute to the renewal of these practices. Students will acquire critical and in-depth knowledge of social work in its multiple contexts, through scientific reasoning steps to successfully complete the doctoral thesis. The option of completing a practicum in research-intervention is available.

The doctoral program offers two research fields: Health and Family-Childhood.

The compulsory courses of the program are offered in French only. It is possible to take the elective course in French or in English. In accordance with the University of Ottawa regulation, students have a right to produce their work, their thesis, and to answer examination questions in French or in English. If the thesis is written in English, the abstract must be in French and vice versa.

It is recommended that candidates who do not hold a degree in social work complete the practicum in research-intervention during the program.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Social Work
Doctorate in Philosophy Social Work

**Admission**

To be eligible for admission, applicants must:

- hold a master's degree or its equivalent in social work or in a related discipline;
- have a minimum average of 75% (B+) calculated in accordance with FGPS guidelines.

Proficiency in French must be sufficient for taking courses and seminars in French and for reading relevant scholarly literature in French. Language tests may be required with the cost to be covered by the applicants.

The list above specifies the minimum admission requirements. The School of Social Work reserves the right to require additional courses if necessary, depending on the candidate’s background preparation. For instance, in cases where the master’s degree was obtained in another discipline or outside of Canada, master’s-level social work courses may be added to the regular program with a requirement that they be completed during the first two sessions. The specific courses will depend on the student’s academic background and the maximum number will not normally exceed two. In all cases, admission to the doctoral program is conditional on finding a professor willing to supervise the thesis in the proposed research area.

**Program Requirements**

Students must successfully complete the following:

- Four courses (12 credits):
  - Compulsory courses
    - SVS7501 ÉPISTÉMOLOGIE ET SERVICE SOCIAL (3cr.)
    - SVS7502 ÉTUDE AVANCÉE DES THÉORIES ET DES PRATIQUES D'INTERVENTION SOCIALE (3cr.)
    - SVS7590 SÉMINAIRE DE RECHERCHE AVANCE EN SERVICE SOCIAL (3cr.)
  - 1 elective course (3cr.)

  The elective course, which can be in English or French, must be approved by the thesis supervisor and the Graduate Studies Coordinator of the École de service social, and it can be selected from graduate courses at the 6000 level (minimum) offered by the École de service social or by another graduate program.

  Upon receiving approval of the thesis supervisor and the Director of Graduate Studies, students may add SVS9901 PRACTICUM IN RESEARCH INTERVENTION to their program. Details regarding the practicum can be found on the program website.

- SVS9997 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

  Subject to successful completion of the compulsory courses SVS7501, SVS7502, SVS7590 and the elective course, students enrol in the comprehensive examination (SVS9997). Students must demonstrate breadth of knowledge and their ability to deepen and integrate
theories, concepts and thinking on practices in social intervention in their area of interest. The examination consists of two questions, one in general theory and the other directly related to the thesis topic or to the Practicum in research intervention. The written examination must include an extensive bibliography.

Upon successfully completing the written exam, students can proceed to the oral presentation and defence, which takes place before the Thesis Advisory Committee (TAC). In the case of failure, students are entitled to retake the exam once, before the end of the next session. A second failure leads to withdrawal from the program.

Initial registration in SVS9997 occurs in the third session in the program. All requirements of SVS9997 must be met by the end of the fifth session of registration in the program. If not, a grade of NS is attributed. All details regarding the exam are posted on the program website.

- **SVS9997 PROJET DE RECHERCHE / RESEARCH PROJECT**

Upon successfully completing the written exam, students may enroll in the research project (SVS9997). Under the direction of the thesis supervisor, students prepare their research proposal. This is similar to a directed readings course leading to the writing of the proposal. In this document, students describe the theoretical context of the thesis, the research questions, the methodology they will use and the contribution that the thesis will make to the advancement of knowledge. The project must be defended to the satisfaction of the TAC.

Initial registration in SVS9997 occurs no later than the sixth session of registration and is permitted only after successful completion of SVS9997. In the case of failure, the research project can be resubmitted and defended the following session at the latest. A second failure leads to withdrawal from the program. All requirements of SVS9997 must be met by the end of the seventh session of registration in the program. If not, a grade of NS is assigned. The proposal must be successfully completed before submitting it to the Research Ethics Board and before undertaking any independent data collection.

- **SVS9999 THÈSE DE DOCTORAT / PhD THESIS**

Initial registration in SVS9999 occurs no later than the eighth session of registration and is permitted only after successful completion of SVS9997. The doctoral thesis must constitute a significant contribution to knowledge, embody the results of original investigation and analysis on the part of the student and be of such quality as to merit publication. It must show that the student has a profound knowledge of his subject and he used relevant methods to arrive at responses to his research questions.

**Duration of the Program**

Students are expected to fulfill all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Residence**

Students must register full-time for at least six sessions at the beginning of their program. They may be allowed to register part-time after the residency period.

**Minimum Standards**

The minimum passing grade in all doctoral courses is B+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, the comprehensive exam, the thesis, or whose progress is deemed unsatisfactory must withdraw from the program.

**Thesis Advisory Committee**

During the first year of registration, a thesis advisory committee (TAC) is formed for each student.

The Committee’s membership is determined by the thesis supervisor in consultation with the student and must be approved by the Graduate Studies Coordinator of the ÉES. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis preparation. Meetings between the student and thesis committee members will take place at least once per session until the end of the program.

**Courses**

- **SVS5500 FONDEMENTS THÉORIQUES DU SERVICE SOCIAL** (3cr.)
  Examen critique des modèles, théories et paradigmes sous-jacents à la pratique du service social.

- **SVS5501 CHANGEMENT SOCIAL ET SERVICE SOCIAL** (3cr.)
  À partir de certaines grandes théories du changement social, analyse des divers facteurs affectant l'intervention en service social.

- **SVS5502 ANALYSE DES PROBLÈMES SOCIAUX ET PRATIQUE DU SERVICE SOCIAL** (3cr.)
  Genèse et analyse des problèmes sociaux. Implications pour le service social.

- **SVS5510 ANALYSE SOCIOHISTORIQUE DES POLITIQUES SOCIALES ET DU SERVICE SOCIAL AU CANADA** (3cr.)
  Analyse sociohistorique du développement des politiques sociales au Canada ; enjeux philosophiques, idéologiques et déontologiques pour la profession du service social.
SVS5512 ANALYSE COMPARATIVE DES SERVICES SOCIAUX (3cr.)
Étude comparative des divers systèmes de services sociaux aux niveaux national et international.

SVS5330 MÉTHODES D'INTERVENTION EN SERVICE SOCIAL (3cr.)

SVS5331 INTERVENTION AUPRÈS DES INDIVIDUS ET DES FAMILLES (3cr.)
Évaluation des problèmes personnels et interpersonnels; développement d'habiletés et de méthodes d'intervention appropriées.

SVS5332 INTERVENTION AUPRÈS DES GROUPES (3cr.)
Connaissance et appréciation des principaux types d'interventions sociales au niveau des groupes et des réseaux.

SVS5333 INTERVENTION COMMUNAUTAIRE (3cr.)
Intervention communautaire et organisationnelle en service social; émergence historique des modèles d'intervention; mouvements sociaux, bénévolat et entraide.

SVS5334 INTERVENTION INTERCULTURELLE ET SERVICE SOCIAL (3cr.)
À partir d’une compréhension des caractéristiques des diversités culturelles, développement de méthodes d'intervention appropriées.

SVS5335 INTERVENTION FÉMINISTE ET SERVICE SOCIAL (3cr.)
Analyse des approches d'intervention auprès des femmes et applications en service social.

SVS5601 STAGE D'INTERVENTION EN SERVICE SOCIAL (6cr.)
Sous supervision professionnelle, intégration dans la pratique, des attitudes, connaissances, méthodes et habiletés propres à la profession de travail social. Préalables : SVS5530 et SVS5709.

SVS5709 LABORATOIRE DE PRÉPARATION AUX STAGES DE MAÎTRISE (3cr.)
Réflexions sur les liens entre les diverses formes de savoirs sous-tendant la pratique du service social, en tenant compte de problématiques sociales et de contextes organisationnels variés; orientation axée sur la préparation nécessaire pour le stage d'intervention. Préalables : SVS5500 et SVS5510

SVS5710 SÉMINAIRE D'INTÉGRATION THÉORIE-PRATIQUE (3cr.)
Concomitant au stage SVS 5601. Réflexions sur les théories et sur l'éthique de la pratique, dans le contexte de leur application à l'expérience en milieu de stage. Préalables : SVS5530 et SVS5709.

SVS6500 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE DE LA SANTÉ (3cr.)
Analyse de diverses conceptions de la santé / maladie et des liens avec les conditions sociales et les politiques publiques. Étude des enjeux de la « médicalisation / professionnalisation du social » et implications pour l'intervention et la recherche en service social. Préalables : SVS5601 et SVS5710.

SVS6501 PROMOTION DE LA SANTÉ ET PRATIQUES PRÉVENTIVES EN SERVICE SOCIAL (3cr.)
Débat épistémologique entourant les notions de promotion et la prévention; examen critique des pratiques en service social et des programmes en santé et famille-enfance.

SVS6502 POLITIQUES SOCIALES EN SANTÉ ET EN FAMILLE-ENFANCE (3cr.)
Examens des enjeux sous-jacents aux politiques de santé et de famille-enfance : contrôle social, expertise, coûts et bénéfices; évaluation des orientations de ces politiques et des enjeux qui les sous-tendent.

SVS6503 SANTÉ MENTALE ET SOCIÉTÉ (3cr.)
Analyse des liens entre des problématiques de santé mentale et le contexte socioculturel. Étude des diverses perspectives conceptuelles et pratiques en égard à la santé / maladie mentale et implications pour l'intervention en service social.

SVS6504 TOXICOMANIES ET CONTEXTE SOCIAL (3cr.)
Situations de la toxicomanie dans le contexte social, politique et économique actuel; examen des diverses théories explicatives du phénomène et des modèles d'intervention qui s'en dégagent.

SVS6510 MÉTHODES DE RECHERCHE QUALITATIVE ET QUANTITATIVE DANS LE DOMAINE DE LA SANTÉ (3cr.)

SVS6515 PRÉPARATION AU MÉMOIRE DE RECHERCHE (3cr.)
Examen critique de textes et documents dont la liste a été approuvée par la directrice ou le directeur de mémoire. Approfondissement de la problématique et de la méthodologie choisies pour le mémoire. Rédaction d'un travail préparatoire au mémoire. Noté Alpha. Préalables : SVS5600 et SVS5610 ou SVS6700 et SVS6710.

SVS6530 SÉMINAIRE D'INTEGRATION EN RECHERCHE-INTERVENTION (3cr.)
Réflexion globale et systématique sur l'expérience de stage afin de comprendre et d'appliquer les concepts de recherche-intervention. Noté S/NS. Préalables : SVS5600 et SVS5610 ou SVS6700 et SVS6710.

SVS6561 LECTURES DIRIGÉES : DOMAINE SANTÉ (3cr.)
SVS6601 STAGE DE RECHERCHE-INTERVENTION EN MILIEU DE SANTÉ (6cr.)
Suite au choix d’un champ d'intervention relié à la santé, évaluation des compétences mises en pratique en recherche-intervention. Préalables : SVS6500 et SVS6510.

SVS6620 MÉMOIRE DE RECHERCHE : DOMAINE SANTÉ (6cr.)

SVS6700 PROBLÉMATIQUE DE LA PRATIQUE ET DE LA RECHERCHE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
Analyse critique des divers modèles et enjeux de la pratique et de la recherche en famille-enfance, en tenant compte des facteurs structurels en place; liens entre pratique, recherche et idéologie. Préalables : SVS6501 et SVS6510.

SVS6701 MODÈLES CONTEMPORAINS DE PRATIQUE DANS LE DOMAINE FAMILLE-ENFANCE (3cr.)
Étude des grands courants pratiques du service social familial et les présupposés idéologiques qu’ils véhiculent; enjeux pour la clientèle et pertinence pour le milieu francophone.

SVS6703 GÉRONTOLOGIE ET SERVICE SOCIAL (3cr.)
Analyse des enjeux reliés au vieillissement de la population (santé, travail, rôle social et économique, retraite); évaluation des approches d’intervention auprès de cette clientèle.

SVS6704 ENFANCE ET JEUNESSE EN DIFFICULTÉ (3cr.)
Examen des problèmes concernant l’enfance et la jeunesse ainsi que les pratiques aussi bien sociales que pénales qui s’y greffent. Évaluations de ces pratiques.

SVS6705 PROBLÉMATIQUE DE LA VIOLENCE ET INTERVENTION SOCIALE (3cr.)
Examen des enjeux reliés à la violence au sein de la famille, compte tenu des personnes en cause. Stratégies d’intervention et évaluation de celles-ci.

SVS6706 FEMMES, SERVICE SOCIAL ET POLITIQUES SOCIALES (3cr.)
Promotion des femmes en milieu professionnel; impact des politiques sociales sur les femmes; étude des politiques en matière d’emploi : équité salariale, discrimination et harcèlement sexuel.

SVS6707 POPULATIONS AUTOCHTONES ET SERVICE SOCIAL (3cr.)
Examen des problématiques propres à ces populations; stratégies d’intervention appropriées.

SVS6708 ADMINISTRATION DES SERVICES DE SANTÉ ET DE FAMILLE-ENFANCE (3cr.)
Théories et modèles d’organisation et de gestion des organismes de santé et de famille-enfance; planification stratégique, supervision du personnel.

SVS6761 LECTURES DIRIGÉES : DOMAINE FAMILLE-ENFANCE (3cr.)

SVS6801 STAGE DE RECHERCHE-INTERVENTION FAMILLE-ENFANCE (6cr.)
À partir d’une expérience structurée, apprentissage combiné de l’intervention et de la recherche en famille-enfance. Préalables : SVS6700 et SVS6710.

SVS6820 MÉMOIRE DE RECHERCHE : DOMAINE FAMILLE-ENFANCE (6cr.)

SVS7501 ÉPISTÉMOLOGIE ET SERVICE SOCIAL (3cr.)
Étude des principales théories de la connaissance (positivisme, phénoménologie, constructivisme, structuralisme, théories critiques, perspectives postmodernes) et leurs rapports avec le service social comme champ d’intervention et de recherche. Les liens entre les théories de la connaissance et la problématisation des questions de recherche en service social. Réservé aux étudiants de doctorat.

SVS7502 ÉTUDE AVANCÉE DES THÉORIES ET DES PRATIQUES D’INTERVENTION SOCIALE (3cr.)
Étude approfondie et examen critique des outils conceptuels (configuration, champ, monde social, micro-pouvoir, etc.) utiles pour une analyse contextualisée des pratiques d’intervention sociale. Réservé aux étudiants de doctorat.

SVS7590 SÉMINAIRE DE RECHERCHE AVANCÉ EN SERVICE SOCIAL (3cr.)
Habilitations avancées de recherche. Toutes les étapes de la démarche scientifique seront considérées et discutées. En plus de faire une analyse des approches méthodologiques les plus récentes en sciences sociales, le séminaire constituera pour l’étudiant une occasion de réfléchir sur les enjeux d’une démarche interdisciplinaire en service social.

SVS9901 PRACTICUM : RECHERCHE-INTERVENTION / PRACTICUM: RESEARCH INTERVENTION
À partir d’une expérience structurée en recherche-intervention, l’étudiant approfondit ses connaissances de l’organisation des services sociaux, des pratiques d’intervention sociale, des politiques sociales ainsi que de la recherche appliquée dans le domaine d’intérêt visé par sa thèse. Le nombre d’heures du practicum est de 450. Noté S/NS. / A structured experience in research-intervention allowing students to deepen their knowledge of the organization of social services, social intervention practices, social policies as well as of applied research in the field of interest of their thesis. The practicum extends over 450 hours. Graded S/NS. Préalables : SVS7501, SVS7502, SVS7590 et un cours au choix. / Prerequisites: SVS7501, SVS7502, SVS7590 and one elective course.
**Sociology**

The School of Sociological and Anthropological Studies offers the following programs: Master of Arts (MA) and PhD in sociology; Master of Arts (MA) in anthropology. In addition, the School participates in the following collaborative programs: women’s studies (master’s level) and Canadian studies (doctoral level).

The MA in sociology is offered as a full-time and a part-time program, in French and in English. In English, the maximum number of annual admissions is fixed according to the procedure explained in the Admission section below. In accordance with the University of Ottawa regulation, students may write their assignments, research papers, theses and examinations in either English or French.

Two options are available for the master’s program: the MA with thesis and the MA with research paper, to which admissible students may add the co-op option. Students in both options are eligible for admission to the collaborative program in women’s studies. For more information, see the section “Apply for admission.”

The PhD in sociology is offered as a full-time program only, in English and in French. However, both required seminars are offered in French exclusively. The doctoral program aims to train sociologists capable of conducting research on the social relations that define the conditions of existence and the transformations of contemporary societies, while using the most up-to-date theoretical and methodological tools. The program’s two main fields of research are minorities and culture, and political sociology. Students in the doctoral program are eligible for admission to the collaborative program in Canadian studies. For more information, see the section “Apply for admission.”

Professors in the School of Sociological and Anthropological Studies conduct research in a number of areas. For a more complete understanding of the breadth of research being undertaken at the School, students are encouraged to consult the list of professors and their areas of interest, which extend well beyond the fields of research mentioned above.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Sociology

Master of Arts Sociology Specialization in Women’s Studies

Doctorate in Philosophy Sociology

Doctorate in Philosophy Sociology Specialization in Canadian Studies

**Admission**

To be admitted to the PhD program, applicants must hold a master’s degree in sociology (or equivalent) and have an overall average of at least 75% (B+), calculated in accordance with FGPS guidelines. A student who has a master’s degree with the required average in a related discipline may be considered. He or she will be asked to take a number of additional master’s courses. The number of extra courses required is determined by the Graduate Studies Committee, upon examination of each candidate’s file.

Admission to the doctoral program also depends on the possibility of finding a supervisor and a committee specialized in the student’s field of interest.

In addition to transcripts and letters of recommendation, the application for admission to the doctoral program should include a letter that specifies:

- the proposed research area;
- the specific research topic for the doctoral thesis;
- the preferred supervisor;
- the candidate’s language skills (English and French). The applicant must also include a sample of written work.
All students must be able to read and understand texts written in French and in English. Students must indicate in their application the language in which they plan to take the majority of their courses. The School of Sociological and Anthropological Studies reserves the right to require a language test for either language.

For information on fast-tracking from the master’s to the PhD, see below.

**Collaborative programs**

The School of Sociological and Anthropological Studies is one of the participating units in the collaborative program in Canadian studies (PhD level only). This program was created to allow students to enrich their education in sociology by adding the interdisciplinary dimension of Canadian studies. The Canadian studies seminar (CDN6910) is recognized by the School as part of the PhD degree requirements. Students registered in the collaborative program therefore do not have to take any additional courses.

To be accepted into the collaborative program, students must be already registered in at least one graduate course in sociology with Canadian content or must have already passed such a course. The degree of those who successfully complete the interdisciplinary seminar (CDN6910) and a thesis with Canadian content will indicate a “specialization in Canadian studies.” For more information, see the description of the program posted on the FGPS website.

**Fast-track from master’s to PhD**

Students enrolled in the MA program in sociology at the University of Ottawa who meet the condition indicated below may be allowed to transfer to the PhD program without completing the master’s thesis or research paper.

The conditions for transfer are as follows:

- successful completion of at least five graduate courses (15 credits), with a minimum grade of A- in each;
- written approval of the research paper or thesis supervisor as well as members of the thesis committee;
- approval of the Graduate Studies Committee of SSAS. The Committee makes its decision on the basis of written reports on the student’s research skills, from the student’s research paper or thesis supervisor.

The transfer must be requested within 16 months of the student’s initial enrolment in the master’s program and the transfer must be approved before the end of the fourth session such that students register in the PhD program in the fifth session. Following transfer, students must successfully complete four courses (12 credits), in addition to the five courses (15 credits) already completed, the qualifying exams (within 24 months after transfer), the thesis proposal, and the doctoral thesis.

**Program Requirements**

**The requirements of the PhD program are as follows:**

- SOC8510 SÉMINAIRE DE DOCTORAT (3cr.)
- SOC8511 SÉMINAIRE AVANCÉ DE RECHERCHE SOCIOLOGIQUE (3cr.)
- Two elective courses (6 credits) approved by the Graduate Studies Committee.
  - These courses are normally chosen among the graduate courses in sociology, but one of them may be from another discipline.
- SOC9910 EXAMEN DE SYNTHÈSE DE DOCTORAT / PHD COMPREHENSIVE EXAMINATION
- SOC9930 PROJET DE THÈSE DE DOCTORAT / PHD THESIS PROPOSAL
- SOC9999 THÈSE DE DOCTORAT / PHD THESIS

During the first session, a thesis committee (consisting of three members, including the thesis supervisor) is assigned to the candidate. The composition of the committee is confirmed at the end of the first year. This committee (including a fourth member from outside the School) is responsible for approving the thesis proposal and comprehensive exam.

Initial registration in SOC9910 EXAMEN DE SYNTHÈSE DE DOCTORAT / PHD COMPREHENSIVE EXAMINATION occurs in the student’s third session. If a comprehensive exam is failed, it may be rewritten once. A second failure is regarded as final, and the candidate will be withdrawn from the program.

Successful completion of the comprehensive exam is a prerequisite for proceeding to SOC9930 PROJET DE THÈSE DE DOCTORAT / PHD THESIS PROPOSAL. The thesis proposal must be approved by the thesis committee. A student whose proposal is not accepted on the first submission may be allowed to submit it a second time. A student whose proposal is rejected a second time will be withdrawn from the program.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are withdrawn from the program.

**Residence**

The program is intended for full-time students. All students must complete a minimum of six sessions of full-time registration at the beginning of
the program. In the case of students fast-tracking from the master's to the PhD, the minimum residency period is nine sessions, at least six of which must be at the doctoral level.

**Duration of the program**

The program is designed as a four-year program, and students are expected to complete it within four years. All requirements other than the thesis must be fulfilled by the end of the sixth session of registration. The maximum time permitted for completing the program is six years from the date of initial registration in the program, or seven years in the case of students fast-tracking from the master's to the PhD.

**Thesis Advisory Committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2 to 3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Social Sciences. The TAC is responsible for providing guidance to the student throughout the program, including course selection, the comprehensive examination, thesis proposal and thesis defense.

A meeting between the student and the Thesis Advisory Committee takes place at least once per session. The thesis examining board may include members who are not part of the TAC.

**Courses**

**SOC6001 STAGE COOP I / CO-OP WORK TERM I (6cr.)**

Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme selon l'évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l'étudiant. / Experience in a workplace setting, Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : admission au régime coop. / Prerequisite: admission to the coop option.

**SOC6002 STAGE COOP II / CO-OP WORK TERM II (6cr.)**

Expérience en milieu professionnel. Le stage est évalué P (réussite) / F (échec) par un professeur du programme selon l'évaluation fournie par le superviseur du stage et le rapport de stage rédigé par l'étudiant. / Experience in a workplace setting, Graded P (Pass) / F (Fail) by a professor in the program based on the work performance evaluation provided by the workplace supervisor and the student’s work term report. Préalable : SOC6001 / Prerequisite: SOC6001

**SOC6101 RESEARCH DESIGN IN SOCIOLOGY (3cr.)**

Training in advanced sociological research. Topics addressed are: the relationship between theory and empirical research; identification of research problematics and the formulation of research questions; choosing a methodology.

**SOC7101 CITIZENSHIP AND RIGHTS (3cr.)**

Explores relationship between citizenship and rights, focusing on structural and discursive conditions of citizenship and struggles for recognition and equality.

**SOC7102 MIGRATION AND MOBILITY (3cr.)**

Explores different forms of international and internal migration and mobility, as well as the multiple factors that favour, channel, or circumvent the movement of populations.

**SOC7103 SOCIOLOGY OF THE ENVIRONMENT (3cr.)**

Origins of environmental problems and conflicts; social theories of environmental degradation, controversies and disasters; perspectives on human-nature interactions.

**SOC7104 SOCIAL NETWORKS AND SOCIAL RELATIONS (3cr.)**

Fundamental theories, epistemologies, methodologies of sociology of social networks. Operationalization of paradigms used in empirical research and their application in the analysis of different social dynamics.

**SOC7105 SOCIOLOGY OF THE FAMILY (3cr.)**

Sociological analysis of the family; household division of labour; “parenting”; family formation; the life course; intimate relations; family policies.

**SOC7106 THE LIFECOURSE AND GENERATIONS (3cr.)**

Inter-generational dynamics; the life course; social, political, and cultural aspects of youth and life course transitions; life stages as social categories.

**SOC7107 SOCIOLOGY OF RELIGIONS (3cr.)**


**SOC7108 SOCIOLOGY OF HEALTH (3cr.)**

Discussion of significant social factors pertaining to contemporary experiences of health. Analysis of recent principal theoretical and empirical contributions to this domain.
SOC7109 FRANCOPHONIE, LANGUAGE, AND POWER (3cr.)
Analysis of social group relations and linguistic practices relating to cultural affiliations and citizenship. Studies of contemporary research in this domain, particularly on the Francophonie in Canada.

SOC7110 CONTEMPORARY SOCIOLOGICAL THEORIES (3cr.)
In depth examination of the main theoretical currents in sociology.

SOC7112 SELECTED TOPICS IN CONTEMPORARY SOCIOLOGY (3cr.)
In depth examination of an issue or question linked to new trends or research areas in sociology.

SOC7113 SOCIOLOGY OF CULTURE (3cr.)
Critical analysis of the range of sociology of culture theories; exploration of the role of cultural organizations; social movements; globalization of cultural practices.

SOC7114 SOCIAL CHANGE (3cr.)
Analysis of transformations, transitions, emerging social phenomena; social changes (macro and micro). Concepts, theories, case studies.

SOC7120 SOCIOLOGICAL EPISTEMOLOGY (3cr.)
Issues related to the social shaping of science; critical examination of sociological knowledge.

SOC7140 ADVANCED QUANTITATIVE METHODOLOGY (3cr.)
Overview of advanced methods of quantitative analysis of data, including multivariate analysis. Examination of use of these methods in the sociological literature. Application of these methods in a research project; definition of a research question and determination of a theoretical framework, selection of a quantitative approach, research ethics, development of data collection tools, collection of data.

SOC7141 ADVANCED QUALITATIVE METHODOLOGY (3cr.)
Creation of a research project and selection of a fieldwork site appropriate for qualitative methodologies: definition of a research question and determination of a theoretical framework, selection of a qualitative approach, research ethics, development of data collection tools, collection of data, use of data organization software, vertical and horizontal analysis, submission of a final report.

SOC7150 INTERETHNIC RELATIONS: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)
Principal sociological theories in interethnic relations, and the use of these theories in the analysis of the social structure of a number of multiethnic societies, especially Canada.

SOC7151 RESEARCH SEMINAR IN INTERETHNIC RELATIONS (3cr.)
Overview and assessment of the main research findings in the area.

SOC7156 GENDER RELATIONS AND INTERETHNIC RELATIONS (3cr.)
Examination of modes of differentiation according to gender, ethnicity, and race in contemporary societies and of the theoretical linkages among them.

SOC7160 DEVELOPMENT: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)

SOC7161 RESEARCH SEMINAR IN DEVELOPMENT (3cr.)
Evaluation of research in the area.

SOC7166 DEVELOPMENT AND GENDER RELATIONS (3cr.)
Deconstruction of the concepts of gender and development. International power relations and gender. Women in the global South and their theorizing of gender relations.

SOC7170 POLITICAL SOCIOLOGY: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)
In depth examination of the main concepts of political sociology such as power, the state, social classes, civil society, democracy, political space, political culture, and citizenship.

SOC7171 RESEARCH SEMINAR IN POLITICAL SOCIOLOGY (3cr.)
Overview and assessment of the main research findings in the area.

SOC7176 GENDER DIFFERENCES IN POLITICAL SOCIOLOGY (3cr.)
Examination of the notion of gender difference, in relation, for example, to citizenship, the private/public divide, political representation, women's rights, kinship, and power.

SOC7930 LECTURE DIRIGÉE/DIRECTED STUDIES (3cr.)
Courses individuel ayant pour objectif d’approfondir les connaissances de l’étudiant dans un domaine particulier ou de lui permettre de se familiariser avec un nouveau domaine. Le sujet est déterminé et développé en consultation avec le professeur responsable et en conformité avec les directives du département. Le travail remis dans ce cours doit être différent de ce qui a pu être soumis dans d’autres cours, y compris le projet de thèse ou de mémoire, le mémoire ou la thèse. Il y a une limite d’un cours de lectures dirigées par étudiant. Préalable : moyenne de A-, permission du comité des études supérieures en sociologie. / Individual course aimed at deepening a student's knowledge of a particular area or at gaining knowledge of a new area. The topic is selected and developed in consultation with the supervising professor in accordance with
The Department participates in a collaborative program in Medieval and Renaissance Studies at the MA level and in a collaborative program in

**SOC7990 THESIS OR RESEARCH PAPER PROPOSAL**

Rédaction d’un projet de thèse ou de mémoire. Soumission du projet au comité de thèse ou de mémoire. Noté : S (satisfaisant) / NS (non satisfaisant). / Drafting of a thesis or a research paper proposal. Submission of proposal to the thesis or research paper committee. Graded: S (Satisfactory) / NS (Not satisfactory).

**SOC7999 THÈSE DE MAÎTRISE / MASTER’S THESIS**

**SOC8510 SÉMINAIRE DE DOCTORAT** (3cr.)
Le séminaire aborde une thématique sociologique contemporaine qui touche plusieurs champs de la discipline. La thématique est abordée dans ses dimensions théoriques, méthodologiques et/ou épistémologiques de même que par le biais des enjeux de recherche qu'elle soulève. Séminaire s’échelonnant de septembre à avril.

**SOC8511 SÉMINAIRE AVANCÉ DE RECHERCHE SOCIOLOGIQUE** (3cr.)
Le séminaire aborde certaines préoccupations fondamentales de la discipline, dont le raisonnement sociologique et les méthodes de travail essentielles pour mener à bien des recherches doctorales. Il comporte également un travail collectif sur les projets de thèse. Séminaire s’échelonnant de septembre à avril.

**SOC9910 EXAMEN DE SYNTHÈSE DE DOCTORAT / PHD COMPREHENSIVE EXAMINATION**
L'examen de synthèse, administré par un comité d'examen, consiste en un travail écrit portant sur chacune de deux questions qui ciblent des domaines sociologiques distincts. Il comporte également une épreuve orale. L’inscription à SOC9910 se fait normalement à la troisième session. L'examen est noté S/NS. The comprehensive exam, administered by the examination committee, consists of a written essay on each of two questions, which targets distinct sociological domains. It also includes an oral exam. Registration in SOC9910 is normally done in the third session. Graded S/NS.

**SOC9930 PROJET DE THÈSE DE DOCTORAT / PHD THESIS PROPOSAL**
Préparation, supervisée par le directeur ou la directrice de thèse, du projet de thèse, qui doit être approuvé par le comité de thèse. Noté S/NS. / Preparation, under the direction of the thesis supervisor, of the thesis proposal and submission for approval by the thesis committee. Graded S/NS.

**Spanish**

The Department of Modern Languages and Literatures offers the degrees of Master of Arts (MA) and Doctor of Philosophy (PhD) in Spanish.

The objective of the program is to provide advanced training in the literatures and cultures of Spain and Latin America, as well as in Hispanic linguistics, benefiting from the theoretical and comparative research interests of the professors of the department.

For more information, visit the website of the Department of Modern Languages and Literatures.

The Department participates in a collaborative program in Medieval and Renaissance Studies at the MA level and in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see admission requirements.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Master of Arts Spanish
Master of Arts Spanish Specialization in Medieval and Renaissance Studies
Doctorate in Philosophy Spanish
Doctorate in Philosophy Spanish Specialization in Canadian Studies

Admission

Applicants must have an MA in Spanish or equivalent degree, with an average of at least 75 per cent (B+). Applicants are required to submit a short description of their proposed doctoral research project outlining their areas of interest as well as a sample of their graduate written work. Wherever possible, candidates for admission to the program should be interviewed by a professor or professors in the program.

All inquiries should be addressed to the director of graduate studies in Spanish.

Language requirements

In addition to an excellent knowledge of Spanish, all students must meet one of the following requirements:

- Proficiency in English with a good passive knowledge of French.
  OR
- Proficiency in French with a good passive knowledge of English.

Moreover, students need a passive knowledge of any other languages necessary for completion of their thesis research.

Transfer from master’s to PhD

Students registered in the Master of Arts in Spanish at the University of Ottawa who have obtained excellent results may, exceptionally, be admitted into the doctoral program without having completed a master’s thesis. To take advantage of this option, they must:

- Obtain an average of at least 80 per cent (A-) in the five courses of the master’s with thesis option.
  AND
- Obtain the approval of the graduate studies committee. Similar arrangements may be made for students registered in a master of arts in Spanish at another university.

The transfer must take place within sixteen months of initial registration in the master’s. Following the transfer, all the requirements of the doctoral program must be met.

Collaborative programs

The Spanish section of the Department of Modern Languages and Literatures is a participating unit in the collaborative program in Canadian Studies at the PhD level. This program has been established for students wishing to enrich their training in Spanish by including an interdisciplinary component in Canadian Studies. The Seminar in Canadian Studies (CDN 6910) counts for credit towards the PhD in Spanish such that students in the collaborative program are not required to complete an additional course.

To be admitted to the program, students must be registered in or have successfully completed at least one graduate course in Spanish with Canadian content. The mention “Specialization in Canadian Studies” will be added to the diploma of students who pass the CDN6910 seminar and successfully defend a thesis on a Canadian topic in Spanish.

For further details, see the description of this collaborative program on the FGPS website.

Program Requirements

Six 3-credit courses:

- One of these courses must be ESP5901 (or equivalent course determined by the Graduate Studies Committee).
  Since ESP5901 is also compulsory in the MA program, students who have completed their MA in Spanish at the University of Ottawa, or at another institution where they passed an equivalent course, will be required to replace ESP5901 with another graduate course in order to complete the six courses while in the PhD program.
- Students specializing in Peninsular literature and culture will complete at least 6 credits in Spanish American literatures and cultures; and at least 3 credits in Hispanic Linguistics.
- Students specializing in Spanish American literatures and cultures will complete at least 6 credits in Peninsular literature and culture; and at least 3 credits in Hispanic linguistics.
- Students specializing in Hispanic Linguistics will complete at least 6 credits in Hispanic Linguistics, and at least 3 credits in either Peninsular literature and culture or Latin American literatures and cultures.

Courses must be selected from each of the following lists:
Peninsular literature and culture:

ESP5901, ESP5912, ESP5914, ESP5918, ESP5920, ESP5922, ESP5924, ESP5957, ESP7901, ESP7902.

Spanish American literatures and cultures:

ESP5901, ESP5930, ESP5932, ESP5934, ESP5957, ESP7903.

Hispanic Linguistics:

ESP5947, ESP5948, ESP5949, ESP5950, ESP7905, ESP7916, LIN5303, LIN5315, LIN5317, LIN5318, LIN7901, LIN7320, LIN7925.

Additional courses may be required, depending on the student’s background and preparation.

The total number of courses required of students permitted to transfer from MA to PhD without completing the master’s will be 9 (4 at the master’s level and 5 at the PhD level).

The comprehensive examination

The comprehensive examination includes a written and an oral component, must be completed within 18 months of initial registration in the program. Its purpose is to test the candidates’ mastery of their field as well as their knowledge of their research topic.

Thesis

Upon admission, students will be assigned a professor in their area of interest who will act as their academic advisor and will normally become their thesis director. The thesis topic will be determined by the student in consultation with the thesis director and will be related to the latter’s area of expertise. Shortly after successfully completing the comprehensive examination, the student must submit a thesis project for the approval of the thesis committee.

NOTE: All program requirements should normally be completed within four years.

Duration of program

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

Residence

Doctoral candidates who hold a master’s degree or the equivalent must spend at least six sessions in full-time residence. Candidates admitted to a doctoral program who do not hold a master’s degree must spend at least nine sessions in full-time residence. Under special circumstances, arrangements may be made for part-time registration after completion of the residency period.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

Thesis Advisory Committee

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Arts. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

Courses offered in a given year are listed in the Student Handbook (available at the Department). All courses listed, with the exception of ESP 7997, 7999, 9998 and 9999, are worth three credits. They normally require 30 hours of class time and last one session.

All courses are given in Spanish.

ESP5901 MÉTHODOLOGIES DE LA RECHERCHE LITTÉRAIRE ET INTERCULTURELLE / METHODOLOGIES OF LITERARY AND INTERCULTURAL RESEARCH (3cr.)

Survol des fondements théoriques nécessaires pour mener des recherches en littératures et cultures. / Overview of the theoretical basis for research in the fields of literatures and cultures. Exclusion: LCM5901

ESP5912 ASPECTS DE LA LITTÉRATURE ESPAGNOLE I / ASPECTS OF SPANISH LITERATURE I (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5914 ASPECTS DE LA LITTÉRATURE ESPAGNOLE II / ASPECTS OF SPANISH LITERATURE II (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5918 ASPECTS DE LA LITTÉRATURE ESPAGNOLE III / ASPECTS OF SPANISH LITERATURE III (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5920 ASPECTS DE LA LITTÉRATURE ESPAGNOLE IV / ASPECTS OF SPANISH LITERATURE IV (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5922 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICaine I / ASPECTS OF SPANISH-AMERICAN LITERATURE I (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5924 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICaine II / ASPECTS OF SPANISH-AMERICAN LITERATURE II (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5930 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICaine III / ASPECTS OF SPANISH-AMERICAN LITERATURE III (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5932 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICaine IV / ASPECTS OF SPANISH-AMERICAN LITERATURE IV (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5934 ASPECTS DE LA LITTÉRATURE HISPANique I / ASPECTS OF HISPANIC LITERATURE I (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP5947 ASPECTS DE LA LINGUISTIQUE HISPANique I / ASPECTS OF HISPANIC LINGUISTICS I (3cr.)

ESP5948 ASPECTS DE LA LINGUISTIQUE HISPANique II / ASPECTS OF HISPANIC LINGUISTICS II (3cr.)

ESP5949 ASPECTS DE LA LINGUISTIQUE HISPANique III / ASPECTS OF HISPANIC LINGUISTICS III (3cr.)

ESP5950 ASPECTS DE LA LINGUISTIQUE HISPANique IV / ASPECTS OF HISPANIC LINGUISTICS IV (3cr.)

ESP5957 ASPECTS DE LA THÉORIE DE LA LITTÉRATURE I / ASPECTS OF THE THEORY OF LITERATURE I (3cr.)

ESP5962 SÉMINAIRE SPÉCIAL I / SPECIAL SEMINAR I (3cr.)

ESP5963 SÉMINAIRE SPÉCIAL II / SPECIAL SEMINAR II (3cr.)

ESP5972 ÉTUDES DIRIGÉES I / DIRECTED STUDIES I (3cr.)

ESP5974 ÉTUDES DIRIGÉES II / DIRECTED STUDIES II (3cr.)

ESP6972 ÉTUDES DIRIGÉES / DIRECTED STUDIES (3cr.)

ESP7901 ASPECTS DE LA LITTÉRATURE ESPAGNOLE V / ASPECTS OF SPANISH LITERATURE V (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.
ESP7902 ASPECTS DE LA LITTÉRATURE HISPANIQUE II / ASPECTS OF HISPANIC LITERATURE II (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP7903 ASPECTS DE LA LITTÉRATURE HISPANO-AMÉRICAINE V / ASPECTS OF SPANISH-AMERICAN LITERATURE V (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP7905 ASPECTS DE LA LINGUISTIQUE HISPANIQUE / ASPECTS OF HISPANIC LINGUISTICS (3cr.)
Concentration sur des aspects sélectionnés dans des domaines spécifiques. Travaux écrits. / Focus on selected aspects in specific areas. Written assignments.

ESP7916 SÉMINAIRE DE RECHERCHE EN LINGUISTIQUE HISPANIQUE / RESEARCH SEMINAR IN HISPANIC LINGUISTICS (3cr.)
Séminaire de recherche sur certains sujets dans des domaines spécifiques avec accent sur la participation de l’étudiant. Travaux écrits. / Seminars on research topics in specific areas with emphasis on student participation. Written assignments.

ESP7920 SÉMINAIRE SPÉCIAL / SPECIAL SEMINAR (3cr.)
Ce cours offre un code de séminaire flexible pour certains domaines de compétences particuliers des professeurs, surtout les professeurs invités. / This course offers a flexible seminar code for some special areas of expertise of professors, particularly invited professors.

ESP7997 MÉMOIRE DE MAÎTRISE / MA RESEARCH PAPER

ESP7999 THÈSE DE MAÎTRISE / MA THESIS

ESP8910 SÉMINAIRE DE RECHERCHE DOCTORALE / DOCTORAL RESEARCH SEMINAR (3cr.)
Séminaire de recherche sur certains sujets dans des domaines spécifiques avec accent sur la participation de l’étudiant. Travaux écrits. / Seminars on research topics in specific areas with emphasis on student participation. Written assignments.

ESP9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

ESP9999 THÈSE DE DOCTORAT / PhD THESIS
Prérequis : ESP 9998 / Prerequisite: ESP 9998

Depending on their research project, students could take some of the following courses offered by the Department of Linguistics, provided they meet the prerequisites or obtain permission of the instructor.

LIN5303 SOCIOLINGUISTICS I (3cr.)
Survey of recent and classical literature on variationist sociolinguistics, and the development of skills to locate, extract and interpret variable phenomena in spontaneous speech.

LIN5315 PHONOLOGY (3cr.)
Basic phonological concepts; current problems in phonological research; the goals of phonological theory; fundamentals of theoretical and experimental phonology.

LIN5317 SYNTAX I (3cr.)
Current aspects and goals of syntactic research. Development of contemporary syntactic concepts.

LIN5318 SEMANTICS I (3cr.)
Introduction to formal semantics with emphasis on the composition of meaning; research goals in formal semantics and overview of some current research questions.

LIN7320 SECOND LANGUAGE ACQUISITION I (3cr.)
Second language acquisition, concentrating on theoretical, experimental and methodological issues.

LIN7901 PSYCHOLINGUISTIQUE I / PSYCHOLINGUISTICS I (3cr.)

LIN7923 LINGUISTIQUE APPLIQUÉE À L’ENSEIGNEMENT DES LANGUES SECONDES / LINGUISTICS APPLIED TO SECOND LANGUAGE TEACHING (3cr.)

LIN7925 PROBLÈMES THÉORIQUES EN LINGUISTIQUE APPLIQUÉE / THEORITICAL ISSUES IN APPLIED LINGUISTICS (3cr.)
Theology

By virtue of the federation of Saint Paul University with the University of Ottawa, the Faculty of Theology of Saint Paul University offers graduate programs leading to the degrees conferred jointly by the senates of both universities.

Other graduate theology programs within the sole jurisdiction of the Senate of Saint Paul University are also offered; their description and requirements can be found in the calendar of the Faculty of Theology.

The Faculty of Theology offers the following programs whose degrees are conferred jointly by the senates of the University of Ottawa and Saint Paul University:

- Graduate Diploma in Contemplative Theology and Spiritual Mentorship;
- Master of Arts in Theology;
- PhD in Theology;
- Master of Pastoral Theology;
- Doctor of Ministry;
- Master of Religious Education.

Master’s program

The MA program in Theology is intended for candidates who already have a good basic formation in Theology, with courses in various areas of Theology such as systematic theology, history, biblical studies, ethics and spirituality. It is designed to allow these students to gain greater familiarity with the various research methods in Theology, and to begin a specialization in a particular area, while promoting an integration of the theological formation already acquired. The program prepares students to teach at undergraduate level, to undertake doctoral studies in Theology, and to assume diverse leadership responsibilities in institutions or organizations requiring a formation in religious studies or theology.

Doctoral program

The doctoral program in Theology is intended to promote the acquisition of a high level of intellectual autonomy and expertise in an area of research. As well, applicants are expected to contribute to the progress of knowledge in their discipline or area of study by presenting original research in the form of a doctoral dissertation. Moreover, the program aims to form qualified persons for university research and teaching or for other activities that require advanced specialization in our disciplines and areas of study.

Doctoral candidates can best benefit from the resources of the faculty by defining their thesis projects in view of the areas of competence of faculty members.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.

Programs

- Master of Arts Theology
- Doctor of Ministry
- Doctorate in Philosophy Theology

Admission

To be admitted to the PhD program, the candidate must:

- hold an MA(Th) degree from the University of Ottawa/Saint Paul with a minimum 75 per cent (B+) average, or its equivalent;
- have an academic record that gives assurance that he or she is able to succeed and make a personal contribution to the field of theological studies;
- master either English or French and have a passive knowledge (ability to follow lectures and to read) of the other of these languages;
- have a basic knowledge (Level 1 - Introduction) of Hebrew and of Greek, and acquire an intermediate level (level 2) of competence in these two languages before presenting the thesis project, in order to be admitted to the biblical studies stream;
- acquire certain skills necessary for the achievement of the research project (for example, knowledge of a language, basic knowledge of other disciplines), if the Faculty deems this necessary.
- provide two confidential letters of recommendation from professors who have known the applicant and are familiar with the student's work; and
- provide a detailed draft of their proposed research project.
Scholarships and fellowships

Saint Paul University has established a number of fellowships for doctoral students. More information concerning these as well as other forms of financial assistance can be obtained from the Registrar of Saint Paul University.

Graduate courses and seminars in Theology

The annual program consists of three courses and one continuous seminar.

Student transfers from other universities

Students who transfer from other universities may receive credit for work already done, but are normally expected to complete the major part of the requirements for the degree at Saint Paul University. Doctoral candidates transferring from another university to complete their degree at Saint Paul University may be given advanced standing for work and residence already completed elsewhere. However, in all such cases, doctoral candidates must complete at least one year of full-time residence, complete 12 credits in their area of study and pass a preliminary examination at Saint Paul University.

Transfer from master’s to PhD

Students enrolled in the MA program may be allowed to transfer to the PhD program without being required to write a master’s thesis provided they meet the following conditions:

• Achievement of an A- average in the last two years of undergraduate studies;
• Completion of at least four graduate courses (12 credits) with a grade of A- or better in each;
• Satisfactory progress in the thesis program;
• Written recommendation by the supervisor;
• Approval by the graduate studies committee.

The student must request permission to fast-track during the fourth session of registration or earlier and must register in the PhD in the fifth session at the latest. Following the transfer, all of the requirements of the doctoral program must be met.

Program Requirements

Requirements for the PhD program:

• two regular courses (three credits each) directly related to the thesis topic or to be chosen in consultation with the director of Graduate Studies;
• directed reading course (3 credits);
• comprehensive exam;
• the seminar (3 credits);
• submission and defence of a thesis.

Research director

The research director is appointed by the Faculty of Theology before the end of the second session upon consultation with the student.

Comprehensive examination

• The comprehensive examination is intended to verify that candidates have developed a theological culture enabling them to acquire a knowledge and critical judgment in reference to the major questions, the most significant debates and the principal authors, past and present, in their area of study and, more particularly, in the area of their own research.
• THO 9998 is a credited activity which is evaluated upon completion of both a written exam and an oral presentation.
• This examination should take place sometime between the beginning of the third session and the end of the fourth session. It takes place before the presentation of the thesis project.

Refer to the graduate studies procedures manual of the Faculty of Theology for further details on the comprehensive examinations.

Thesis project presentation

The thesis topic must be submitted to the Faculty of Graduate and Postdoctoral Studies for registration after the successful completion of the comprehensive examination.

After the comprehensive examination, upon completion of all course and seminar requirements, and with the approval of the research director, the candidates present their thesis project to professors and graduate students. At this meeting, the candidates present the original hypothesis they have formulated and explain how their project attempts to prove it. The presentation is not perceived as an examination but as an exchange between the participants which may elicit suggestions for improving the project.

Thesis

The candidate must write, submit and successfully defend a thesis of at least 200 pages. The thesis must be a significant contribution to the advancement of knowledge, embody the results of original research and analysis and be of such quality as to be worthy of publication.
At least six copies of the thesis and of a summary not exceeding 350 words must be submitted to the Faculty of Theology.

The thesis is submitted to an examining board of four to seven examiners, at least one of these being chosen outside the University. If the thesis is accepted by this board, the candidate will be called to defend it. The University community and the general public are invited to attend the defence.

**Minimum standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

**Residence**

All students must complete a minimum of six sessions of full-time registration at the beginning of the program.

**Duration of the program**

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

**Thesis advisory committee**

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be from the Faculty of Theology of Saint Paul University. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

**Courses**

**THO6310 THEOLOGICAL HERMENEUTICS** (3cr.)
Principles and history of interpretation in theology. Recent developments and debates. The role of classic texts and the question of historical consciousness.

**THO6317 THE FORMATION OF THE BIBLICAL TEXT** (3cr.)

**THO6318 THE INTERPRETATION OF BIBLICAL TEXTS** (3cr.)
Principles and methods of interpretation. History of interpretation: the Church Fathers, Middle Ages, the Reformation, 19th and 20th centuries.

**THO6333 METHODS AND APPROACHES IN CONTEMPORARY ETHICS** (3cr.)
Hermeneutical questions and methodological foundations of contemporary ethical reflection analysed from a theological perspective.

**THO6334 ISSUES AND DEBATES IN CONTEMPORARY ETHICS** (3cr.)
Analyses, from a theological perspective, of major issues and debates characterizing ethical research in its present context.

**THO6352 STUDIES IN EASTERN CHRISTIANITY** (3cr.)
Investigation of a particular issue, author, or trend related to any aspect of Eastern Christianity not foreseen by the other courses.

**THO6354 RELIGIOUS EXPERIENCE** (3cr.)
Faith and experience. The Mystery of God. Interpretations and expressions of the experience of God.

**THO6355 THEOLOGY AND CULTURE** (3cr.)
The relationship between faith and culture; contemporary issues, questions and challenges. The contextual nature of theology.

**THO6358 SPIRITUALITY: METHODS; RELATIONSHIPS WITH THE HUMAN SCIENCES** (3cr.)
Analysis of the methods used in the theological study of spirituality. Spirituality in relation to the human sciences.

**THO6359 COMPARATIVE STUDY OF SPIRITUAL TRADITIONS** (3cr.)
Comparative theological study of one or more Christian spiritual traditions and one or more spiritual traditions within other religions to highlight their views of the world, human reality and salvation.

**THO6375 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN CHURCH HISTORY** (3cr.)
In-depth reading, analysis and evaluation of key historical source material from the fourth century to the present.

**THO6376 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN SPIRITUALITY** (3cr.)
In-depth reading, analysis and evaluation of basic spiritual classics of Eastern Christianity from the fourth century to the present.
THO6377 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL HISTORY (3cr.)
In-depth reading, analysis and evaluation of basic sources that illustrate the evolution of Eastern Christian worship from the fourth century to the present.

THO6378 RESOURCES AND METHODS FOR THE STUDY OF EASTERN CHRISTIANITY (3cr.)
An examination of various research tools related to Eastern Christianity and religion in general. An overview of key methods in Eastern Christian exegesis, theology, liturgy, spirituality and Church history and their interface with modern and classical Western approaches.

THO6379 ISSUES IN EASTERN CHRISTIAN HERMENEUTICS & EXEGESIS (3cr.)
Study of a particular issue, author, or trend in the hermeneutics and exegesis of the Eastern Churches, e.g. particularities of the Greek, Syriac, or Slavonic versions and their distinctive canons; worship as hermeneutical matrix; scripture and tradition in Eastern Christian reflection; extra-biblical texts; the development of modern Orthodox hermeneutics in dialogue with Western text criticism and methods.

THO6380 PATRICIAN THEOLOGY (3cr.)
Examination of a particular issue, author, or trend in Eastern Patrician theology, e.g. Greek, Byzantine, Syriac, Coptic or Armenian sources; or the twentieth-century neo-patrician synthesis.

THO6381 CONTEMPORARY EASTERN THEOLOGY (3cr.)
Study of a particular issue, author, or trend in contemporary Eastern Christian theology, e.g. modern philosophical theology (for example, sophiology), and systematics and/or moral theology of the Greek, Russian, Ukrainian, Melkite and Romanian schools in particular; or the systematics and/or moral reflection of non-Byzantine theologians.

THO6382 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN THEOLOGY (3cr.)
In-depth reading, analysis and evaluation of basic texts that have helped shape Eastern Christian theology from the third century to the present.

THO6387 ISSUES IN EASTERN CHRISTIAN LITURGICAL HISTORY (3cr.)
Study of a particular issue, author, or trend relating to the history of the Constantinopolitan, Armenian, Alexandrian, West Syrian or East Syrian worship traditions and their offshoots, e.g. historical and structural analyses of Eastern patristic sources, Church Orders, eulogia, typica and other worship books; chant traditions, execution, environment; cultural factors conditioning these traditions.

THO6388 FOUNDATIONAL TEXTS IN EASTERN CHRISTIAN LITURGICAL THEOLOGY (3cr.)
In-depth reading, analysis and evaluation of basic texts from the fourth century to the present.

THO6392 THE HISTORY OF EASTERN CHRISTIAN INSTITUTIONS, MOVEMENTS, PERSONS (3cr.)
Historical analysis of Eastern Christian institutions, movements or persons in the early, "medieval," or modern periods of one or several of the various Eastern Churches, e.g. pre- and post- Nicene developments; Byzantium; pre-Ephesian and pre-Chalcedonian Churches; the Slavic missions and Kyivan Rus'; the Turkocratiea and subsequent liberation; later Rus' Christianity; the Tsarist era; modern persecution; the Eastern Christian "diaspora."

THO6393 METHODOLOGICAL ISSUES IN EASTERN CHURCH HISTORY (3cr.)
Investigation of a particular issue, author, or trend related to the periodization, historiography or methodology in general of Eastern Christian history.

THO6397 FOUNDATIONAL TEXTS IN EAST-WEST ECUMENISM (3cr.)
In-depth reading, analysis and evaluation of key documents that have shaped East-West rapprochement from 1902 to the present.

THO6398 INTER-RELIGIOUS ISSUES AND THE CHRISTIAN EAST (3cr.)
Examination, from the perspective of the Eastern Churches, of a particular issue, author, or trend relating to dialogue between Christianity and other religions, e.g. Islamic-Christian encounters in the Middle-East, the Balkans and the former USSR; Slavic Christian-Jewish interaction; Buddhist-Eastern Christian monastic contacts.

THO6399 METHODOLOGIES IN THEOLOGY (3cr.)
A study of methodologies found in different theological fields. Introduction to the diverse resources available for theological research. Preparation of a master’s research paper.

THO6997 EXAMEN DE SYNTHÈSE DE M.A EN CHRISTIANISME ORIENTAL / MA SYNTHESIS EXAMINATION IN EASTERN CHRISTIAN STUDIES (3cr.)
Un examen oral et écrit pendant lequel l'étudiant devra démontrer son aptitude à faire une réflexion critique sur cinq thèmes (et textes correspondants), ayant une portée particulière pour le christianisme oriental. / A written and oral exercise during which the student is expected to demonstrate the ability to reflect critically on five themes (and concomitant texts) of particular significance to Eastern Christian Studies.

THO6998 MÉMOIRE / RESEARCH PAPER (6cr.)
Le mémoire, d’environ 40 pages, sera évalué par le directeur, qui doit appartenir à la concentration de l’étudiant, et par un autre professeur de la Faculté de théologie. Le mémoire ne peut être déposé qu’après avoir terminé avec succès le cours de méthodologie (THO 6799 ou THO 6778). / The research paper, approximately 40 pages in length, will be evaluated by both the supervisor, who must be from the student's concentration, and another professor from the Faculty of Theology. The submission of the research paper is dependent upon successful completion of the methodology course (THO 6399 or THO 6378).

THO7999 THÈSE DE MAÎTRISE / MASTER'S THESIS
THO9295 DOCTORAL SEMINAR IN THEOLOGY (3cr.)
Organization and composition of a thesis proposal acceptable to the Faculty of theology and the Faculty of Graduate and Postdoctoral Studies. (Graded: S or N/S)

THO9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD PRELIMINARY EXAMINATION

THO9999 THÈSE / THESIS

Translation Studies

The School of Translation and Interpretation (STI) offers graduate programs leading to the degrees of Master of Arts in Translation Studies (MA), Master in Conference Interpreting (MCI) and Doctor of Philosophy (PhD) in Translation Studies.

Master’s program

The master’s program in Translation is intended to develop research capability in various fields of translation, as well as to provide advanced training in areas such as terminology, computerized translation or translation teaching. It is desirable that students have practical experience in translation before entering the program.

This program consists of compulsory and optional seminars and courses, followed by a basic or applied research requirement. It may be undertaken full-time or part-time.

Not all seminars and courses are offered every year. Students will be notified at registration of which ones are available during the current year.

Doctoral program

The primary objective of the doctoral program in translation studies is to produce qualified scholars in the field for academic teaching and research.

The doctoral program will focus on:

- Theories, history and pedagogy of translation as inter-lingual and intercultural communication.
- Lexicology, terminology, and technologies as applied to translation.

Since translation is interdisciplinary, the doctoral program may collaborate with disciplines in other units such as Law, English, Canadian Studies, French, Modern Languages and Literatures, Linguistics, Philosophy, as well as the School of Information Technology and Engineering (SITE). However, the administration of the program is the sole responsibility of the School of Translation and Interpretation.

This full-time program consists of four courses, a comprehensive exam, and a thesis.

The department participates in a collaborative program in Canadian Studies at the PhD level. For more information on this program, see "Admission."

Languages

Most seminars are bilingual, that is, they may be conducted in French or English. The student's research may be conducted not only on French and English, but also on a third language, subject to the conditions stipulated under "Additional Requirements".

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Master of Arts Translation Studies
Master of Arts Translation Studies Concentration in Literary Translation
Doctorate in Philosophy Translation Studies
Doctorate in Philosophy Translation Studies Specialization in Canadian Studies

Admission
MA in Translation Studies or equivalent, with a minimum average of B+ (75%). Applicants are required to submit a one- or two-page summary of their proposed research project. Applicants are also required to respond to a questionnaire concerning their background preparation.

Students with a master's containing a translation component but which is not equivalent to a master's in translation studies may be considered for admission at the master's level, with the possibility of transferring into the doctoral program after four courses, if they obtain an average of A- (80%).

Students registered in the master's program in Translation Studies at the University of Ottawa who have obtained excellent results may exceptionally be admitted into the doctoral program without a master's thesis. Please note that the minimal admission average requirements for the doctoral program must also be met. To take advantage of this option, they must: a) obtain A- average in six master's courses, and b) submit a major research paper of about 30 pages (TRA7998). This paper will be evaluated for research potential by a committee consisting of at least two members of the Faculty of Graduate and Postdoctoral Studies (FGPS). Admission will be dependent on the availability of a thesis supervisor in the applicant's area of research interest.

**Transfer from master's to PhD**

In exceptional circumstances, it is possible to transfer from the MA program at the School of Translation and Interpretation (STI) directly into the PhD program under the following conditions:

- Completion of the 3 mandatory MA courses, plus one more MA course, with a grade of A (85%) in each course;
- Completion of a 40-page research paper (TRA7998) under the supervision of a professor who is the potential PhD thesis supervisor;
- Written recommendation for transfer from the supervisor of the paper and from the Graduate Studies Committee.

The transfer must take place within sixteen months of initial registration in the master's. Students permitted to transfer will complete a total of 8 courses (24 credits), 6 courses while registered in the master's and 2 while registered in the PhD. Following transfer, the following requirements must be met: 2 courses (6 credits), the comprehensive exam, the thesis proposal and the thesis.

**Language requirements**

Students must meet one of the following requirements:

- Proficiency in English and French. Knowledge of a third language will be an asset.
- Proficiency in English and another language. In this case, a good passive knowledge of French is required.
- Proficiency in French and another language. In this case, a good passive knowledge of English is required.

The School of Translation and Interpretation (STI) reserves the right to test the linguistic knowledge of applicants.

**Admission procedure**

Applications for admission are reviewed by the Graduate Studies Committee of the School of Translation and Interpretation, and must also meet the general requirements of the Faculty of Graduate and Postdoctoral Studies of the University. In addition to completing our on-line application and paying the application fee to the Ontario Universities’ Application Centre, students must also assemble all relevant documentation and forward the complete application package to the director of the School of Translation and Interpretation. Applications will not be processed without the application fee and the complete file.

To find the application deadline, please check the “program-specific requirements” under Application Procedures and Information at the following address: www.grad.uottawa.ca/apply.

**Collaborative programs**

The School of Translation and Interpretation is a participating unit in the collaborative program in Canadian Studies (PhD level only). This program has been established for students wishing to enrich their training in Translation by including an interdisciplinary component in Canadian Studies. The Canadian Studies Seminar (CDN 6910) fits into the departmental course requirements and does not add to the number of courses required for the PhD in Translation Studies.

To be admitted to the program, students must be registered in or have successfully completed at least one graduate course in history with Canadian content. The mention “Specialization in Canadian Studies” will be added to the diploma of students who pass the CDN 6910 seminar and successfully defend a thesis on a Canadian topic in Translation.

For further details, see the description for the program posted on the FGPS website.

**Program Requirements**

**Program requirements**

- Four courses (12 credits) of which two are compulsory:
Two other graduate courses related to the student’s fields of interest.

These courses, chosen in consultation with the student’s faculty advisor, may be taken in Translation and/or in other related fields.

NOTE: Upon admission, one or two additional or substitute courses at the 5000 or 6000 level may, at the discretion of the STI, be added to complete the student’s background.

- Comprehensive examination (TRA9998)
- Doctoral thesis (TRA9999)

Transfer from master’s to PhD

The transfer must take place within 16 months of initial registration in the master’s. Students permitted to transfer will complete a total of 8 courses (24 credits): 6 courses while registered in the master’s and 2 while registered in the PhD. Following transfer, the following requirements must be met: 2 courses (6 credits), the comprehensive exam, the thesis proposal and the thesis.

Minimum standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

Residence

Doctoral candidates who hold a master’s degree or the equivalent in the same discipline must spend at least six sessions in full-time residence, at the beginning of their program. Candidates admitted to a doctoral program who do not hold a master’s degree must spend at least nine sessions in full-time residence.

Duration of the program

Students are expected to complete all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program.

Thesis Advisory Committee (TAC)

During the first session of the program, a thesis advisory committee (TAC) is formed for the candidate. The Committee’s membership will be determined by the specific interests of the candidate. It will be composed of the supervisor and 2-3 additional professors. At least one member of the thesis committee, in addition to the supervisor, must be form the Faculty of Arts. The TAC is responsible for guiding the student throughout the program, including course selection, the comprehensive examination, thesis proposal, and thesis defense.

A meeting between the student and the Thesis Advisory Committee will take place at least once per session. The thesis examining board may include members who are not part of the TAC.

Courses

TRA5901 HISTOIRE DE LA TRADUCTION / HISTORY OF TRANSLATION (3cr.)

TRA5902 THÉORIES DE LA TRADUCTION / THEORIES OF TRANSLATION (3cr.)

TRA5903 INFORMATIQUE ET TRADUCTION / COMPUTERS AND TRANSLATION (3cr.)

TRA5905 LEXICOLOGIE, TERMINOLOGIE ET DOCUMENTATION / LEXICOLOGY, TERMINOLOGY AND DOCUMENTATION (3cr.)

TRA5906 LANGUE ET TRADUCTION / LANGUAGE AND TRANSLATION (3cr.)

TRA5909 PÉDAGOGIE DE LA TRADUCTION / DIDACTICS OF TRANSLATOR TRAINING (3cr.)

TRA5912 TRADUCTION LITTÉRAIRE / LITERARY TRANSLATION (3cr.)
TRA5913 ADAPTATION / ADAPTATION (3cr.)

TRA5916 ATELIER DE TRADUCTION I / TRANSLATION WORKSHOP I (3cr.)

TRA5917 ATELIER DE TRADUCTION II / TRANSLATION WORKSHOP II (3cr.)

TRA5918 ATELIER DE TRADUCTION III / TRANSLATION WORKSHOP III (3cr.)

TRA5930 ÉTUDES DIRIGÉES II / GUIDED RESEARCH II (3cr.)

TRA5941 ADVANCED TRANSLATION FROM SPANISH INTO ENGLISH (3cr.)

TRA5942 TRADUCTION AVANCÉE DE L'ESPAGNOL VERS LE FRANÇAIS (3cr.)

TRA6902 DISCOURS ET TRADUCTION / DISCOURSE AND TRANSLATION (3cr.)

TRA6903 TRADUCTION AUTOMATIQUE / MACHINE TRANSLATION (3cr.)
Préalable : TRA 5903 ou permission du professeur. / Prerequisite: TRA 5903 or permission of the professor.

TRA6905 LEXICOLOGIE, TERMINOLOGIE APPLIQUÉE / APPLIED LEXICOLOGY AND TERMINOLOGY (3cr.)
Préalable : TRA 5905 ou permission du professeur. / Prerequisite: TRA 5905 or permission of the professor.

TRA6906 TRADUCTION TECHNIQUE ET SPÉCIALISÉE / TECHNICAL AND OTHER SPECIALIZED TRANSLATION (3cr.)

TRA6907 THÉORIE DE L'INTERPRÉTATION / THEORY OF INTERPRETATION (3cr.)

TRA6908 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)

TRA6911 MÉTHODOLOGIE DE LA RECHERCHE TRADUCTOLOGIQUE / RESEARCH METHODS IN TRANSLATION STUDIES (3cr.)

TRA6920 ÉTUDES DIRIGÉES III / GUIDED RESEARCH III (3cr.)

TRA6930 ÉTUDES DIRIGÉES IV / GUIDED RESEARCH IV (3cr.)

TRA6941 ADVANCED TRANSLATION FROM ENGLISH INTO SPANISH (3cr.)

TRA6942 TRADUCTION AVANCÉE DU FRANÇAIS VERS L'ESPAGNOL (3cr.)

TRA6980 SÉMINAIRE DE RECHERCHE I / RESEARCH SEMINAR I (3cr.)

TRA6981 SÉMINAIRE DE RECHERCHE II / RESEARCH SEMINAR II (3cr.)

TRA6982 SÉMINAIRE DE RECHERCHE III / RESEARCH SEMINAR III (3cr.)

TRA6983 SÉMINAIRE DE RECHERCHE IV / RESEARCH SEMINAR IV (3cr.)

TRA6984 COURANTS ACTUELS EN TRADUCTOLOGIE I / DEVELOPMENTS IN TRANSLATION STUDIES I (3cr.)
Exploration des plus récents développements en traductologie dans la double optique des sciences humaines et des études interculturelles. / An intercultural and humanities-based perspective on contemporary trends in Translation Studies.
TRA6985 COURANTS ACTUELS EN TRADUCTOLOGIE II / DEVELOPMENTS IN TRANSLATION STUDIES II (3cr.)
Perspectives actuelles en études traductologiques : aspects terminologiques, lexicologiques, technologiques et domaines connexes. / Trends in Translation Studies, with a focus on developments in terminology, lexicology, technology and related fields.

TRA7995 TRADUCTION COMMENTÉE / COMMENTED TRANSLATION (6cr.)

TRA7996 FICHIER TERMINOLOGIQUE OU LEXICOGRAPHIQUE COMMENTÉ / COMMENTED TERMINOLOGY OR LEXICOGRAPHY FILE (6cr.)

TRA7997 MÉMOIRE / RESEARCH PAPER (6cr.)
Mémoire d'environ 40 pages portant sur une question choisie en consultation avec le directeur. Noté S/NS par le directeur et un autre professeur du programme. / Research paper approximately 40 pages in length, focusing on a Translation Studies question chosen in consultation with the supervisor. Graded S/NS by the supervisor and another professor in the program.

TRA7998 TRAVAIL DE RECHERCHE / RESEARCH PAPER (6cr.)

TRA7999 RECHERCHE ET THÈSE DE MAÎTRISE / THESIS RESEARCH (MA)

TRA9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

TRA9999 THÈSE DE DOCTORAT / DOCTORAL THESIS

Women's Studies

The Institute of Feminist and Gender Studies offers a masters, a doctorate and a collaborative program (at the master’s level) in women’s studies.

The objective of the MA program in women’s studies is to encourage the acquisition of in-depth, plural, diversified, and heuristic knowledge of the different currents of feminist thought, including theoretical and methodological proposals. The program aims to develop an aptitude for research in the university or the community, while enriching the student’s personal work through the supervised writing of a research paper or thesis.

The primary objective of the Doctoral program is to prepare candidates for a career in teaching and research. The program, however, also prepares candidates for other careers by giving them a comprehensive knowledge in feminist theory, methodology and analysis in a context that highlights the need for scholarship engaged with the realities of an increasingly transnational world. PhD graduates will have acquired and demonstrated their aptitude to produce scholarly work engaged with some of the most urgent issues in the global and local socio-political, cultural and economic landscape while identifying new directions for feminist scholarship and intervention.

The programs offer a specialization in one or the other of the following fields of research:

- Gender, Power and Representations

The field of Gender, Power and Representations examines gendered representations in such domains as literature, arts, communications, history, politics and the law (among others). Such scholarship interrogates commonplace understandings of masculinity and femininity and examines the ways in which sex and gender intersect with race, class, sexuality, ability and age. Focusing on the locations and forms of power with regard to the notions of "sex", "gender", "difference" and interlocking oppressions, this field also examines how these perspectives are created, inscribed, and regulated through various spheres of social and institutional activity in Canada and elsewhere in the world.

- Women, Rights and Citizenship in a Globalized World

The field of Women, Rights and Citizenship in a Globalized World explores scholarly and practice issues related to feminist gendered analyses of globalization and cosmopolitanism, citizenship and development, transnational migrations and activisms, as well as rights, social justice and health in an increasingly globalized world. The field responds to the need to examine the ways in which women are now located in a world characterized by a reordering of economic, political and cultural processes and a reconfiguration of the territorial and discursive boundaries of rights, justice, participation, and collective agency, as well as the implications of the intersections of gender with race, class, and sexuality in such analyses.

The programs are offered full-time and part-time. Courses are offered both in English and in French. In accordance with University of Ottawa regulations, students can write their papers, exams, and theses in the official language of their choice (either English or French). Students are encouraged to acquire at least a passive knowledge of the second official language before graduation.

The programs are governed by the [general regulations](#) of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs
Master of Arts Women's Studies

Doctorate in Philosophy Women's studies

Admission

To be eligible for admission to the PhD program, students must hold a master’s degree (thesis or research paper) in women’s studies or a master’s degree with specialization in women’s studies and have a minimum average of 75% (B+) calculated in accordance with FGPS guidelines. Applicants with a master’s degree in a related discipline may also be considered if the subject of their thesis or research paper is linked to women’s studies and if they possess the theoretical and methodological background necessary for the doctoral program in women’s studies.

Language Requirements

Proficiency in either English or French is required. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

Transfer to the PhD Program

Students enrolled in the MA program in Women’s Studies, whose academic performance is exceptional and who have demonstrated good aptitude for doctoral research (as evaluated by the Women’s Studies Graduate Committee) may be admitted to the PhD program without having to complete their MA. To qualify for transfer to the PhD program, students must have completed four graduate courses (12 credits) including three FEM courses with a minimum average of 80% (A-); have demonstrated potential for doctoral-level research; and have received approval from the Women’s Studies Graduate Committee.

Transfer to the PhD program must take place within the 16 months following initial registration for the master’s degree. Following transfer, students must successfully complete two graduate FEM courses (6 credits), the comprehensive examination (within the 24 months following transfer), the thesis proposal and prepare the doctoral thesis.

The request for transfer must be made during the third session of full-time registration (or equivalent), and the transfer must take place before the end of the fourth session.

The application file must include a curriculum vitae, official transcripts and two letters of recommendation. Applicants must also submit a letter of intent describing their interest in studying in one of the fields of the program, their research interests and their university and practical experience deemed relevant for admission to the program.

Program Requirements

The doctoral program consists of:

Four compulsory courses (12 credits):

FEM5103 FEMINIST METHODOLOGIES (3cr.)
FEM5300 FEMINIST THEORIES (3cr.)

FEM6101 GENDER, POWER AND REPRESENTATIONS (3cr.)

or

FEM6102 WOMEN, RIGHTS AND CITIZENSHIP IN A GLOBALIZED WORLD (3cr.)

FEM8101 SEMINAR IN WOMEN’S STUDIES (3cr.)

Thesis Proposal

FEM9997 PROJET DE THÈSE DE DOCTORAT / DOCTORAL THESIS PROPOSAL

Comprehensive Examination

FEM9998 EXAMEN DE SYNTHÈSE / COMPREHENSIVE EXAMINATION

Ph.D. Thesis
Students who have already taken the compulsory courses (FEM5103 and FEM5300) prior to admission may replace these courses with FEM elective courses or electives from other disciplines. The choice of electives is subject to the approval of the supervisor of Graduate Studies Coordinator or a delegate.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits), the thesis proposal, or whose research progress is deemed unsatisfactory are required to withdraw.

**Residence**

All full-time students must complete a minimum of six sessions of full-time registration. In the case of transfer to the PhD, the residency period for the PhD is nine full-time sessions from the initial registration in the program.

**Duration of the Program**

Students are expected to fulfill all requirements within four years. The maximum time permitted is six years from the date of initial registration in the program, or seven years in the case of the students transferring from the master’s to the doctorate.

**Courses**

**FEM5103 FEMINIST METHODOLOGIES** (3cr.)
Methodologies developed in Women’s Studies. Critical examination from both multidisciplinary and interdisciplinary perspectives. **Prerequisite:** Two undergraduate courses in Women’s Studies or the permission of the supervisor of graduate studies in Women’s Studies.

**FEM5300 FEMINIST THEORIES** (3cr.)
Approaches to contemporary feminist theory. Critical examination from both multidisciplinary and interdisciplinary perspectives. **Prerequisite:** Two undergraduate courses in Women’s Studies or the permission of the supervisor of graduate studies in Women’s Studies.

**FEM6100 SPECIAL TOPICS IN WOMEN’S STUDIES** (3cr.)

**FEM6101 GENDER, POWER AND REPRESENTATIONS** (3cr.)
This course analyses the diverse body of feminist scholarship theorizing conceptions of gender, power and representation. Examining the construction and representation of gender/sex differences, the course explores the power relations inherent in these representations, while also examining how gender roles and expectations are linked to representations of class, race, sexuality, age, nationality and ability. Prerequisites: FEM 5103 and FEM 5300

**FEM6102 WOMEN, RIGHTS AND CITIZENSHIP IN A GLOBALIZED WORLD** (3cr.)
This course examines women’s rights and citizenship; gender and development; and gender, migration and health in the context of globalization. Topics include the following: mainstreaming gender and health development; initiatives bringing feminist Southern voices across the world; health consequences of the massive incorporation of Third World women into a transnational labour force; women’s agency and resistance; social capital and pluralism in health services and health care. Prerequisites: FEM 5103 and FEM 5300

**FEM6103 DIRECTED READINGS** (3cr.)

**FEM6900 THÈMES SPÉCIAUX EN ÉTUDES DES FEMMES / SPECIAL TOPICS IN WOMEN’S STUDIES** (3cr.)

**FEM6997 PROJET DE THÈSE DE MAÎTRISE / MASTER’S THESIS PROPOSAL**
Préalables : FEM 5503, FEM 5700 et 6 crédits de la banque de cours au choix. **Prerequisites:** FEM 5103, FEM 5300 and 6 credit from the list of electives.

**FEM6999 MÉMOIRE / RESEARCH PAPER** (6cr.)
Préalables : FEM 5503, FEM 5700 et 12 cr. de la banque de cours au choix. **Prerequisites:** FEM 5103, FEM 5300 and 12 cr. from the list of electives.

**FEM7999 THÈSE DE MAÎTRISE / MASTER’S THESIS** (12cr.)
Préalable / **Prerequisite:** FEM 6997.

**FEM8101 SEMINAR IN WOMEN’S STUDIES** (3cr.)
This seminar deals with professional development (the preparation of grant applications, conference papers and articles), and reviews the central issues and debates of the discipline. Prerequisites: FEM 5103 and FEM 5300. Reserved for students registered in the PhD program in Women’s Studies.
Within a theological perspective, the program goals are to train students in understanding the nature and dynamics of the contemplative path, to
Admission to the Graduate Diploma Program in Chartered Professional Accountancy is governed by the general regulations of the Faculty of
DCA8396 DOCTORAL DIRECTED STUDIES I
Separation of the spouses with the dissolution of the marriage bond (dissolution of ratified and non-consummated marriages, dissolution in
DCA5133 PROCEDURES I (3cr.)
Supreme authority of the Church: Roman Pontiff, College of Bishops and Ecumenical Council. Synod of Bishops, College of Cardinals, Roman
Students registered in the graduate diploma
DCL5122 STUDIES IN HUMAN RIGHTS II
Examination of the notion of gender difference, in relation, for example, to citizenship, the private/public divide, political representation, women’s rights, kinship,
Social capital and pluralism in health services and health care. Prerequisites: FEM 5103 and FEM 5300
Minimum Standards
Ph.D. Thesis
Language Requirements
Electives
Each year a list of elective courses approved and offered for students in the program will be posted on the program’s website. Graduate courses other than
those posted on the program website may be selected with the approval of the Women’s Studies Graduate Committee.
CRM6367 WOMEN AND CRIMINAL JUSTICE (3cr.)
Women as criminals and victims; the impact of the operation of the criminal justice system on women.
DCL5305 FEMINIST ANALYSIS OF LAW (3cr.)
Exploration of feminist perspectives, theories and themes and the application of these to particular problems or issues. Development of techniques for analyzing
social meaning of law.
DCL5505 ANALYSE FÉMINISTE DU DROIT (3cr.)
Statut juridique, droits et obligations des femmes dans les domaines de la santé, de la famille, du travail, de la criminalité, de la fiscalité, du commerce, etc.
Analyse critique du droit à partir d’une perspective féministe. Étude des différentes théories féministes du droit.
DCL5721 PERSPECTIVES FÉMINISTES DU DROIT (3cr.)
DCL7306 LEGAL PERSPECTIVES ON CYBERFEMINISM (3cr.)
This course analyzes issues relating to application of feminist principles to the legal regulation of communication technologies. Topics covered include the
gendered dynamics of networked capitalist society; women’s relationships with communication technologies; technology’s potential impact on equality for
women; and questions surrounding whether and how to legally regulate communication technologies.
FRA5502 LECTURES FéMINISTES (3cr.)
HIS7331 SEMINAR ON THE HISTORY OF WOMEN AND GENDER (3cr.)
SOC7156 GENDER RELATIONS AND INTERETHNIC RELATIONS (3cr.)
Examination of modes of differentiation according to gender, ethnicity, and race in contemporary societies and of the theoretical linkages among them.
SOC7166 DEVELOPMENT AND GENDER RELATIONS (3cr.)
Deconstruction of the concepts of gender and development. International power relations and gender. Women in the global South and their theorizing of gender relations.
SOC7176 GENDER DIFFERENCES IN POLITICAL SOCIOLOGY (3cr.)
Examination of the notion of gender difference, in relation, for example, to citizenship, the private/public divide, political representation, women’s rights, kinship,
and power.
SRS5106 GODDESSES AND WOMEN IN MYTH AND SYMBOL (3cr.)
SRS5912 LA FEMME ET LA TRADITION CHRÉTIENNE / WOMEN AND THE CHRISTIAN TRADITION (3cr.)
SRS7001 LA RELIGION DANS LA PENSÉE FÉMINISTE CONTEMPORAINE / RELIGION AND CONTEMPORARY FEMINIST
THOUGHT (6cr.)
SVS5535 INTERVENTION FÉMINISTE ET SERVICE SOCIAL (3cr.)
Analyse des approches d'intervention auprès des femmes et applications en service social.
The following courses may be taken if there is a women's studies, gender or feminist perspective to the course content. The approval of the Women's Studies Graduate Studies Coordinator is required prior to registering to the course.

**DCL5121 STUDIES IN HUMAN RIGHTS I** (3cr.)

**DCL5122 STUDIES IN HUMAN RIGHTS II** (3cr.)

**DCL5303 STUDIES IN LEGAL THEORY I** (3cr.)
Survey of current theories of law. May be organized around a particular problem or writer or perspective. May include interdisciplinary materials.

**DCL5731 PROBLÈMES CHOISIS DE DROIT DE LA PERSONNE I** (3cr.)

**EDU6651 ÉDUCATION À LA CITOYENNETÉ** (3cr.)
Études des différentes approches théoriques et pratiques associées à la citoyenneté et leur lien avec les inégalités et la marginalisation sociales.

**HIS7330 SEMINAR ON COMPARATIVE HISTORY** (3cr.)

**HIS7530 SÉMINAIRE EN HISTOIRE COMPARÉE** (3cr.)

**MUS6370 TOPICS IN MUSICOLOGY** (3cr.)

**MUS6930 SÉMINAIRE DE THÉORIE ET D'ANALYSE / SEMINAR IN THEORY AND ANALYSIS** (3cr.)
Graduate Diploma Programs

Auditory-Verbal Studies

(Admissions to this program are temporarily suspended.)

The graduate diploma in Auditory-Verbal Studies program is offered by the Faculty of Health Sciences in conjunction with the Faculty of Graduate and Postdoctoral Studies (FGPS). The program seeks to provide in-depth training beyond what is currently offered through programs in Audiology, Speech-Language Pathology, and Education of Hearing-Impaired Children.

Graduates of the program will acquire a good foundation in the development of spoken communication in children with hearing impairment, and will learn the specialized skills and therapeutic/teaching strategies applied in auditory-verbal practice in clinical, community or school environments.

Teaching and practicum placements will focus on the development of listening and spoken communication from childhood to adolescence.

The graduate diploma operates within the framework of the master’s program in Audiology and Speech-Language Pathology and both are governed by the general regulations of the FGPS, which are posted on the website.

The diploma can be pursued either full- or part-time. The courses are offered in English and in French; the clinical placements may be in either language or in both. In accordance with the University of Ottawa regulation, assignments and examinations can be produced in either English or French.

Programs

Graduate Diploma Auditory-Verbal Studies

Admission

(Admissions to this program are temporarily suspended.)

Admission to the graduate diploma in Auditory-Verbal Studies program is governed by the general regulations of the FGPS.

Applicants must have a master’s degree in Audiology, in Speech-Language Pathology, in Education of children with hearing impairment, or a diploma in the Education of children with hearing impairment.

It is essential to have studied acoustics/speech perception and successfully completed one course in basic concepts in Audiology. Students requiring this course must take it as a co-requisite.

The minimum average for admission is 70% (B), calculated in accordance with FGPS guidelines.

All applicants must be able to understand speak and write proficiently either English or French. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable tests is indicated in the “Admission” section of the general regulations of the FGPS.

Given that the scientific literature in the field is mainly published in English, it is necessary to have at least a passive knowledge of English.

Program Requirements

The graduate diploma in Auditory-Verbal Studies program requires 15 credits, of which 9 are compulsory courses and 6 are practicum placements. If, prior to being admitted, a student has successfully completed one of the diploma courses at the University of Ottawa with “special student” or “out-of-program” status, that course will be recognized in the graduate diploma.

Compulsory courses (9 credits):

AVB6100 FUNDAMENTAL CONCEPTS IN AUDITORY-VERBAL STUDIES (3cr.)
AVB6105 AUDITORY-VERBAL TECHNIQUES AND PROCEDURES I (3cr.)
AVB6110 AUDITORY-VERBAL TECHNIQUES AND PROCEDURES II (3cr.)
Compulsory practica (6 credits):
AVB6900 PRACTICUM I / STAGE I (3cr.)
AVB6905 PRACTICUM II/STAGE II (3cr.)

Duration of the Program

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) or the same course twice are required to withdraw from the program.

Courses

AVB6100 FUNDAMENTAL CONCEPTS IN AUDITORY-VERBAL STUDIES (3cr.)
Foundations of auditory-verbal practice, including its history, philosophy and principles, as a means of facilitating spoken communication in children with hearing loss. Focus on the development of maximal use of residual hearing through the application of technology, the participation of parents as primary language facilitators, and the integration of auditory-verbal techniques and strategies into everyday life. Discussion of the evidence-base for an auditory-based approach to spoken communication development.

AVB6105 AUDITORY-VERBAL TECHNIQUES AND PROCEDURES I (3cr.)
Topics to include diagnostic evaluation and intervention in listening, speech, language, and communication for children with an emphasis on infants and preschool children. Interpretation of the results of formal assessments and identification of goals for intervention. Planning of family-centred auditory and linguistic experiences to facilitate the development of spoken communication. Demonstration of the application of auditory-verbal techniques and strategies in various teaching contexts.

AVB6110 AUDITORY-VERBAL TECHNIQUES AND PROCEDURES II (3cr.)
Topics to include the multidisciplinary assessment of school-age children, educational placement, academic and social functioning. Role of the auditory-verbal therapist in planning and facilitating the participation of children with hearing loss in regular classroom and social settings. Planning of school-based therapy sessions and education of school professionals. Discussion of the application of auditory-verbal therapy techniques with special populations (e.g., children with multiple disabilities and late-implanted adolescents and adults). This course will include problem-based learning through case discussions with a focus on the school-age population. Prerequisite: AVB6105

AVB6900 PRACTICUM I / STAGE I (3cr.)
Stage de 150 heures sous la supervision d’un thérapeute. Accent sur les enfants d’âge préscolaire avec déficience auditive. Ce stage permettra à l’étudiant d’intégrer la théorie et le travail pratique dans le but d’offrir des services en intervention auditive-verbale auprès des jeunes enfants et de leurs familles. Noté S/NS. Préalable: AVB 6100. Under the supervision of an auditory-verbal therapist, students will complete 150 hours of practicum with a focus on preschool age children with hearing impairment. This practicum will allow students to integrate theory and practical skills to provide auditory-verbal intervention services for young children and their families. Graded S/NS. Prerequisite: AVB 6100.

AVB6905 PRACTICUM II /STAGE II (3cr.)
Stage de 150 heures sous la supervision d’un thérapeute. Accent sur les enfants d’âge scolaire avec déficience auditive. Ce stage permettra à l’étudiant d’intégrer la théorie et le travail pratique dans le but d’offrir des services en intervention auditive-verbale en milieu scolaire. Noté S/NS. Under the supervision of an auditory-verbal therapist, students will complete a 150 hours of practicum with a focus on school age children with hearing impairment. This practicum will allow students to integrate theory and practical skills to provide auditory-verbal intervention services in the school environment. Graded S/NS.

Canon Law

The Faculty of Canon Law of Saint Paul University offers programs leading to the Graduate Diplomas in Canon Law (GDCL), in Ecclesiastical Administration (GDEA) and in Canonical Practice (GDCP), and to the Master of Canon Law (MCL) and the Doctor of Philosophy in Canon Law (PhD(CL)). These degrees are conferred jointly by the Senates of the University of Ottawa and Saint Paul University under the terms of the federation agreement between them.

The programs are governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies(FGPS) of the University of Ottawa, which are posted on the FGPS website. The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.

Programs
Graduate Diploma Canon Law
Master of Canon Law
Doctorate in Philosophy Canon Law

Admission

- An honours bachelor's degree or equivalent four years of post-secondary studies with at least a B average.
- At least 18 credits in the theological disciplines either by course work and/or equivalent pastoral experience in keeping with criteria established by the Executive Committee of the Faculty of Canon Law.
- Two (2) letters of recommendation by persons who know the applicant and can attest to the applicant's capacity to pursue graduate study. In addition, a letter of permission from the applicant's bishop (for secular clergy) or superior (for members of institutes of consecrated life or societies of apostolic life).
- A curriculum vitae.
- Excellent knowledge of English or French.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from graduate diploma to master’s

Students registered in the graduate diploma program can request to transfer to the master in canon law (MCL) in accordance with section A.7.1 of the general regulations of the FGPS.

Program Requirements

Courses

The graduate diploma in Canon Law requires 15 credits of courses.

- Compulsory courses (6cr.)
  - DCA5129 GENERAL NORMS (3cr.)
  - One course chosen from among the following:
    - DCA5131 CHRISTIAN FAITHFUL (3cr.)
    - DCA5132 ADMINISTRATIVE INSTITUTES (3cr.)
    - DCA5136 INTRODUCTION TO CANON LAW (3cr.)
- Elective courses (9cr.): These courses are chosen from among the graduate courses taught in the Faculty of Canon Law and approved by the Dean of the Faculty of Canon Law.

Duration of the program

Students may complete the diploma requirements full-time in one session or part-time over the course of one, two, or at most three years.

Minimum standards

The passing grade in all courses is 65% (C+). Students who fail two courses (equivalent to 6 credits) or the same course twice will be withdrawn from the program.

Courses

DCA5103 UNIVERSAL AND SUPRA DIOCESAN CHURCH STRUCTURES (3cr.)
Supreme authority of the Church: Roman Pontiff, College of Bishops and Ecumenical Council. Synod of Bishops, College of Cardinals, Roman Curia, legates. Groupings of particular Churches: ecclesiastical provinces and regions, metropolitans, particular councils (plenary and provincial), conferences of bishops. (cc. 330-367; 431-459)

DCA5127 PARTICULAR CHURCHES (3cr.)

DCA5128 SANCIFYING OFFICE (3cr.)

DCA5129 GENERAL NORMS (3cr.)

DCA5130 MATRIMONIAL LAW (3cr.)

DCA5131 CHRISTIAN FAITHFUL (3cr.)

DCA5132 ADMINISTRATIVE INSTITUTES (3cr.)
General decrees and instructions. Singular administrative acts: singular decrees and precepts, rescripts, privileges, dispensations. Ecclesiastical offices. Presentation and drafting of singular and general decrees, precepts, and rescripts for routine and exceptional matters. Practical application: internal and external diocesan structures, sacraments, finances, civil law. (cc. 29-93, 145-183) [Previously: DCA 5306, DCA 6322]

DCA5133 PROCEDURES I (3cr.)
Trials in general. Competent forum. Different grades and kinds of tribunals: first instance, second instance, tribunals of the Apostolic See. Discipline to be observed in tribunals: duties of judges and tribunal ministers, order of adjudication, time limits and delays, place of the trial, persons to be admitted to the court, manner of preparing and keeping the acts. Parties in a case. Actions and exceptions. Oral contentious process. (cc. 1400-1500, 1656-1677)

DCA5134 EASTERN CANON LAW (3cr.)

DCA5135 MATRIMONIAL JURISPRUDENCE (3cr.)
Study of jurisprudence focusing on the grounds of nullity of matrimonial consent, with special focus on the jurisprudence of the Roman Rota. [Previously: DCA 6321]

DCA5136 INTRODUCTION TO CANON LAW (3cr.)
Methodology for canonical research and writing. History of canonical sources. History of canonical institutions.

DCA5137 TEACHING OFFICE (1.5cr.)

DCA5138 SPECIAL MATRIMONIAL CASES AND PROCEDURES (1.5cr.)
Separation of the spouses with the dissolution of the marriage bond (dissolution of ratified and non-consummated marriages, dissolution in virtue of the Pauline privilege, dissolution in favour of the faith). Separation of the spouses with the bond remaining. Convalidation of marriage. Procedure in presumed death of a spouse. (cc. 1141-1165, 1692-1707) [Previously: DCA 5133]

DCA5203 INSTITUTES OF CONSECRATED LIFE AND SOCIETIES OF APOSTOLIC LIFE (3cr.)
Common norms. Religious institutes: religious houses, governance of institutes, admission of candidates and formation of members, obligations and rights of the institutes and of their members, apostolate of institutes, separation of members from the institute, religious who are bishops, conferences of major superiors. Secular institutes. Societies of apostolic life. (cc. 573-633; 641-717, 719-740, 742-746)

DCA5310 CHURCH LAW AND PASTORAL MINISTRY (3cr.)
Theological reflection on and practical application of Canon Law to some areas of pastoral ministry, specifically marriage and reconciliation.

DCA5396 DIRECTED STUDIES I (3cr.)

DCA5397 DIRECTED STUDIES II (3cr.)

DCA5398 DIRECTED STUDIES III (3cr.)
DCA5401 SELECTED TOPICS IN CANON LAW
Study of a particular topic in Canon Law. Graded S/NS.

DCA5304 COMPARATIVE PARTICULAR LAW (3cr.)
Comparative study of the development of particular canon law at the level of conferences of bishops.

DCA6112 ADMINISTRATIVE PROCEDURES (3cr.)

DCA6113 TEMPORAL GOODS (3cr.)

DCA6114 PROCEDURES II (3cr.)

DCA6115 PENAL LAW (3cr.)

DCA6116 FOUNDATIONS OF CANON LAW (3cr.)
Theology of Law. Philosophy of Law. Elements of Roman Law. Previously: DCA6415

DCA6117 INSTITUTES OF LAW (3cr.)
An introduction to the juridical system of civil law (common law). A comparison of selected themes of civil law to principles established by canon law. An examination of the tension between Church and State, with an analysis of civil law court judgments. Previously: DCA6415.

DCA6301 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6302 SPECIAL PROBLEMS IN CANON LAW II (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6315 LITURGICAL LAW OUTSIDE THE CODE (3cr.)
Selected Praenotanda of liturgical books and post-Code legislation on the Liturgy.

DCA6316 THE LAITY AND THE POWER OF GOVERNANCE IN THE CHURCH (3cr.)
Collaboration of the lay faithful in the exercise of the power of governance: law, theory, and practice.

DCA6321 SEMINAR ON TRIBUNAL PRACTICE (3cr.)

DCA6363 SPECIAL PROBLEMS IN CANON LAW III (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6364 SPECIAL PROBLEMS IN CANON LAW IV (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6365 SPECIAL PROBLEMS IN CANON LAW V (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6366 SPECIAL PROBLEMS IN CANON LAW VI (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCA6367 SPECIAL PROBLEMS IN CANON LAW VII (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.
DCA6395 RESEARCH SEMINAR (3cr.)
Research on a particular canonical subject resulting in its presentation to the seminar group and director, and in submission of a written project.

DCA6396 SELECTED TOPICS IN CANON LAW I (3cr.)

DCA6397 SELECTED TOPICS IN CANON LAW II (3cr.)

DCA6398 SELECTED TOPICS IN CANON LAW III (3cr.)

DCA6921 LATIN CANONIQUE / CANONICAL LATIN (3cr.)
Etude du latin ecclésiastique de niveau avancé. Traduction de textes canoniques: Codex iuris canonici, Codex canonum ecclesiarii orientalium, autres sources canoniques. (Préalables: DCA 5609 ou une connaissance équivalente au jugement du doyen de la Faculté du droit canonique; connaissance passive de l’anglais.) / Advanced level of ecclesiastical Latin. Translation of canonical texts: Codex iuris canonici, Codex canonum ecclesiarii orientalium, other canonical sources. Prerequisite: DCA 5609 or equivalent knowledge in the judgment of the Dean of the Faculty of Canon Law; passive knowledge of French)

DCA6922 STAGE EN MILIEU DE TRAVAIL / FIELD PRACTICUM (3cr.)
Stage supervisé de pratique canonique d’une durée de six semaines (minimum 18 h/semaine) dans un milieu de travail approuvé. L’évaluation de l’étudiant est fondée sur les résultats du rapport écrit et l’évaluation du superviseur de stage. / A six-week (minimum 18 hours per week) of supervised internship in canonical practice at an approved site. Assessment based on a written report as well as the evaluation of the internship supervisor.

DCA6961 VOYAGE DE FORMATION À LA CURIE ROMAINE / STUDY VISIT TO THE ROMAN CURIA (1.5cr.)
Séminaire sur la Curie romaine comprenant des échanges sur les lieux avec le personnel de congrégations romaines, tribunaux et conseils pontificaux. (Prérequis: Connaissance passive de l’anglais). / Seminar on the Roman Curia involving on-site interchange with personnel from a variety of Roman congregations, tribunals, and pontifical councils. Prerequisite: passive knowledge of French)

DCA6962 QUESTIONS SPÉCIALES RELATIVES À LA VIE CONSACRÉE / SPECIAL ISSUES IN CONSECRATED LIFE (1.5cr.)
Séminaire sur des questions juridiques et canoniques concernant la vie consacrée, en particulier dans le contexte canadien. Comprend la session d’été « Formation légale pour le leadership des instituts religieux » et la rédaction d’un travail de recherche. (Inscription limitée. Préalables: DCA 5603, ou connaissances jugées équivalentes par le doyen de la Faculté du droit canonique; connaissance passive de l’anglais). / Seminar on legal and canonical issues concerning consecrated life, especially in the context of Canada. Includes the summer session: “Legal Education for Leadership of Religious Institutes” and the submission of a research paper. (Restrict Registration. Prerequisite: DCA 5603 or equivalent knowledge as determined by the Dean of the Faculty of Canon Law; passive knowledge of French)

DCA8101 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA8175 POWER OF GOVERNANCE (3cr.)
Certain particular or specialized questions related to the concept or to the exercise of power of governance in the Church.

DCA8176 JURISPRUDENCE (3cr.)
Matrimonial or administrative jurisprudence in specialized areas of interest.

DCA8396 DOCTORAL DIRECTED STUDIES I (3cr.)

DCA8397 DOCTORAL DIRECTED STUDIES II (3cr.)

DCA8398 DOCTORAL DIRECTED STUDIES III (3cr.)

DCA8981 LECTURE DE SOURCES CANONIQUES LATINES / READINGS IN LATIN Canonical SOURCES (3cr.)
Interprétation des sources canoniques dans la version originale latine. (Préalables: DCA 6921 ou une connaissance jugée équivalente par le doyen de la Faculté du droit canonique; connaissance passive de l’anglais) / Interpreting canonical sources in the original Latin. (Prerequisites: DCA 6921 or equivalent knowledge in the judgment of the Dean of the Faculty of Canon Law; passive knowledge of French.)

DCA9997 PROJET DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL

DCA9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION

DCA9999 THÈSE DE DOCTORAT / PhD THESIS
**Canonical Practice**

The Graduate Diploma inCanonical Practice (GDCP) aims to provide students with the skills and information needed for various canonical professions.

The graduate diploma program consists of 15 credits of course work.

**Objectives**

The GDCP is open to students who have a degree in canon law or have already completed significant training in canon law and need a specialization to obtain employment in careers involving the practice of canon law. It allows them to acquire or deepen the knowledge and skills required for occupations and professions such as: judge, defender of the bond, promoter of justice, chancery personnel, lawyer, canonical consultant for various religious bodies, etc.

The GDCP is also available as a refresher program for canon lawyers and others who are already employed in the above mentioned positions, and who need updated or additional knowledge and specialized skills in particular areas of canonical practice.

The GDCP is granted jointly by Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The GDCP is offered in both French and English. All compulsory courses are available in each language. Some elective courses may be offered in one language only.

On completion of the diploma, qualified students meeting admission requirements may apply for admission to the master’s in Canon Law program and, on admission, complete the requirements of this program with credit granted for relevant courses already completed in the diploma. The number of credits remaining would be assessed individually.

The diploma operates within the framework of the general regulations of the FGPS, which are available on the Website at the following link:

www.etudesup.uottawa.ca/generalregulations

**Programs**

Graduate Diploma Canonical Practice

**Admission**

**Admission Requirements**

- An honours bachelor’s degree or equivalent four years of post-secondary studies with at least a B average.
- At least 18 credits in the theological disciplines either by course work and/or equivalent pastoral experience in keeping with criteria established by the Executive Committee of the Faculty of Canon Law.
- Two (2) letters of recommendation by persons who know the applicant and can attest to the applicant’s capacity to pursue graduate study. In addition, a letter of permission from the applicant’s bishop (for secular clergy) or superior (for members of institutes of consecrated life or societies of apostolic life).
- A curriculum vitae.
- Excellent knowledge of English or French.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

**Transfer from Graduate Diploma to Master’s**

Students registered in the graduate diploma program can request to transfer to the master in canon law (MCL) in accordance with section A.7.1 of the general regulations of the FGPS.

**Program Requirements**

Requirements for the Diploma in Canonical Practice (15 credits):
Compulsory courses (6cr.) from among the following:

DCA5128 SANCTIFYING OFFICE (3cr.)
DCA5130 MATRIMONIAL LAW (3cr.)
DCA5133 PROCEDURES I (3cr.)
DCA6114 PROCEDURES II (3cr.)

Elective courses (9cr.):

These courses are chosen from among the graduate courses taught in the Faculty of Canon Law and approved by the Dean of the Faculté of Canon Law.

**Duration of the Program**

Students may complete the diploma requirements full-time in one session or part-time over the course of one, two, or at most three years.

**Minimum Standards**

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) or the same course twice are required to withdraw from the program.

**Courses**

**DCA5103 UNIVERSAL AND SUPRA DIOCESAN CHURCH STRUCTURES** (3cr.)
Supreme authority of the Church: Roman Pontiff, College of Bishops and Ecumenical Council. Synod of Bishops, College of Cardinals, Roman Curia, legates. Groupings of particular Churches: ecclesiastical provinces and regions, metropolitans, particular councils (plenary and provincial), conferences of bishops. (cc. 330-367; 431-459)

**DCA5127 PARTICULAR CHURCHES** (3cr.)
Particular Churches. Bishops: bishops in general, diocesan bishops, coadjutor and auxiliary bishops. Impeded and vacant see. Diocesan synod; diocesan curia; vicars general, episcopal vicars, chancellor, finance committee, financial officer; presbyteral council; college of consultants; chapter of canons; pastoral council. Parishes, pastors, parochial vicars. Vicars forane. Rectors of churches. Chaplains. (cc. 368-430; 460-572) [Previously: DCA 5123, DCA 5124]

**DCA5128 SANCTIFYING OFFICE** (3cr.)

**DCA5129 GENERAL NORMS** (3cr.)

**DCA5130 MATRIMONIAL LAW** (3cr.)

**DCA5131 CHRISTIAN FAITHFUL** (3cr.)

**DCA5132 ADMINISTRATIVE INSTITUTES** (3cr.)
General decrees and instructions. Singular administrative acts: singular decrees and precepts, rescripts, privileges, dispensations. Ecclesiastical offices. Presentation and drafting of singular and general decrees, precepts, and rescripts for routine and exceptional matters. Practical application: internal and external diocesan structures, sacraments, finances, civil law. (cc. 29-93, 145-183) [Previously: DCA 5306, DCA 6322]

**DCA5133 PROCEDURES I** (3cr.)
Trials in general. Competent forum. Different grades and kinds of tribunals: first instance, second instance, tribunals of the Apostolic See. Discipline to be observed in tribunals: duties of judges and tribunal ministers, order of adjudication, time limits and delays, place of the trial, persons to be admitted to the court, manner of preparing and keeping the acts. Parties in a case. Actions and exceptions. Oral contentious process. (cc. 1400-1500, 1656-1677)

**DCA5134 EASTERN CANON LAW** (3cr.)
DCA5135 MATRIMONIAL JURISPRUDENCE (3cr.)
Study of jurisprudence focusing on the grounds of nullity of matrimonial consent, with special focus on the jurisprudence of the Roman Rota. [Previously: DCA 6321]

DCA5136 INTRODUCTION TO CANON LAW (3cr.)
Methodology for canonical research and writing. History of canonical sources. History of canonical institutions.

DCA5137 TEACHING OFFICE (1.5cr.)

DCA5138 SPECIAL MATRIMONIAL CASES AND PROCEDURES (1.5cr.)
Separation of the spouses with the dissolution of the marriage bond (dissolution of ratified and non-consummated marriages, dissolution in virtue of the Pauline privilege, dissolution in favour of the faith). Separation of the spouses with the bond remaining. Convalidation of marriage. Procedure in presumed death of a spouse. (cc. 1141-1165, 1692-1707) [Previously: DCA 5133]

DCA5203 INSTITUTES OF CONSECRATED LIFE AND SOCIETIES OF APOSTOLIC LIFE (3cr.)
Common norms. Religious institutes: religious houses, governance of institutes, admission of candidates and formation of members, obligations and rights of the institutes and of their members, apostolate of institutes, separation of members from the institute, religious who are bishops, conferences of major superiors. Secular institutes. Societies of apostolic life. (cc. 573-633; 641-717, 719-740, 742-746)

DCA5310 CHURCH LAW AND PASTORAL MINISTRY (3cr.)
Theological reflection on and practical application of Canon Law to some areas of pastoral ministry, specifically marriage and reconciliation.

DCA5396 DIRECTED STUDIES I (3cr.)

DCA5397 DIRECTED STUDIES II (3cr.)

DCA5398 DIRECTED STUDIES III (3cr.)

DCA5401 SELECTED TOPICS IN CANON LAW
Study of a particular topic in Canon Law. Graded S/NS.

DCA5304 COMPARATIVE PARTICULAR LAW (3cr.)
Comparative study of the development of particular canon law at the level of conferences of bishops.

DCA6112 ADMINISTRATIVE PROCEDURES (3cr.)

DCA6113 TEMPORAL GOODS (3cr.)

DCA6114 PROCEDURES II (3cr.)

DCA6115 PENAL LAW (3cr.)

DCA6301 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6302 SPECIAL PROBLEMS IN CANON LAW II (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6315 LITURGICAL LAW OUTSIDE THE CODE (3cr.)
Selected Praenotanda of liturgical books and post- Code legislation on the Liturgy.

DCA6316 THE LAITY AND THE POWER OF GOVERNANCE IN THE CHURCH (3cr.)
Collaboration of the lay faithful in the exercise of the power of governance: law, theory, and practice.

**DCA6321 SEMINAR ON TRIBUNAL PRACTICE** (3cr.)

**DCA6363 SPECIAL PROBLEMS IN CANON LAW III** (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

**DCA6364 SPECIAL PROBLEMS IN CANON LAW IV** (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

**DCA6365 SPECIAL PROBLEMS IN CANON LAW V** (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

**DCA6366 SPECIAL PROBLEMS IN CANON LAW VI** (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

**DCA6367 SPECIAL PROBLEMS IN CANON LAW VII** (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

**DCA6395 RESEARCH SEMINAR** (3cr.)
Research on a particular canonical subject resulting in its presentation to the seminar group and director, and in submission of a written project.

**DCA6396 SELECTED TOPICS IN CANON LAW I** (3cr.)

**DCA6397 SELECTED TOPICS IN CANON LAW II** (3cr.)

**DCA6398 SELECTED TOPICS IN CANON LAW III** (3cr.)

**DCA6921 LATIN CANONIQUE / CANONICAL LATIN** (3cr.)
Etude du latin ecclésiastique de niveau avancé. Traduction de textes canoniques: Codex iuris canonici, Codex canonum ecclesiarem orientalium, autres sources canoniques. (Préalables : DCA 3509 ou une connaissance équivalente au jugement du doyen de la Faculté du droit canonique ; connaissance passive de l’anglais.) / Advanced level of ecclesiastical Latin. Translation of canonical texts: Codex iuris canonici, Codex canonum ecclesiarem orientalium, other canonical sources. Prerequisite: DCA 3109 or equivalent knowledge in the judgment of the Dean of the Faculty of Canon Law; passive knowledge of French)

**DCA6922 STAGE EN MILIEU DE TRAVAIL / FIELD PRACTICUM** (3cr.)
Stage supervisé de pratique canonique d’une durée de six semaines (minimum 18 h/semaine) dans un milieu de travail approuvé. L’évaluation de l’étudiant est fondée sur les résultats du rapport écrit et l’évaluation du superviseur de stage. / A six-week (minimum 18 hours per week) of supervised internship in canonical practice at an approved site. Assessment based on a written report as well as the evaluation of the internship supervisor.

**DCA6961 VOYAGE DE FORMATION À LA CURIE ROMAINE / STUDY VISIT TO THE ROMAN CURIA** (1.5cr.)
Séminaire sur la Curie romaine comprenant des échanges sur les lieux avec le personnel de congrégations romaines, tribunaux et conseils pontifical. (Prérequis : Connaissance passive de l’anglais). / Seminar on the Roman Curia involving on-site interchange with personnel from a variety of Roman congregations, tribunals, and pontifical councils. Prerequisite: passive knowledge of French)

**DCA6962 QUESTIONS SPÉCIALES RELATIVES À LA VIE CONSECRÉE / SPECIAL ISSUES IN CONSECRATED LIFE** (1.5cr.)
Séminaire sur des questions juridiques et canoniques concernant la vie consacrée, en particulier dans le contexte canadien. Comprend la session d’été « Formation légale pour le leadership des instituts religieux » et la rédaction d’un travail de recherche. (Inscription limitée. Préalables: DCA 5603, ou connaissances jugées équivalentes par le doyen de la Faculté du droit canonique ; connaissance passive de l’anglais.) / Seminar on legal and canonical issues concerning consecrated life, especially in the context of Canada. Includes the summer session: “Legal Education for Leadership of Religious Institutes” and the submission of a research paper. (Restricted Registration. Prerequisite: DCA 5203 or equivalent knowledge as determined by the Dean of the Faculty of Canon Law; passive knowledge of French)

**DCA8101 SPECIAL PROBLEMS IN CANON LAW I** (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

**DCA8175 POWER OF GOVERNANCE** (3cr.)
Certain particular or specialized questions related to the concept or to the exercise of power of governance in the Church.
**Chartered Professional Accountancy**

**Note:** The graduate diploma in Chartered Professional Accountancy will begin in September 2017.

The Chartered Professional Accountant (CPA) designation emerged from the unification of the accounting profession in Canada. Following this merger, CPA Canada developed the CPA professional education program (PEP) that provincial accounting institutes have the responsibility to deliver. CPA Ontario offers Canadian universities the opportunity to offer graduate programs designed to cover some or all of the CPA PEP.

This program is a direct-entry graduate diploma and should be viewed as a continuation of the Specialization in Accounting of the Bachelor of Commerce already offered by the Telfer School. Together, the Specialization in Accounting and this diploma satisfy the requirements of the Chartered Professional Accountant Competency Map established by CPA Canada. This graduate diploma in chartered professional accountancy prepares candidates to enter into the capstone modules of the CPA PEP.

The diploma addresses advanced competencies in financial accounting, strategy and governance, management accounting, audit and assurance, finance and taxation, mostly for non-routine and complex transactions not covered at the undergraduate level. It also has a greater focus on enabling competencies related to professional and ethical behaviour, problem solving and decision making, communication, self-management, and teamwork and leadership.

**Programs**

Graduate Diploma Chartered Professional Accountancy

**Admission**

Admission to the Graduate Diploma Program in Chartered Professional Accountancy is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

To be admitted into the graduate diploma program candidates must:

- have completed a Canadian bachelor’s degree with a minimum admission average of 6.0 or B (70%), calculated in accordance with Graduate studies guidelines;
- have achieved a minimum grade of C (60%) in each of the 24 undergraduate courses listed below or their equivalent;
- have achieved a minimum GPA of B+ (75%) for these 24 courses.
  - ADM1340/1740 Financial Accounting/Comptabilité financière
  - ADM2303/2703 Statistics for Management/Les statistiques en gestion
  - ADM2304/2704 Applications of Statistical Methods in Business/Applications des méthodes statistiques en gestion

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DCA8176 JURISPRUDENCE (3cr.)
Matrimonial or administrative jurisprudence in specialized areas of interest.

DCA8396 DOCTORAL DIRECTED STUDIES I (3cr.)

DCA8397 DOCTORAL DIRECTED STUDIES II (3cr.)

DCA8398 DOCTORAL DIRECTED STUDIES III (3cr.)

DCA8981 LECTURE DE SOURCES CANONIQUES LATINES / READINGS IN LATIN CANONICAL SOURCES (3cr.)
Interprétation des sources canoniques dans la version originale latine. (Préalables: DCA 6921 ou une connaissance jugée équivalente par le doyen de la Faculté du droit canonique; connaissance passive de l’anglais) / Interpreting canonical sources in the original Latin.(Prerequisites: DCA 6921 or equivalent knowledge in the judgment of the Dean of the Faculty of Canon Law; passive knowledge of French.)

DCA9997 PROJET DE THÈSE DE DOCTORAT / PhD THESIS PROPOSAL

DCA9998 EXAMEN DE SYNTHÈSE DE DOCTORAT / PhD COMPREHENSIVE EXAMINATION

DCA9999 THÈSE DE DOCTORAT / PhD THESIS
Program Requirements

The Graduate Diploma program requires completion of five courses (15 credits):

- CPT5100 ADVANCED COMPETENCIES IN FINANCIAL ACCOUNTING
- CPT5101 ADVANCED COMPETENCIES IN AUDIT, ASSURANCE AND GOVERNANCE
- CPT5102 ADVANCED COMPETENCIES IN STRATEGY AND MANAGEMENT ACCOUNTING
- CPT5103 ADVANCED COMPETENCIES IN TAXATION
- CPT5104 INTEGRATION OF ADVANCED COMPETENCIES IN ACCOUNTANCY

Duration of the program

Students must complete the diploma requirements full-time in one session. Exceptionally, students who fail a course must re-enrol in the year following their year of admission.

Minimum standards

The minimum passing grade in all courses is C+, and students must achieve an average of 6.0 (70%) for the diploma courses in order to graduate. Students who incur failures in two courses or fail the same course twice will be withdrawn from the program.

Courses

CPT5100 ADVANCED COMPETENCIES IN FINANCIAL ACCOUNTING (3cr.)

CPT5101 ADVANCED COMPETENCIES IN AUDIT, ASSURANCE AND GOVERNANCE (3cr.)
Non-routine engagements related to corporate social responsibility, system design, acquisition, and development to meet information needs, assurance engagements other than traditional financial statement audit including review, compilation, and comprehensive audit engagements. Quality control standards, specialized areas, and public sector. Implications of pending changes in assurance standards.

CPT5102 ADVANCED COMPETENCIES IN STRATEGY AND MANAGEMENT ACCOUNTING (3cr.)
Environmental scanning, strategy formulation, implementation and evaluation, risk management, sustainable profit maximization, strategic cost management, process improvement methodologies, pricing decisions, international transfer pricing, and special considerations for government and not-for-profit entities.

CPT5103 ADVANCED COMPETENCIES IN TAXATION (3cr.)
Determination of taxes payable for corporations in non-routine transactions, evaluation of tax consequences or tax planning opportunities for shareholders and their closely held corporations and for complex corporate transactions, including restructuring transactions, the determination of taxes payable for individuals in non-routine transactions, the evaluation of tax planning opportunities for individuals, including estate planning opportunities, determination of tax consequences for non-residents.
CPT5104 INTEGRATION OF ADVANCED COMPETENCIES IN ACCOUNTANCY (3cr.)
Integration of technical competencies in financial accounting, strategy and governance, management accounting, audit and assurance, finance and to a lesser extent, taxation in realistic professional work situations. Methodological approach to analyze cases in accounting. Business valuation. Professional and ethical behaviour, problem solving and decision making, communication, self-management, and teamwork and leadership.

Contemplative Theology and Spiritual Mentorship

The Faculty of Theology at Saint Paul University offers a graduate program leading to a Graduate Diploma in Contemplative Theology and Spiritual Mentorship. This diploma is conferred jointly by the Senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

Psychology, the contemporary reference in helping relationships, has replaced confession (Catholicism) and cure of souls (Protestantism) in today’s secular society. At the same time, references to spirituality are increasing. Many are searching for a more authentic life open to experience, interiority, and silence. In health care, for example, prayer is being introduced to complement conventional practices. In this specific context, spiritual mentorship is poised to play a role in helping relationships.

Within a theological perspective, the program goals are to train students in understanding the nature and dynamics of the contemplative path, to identify the interfaces linking it to human sciences and other spiritual traditions, and also develop one’s capacity to express personal experience according to theoretical content. In short, to provide a framework for future involvement in safe and efficient helping relationships.

Upon diploma completion, the graduate could:
• Use the training in his/her present professional setting (e.g: psychotherapy, health professional or other); or
• Apply to the Master’s in Theology with concentration in Spirituality at Saint Paul University (part of the credits obtained in the diploma can be recognised). Refer to regulation B.2.7 of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

The diploma operates within the framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Graduate Diploma Contemplative Theology and Spiritual Mentorship

Admission

Candidates must satisfy the following conditions:

• Hold an Honours Bachelor’s degree in Theology, or Psychology, or Health Sciences, or a relevant discipline; with an average of at least «B».
• Completion of a minimum of 12 credits in Theology or Religious Studies: a pastoral experience may be considered equivalent.
• Comply with one of the following criteria (in each case provide a confirmation letter from the supervisor indicating the duration of the activity):
  • Experience as a spiritual advisor
  • Experience as a spiritual advisee
  • Experience as a psychologist or psychotherapist
  • Psychotherapy experience
  • Pastoral experience
• Provide the following documents:
  • Motivation letter (maximum 500 words) and curriculum vitae
  • Two (2) letters of recommendation (professor, advisor, employer, religious community superior, etc.); at least one from a university professor.
• Completion of a silent retreat, preferably the one organized by Saint Paul University’s Faculty of Theology.
• Pass an interview with the program coordinators to verify the candidate’s objectives and abilities for the program.

Program Requirements

The program consists of five courses (15 credits):

THO5112 SELF-UNDERSTANDING: HERMENEUTICAL THEORIES AND METHODOLOGICAL INTEGRATION (3cr.)

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Duration of the Program

Students may complete the diploma requirements full-time in one session or part-time over the course of one, two, or at most three years.

Minimum Standards

The passing grade in all courses is 65% (C+). Students who fail two courses (equivalent to 6 credits) or the same course twice are required to withdraw from the program.

Courses

THO5112 SELF-UNDERSTANDING: HERMENEUTICAL THEORIES AND METHODOLOGICAL INTEGRATION (3cr.)
This course analyzes several methods geared towards self-understanding and questions their limits and strengths. Religious experience holds within it some measure of self-understanding. What are the links between the different types of consciousness identified in philosophy (e.g., Brentano, Husserl) and the notion of consciousness that is specific to contemplative theology? Religious experience is not to be confused with its articulation which depends on a particular psychological, cultural, and theological context. What are the issues related to this methodological distinction in the process of self-understanding?

THO5113 ISSUES AND CONDITIONS FOR A CONTEMPLATIVE RENEWAL (3cr.)
This course examines several current controversial issues surrounding contemplative theology and related theological and pastoral issues (e.g., pantheistic drift, negative relationship with the body, dangers of self-absorption and of a mind empty of thoughts, subversive attitude towards institutions). Exploring these issues can establish a link to similar controversies in the past, and allows reflection on the conditions necessary for a modern contemplative renewal, using language adapted to a secular and pluralistic society.

THO5114 STEPS ON THE PATH TOWARDS FULLNESS: METHODS AND ISSUES (3cr.)
This course deepens the “mapping” done by mystical theologians (e.g., M. Eckhart, Theresa of Avila, Y. Raguin) of the road that leads to Fullness (unio mystica). What are the strengths and weaknesses of these “maps,” their commonalities and differences, their contribution to human knowledge and its spiritual dimension? Among the questions to be studied: What type of healing and what relationship to suffering is inherent in it? What is the place of grace as it relates to personal effort and the use of meditation methods? Are there any basic spiritual diseases?

THO5115 THE MASTER-DISCIPLE RELATIONSHIP AND SPIRITUAL MENTORSHIP (3cr.)
Contemplative theology has traditionally recognized the need for a guide when one embarks on the spiritual path. Such an insistence can be viewed with suspicion in an era which questions authority and received traditions. How may the history and nature of the master-disciple relationship be understood today? Conversely, many put their trust in any self-proclaimed guide. How may one avoid falling into dependency or into a cult? Different models of guide – master, director, accompanier, soul friend, mentor, and counsellor – will be explored. What points of convergence may exist between this relationship and other forms of spiritual authority – pastor, priest, guru, etc.?

THO5116 CONTEMPLATIVE THEOLOGY, PSYCHOTHERAPIES, AND SPIRITUAL TRADITIONS: A DIALOGICAL APPROACH (3cr.)
This course deepens the study of spiritual experience and its attendant need for mentorship in dialogue with secular and pluralistic society. Among the questions to be studied: What is the nature of a dialogical approach, its premises and implications (e.g., Buber, Panikkar)? What issues arise in a social context in which interest in spirituality rubs shoulders with psychotherapies and Easter meditation? How do they put theology itself into question? What are the similarities between the main mediation methods, Christian or otherwise? Do they lead to the same experience? If so, what is the value of the theological content?

THO5112 SELF-UNDERSTANDING: HERMENEUTICAL THEORIES AND METHODOLOGICAL INTEGRATION (3cr.)
This course analyzes several methods geared towards self-understanding and questions their limits and strengths. Religious experience holds within it some measure of self-understanding. What are the links between the different types of consciousness identified in philosophy (e.g., Brentano, Husserl) and the notion of consciousness that is specific to contemplative theology? Religious experience is not to be confused with its articulation which depends on a particular psychological, cultural, and theological context. What are the issues related to this methodological distinction in the process of self-understanding?

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**THO5116 CONTEMPLATIVE THEOLOGY, PSYCHOTHERAPIES, AND SPIRITUAL TRADITIONS: A DIALOGICAL APPROACH (3cr.)**
This course deepens the study of spiritual experience and its attendant need for mentorship in dialogue with secular and pluralistic society. Among the questions to be studied: What is the nature of a dialogical approach, its premises and implications (e.g., Buber, Panikkar)? What issues arise in a social context in which interest in spirituality rubs shoulders with psychotherapies and Easter meditation? How do they put theology itself into question? What are the similarities between the main meditation methods, Christian or otherwise? Do they lead to the same experience? If so, what is the value of the theological content?

**Couple Counselling and Spirituality**

The Faculty of Human Sciences at Saint Paul University offers a graduate program leading to a Graduate Diploma in Couple Counselling and Spirituality. This diploma is conferred jointly by the Senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

Professionals who seek to update their credentials and skills in the area of couple therapy, by completing the Diploma, will have met the requirements, in the area of theory and therapy, of the marriage and family courses required towards certification by the American Association of Marriage and Family Therapists (AAMFT). AAMFT Clinical Membership pre-requisites include three master's courses in MFT theory and three courses in MFT training.

This program is intended for professionals who are already experienced counselors and who would like to specialize in couple counselling.

**Programs**

Graduate Diploma Couple Counselling and Spirituality

**Admission**

Admission to the graduate programs in counselling and spirituality is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Applications are evaluated based on the following criteria:

- Hold a bachelor’s degree with honours or with a major in a related discipline such as counselling, spirituality, practical theology, health care, psychology, social work, pastoral studies or a discipline judged equivalent to these;
- Completion of 24 credits in total in psychology and sociology;
- Completion of 6 credits in theology or religious studies or a discipline deemed equivalent*;
- Completion of a counselling training with clinical experience (a minimum of 120 hours of supervised direct, face-to-face, contact with clients);
- An average of at least 70% (B) calculated in accordance with FGPS guidelines.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

**Transfer from Graduate Diploma to MA degree program**

Students registered in the graduate diploma program can request to transfer to the MA in Counselling and Spirituality in accordance with regulation A.7.1. of the general regulations of the FGPS.

*Students wishing to pursue their studies in counselling and spirituality at the master’s level must complete an additional 6 credits in theology, religious studies or a discipline deemed equivalent (for a total of 12 credits) prior to submitting their application for admission to the master's.
Program Requirements

Graduate Diploma Requirements (18 credits)

Core Courses (12 credits):

IPA5138 THEORIES OF FAMILY SYSTEMS AND INTERVENTIONS (3cr.)
IPA5144 SPIRITUALITY AND COUNSELLING (3cr.)
IPA6312 COUPLES, FAMILY DEVELOPMENT AND GROWTH (3cr.)
IPA7104 THEORIES OF COUPLE COUNSELLING (3cr.)

Optional Courses (6 credits from the following):

IPA5129 GROUP DYNAMICS AND COUNSELLING (3cr.)
IPA5134 PRACTICAL THEOLOGY (3cr.)
IPA5142 WORKING WITH TRAUMA AND VIOLENCE IN COUPLES AND FAMILIES (3cr.)
IPA5161 UNDERSTANDING THE TRAUMA OF SEXUAL ABUSE (3cr.)
IPA6130 COUPLES, FAMILIES AND ADDICTIONS (3cr.)
IPA7102 PHENOMENOLOGY OF HUMAN RELATIONSHIPS IN LOVE AND MARRIAGE (3cr.)
IPA7109 SURVEY OF SEXUAL DYSFUNCTION AND TREATMENT (3cr.)
IPA7205 PRACTICUM IN COUPLE AND FAMILY COUNSELLING (6cr.)

Course Sequence

The compulsory courses will be offered every year.

Duration of the Program

The requirements of the diploma must be fulfilled within three years of initial registration in the program.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) or the same course twice must withdraw from the program.

Courses

IPA5129 GROUP DYNAMICS AND COUNSELLING (3cr.)
This course introduces theories, principles and practices in group therapy designed to help prepare future professionals to work with people in various settings. Group processes are covered through interactive discussions, small group participation, role plays, and other observations.

IPA5131 METHODOLOGY OF EMPIRICAL RESEARCH (3cr.)
This course helps the students to develop skills for the critical evaluation of empirical research in the human sciences and the application of these skills in graduate research projects and theses. Qualitative and quantitative methods of gathering and validating scientific evidence in observation, case, evaluation, correlational and experimental studies. The formation of problems, structured questions, causal and non-causal hypotheses; operational definitions; dependent, extraneous and randomized variables; the selection of samples. Research ethics will be examined.

IPA5134 PRACTICAL THEOLOGY (3cr.)
This course presents new developments in Practical Theology with its particular interdisciplinary perspectives on faith and practice. The origins and development of Practical Theology are presented as a background to its specific methods and content. Practical Theology is situated within the modern context of theology. The course introduces the pastoral practitioner and the student of theology to theological examination of the components of ministry and of contemporary expressions of faith.

IPA5138 THEORIES OF FAMILY SYSTEMS AND INTERVENTIONS (3cr.)
This course presents a history of the family systems theories with individuals, couples, and families with a major focus on advanced family systems theories and interventions. Theories covered include Structural, Strategic, Bowen, Narrative, Solution Focused and more. Attention is paid to assessment of functional and dysfunctional family systems. The student/practitioner will learn interviewing, assessment and restructuring techniques, and how to explore family rules, systems, values and boundaries.

IPA5142 WORKING WITH TRAUMA AND VIOLENCE IN COUPLES AND FAMILIES (3cr.)
The goal of this course is to provide a conceptual framework, including theory, research and interventions that will enable the students to understand and treat trauma and violence in couples and family relationships. The course will present an attachment perspective and research on trauma and outline advanced family systems therapeutic assessments and interventions for trauma survivors and their families.

IPA5144 SPIRITUALITY AND COUNSELLING (3cr.)
This course presents the human experience as the common bond linking theology, counselling and spirituality. A variety of approaches in theology and in counselling will be studied, including: The relationship between the stages of moral (human) development and the images of
God, how psychology helps make the difference between an unhealthy theology, and a healthy one, that gives rise to a spirituality enriching us in our growth and development.

IPA5146 PROFESSIONAL ISSUES AND ETHICS IN PASTORAL COUNSELLING (3cr.)
Students are oriented to relevant professional organizations; the need for liability insurance, codes of ethics, professional standards and certification is examined. The course reviews major contemporary issues that surround the practice of pastoral counselling (e.g., confidentiality and its limits, record keeping, informed consent, the legal concerns impacting pastoral counselling) and research. The student is introduced to the processes of ethical reasoning and ethical decision-making. The need for continued training and supervised practice leading to certification will be discussed. Considerable attention is given to the role of informed judgment and peer consultation in resolving ethical dilemmas.

IPA5161 UNDERSTANDING THE TRAUMA OF SEXUAL ABUSE (3cr.)
The goal of this course is to present an overview of the theory, research, clinical and treatment issues related to trauma and childhood sexual abuse. This course will introduce the theories of trauma from a family systems perspective. Effects of sexual abuse in terms of developmental issues over the life span, associated symptomatology of sexual abuse and trauma, and related clinical issues and practices.

IPA5162 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS II (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5163 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS III (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5164 COUNSELLING AND SPIRITUALITY: SELECTED TOPICS IV (3cr.)
Study of a particular area in counselling and Spirituality.

IPA5517 DYNAMIQUE DE LA MALADIE ET DE SES EFFETS (3cr.)
Les stresseurs reliés à la maladie, à la souffrance et à l’hospitalisation; les possibilités de développement humain et spirituel. Les phases psychodynamiques de la maladie, de la mort et du deuil; façons de répondre aux besoins des patients, de leurs familles et de la communauté professionnelle des soins de santé. Les attitudes pastorales nécessaires pour un tel travail, espérance, ouverture, acceptation de sa propre mortalité.

IPA5540 QUESTIONS PROFESSIONNELLES ET QUESTIONS D’ÉTHIQUE EN SOINS SPIRITUELS (3cr.)
Ce cours initie l’étudiant aux questions professionnelles d’éthique relatives aux services en soins de santé. L’étudiant apprend les normes professionnelles d’éthique et leur application en milieu hospitalier. Par le biais d’études de cas et de situations d’éthique difficiles, l’étudiant examine des questions d’ordre général, mais aussi des questions professionnelles plus spécifiques, i.e., l’utilisation des règles d’éthique au moment de la prise de décision, le respect de la liberté de conscience, le besoin de confidentialité et ses limites, la formulation de questions de recherche en soins de santé, et l’influence du travail d’équipe dans les soins apportés aux patients. L’étudiant aborde des questions d’éthique et de morale telles l’avortement, l’euthanasie et le prolongement de la vie. Enfin, il apprend à travailler avec des ressources souvent limitées.

IPA6103 SPIRITUALITY AND HUMAN DEVELOPMENT (3cr.)
This course examines psychological and sociological theories of human development as they relate to the religious and spiritual dimensions of the human personality. More particularly, it looks at the impact of individual growth and development, cultural and social processes of religious experience, healthy and unhealthy religion, conversion and faith, religious attitude and maturity. Practical implications will be drawn from theory.

IPA6108 PSYOPATHOLOGY AND TREATMENT (3cr.)
Concepts such as normality and abnormality, and the inter-relationship of perceptual, cognitive and affective dimensions are discussed. Motivational, social, behavioural and inter-personal components of human functioning and reviewed. This course presents the mental disorders, distinguishing the neurotic and psychotic disorders. The neuroses, transitory reactions to stress, psychological factors in physical illnesses, personality disorders and affective disorders are treated in depth. Each class of disorders is viewed from the point of view of its etiology, diagnostic indicators, assessment, research and treatment. An explanation of the factors that foster an individual’s invulnerability to stress, trauma, and genetic predispositions is presented. The interplay of stressors, interpersonal and intrapersonal resources, life history and community is emphasized in the etiology and course of the disorders and normal functioning. Disordered functioning is seen as a person’s attempt to come to terms with the demands of living.

IPA6120 THEORIES OF INDIVIDUAL COUNSELLING (3cr.)
This course provides a brief overview of the history of counselling theory and its orientations and trends. It attends to the nature of theory building and its interconnection to practice and research. It presents, critically in depth, representative theories from the current major orientations (e.g., experiential, cognitive, psychodynamic, behavioral) with a focus on the integration of understanding, assessment and treatment in the counselling process. In the presentation of theories, attention is given to the integration of theory, research and practice. Each theory is discussed with reference to its practical application, effectiveness and limitations. The manner in which one or more of these theories has been applied to pastoral counselling practice and in the development of pastoral counselling models, and in the development of a person’s spiritual and religious life is covered.

IPA6130 COUPLES, FAMILIES AND ADDICTIONS (3cr.)
The goal of this course is to present an in depth examination of the specific characteristics, dynamics and best therapeutic practices in working with individuals, couples and families affected by chronic addiction. It will focus on the challenges faced by professionals working with the addicted person or family and will teach ways to overcome those challenges. It will offer information regarding recovery issues and will provide students with systemic therapy interventions and resources for their work with this population.

IPA6151 SPIRITUALITY AND ADAPTATION TO ILLNESS (3cr.)
Examines the phenomenology and etiology of health and illness. Emphasizes the creation of opportunities for human and spiritual growth. It
examines the tensions that negatively affect certain types of terminal illness, their implications and effects on individuals, their families, and the community. It also examines the role of pastoral workers and how fears, guilt, feelings of inadequacy, and troubled interpersonal relationships can lead to Hope, forgiveness, self-fulfillment, and human and spiritual growth. This course will enrich the critical thinking of professionals working with individuals who are at the end of life and with those close to them.

**IPA6156 RESEARCH SEMINAR (3cr.)**

**IPA6160 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM I (4cr.)**
This beginner practicum provides a learning situation whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of pastoral care services. Students are trained in the basic skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff. This practicum consists of group activities, placement, written exercises and personal development seminar.

**IPA6161 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM II (4cr.)**
This practicum continues the experience gained in #1. Students learn more of the functions and concerns of spiritual care services; to the organization of a spiritual care department; to the practices and procedures for the implementation of spiritual care. The following methods encompass this experiential learning: supervised practice of ministry, lectures, seminars and didactics, personal development seminar, verbatim/virtual visit reporting, individual supervision, and reflection reports.

**IPA6181 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM I (4cr.)**
This beginner extended unit practicum provides a learning situation in a hospital, health care institution, prison, or parish whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of pastoral care services; to the organization of a spiritual care department; to the practices and procedures for the implementation of spiritual care. Students are trained in the basic communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPA6182 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM II (4cr.)**
This extended practicum continues the learning whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students deepen the functions and concerns of pastoral care services. Students are trained in the advanced communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPA6183 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM III (4cr.)**
This advanced extended practicum solidifies the experience gained whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students learn more of the functions and concerns of spiritual care services. Students are trained in the greater communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPA6184 CLINICAL PASTORAL EDUCATION (CPE) EXTENDED PRACTICUM IV (3cr.)**
This advanced extended practicum solidifies the experience gained whereby students develop personal and professional qualifications for ministry as a chaplain / spiritual care clinician. Students learn more of the functions and concerns of spiritual care services. Students are trained in the greater communication and assessment skills as they bear on the spiritual, emotional and religious needs of the patients, family and staff.

**IPA6221 PRACTICUM IN INDIVIDUAL COUNSELLING I (6cr.)**
Students receive training in basic communication, interpersonal and interviewing skills. The development of attitudes and interpersonal qualities that facilitate the helping process is encouraged through a didactic experiential training approach. Assessment of the client’s needs, personal and religious development, current capabilities, and circumstances of living is carried out. The counsellor-in-training is taught to evaluate the client’s emotional patterns, cognitive style, interpersonal patterns, and strategies for living. Students are instructed in a professional ethical approach to clients. Emphasis is placed on the integration of theory with an assessment of the client to plan counselling goals. These goals are continually re-evaluated with respect to theological and psychological theory, client responsiveness, clinical practice and research. When ready, students are given opportunities to counsel individuals. The student is introduced to assessments and treatment of couples through observations of videotapes and of live sessions. Acquired skills are systematically applied and practiced in role-playing sessions or with clients of the Centre for Counselling and Pastoral Services. Students are taught to write professional reports on their client sessions. Video and audio recordings, staff demonstrations, case studies and coaching may be used in both individual and small group supervision. Within the practicum, the student examines the spiritual values in the client’s existential situation. A holistic approach to the person is encouraged. Face-to-face contacts with clients is determined by the availability of clients and the student’s readiness to see clients.

**IPA6257 MA THESIS (12cr.)**

**IPA6260 CLINICAL PASTORAL EDUCATION (CPE) SUMMER PRACTICUM (6cr.)**
This practicum provides a learning situation in a hospital whereby students develop personal and professional qualifications for ministry as an intern chaplain / spiritual care clinician. Students are systematically initiated to the functions and concerns of spiritual care services and acquire a knowledge base of the practices and procedures for the implementation of spiritual care. Students are trained in communication and assessment skills in order to meet the spiritual, emotional and religious needs of patients, families and staff.

**IPA6301 THEOLOGICAL QUESTIONS IN FAMILY LIFE (3cr.)**
This course treats the interrelation of contemporary family life and Christian faith. It examines the questions raised for theology and pastoral care by new values and lifestyles in the family. It offers a critical assessment of the forces responsible for these changes. In light of this analysis, it presents new possibilities for pastoral care. Among the questions treated are: faith and the sacrament of marriage; conjugal love and procreation; pastoral care of the divorced and separated; role relations in the family; family spirituality.
IPA6312 COUPLES, FAMILY DEVELOPMENT AND GROWTH (3cr.)
Introduction to the psychology of individuals, couple and family development and growth and provided knowledge of personality development
over the life span. This course will review attachment over the life span, the stages of development from childhood to adulthood, and
corresponding changes in family roles, as well as advanced therapeutic interventions.

IPA6321 PRACTICUM IN INDIVIDUAL COUNSELLING II (3cr.)
Students will further their training by practicing their counselling skills through role plays, client contact, and by practicing in regular
supervision.

IPA6552 THÉOLOGIE ET SOINS SPIRITUELS (3cr.)
Ce cours offre aux étudiants une compréhension théologique critique et fournit les moyens de développer la pratique du ministère pastoral dans les
services en questions. Il présente une étude anthropologique de l’expérience humaine de la santé, de la maladie, de la guérison, de la
souffrance, et de la mort, accompagnée d’une réflexion théologique basée sur différentes traditions chrétiennes. Il présente aussi les ressources suivantes :
les principes du développement humain et de l’aide aux autres; la réflexion sur la pratique des soins pastoraux et des divers modèles de soins de santé; les habiletés requises à l’exercice de ces soins, ainsi qu’une réflexion sur les rites utilisés; enfin, l’étude de la religion personnalisée et de la spiritualité.

IPA6703 SPIRITUALITÉ ET DÉVELOPPEMENT HUMAIN (3cr.)
Ce cours examine les théories psychologiques et sociologiques du développement humain et les effets qu’elles ont en relation avec les dimensions
religieuses et spirituelles de la personnalité humaine. Plus particulièrement, on étudiera la relation des processus de changement humain et des
processus d’incultration et de socialisation avec le phénomène de l’expérience religieuse, la conversion et la foi, l’attitude et la maturité
religieuses et le bien-être spirituel. Diverses applications pratiques seront examinées à la lumière des théories à l’étude.

IPA7102 PHENOMENOLOGY OF HUMAN RELATIONSHIPS IN LOVE AND MARRIAGE (3cr.)
This course examines the representation, practices, and issues of love and relationships. These issues will be examined through various systems
theories, and then brought into everyday applied practice for counselors. The course will present aspects of love in committed relationships,
review the literature and psychology theory on these aspects, and work with doing applied therapy on these aspects.

IPA7103 THEOLOGICAL QUESTIONS IN MARITAL COUNSELLING (3cr.)
This course examines the process of pastoral counselling with special reference to marital counseling. It looks at the value orientation of the
marital counsellor, the place of religious values and resources in the counselling process, and the religious and moral development of the couple.
The Christian dimension of certain ethical issues in marital counselling such as human sexuality, parenthood and divorce are explored as well as
religious growth as it relates to the life cycle of the couple.

IPA7104 THEORIES OF COUPLE COUNSELLING (3cr.)
The goal of this course is to provide an overview of the history and nature of theories of couple counselling. This course will introduce the central
theories and concepts guiding couple therapy, including attachment, family systems, Emotionally Focused, experiential, and humanistic and the
recent research related to couple therapy. There will be a particular focus on the skills, assessment and practice associated with Emotionally
Focused therapy. Couple relationships both on the conscious and unconscious levels of functioning are examined and conceptualized.

IPA7105 ASSESSMENT PROCEDURES IN PASTORAL COUNSELLING (3cr.)
This course approaches assessment from a non-testing perspective and by the use of clinical material. The major emphasis is given to the use of
theoretical concepts to assess the internal and external factors that contribute to personal and interpersonal functioning or dysfunctioning. The
clinical material for this assessment is derived from structured and unstructured interviews. The means and ways to assess individual’s strength
and resources to cope with life demands are discussed. The use of applications that are linked to major current theoretical orientations (e.g.,
experiential, cognitive, psychodynamic, behavioural) are introduced. When to make referrals for assessment to another professional will be
introduced. The ethics, limitations and purpose of assessments are integrated into the course.

IPA7109 SURVEY OF SEXUAL DYSFUNCTION AND TREATMENT (3cr.)
The purpose of this course is to present the history and development of dysfunctions in the field of human sexuality and to survey various
treatments for couples. This course will examine the human development of sexual expressions in their male and female dysfunctions; the
biological and psychological determinants; sexual dysfunction and marital interaction and sexual assessment and applied treatment within
individual; and couple therapy.

IPA7128 EXTERNAL CLINICAL PRACTICUM (6cr.)
In this supervised field practicum, the student offers counselling services at a community centre or an agency located outside campus.
Prerequisite: Have obtained an “S” (Satisfactory) in all evaluation items in the course IPA6221 Corequisites : IPA6321 or IPA7221 or IPA7205

IPA7162 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM III (4cr.)
Students learn advanced skills in ministry to the sick, their families, as well as other specific settings in keeping with the students learning goals.
They perfect and consolidate basic attitudes. Students are responsible for more complex ministry situations such as palliative care and mental
health. They are taught to foster team work in a caring community as part of a spiritual care team.

IPA7163 CLINICAL PASTORAL EDUCATION (CPE) PRACTICUM IV (3cr.)
Students learn advanced skills in spiritual care to the sick, their families, as well as other specific settings in keeping with the students learning
goals. Students also are required to make presentations in class or to other professionals on a topic of their expertise. They are taught to foster
team work in a caring community as part of a spiritual care team. The following methods encompass this experiential learning: supervised
practice of ministry, lectures, seminars and didactics, integration seminar, verbatim/ virtual visit reporting, individual supervision, and reflection
reports.

IPA7205 PRACTICUM IN COUPLE AND FAMILY COUNSELLING (6cr.)
This practicum presents 1) theoretical study on couple and family therapy, 2) therapy application to various situations and role-plays, and video of various expert intervention modalities and 3) contact with clients (couples and/or families) and supervision. Studies will focus on advanced family systems theories. As well, this study portion will provide applied practices evolving from these theoretical orientations. The emphasis is on case conceptualization, applicable assessment, and executive therapeutic skills. Prerequisite: IPA7104.

IPA7221 PRACTICUM IN INDIVIDUAL COUNSELLING III (6cr.)
It emphasizes the use of advances assessment and treatment skills and presupposes that the students demonstrate the utility of their theoretical knowledge and their research knowledge. Students learn to use current major individual counselling models (e.g. experiential, cognitive, psychodynamic, behavioural) so that they can respond with a wide range of therapeutic strategies to the varied needs and circumstances of clients. Practice consists of counselling sessions with clients at the Centre for Counselling and Pastoral Services under team observation and individual and small group supervision. These sessions or other case studies are used to assess the progress and plans of counselling. According to the Faculty’s regulations and at the discretion of the supervisor, audio-visual or written records are used to monitor the process. Additionally, field practice is arranged in order to ensure adequate exposure to a varied population of pastoral counselling clients.

IPA8101 SPIRITUALITY AND COUNSELLING (3cr.)
Study of qualitative and hermeneutical methods as these are used in the social sciences and in theological study of spirituality. Comparative study of one or more Christian spiritual traditions and one or more spiritual traditions within other religions and secular culture to increase understanding and practice of spirituality. The course is designed to highlight the role of spirituality in the emotional well-being and adjustment of individuals. This course will treat the question of personal and spiritual growth. The importance of spiritual practices and the overall relationship of spirituality to the counselling process will also be considered.

IPA8102 COUNSELLING IN MULTI-FaITH AND CROSS-CULTURAL SETTINGS (3cr.)
This course examines counselling in a culturally pluralistic spiritual and religious context. It examines the possibility of mutuality and dialogue using a comparative religions approach from social science and theological perspectives. The theory and practice proposed focuses on the differing spiritual and secular humanist journeys of the counsellor and the client, and the possibility of meeting in difference. Topics covered include: the impact of enculturation, intercultural identity, inter-religious dialogue, intercultural competence on both parties; the ways in which intercultural competence and intercultural growth contribute to spiritual growth. The course enables counsellors and their clients to assess the extent to which spiritual values, beliefs and practices are an asset or a liability for clients in reaching their counselling goals.

IPA8103 ISSUES IN SPECIAL POPULATIONS (3cr.)
This course treats issues related to the needs and social status of certain special populations. Accumulated data on group characteristics and challenges facing some special populations, such as those who are aged or those who are homeless, are critically reviewed. Membership in some social groups may involve loss of social privileges, as well as diminished access to mental and health care resources. Students explore issues related to the unique spiritual and mental health needs of these groups, their social circumstances, and the implications for service provision. Growing problems concerning assessment, intervention, and the increased barriers to services are examined from the point of view of community approaches to research and intervention. The role of counsellors working with persons with unique needs, individually or at the community level, will be addressed.

IPA8104 EXISTENTIAL ISSUES IN COUNSELLING (3cr.)
This course explores meaning-of-life issues often presented by clients in a variety of contexts, including, but not limited to, the quest for increased well-being, existential crises, life transitions, loss and death, end-of-life, and trauma. Qualitative methods of data collection and analysis are critically reviewed to gain insight into the meaning participants give to their lived experience, the meaning they place on events, processes, perceptions and into the ways in which they connect these meanings to the social world around them. A variety of religious, spiritual and secular humanist sources of and responses to existential issues are treated.

IPA8105 RESEARCH METHODS AND DESIGN PROBLEMS IN COUNSELLING AND SPIRITUALITY (3cr.)
The focus of this course is the critical analysis and discussion of the challenges that counsellors face in choosing and applying qualitative and quantitative methods to spirituality. In-depth study of design pitfalls that arise from the complexity and unpredictability of working with human subjects given the multi-cultural complexity of pluralistic societies. Potential topics include sampling issues, measurement issues, and special analytic techniques.

IPA8106 DOCTORAL SEMINAR (3cr.)
Guest lecturers will select readings and lead seminars related to relevant research topics such as proposal writing, conceptual frameworks, ethics, methods and procedures, and statistical analysis. Students must write an annotated bibliography and prepare a plan for their comprehensive exam. In addition, they must write a paper and do an oral presentation designed to facilitate their work around the thesis proposal. Evaluation by the seminar coordinator.

IPA8201 INTERNAL CLINICAL PRACTICUM
The internal clinical practicum takes place in the Saint Paul University Counselling Centre. The goal of the practicum is to put into practice the theoretical knowledge of counselling and spirituality. Supervisors will specify the goals, objectives and syllabus of practicum. They will use observation, debriefing, peer review, written and oral feedback, and direct intervention and observation, to instruct and evaluate students. Minimum number of hours: 250. Graded S/NS.

IPA8202 EXTERNAL CLINICAL PRACTICUM
Clinical practice in an external location that must be approved by the program director. Graded S/NS. Students complete a minimum of 1500 hours of supervised training, internal and external practicum combined.

IPA9997 PROPOSITION DE THèSE / THESIS PROPOSAL
Présentation du projet de thèse devant un comité composé du directeur de la thèse, des membres du comité de thèse et d’un ou deux autres professeurs. / Presentation of the thesis proposal to an examining committee composed of the supervisor, the members of the advisory committee and one or two other professors.
Ecclesiastical Administration

The Graduate Diploma in Ecclesiastical Administration (GDEA) offers an advanced specialization, within the general discipline of canon law, suited to careers in church administration. From the perspective of canon law, the program provides the students a specialized knowledge of issues related to the governance and management of dioceses, religious institutes, church tribunals, ecclesiastical institutions of education and healthcare, and other similar bodies.

The graduate diploma program requires 15 credits of coursework.

The GDEA is open to students who have a university degree in canon law, or have already completed significant training in canon law.

The GDEA is conferred jointly by Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The GDEA is offered in both French and English. All compulsory courses are available in each language. Some elective courses may be offered in one language only.

On completion of the diploma, qualified students meeting admission requirements may apply for admission to the master's in Canon Law program and, on admission, complete the requirements of this program with credit granted for relevant courses already completed in the diploma. The number of credits remaining would be assessed individually.

The diploma operates within the framework of the general regulations of the FGPS, which are available on the website at the following link: www.etudesup.uottawa.ca/generalregulations

Programs

Graduate Diploma Ecclesiastical Administration

Admission

- An honours bachelor’s degree or equivalent four years of post-secondary studies with at least a B (70%) average.
- At least 18 credits in the theological disciplines either by course work and/or equivalent pastoral experience in keeping with criteria established by the Executive Committee of the Faculty of Canon Law.
- Two (2) letters of recommendation by persons who know the applicant and can attest to the applicant’s capacity to pursue graduate study. In addition, a letter of permission from the applicant’s bishop (for secular clergy) or superior (for members of institutes of consecrated life or societies of apostolic life).
- A curriculum vitae.
- Excellent knowledge of English or French.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master’s

Students registered in the graduate diploma program can request to transfer to a related master's program in accordance with section A.7.1 of the general regulations of the FGPS.

Program Requirements
The Graduate Diploma requires 15 credits as follows:

Compulsory courses (6cr.) are chosen from among the following:

DCA5103 UNIVERSAL AND SUPRA DIOCESAN CHURCH STRUCTURES (3cr.)
DCA5127 PARTICULAR CHURCHES (3cr.)
DCA6113 TEMPORAL GOODS (3cr.)
DCA6115 PENAL LAW (3cr.)

Elective courses (9cr.):

These courses are chosen from among the graduate courses taught in the Faculty of Canon Law and approved by the Dean of the Faculty of Canon Law.

Duration of the Program

Students may complete the diploma requirements full-time in one session or part-time over the course of one, two or three years.

Minimum Standards

The passing grade in all courses is C+. Students who fail six credits or the same course twice, must withdraw from the program.

Courses

DCA5103 UNIVERSAL AND SUPRA DIOCESAN CHURCH STRUCTURES (3cr.)
Supreme authority of the Church: Roman Pontiff, College of Bishops and Ecumenical Council. Synod of Bishops, College of Cardinals, Roman Curia, legates. Groupings of particular Churches: ecclesiastical provinces and regions, metropolitan, particular councils (plenary and provincial), conferences of bishops. (cc. 330-367; 431-459)

DCA5127 PARTICULAR CHURCHES (3cr.)

DCA5128 SANCTIFYING OFFICE (3cr.)

DCA5129 GENERAL NORMS (3cr.)

DCA5130 MATRIMONIAL LAW (3cr.)

DCA5131 CHRISTIAN FAITHFUL (3cr.)

DCA5132 ADMINISTRATIVE INSTITUTES (3cr.)
General decrees and instructions. Singular administrative acts: singular decrees and precepts, rescripts, privileges, dispensations. Ecclesiastical offices. Presentation and drafting of singular and general decrees, precepts, and rescripts for routine and exceptional matters. Practical application: internal and external diocesan structures, sacraments, finances, civil law. (cc. 29-93, 145-183) [Previously: DCA 5306, DCA 6322]

DCA5133 PROCEDURES I (3cr.)
Trials in general. Competent forum. Different grades and kinds of tribunals: first instance, second instance, tribunals of the Apostolic See. Discipline to be observed in tribunals: duties of judges and tribunal ministers, order of adjudication, time limits and delays, place of the trial, persons to be admitted to the court, manner of preparing and keeping the acts. Parties in a case. Actions and exceptions. Oral contentious process. (cc. 1400-1500, 1656-1677)

DCA5134 EASTERN CANON LAW (3cr.)
DCA5135 MATRIMONIAL JURISPRUDENCE (3cr.)
Study of jurisprudence focusing on the grounds of nullity of matrimonial consent, with special focus on the jurisprudence of the Roman Rota. [Previously: DCA 5207]

DCA5136 INTRODUCTION TO CANON LAW (3cr.)
Methodology for canonical research and writing. History of canonical sources. History of canonical institutions.

DCA5137 TEACHING OFFICE (1.5cr.)

DCA5138 SPECIAL MATRIMONIAL CASES AND PROCEDURES (1.5cr.)
Separation of the spouses with the dissolution of the marriage bond (dissolution of ratified and non-consummated marriages, dissolution in virtue of the Pauline privilege, dissolution in favour of the faith). Separation of the spouses with the bond remaining. Convalidation of marriage. Procedure in presumed death of a spouse. (cc. 1141-1165, 1692-1707) [Previously: DCA 5133]

DCA5203 INSTITUTES OF CONSECRATED LIFE AND SOCIETIES OF APOSTOLIC LIFE (3cr.)
Common norms. Religious institutes: religious houses, governance of institutes, admission of candidates and formation of members, obligations and rights of the institutes and of their members, apostolate of institutes, separation of members from the institute, religious who are bishops, conferences of major superiors. Secular institutes. Societies of apostolic life. (cc. 573-633; 641-717, 719-740, 742-746)

DCA5304 COMPARATIVE PARTICULAR LAW (3cr.)
Comparative study of the development of particular canon law at the level of conferences of bishops.

DCA5310 CHURCH LAW AND PASTORAL MINISTRY (3cr.)
Theological reflection on and practical application of Canon Law to some areas of pastoral ministry, specifically marriage and reconciliation.

DCA5396 DIRECTED STUDIES I (3cr.)

DCA5397 DIRECTED STUDIES II (3cr.)

DCA5398 DIRECTED STUDIES III (3cr.)

DCA6112 ADMINISTRATIVE PROCEDURES (3cr.)

DCA6113 TEMPORAL GOODS (3cr.)

DCA6114 PROCEDURES II (3cr.)

DCA6115 PENAL LAW (3cr.)

DCA6301 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6302 SPECIAL PROBLEMS IN CANON LAW II (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCA6315 LITURGICAL LAW OUTSIDE THE CODE (3cr.)
Selected Praenotanda of liturgical books and post-Code legislation on the Liturgy.

DCA6316 THE LAITY AND THE POWER OF GOVERNANCE IN THE CHURCH (3cr.)
Collaboration of the lay faithful in the exercise of the power of governance: law, theory, and practice.
DCAP121 SEMINAR ON TRIBUNAL PRACTICE (3cr.)

DCAP363 SPECIAL PROBLEMS IN CANON LAW III (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCAP364 SPECIAL PROBLEMS IN CANON LAW IV (1.5cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law. Each academic year the details of the course will be made available in advance to the students.

DCAP395 RESEARCH SEMINAR (3cr.)
Research on a particular canonical subject resulting in its presentation to the seminar group and director, and in submission of a written project.

DCAP396 SELECTED TOPICS IN CANON LAW I (3cr.)

DCAP397 SELECTED TOPICS IN CANON LAW II (3cr.)

DCAP398 SELECTED TOPICS IN CANON LAW III (3cr.)

DCAP6921 LATIN CANONIQUE / CANONICAL LATIN (3cr.)
Etude du latin ecclésiastique de niveau avancé. Traduction de textes canoniques: Codex iuris canonici, Codex canonum ecclesiarum orientalium, autres sources canoniques. (Préalables : DCA 3509 ou une connaissance équivalente au jugement du doyen de la Faculté du droit canonique ; connaissance passive de l'anglais.) / Advanced level of ecclesiastical Latin. Translation of canonical texts: Codex iuris canonici, Codex canonum ecclesiarum orientalium, other canonical sources. Prerequisite: DCA 3109 or equivalent knowledge in the judgment of the Dean of the Faculty of Canon Law; passive knowledge of French)

DCAP6922 STAGE EN MILIEU DE TRAVAIL / FIELD PRACTICUM (3cr.)
Stage supervisé de pratique canonique d’une durée de six semaines (minimum 18 h/semaine) dans un milieu de travail approuvé. L’évaluation de l’étudiant est fondée sur les résultats du rapport écrit et l’évaluation du superviseur de stage. / A six-week (minimum 18 hours per week) of supervised internship in canonical practice at an approved site. Assessment based on a written report as well as the evaluation of the internship supervisor.

DCAP6961 VOYAGE DE FORMATION À LA CURIE ROMAINE / STUDY VISIT TO THE ROMAN CURIA (1.5cr.)
Séminaire sur la Curie romaine comprenant des échanges sur les lieux avec le personnel de congrégations romaines, tribunaux et conseils pontificaux.(Prérequis : Connaissance passive de l’anglais). / Seminar on the Roman Curia involving on-site interchange with personnel from a variety of Roman congregations, tribunals, and pontifical councils. Prerequisite: passive knowledge of French)

DCAP6962 QUESTIONS SPÉCIALES RELATIVES À LA VIE CONSCRÉE / SPECIAL ISSUES IN CONSECRATED LIFE (1.5cr.)
Séminaire sur des questions juridiques et canoniques concernant la vie consacrée, en particulier dans le contexte canadien. Comprend la session d’été « Formation légale pour le leadership des instituts religieux » et la rédaction d’un travail de recherche. (Inscription limitée. Préalables: DCA 5603, ou connaissances jugées équivalentes par le doyen de la Faculté du droit canonique ; connaissance passive de l’anglais.) / Seminar on legal and canonical issues concerning consecrated life, especially in the context of Canada. Includes the summer session: “Legal Education for Leadership of Religious Institutes” and the submission of a research paper. (Restricted Registration. Prerequisite: DCA 5203 or equivalent knowledge as determined by the Dean of the Faculty of Canon Law; passive knowledge of French)

DCAP8101 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCAP8102 SPECIAL PROBLEMS IN CANON LAW II (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

DCAP8175 POWER OF GOVERNANCE (3cr.)
Certain particular or specialized questions related to the concept or to the exercise of power of governance in the Church.

DCAP8176 JURISPRUDENCE (3cr.)
Matrimonial or administrative jurisprudence in specialized areas of interest.

DCAP8396 DOCTORAL DIRECTED STUDIES I (3cr.)

DCAP8397 DOCTORAL DIRECTED STUDIES II (3cr.)
DCA8398 DOCTORAL DIRECTED STUDIES III (3cr.)

DCA8101 SPECIAL PROBLEMS IN CANON LAW I (3cr.)
Study of interdisciplinary problems with a large canonical component or of specialized questions not covered by the Code of Canon Law.

**Ethics and Religious Beliefs in the Media**

The Faculty of Human Sciences at Saint Paul University offers a graduate program leading to a Graduate Diploma in Ethics and Religious Beliefs in the Media. This Diploma is conferred jointly by the Senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The diploma is offered on a full-time basis.

In accordance with the Saint Paul University regulation, students have the right to produce their work, their research papers or theses, and to answer examination questions in French or in English.

**Programs**

Graduate Diploma Ethics and Religious Beliefs in the Media

**Admission**

Applicants must: Applicants must:

- Hold a bachelor’s degree with honours or with a major, or the equivalent, in a discipline considered relevant such as communication studies, religious studies, philosophy, ethics, etc., with a cumulative grade point average of at least 6 (B);
- Have relevant expertise in one of the communications media;
- Have acquired basic theoretical knowledge in communication studies;
- Provide two letters of recommendation, including at least one from a university-level professor;
- Have an excellent knowledge of the language of instruction (English or French).

Exceptionally, a person with an honours bachelor’s degree or with a major considered not pertinent could be admitted if he/she can demonstrate to the satisfaction of the Faculty of Human Sciences of Saint Paul University that he/she has the equivalent expertise and knowledge (for example, sufficient work experience in communication for a media outlet and/or a religious institution).

**Program Requirements**

**Compulsory Courses (9 crédits)**

1^ISC5101 MEDIA AND RELIGION (3cr.)
2^ISC5102 MEDIA, RELIGIOUS FAITH, AND SYMBOLIC WAYS (3cr.)
3^ISC5103 INTEGRATION WORK RESIDENCY (3cr.)

**Optional Distance Courses (6 credits)**

One course (3 credits) in the area of media and culture, to be chosen from:

ISC5111 TESTIFYING FAITH, THROUGH THE MEDIA (3cr.)
ISC5112 RELIGIOUS LEADERS AS SPOKEPEPSONS FOR RELIGION IDENTITY IN THE MEDIA (3cr.)
ISC5113 SPECIAL TOPICS ON “MEDIA, RELIGION, AND CULTURE” (3cr.)

One course (3 credits) in the area of media and ethics, to be chosen from:

ISC5121 THE ETHICAL PROBLEM OF IDOLATROUS IMAGES (3cr.)
ISC5122 MEDIA ENTERTAINMENT, RELIGION, AND ETHICS (3cr.)
ISC5123 SPECIAL TOPICS ON “MEDIA, RELIGION, AND ETHICS” (3cr.)
Course Sequence

The compulsory course on Media and Religion (ISC 5101) is a prerequisite to the two courses offered on campus.

Duration of the Program

The expectation is that all requirements of the diploma will be completed in one year of full-time study. The maximum time permitted is three years from the time of initial registration in the program.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) or the same course twice must withdraw from the program.

1. distance course
2. given on campus

Courses

ISC5101 MEDIA AND RELIGION (3cr.)
Historical clashes between the media and religion. Culture, religion, and media. Possible divergences and convergences. Religions and new technologies.

ISC5102 MEDIA, RELIGIOUS FAITH, AND SYMBOLIC WAYS (3cr.)
In-depth theoretical study of symbolic expressions of religious faith. Creativity and religious expression in contemporary language. Features of media language in its creative expression and symbolic manifestations.

ISC5103 INTEGRATION WORK RESIDENCY (3cr.)
Supervised research on the subject of media, religion, and ethics. The work must be completed while in residence. Corrections are made by the supervising professor and by a professor designated by the two institutions which signed the protocol. Prerequisite: ISC5101. Corequisite: ISC5102.

ISC5111 TESTIFYING FAITH, THROUGH THE MEDIA (3cr.)
What does it mean to testify and to witness religious faith today. In connection with the media: who should be a witness, based on what, when, where, what for. Consequences, values and limitations of such testimonies.

ISC5112 RELIGIOUS LEADERS AS SPOKEPERSONS FOR RELIGION IDENTITY IN THE MEDIA (3cr.)
The media impact of the Pope, the ayatollahs, the Dalai Lama. Case example: Pope John Paul II and television. Consequences for all believers of a religion. Perception of other believers and the general population. Challenges for religions of the presence of religious leaders in the media.

ISC5113 SPECIAL TOPICS ON “MEDIA, RELIGION, AND CULTURE” (3cr.)
In-depth analysis of a problem or an issue related to new trends in research or to new research topics in media/culture, from a religious point of view.

ISC5121 THE ETHICAL PROBLEM OF IDOLATROUS IMAGES (3cr.)
Photographs, posters, slides, videos, television, movies, multimedia raise theological questions based on ethics: potential idolatry of the audiovisual image, how and should media idols influence consumption, advertising, alienation, etc. The major monotheistic religions denounce and fear this danger associated with idolatry. Challenges for a religion to be present in the audiovisual media without falling into idolatry.

ISC5122 MEDIA ENTERTAINMENT, RELIGION, AND ETHICS (3cr.)
Entertainment and fantasy: religions fear them as potential dangers. Religions are more comfortable with doctrines and dogmas; media is interested in emotion and entertaining shows. Challenge for entertaining media and for dogmatic religions to hold together. Place for expression of faith in entertainment: to what extent can religious faith be expressed in the form of entertainment?

ISC5123 SPECIAL TOPICS ON “MEDIA, RELIGION, AND ETHICS” (3cr.)
In-depth analysis of a problem or an issue related to new trends in research or new research topics about media/ethics, from a religious point of view.

Health Professions Education

The graduate diploma in health professions education allows candidates to gain expertise in university health professions education. It is offered in both English and French

In accordance with University of Ottawa regulations, examinations and assignments may be written in either one of the two official languages
The master's thesis should reveal that the candidate is able to work in a scholarly manner and is
5374 or its equivalent.


CSI5134 (COMP 5004) FAULT TOLERANCE (3cr.)

with credit granted for relevant courses already completed in the diploma. The number of credits remaining would be assessed individually, at
ISI6352 MARKETING AND ADVOCACY FOR INFORMATION ORGANIZATIONS

Survey of digital technologies for representing and retrieving information. The course focuses on XML and database methods for representing,

Critical examination of theories, principles, and practices relating to the analysis of concepts reflected in information resources, and the

Overview of publishing and its role in today's information landscape. The course examines various types of publishers, their role in the

DCA6316 THE LAITY AND THE POWER OF GOVERNANCE IN THE CHURCH

the federation agreement between them.

DCA5130 MATRIMONIAL LAW

differing spiritual and secular humanist journeys of the counsellor and the client, and the possibility of meeting in difference. Topics covered

Students receive training in basic communication, interpersonal and interviewing skills. The development of attitudes and interpersonal qualities

building and its interconnection to practice and research. It presents, critically in depth, representative theories from the current major

Students are oriented to relevant professional organizations; the need for liability insurance, codes of ethics, professional standards and

restructuring techniques, and how to explore family rules, systems, values and boundaries.

IPA5134 PRACTICAL THEOLOGY (3cr.)

This course deepens the “mapping” done by mystical theologians (e.g., M. Eckhart, Theresa of Avila, Y. Raguin) of the road that leads to Fullness

theology itself into question? What are the similarities between the main meditation methods, Christian or otherwise? Do they lead to the same

• Use the training in his/her present professional setting (e.g: psychotherapy, health professional or other);
• Apply ... Diplomas, one being the Diploma in Leadership and Management, the other in
Organizational Performance Management.

Goods of institutes of consecrated life and societies of

Instruments of social communication and books in

Prerequisites: 12 credits among compulsory

Value

The diploma operates within the framework of the General Regulations of the FGPS, which are available on the Website at the following link:
www.etudesup.uottawa.ca/generalregulations

Programs

Graduate Diploma Health Professions Education

Admission

To be admitted, candidates must have:

• an honours bachelor's degree in Education or the equivalent (an honours bachelor's degree in science, in health science or in a related field)
and a minimum of at least 2 years of full-time teaching experience in a health related field in an accredited educational institution or in
another teaching context (e.g., clinical supervision.)

OR

a university professional degree (such as an MD, BScN) or a graduate degree (Master's or PhD) in science, in health science or in a related
field.

• an overall average of 70% (B), calculated in accordance with FGPS guidelines.

• proficiency in either English or French.

On completion of the graduate diploma, qualified students meeting admission requirements could apply to one of the related master's programs,
in particular the MA in Education or the MEd and, upon admission, complete the requirements for those programs with credit granted for
relevant courses already completed in the diploma. The number of credits remaining would be assessed individually, at the time of admission,
with relation to the student's chosen master's program. The regulation governing the articulation between graduate diplomas and related
master's programs can be found in the general Regulations of the FGPS (section A.7).

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted
towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits
may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the General Regulations of the FGPS.

Documents Required for Admission

Health Professions Education: Candidates without a university professional degree or a graduate degree must demonstrate teaching experience
by submitting a Statement of Teaching Experience form.

Transfer from Diploma to a Master’s Program

Students registered in the graduate diploma program can request to transfer to the Master of Education (MEd) program in accordance with
section A.7.1 of the "General regulations" of the FGPS.

Program Requirements

The Diploma requires successful completion of five courses (15 credits), with at least one course from four of the five themes listed below. At least
one of these four courses must be specific to health professions education and must be chosen from the following: EDU5105, EDU5202,
EDU5261, EDU5286, and EDU5298.

The program can be completed either full-time or part-time. Full-time students should expect to take evening courses.

Teaching and learning:

EDU5105 INTER-PROFESSIONAL EDUCATION IN THE HEALTH PROFESSIONS (3cr.)
EDU5463 CULTURAL STUDIES AND EDUCATION: THEORY AND PRAxis (3cr.)
EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
EDU5466 RACISM AND ANTIRACISM IN EDUCATION (3cr.)
EDU6103 RESEARCHING PROFESSIONAL PRACTICE (3cr.)
EDU6204 LEARNING IN ADULTHOOD (3cr.)
EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR (3cr.)
EDU6259 RESEARCH AND CONTEMPORARY ISSUES IN TEACHING MODELS AND PRACTICES (3cr.)
Curriculum:
EDU5206 PROGRAM PLANNING IN ADULT EDUCATION (3cr.)
EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)

Learning assessment:
EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
EDU6293 ASSESSMENT FOR LEARNING (3cr.)
EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)

Technology and education:
EDU5188 INTEGRATION OF TECHNOLOGY IN EDUCATION (3cr.)
EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION (3cr.)
EDU5287 EMERGING TECHNOLOGIES AND LEARNING (3cr.)

Program evaluation:
EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE (3cr.)
EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)

Duration of the Program
Students must complete all the requirements of the diploma within three years following initial registration.

Minimum Standards
The passing grade in all courses is C+. Students who fail six credits or the same course twice, must withdraw from the program.

Courses

EDU5188 INTEGRATION OF TECHNOLOGY IN EDUCATION (3cr.)
Examination of the implications on teaching practice and learning outcomes in the integration of technology studies across the curriculum.

EDU5202 TEACHING STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
Exploration of the concepts and strategies, methods of instruction in health education; examination of how instruction supports student learning.

EDU5206 PROGRAM PLANNING IN ADULT EDUCATION (3cr.)
Exploration of the fundamental concepts necessary to understand program development in adult education; review of conceptual frameworks for planning, recruitment, evaluation and research on program implementation and program building, procedures for making programs more meaningful to adult learners.

EDU5261 CURRICULUM DESIGN FOR HEALTH PROFESSIONS EDUCATION (3cr.)
Examination of theory for current practices related to curriculum design in health professions.

EDU5286 TECHNOLOGY AND HEALTH PROFESSIONS EDUCATION (3cr.)
Study of the impact of computer technology on communication and instructional techniques for health professions education; exploration of distance education, on-line learning, and low and high fidelity simulation.

EDU5287 EMERGING TECHNOLOGIES AND LEARNING (3cr.)
Research, theory and practice concerning the use of emerging technologies to facilitate learning; the impact of new media on teaching and learning strategies, on curriculum change, on learner attitudes and motivation, and on higher order learning.

EDU5298 STUDENT ASSESSMENT STRATEGIES FOR HEALTH PROFESSIONS EDUCATION (3cr.)
Exploration of the assessment formats used to evaluate the domains of clinical competence in health care professional training at both the undergraduate and postgraduate levels; analysis of written and oral examinations, oral and performance-based testing.

EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE (3cr.)
Exploration of principles of effective program evaluation methods; planning; instrument development; data collection, processing and analysis; reporting and follow-up; survey of diverse models of evaluation. Prerequisite: EDU5190

EDU5403 CULTURAL STUDIES AND EDUCATION: THEORY AND PRACTICE (3cr.)
Introduction to the interdisciplinary study of contemporary popular culture including theories of representation, texts, social identities, and their implications for school practices.
EDU5466 RACISM AND ANTIRACISM IN EDUCATION (3cr.)
Theories of "race", racism and antiracism in education; exploration of the challenges of anti-racist education and change.

EDU5600 L'APPRENTISSAGE À L'ÂGE ADULTE (3cr.)
Examen des théories de l'apprentissage appliquées à l'éducation de l'apprenant adulte. Analyse critique des modèles de mises en pratique de ces théories en situation d'apprentissage.

EDU5260 INTRODUCTION TO CURRICULUM STUDIES (3cr.)
Overview of recurring curriculum issues in historical and contemporary perspectives; introduction to the practices of curriculum theorizing; investigation of the effects of shifting paradigms within the field of curriculum studies.

EDU5752 ENSEIGNEMENT EN MILIEU MINORITAIRE FRANCOPHONE (3cr.)
Examen des enjeux reliés à l'apprentissage et l’enseignement en milieu minoritaire francophone permettant de préciser les démarches éducatives pertinentes.

EDU5833 ÉDUCATION ET CHANGEMENT SOCIAL (3cr.)

EDU6193 FOUNDATIONS OF MEASUREMENT AND TESTING (3cr.)
Classical test theory; composite variables; reliability; validity; applications to norm-referenced and criterion-referenced tests; scales standardization.

EDU6200 THE ADULT EDUCATOR: ROLES AND BEHAVIOUR (3cr.)
Study of functions and tasks, and the various roles of adult educators as volunteers, as trainers, as teachers of adults, as researchers; examination of the pre service and on going training of adult educators and professionalization in adult education.

EDU6204 LEARNING IN ADULTHOOD (3cr.)
Examination of theories and stages of adulthood with emphasis on adult psychological development and implications for education. Critical study of adult characteristics, motivation, gender roles and other concepts related to development.

EDU6293 ASSESSMENT FOR LEARNING (3cr.)
Nature and role of formative assessment in instructional settings; conditions and contexts favorable for effective use of assessment for learning.

EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
Critical exploration of theoretical orientations to program evaluation and in-depth examination of selected contemporary issues confronting evaluators. Prerequisite: EDU 5299 or PSY 7103 or PSY 7503 or CRM 6359 or CRM 6759 (Diploma in Program Evaluation).

Information Studies

The School of Information Studies, located in the Faculty of Arts, offers a graduate diploma in Information Studies and a Master of Information Studies (MIS).

Full-time or part-time students in the Master of Information Studies (MIS) degree complete 7 compulsory core courses in their first year of study plus a capstone experience course in their final semester.

The master's program offers three options to complete the 48 credits required for the MIS degree. The three options include a course-based option, a thesis option, and a co-op option. Please note that the co-op option is available to full time students only, and that there are a limited number of work placement spots available to SIS students each year. In all cases, a minimum of 25% of the courses must be completed in the second language.

Graduates of the MIS program are prepared to take on many exciting career opportunities as controlled vocabulary specialists, digital curators, information architects, knowledge management analysts, library directors, metadata managers, privacy analysts, records managers and web content managers, to name just a few.

This program is open to graduates in all disciplines, and is offered on a full-time and part-time basis. The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

Programs

Graduate Diploma Information Studies
Master of Information Studies (Bilingual)
Master of Information Studies (Bilingual) Specialization in Science, Society and Policy
Admission

Admission to the graduate programs in Information Studies is governed by the General Regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). Applicants to the graduate diploma program must have a master’s degree and a minimum cumulative average of 70% calculated in accordance with FGPS guidelines.

All applicants must be able to understand speak and write proficiently either English or French and have a passive knowledge (ability to understand the spoken and written word) of the other language. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the General Regulations of the FGPS.

Applications are evaluated based on the criteria listed in the online application form.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the General Regulations of the FGPS.

Transfer from graduate diploma to master’s

Students registered in the graduate diploma program can request to transfer to Master of Information Studies (MIS) in accordance with section A.7.1 of the "General regulations" of the FGPS.

Program Requirements

The Graduate Diploma program requires completion of five ISI courses (15 credits), generally chosen from 6000-level courses. Up to six credits of relevant courses from other graduate programs at the University of Ottawa may be taken with the approval of the School of Information Studies Programs Committee and the other program concerned. Students are responsible for having completed the prerequisites for the selected courses. No equivalencies are granted.

Duration of the program

Students in the Graduate Diploma in Information Studies must meet all the diploma requirements within three years of initial registration in the program.

Minimum standards

The minimum passing grade in all courses taken as part of the Information Studies programs is C+. Students who incur failures in two courses (equivalent to six credits) must withdraw from the program.

Courses

Not all of the listed courses are given each year.

The course description appears in the language of instruction.

**ISI5301 INFORMATION AND SOCIETY (3cr.)**
Critical examination of roles, values, ethics, and policies associated with the creation, communication, and use of information in today's society. The course examines from both an historical and a contemporary perspective the socio-cultural, economic, legal, and technological dimensions of the information environment, and the role of the information professions with respect to promoting and safeguarding principles such as those that form the foundation of intellectual freedom and equitable access to information. (Formerly: ISI5105)

**ISI5302 KNOWLEDGE ORGANIZATION (3cr.)**
Theories, principles, and models underlying the organization of knowledge and the representation of information resources. The course examines various approaches to knowledge organization, drawing on theories based in philosophy, cognitive sciences, linguistics, and other related fields, and explores their application in ontologies, taxonomies, classification systems, indexing languages, folksonomies, and resource description schema. (Formerly: ISI5102)

**ISI5303 INFORMATION RESOURCE MANAGEMENT (3cr.)**
Concepts and practices related to the management of information resources evaluation, selection, acquisition, storage, conservation, and preservation. The course examines organizational and technological models and standards for the management of a variety of analog, digital, and networked resources. (Formerly: ISI6126)
ISI5304 INFORMATION RESOURCE DISCOVERY (3cr.)
Theories and models relating to information seeking and use within both individual and institutional contexts. The course addresses the identification and representation of information needs, search strategies and techniques, ethical issues, and evaluation methods all within a variety of user communities and technological settings. The course also examines the information mediation process and services that facilitate information access. (Formerly: ISI5104)

ISI5305 MANAGEMENT FOUNDATIONS FOR THE INFORMATION PROFESSIONAL (3cr.)
Core management theories, principles, and methods used to effectively plan, deliver, and control the provision of information services. The course addresses strategic planning, project management, human and financial management, collaboration and team building, communications and marketing, and the evaluation of programs and services. (Formerly: ISI5103)

ISI5306 INFORMATION PROFESSIONALS AS LEADERS (3cr.)
Exploration of the multi-dimensional concept of leadership. The course provides an overview of theories and practices related to the various forms that leadership can take both within an organization and in the context of partnerships, collaborations, networks, and engagement with stakeholders and explores the dynamics of transformational leadership, entrepreneurship, and mentorship as they impact organizational change, innovation, advocacy, professional development, and advancement of the field of information studies. (Formerly: ISI5106)

ISI5307 RESEARCH AND EVALUATION IN INFORMATION STUDIES (3cr.)
Analysis of the research process from qualitative, quantitative, and evaluative perspectives. The course addresses each specific element of the research and evaluation process articulation of a research problem or evaluation goal, data collection and analysis, and dissemination of findings through a combination of critical analysis of existing research and in-class experimentation. (Formerly: ISI5101)

ISI6001 STAGE COOP / CO-OP WORK TERM (6cr.)
Expérience en milieu de travail comprenant une application pratique de recherche. Le stage est évalué Réussite / Échec (P/F) par un professeur de l’École des sciences de l’information basé sur l’évaluation fournie par le superviseur de la partie pratique du stage et sur le rapport de stage rédigé par l’étudiant. Préalable : Permission de l’École des sciences de l’information et du bureau du programme coop./ Experience in a workplace setting including practical application of research. Graded P (pass) / (F) fail by a professor from the School of Information Studies based on the work performance evaluation provided by the workplace supervisor and the student's work term written report. (Prerequisite: Permission of the School of Information Studies and the CO-OP office.)

ISI6002 STAGE COOP / CO-OP WORK TERM (6cr.)
Expérience en milieu de travail comprenant une application pratique de recherche. Le stage est évalué Réussite / Échec (P/F) par un professeur de l’École des sciences de l’information basé sur l’évaluation fournie par le superviseur de la partie pratique du stage et sur le rapport de stage rédigé par l’étudiant. Préalable : 6001 et permission de l’École des sciences de l’information et du bureau du programme coop./ Experience in a workplace setting including practical application of research. Graded P (pass) / (F) fail by a professor from the School of Information Studies based on the work performance evaluation provided by the workplace supervisor and the student’s work term written report. (Prerequisite: 6001 and permission of the School of Information Studies and the CO-OP office.)

ISI6011 PROJET DE RECHERCHE APPLIQUÉE I / APPLIED RESEARCH PROJECT I
Projet en bibliothéconomie, gestion de l’information ou pratique archivistique, permettant à l’étudiant d’acquérir de l’expérience en recherche appliquée, en intégrant connaissances et pratique. Le projet est préparé sous la direction d’un professeur du programme avec l’apport du superviseur de stage. L’étudiant doit soumettre un rapport écrit où il démontre qu’il a acquis des connaissances théoriques et pratiques pertinentes. Noté S/NS. Préalables : être accepté dans l’option coop OU au moins 24 crédits de cours d’études supérieures, incluant 12 crédits de cours ISI et permission de l’École des sciences de l’information. / A project in librarianship, information management or archival practice, allowing students to acquire experience in the application of research, integrating knowledge and practice. The project is conducted under the direction of a professor in the program with input from the workplace supervisor. Students must submit a written report that describes the project and demonstrates that they have acquired relevant theoretical and methodological knowledge. Graded S/NS. Prerequisites: Acceptance into the co-op option OR at least 24 credits at the graduate level, including 12 credits of ISI courses, and the permission of the School of Information Studies.

ISI6012 PROJET DE RECHERCHE APPLIQUÉE II / APPLIED RESEARCH PROJECT II
Projet en bibliothéconomie, gestion de l’information ou pratique archivistique, permettant à l’étudiant d’acquérir de l’expérience en recherche appliquée, en intégrant connaissances et pratique. Le projet est préparé sous la direction d’un professeur du programme avec l’apport du superviseur de stage. L’étudiant doit soumettre un rapport écrit où il démontre qu’il a acquis des connaissances théoriques et pratiques pertinentes. Noté S/NS. Préalable : être accepté dans l’option coop. Co-requis : ISI6002. / A project in librarianship, information management or archival practice, allowing students to acquire experience in the application of research, integrating knowledge and practice. The project is conducted under the direction of a professor in the program with input from the workplace supervisor. Students must submit a written report that describes the project and demonstrates that they have acquired relevant theoretical and methodological knowledge. Graded S/NS. Prerequisite: Acceptance into the co-op option. Co-requisite: ISI6002.

ISI6300 SPECIAL TOPICS IN INFORMATION STUDIES (3cr.)
Particular subjects in information studies not included or covered to the same extent in other Information Studies courses. May be repeated with distinct topics. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6100)

ISI6310 ETHICS, VALUES AND INFORMATION DILEMMAS (3cr.)
Exploration of major ethical concerns currently confronting our information society. The course examines the moral and ethical values involved in information and technology-related situations faced by today’s information professionals and agencies, and provides an opportunity to apply ethical theories to situations involving issues such as freedom of expression, censorship, intellectual property rights, equitable access, and privacy. (Formerly: ISI5160) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.
ISI6311 INFORMATION AND THE LAW (3cr.)
Survey of the legal framework relevant to the formulation and implementation of information policies in libraries, archives, and other cultural, educational, and governmental organizations. The course focuses on Canadian legislation regulating copyright, access to information, and privacy; examines models for licensing intellectual property; and assesses the impact of digital technologies on regulations governing the management and dissemination of information. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5161)

ISI6312 GLOBAL INFORMATION AND COMMUNICATIONS POLICY (3cr.)
Contemporary policy issues relating to information and communication systems and institutions worldwide. The course examines how the interests of various actors and their differing abilities to advance these interests influence the intended and unintended outcomes of information and communications policy, and provides an opportunity to use the tools and techniques of policy analysis. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5162)

ISI6313 GOVERNMENT INFORMATION POLICY AND PRACTICE (3cr.)
Exploration of the role of government policy in the provision of information services, in its social, economic, and technological dimensions. The course examines policies and practices relating to publishing, distributing, and providing online access to government information at the federal, provincial, and municipal levels; assesses the role and expectations of government in the information ecosystem today; and compares Canadian information policies and trends with those of foreign and intergovernmental agencies. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5164)

ISI6314 THE PUBLISHING BUSINESS: TRANSFORMATIONS AND OPPORTUNITIES (3cr.)
Overview of publishing and its role in today’s information landscape. The course examines various types of publishers, their role in the communications ecosystem, their business models, use of formats and standards, strategic planning, and intellectual property issues. The challenges addressed include the multiplicity of communication technologies and supply/distribution channels, publishers’ efforts to transform their operations for the digital age, open access, and the dynamics of global partnerships, collaboration, and competition. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6130)

ISI6321 ARCHIVES AND RECORDS MANAGEMENT (3cr.)
Principles and challenges of organizing, archiving, and providing access to the records of an organization. The course examines methods, standards, and best practices for establishing information inventories, evaluating information policies, and managing the information life cycle, through an exploration of a multiplicity of media formats and a variety of records storage, retrieval, and management technologies. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6121)

ISI6322 DIGITAL PRESERVATION (3cr.)
Critical examination of the organizational, technological, regulatory, and cultural factors associated with the preservation of digital information over time to ensure its long-term accessibility and authenticity. The course focuses on the set of processes, initiatives, and standards used to identify, control, and manage digital information, whether this information is born-digital with no analog counterpart or has been digitally reformatted from an analog source. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6122)

ISI6323 LIBRARY COLLECTIONS MANAGEMENT (3cr.)
Exploration of the concepts, theories, and practices involved in library collection development and management. The course examines policies and issues related to the evaluation, selection, acquisition, and disposition of resources, budgeting, pricing models, and the impact of communication systems, in a variety of library settings. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6148)

ISI6330 RESOURCE DESCRIPTION (3cr.)
Critical examination of concepts and principles underlying the design and application of standards for the description of information resources. The course examines current standards for resource description and their relationship to the resource discovery context within which they operate. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5120)

ISI6331 CONCEPT ANALYSIS AND REPRESENTATION (3cr.)
Critical examination of theories, principles, and practices relating to the analysis of concepts reflected in information resources, and the representation of those concepts by means of indexing terms and class notation. The course focuses on the design and application of controlled vocabularies and classification systems used currently to support resource discovery in a variety of domains. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5121)

ISI6332 METADATA AND TAXONOMIES (3cr.)
Critical examination of the development and application of metadata standards and taxonomies designed to support resource discovery, resource management, and resource use. The course examines standards and taxonomies drawn from a variety of domains (e.g., cultural heritage, education, government, e-commerce) covering a broad range of resources (texts, images, geospatial data, multimedia); and explores issues relating to the planning and management of metadata projects and interoperability in a distributed environment. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI6123)

ISI6341 INFORMATION REPRESENTATION AND RETRIEVAL TECHNOLOGIES (3cr.)
Survey of digital technologies for representing and retrieving information. The course focuses on XML and database methods for representing, querying, and transforming structured data, including entity relationship diagrams, XML schema and XML style sheets. The course also examines technologies that underlie search engines, such as natural language processing, full-text indexing, document classification, semantic search, and recommender systems, situating each of these technologies in the context of document repositories and digital libraries. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: ISI5141)
IS16342 WEB ARCHITECTURE AND TECHNOLOGIES (3cr.)
Design and management of websites information architecture as it pertains to website design and the web environment. The course examines methodologies applied in information organization, website design, and evaluation of the user experience, as well as state of the art software tools supporting website design and management. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: IS16127)

IS16343 DIGITAL ASSET MANAGEMENT TECHNOLOGIES (3cr.)
Structure and function of digital asset management technologies designed to meet a variety of individual and organizational needs. The course examines client-server architectures, database-driven web applications, and the selection and deployment of digital asset management systems to meet end-user and organizational requirements. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: IS16131)

IS16351 SOCIAL MEDIA (3cr.)
Exploration of social media technologies and how they are changing the way we learn, communicate, interact, and share information. The course assesses the implications of social media for individuals, organizations, social networks, and communities, and examines how social media can be used to develop innovative information services and applications. (Formerly: IS16129) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

IS16352 MARKETING AND ADVOCACY FOR INFORMATION ORGANIZATIONS (3cr.)
Examination of how marketing concepts and techniques can be applied to promote the products and services offered by information organizations, and to raise public awareness around issues relating to information access and services. The course introduces theoretical concepts and marketing tools, and examines how they can be applied in the context of non-profit organizations. The course also examines the advocacy process, and provides an opportunity to apply advocacy techniques to selected issues. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.) (Formerly: IS16142)

IS16353 ACCESS AND SERVICES TO DIVERSE POPULATIONS (3cr.)
Critical examination of the social, cultural, political, and economic information contexts experienced by minority and underserved populations in Canada and in the global society. The course examines barriers, enablers, and issues related to various forms of literacy, ethnocultural practices, organizational structures, and user-centered knowledge and information preferences, with the goal of improving the information professional's cross-cultural skills and practices related to information access, service design, delivery, and evaluation. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies)

IS16354 CULTURAL HERITAGE RESOURCES (3cr.)
Examination of policies, practices, and issues relating to cultural heritage collections. The course examines the role of cultural heritage organizations, their policies and practices with respect to developing, preserving, and facilitating access to collections of cultural significance, and issues relating to interpretation, stewardship, advocacy, and cultural engagement. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: IS15112)

IS16361 ADVANCED RESEARCH METHODS IN INFORMATION STUDIES (3cr.)
Advanced study of quantitative and qualitative research paradigms for the investigation of both practical and theoretical problems in information studies and the critical assessment of published research. The course addresses online data collection and analysis, ethics of Internet research and relevant data analysis software, and established and emerging research methods for large data sets. (Prerequisites: IS15307 and 9 credits among compulsory core courses.)

IS16371 LEARNING AND INSTRUCTION (3cr.)
Survey of theories and practices related to learning and instructional design from the perspective of skills development and lifelong learning on a personal, organizational, and societal level. The course addresses the roles of information professionals in providing instruction in the use of information services, in enabling users to conduct independent research, and in staff training, and examines approaches and issues related to technology-enhanced learning. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies) (Formerly: IS16145)

IS16372 INFORMATION LITERACY (3cr.)
Survey of information literacy perspectives, concepts, and principles, including past and current trends. The course provides an in-depth examination of practical and theoretical issues relating to the development and evaluation of information literacy modules and programs, using case studies of information literacy programs and services in libraries, community agencies, business, education, and other information settings. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.)

IS16381 KNOWLEDGE IN ORGANIZATIONS (3cr.)
Exploration of the institutional structures, agencies, and practices of contemporary knowledge organizations. The course examines organizational culture, decision-making, socio-technical practices, and approaches to assessing and communicating organizational value all within a knowledge and information management framework. (Formerly: IS16140) Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.

IS16382 HUMAN RESOURCE MANAGEMENT (3cr.)
Examination of various perspectives on organizations, their infrastructure, their human resources, and their political and symbolic realities. The course uses case studies extensively, providing examples from special, academic, and public libraries as well as archival repositories, and addressing a number of issues associated with change management, including those related to recruitment, retention, collective bargaining, team building, mentoring, and professional development. (Prerequisites: 12 credits among compulsory core courses or permission of the School of Information Studies.) (Formerly: IS16144)

IS16995 PROJET DE FIN D'ÉTUDES / CAPSTONE EXPERIENCE (3cr.)
Ce cours synthèse vise à offrir une perspective intégrée des expériences d'apprentissage vécues par l'étudiant durant son programme de M.S.I. dans le cadre de ses cours, du travail de terrain, et des activités d'implication dans la communauté auxquelles il a participé. Le cours permet de faire une évaluation globale des réalisations de l'étudiant en fonction de ses compétences professionnelles et de ses résultats d'apprentissage. Évalué S/NS Préalable : réussite de 36 crédits, dont 30 crédits ISI, ou la permission de l'École des sciences de l'information.) / The capstone course is designed to provide an integrated perspective on the student's learning experiences in the MIS program gained through courses, field work, and community engagement. The course enables an overall assessment of the student's achievements in the context of professional competencies and student learning outcomes. Evaluated S/NS. (Prerequisite: completion of 36 credits, including 30 ISI credits or permission of the School of Information Studies.)

**ISI6996 APPRENTISSAGE EXPÉRIMENTIEL / EXPERIENTIAL LEARNING (3cr.)**
Application des principes des sciences de l'information au cours d'un stage supervisé effectué dans un service de l'information. Rédaction d'un rapport de stage. Préalable : Permission de l'École des sciences de l'information.) / Supervised practicum designed to allow students to put their knowledge of information studies principles to work in an organization that offers information services. Students are required to submit a written report. (Prerequisite: Permission of the School of Information Studies.)

**ISI6997 LECTURES DIRIGÉES EN SCIENCES DE L’INFORMATION / DIRECTED READINGS IN INFORMATION STUDIES (3cr.)**
Études personnelles supervisées sur des sujets qui n'ont pas été traités, ou l'ont été de façon sommaire, dans les autres cours du programme. Peut être répété si les sujets diffèrent. Préalable : Permission de l'École des sciences de l'information.) / Supervised specialized study of subjects not included or covered to the same extent in available Information Studies courses. May be repeated with distinct subjects. (Prerequisite: Permission of the School of Information Studies)

**ISI6998 PROPOSITION DE THÈSE DE MAÎTRISE / MASTER'S THESIS PROPOSAL**

**ISI6999 THÈSE DE MAÎTRISE / MASTER'S THESIS (12cr.)**
La thèse de maîtrise doit révéler que le candidat possède une méthode de travail scientifique et est au courant des principaux ouvrages sur le sujet de sa thèse. Autant que possible, la thèse doit être une contribution originale. Pour de plus amples renseignements, veuillez consulter la Section G des Règlements Généraux de la FESP et le guide « Préparer sa thèse ou son mémoire », qui se trouvent sur le site internet de la FESP (www.etudesup.uottawa.ca). Évaluer S/NS./ The master’s thesis should reveal that the candidate is able to work in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. Insofar as it is possible, the thesis should be an original contribution. For additional information, please consult section G of the General Regulations of the FGPS and the guide "Preparing a Thesis or a Research Paper", which can be found in the website of the FGPS (www.grad.uottawa.ca). Evaluated S/NS.

**Internet Technologies**

Internet is fast becoming the vehicle for integrated multimedia (voice/video/graphics/data) communications. It may absorb within its standards and protocols other well-established technologies, such as telephony, facsimile, messaging, data and entertainment technologies. Its fastest growing service, the World Wide Web, has created a true information revolution and is daily pushing the limits of current technologies to cope with its growth.

Internet technologies have become a discipline in themselves. The Internet Protocol (IP) continues to dominate as a standard for ubiquitous global communications, and other Internet standards (for example, DiffServ, RSVP) are quickly emerging to offer quality of service on the Internet. There is a need to train professionals at the graduate level in this area, where expertise is required beyond basic undergraduate experience.

The objective of the graduate diploma in Internet Technologies is to educate high technology professionals with full undergraduate training for the growing Internet standards, methods, techniques and applications markets. It includes courses in both the main theories and applications of Internet engineering, as well as basic formation of the intricate world of Internet law and electronic commerce.

The diploma operates within the framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS), which are available on the Website at the following link:

www.etudesup.uottawa.ca/generalregulations

**Programs**

Graduate Diploma Internet Technologies

**Admission**

The minimum admission requirements are a bachelor’s degree with honours in electrical engineering, computer engineering, software
engineering, computer science, or equivalent, with a minimum average of 75 per cent (B+). The admissions committee may, however, also recommend other candidates, who satisfy the minimum admission requirements of the FGPS and have a demonstrated knowledge and/or experience in the field. Candidates for whom a list of additional qualifying courses will be required may be considered in exceptional cases. In this case, they must obtain a minimum grade of B+ in all their additional courses.

On completion of the diploma, qualified students meeting admission requirements could apply to one of the master's programs, in particular the master of computer science or the MEng or MASc in electrical engineering, and, upon admission, complete the requirements for those programs with credit granted for relevant courses already completed in the diploma. The number of credits remaining would be assessed individually, at the time of admission, with relation to the student's chosen master's program.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

**Transfer from Graduate Diploma to Master's**

Students registered in the graduate diploma program can request to transfer to the Master of Applied Science degree (MASc) or to the Master of Engineering degree (MEng) or to the Master of Computer Science (MCS) in accordance with section A.7.1 of the general regulations of the FGPS.

Applications should be addressed to the Director, Graduate Diploma in Internet Technologies (INTERTECH), School of Information Technology and Engineering

**Language Requirements**

Some of the requirements of the Program must be fulfilled in English. A very good knowledge of the English language is therefore required. Students whose first language is neither English nor French are required to take the TOEFL examination or an equivalent (as determined by the Faculty of Graduate and Postdoctoral Studies) as a condition of admission.

**Program Requirements**

The Diploma requirements are as follows: 12 credits of core courses and 6 credits of electives. All academic regulations of the Faculty of Graduate and Postdoctoral Studies will apply to the Diploma.

Compulsory courses (12 credits as follows):

Two compulsory courses:

- ELG5374 (EACJ 5607) COMPUTER COMMUNICATION NETWORKS (3cr.)
- DCL7302 REGULATION OF INTERNET COMMUNICATIONS (3cr.)

Two courses among the following:

- ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS (3cr.)
- ELG5369 (EACJ5369) INTERNETWORKING TECHNOLOGIES (3cr.)
- ELG5373 (EACJ 5105) DATA ENCRYPTION (3cr.)
- or
- CS1505 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)

Optional courses (6 credits) chosen from the following:

- CS1510 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
- CS1511 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)
- CS1512 (COMP 5207) SOFTWARE ENGINEERING (3cr.)
- CS1515 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
- CS1522 (COMP 5301) SOFTWARE USABILITY (3cr.)
- CS1534 (COMP 5004) FAULT TOLERANCE (3cr.)
- CS1540 (COMP 5900) SELECTED TOPICS IN COMPUTER SCIENCE (3cr.)
- CS1561 (COMP 5606) PRINCIPLES OF DISTRIBUTED SIMULATION (3cr.)
- CS1566 (COMP 5805) APPLICATIONS OF COMBINATORIAL OPTIMIZATION (3cr.)
- CS1569 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
- CS1574 (COMP 5174) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)
- CS1587 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)
- CS1589 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

- ELG5124 (EACJ 5204) VIRTUAL ENVIRONMENTS (3cr.)
- ELG5191 (EACJ 5503) DESIGN OF DISTRIBUTED SYSTEM SOFTWARE (3cr.)
- ELG5171 (EACJ 5500) DIGITAL COMMUNICATION BY SATELLITE (3cr.)
- ELG5372 (EACJ 5504) ERROR CONTROL CODING (3cr.)
ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3cr.)
ELG5381 (EACJ 5004) PHOTONICS NETWORKS (3cr.)
ELG5382 (EACJ 5108) SWITCHING AND TRAFFIC THEORY FOR INTEGRATED BROADBAND NETWORKS (3cr.)
ELG5383 (EACJ 5006) SURVIVABLE OPTICAL NETWORKS (3cr.)
ELG7178 TOPICS IN COMMUNICATION II (3cr.)
ELG7186 (EACJ 5807) TOPICS IN COMPUTERS I: FORMAL METHODS FOR THE DEVELOPMENT OF REAL-TIME SYSTEM APPLICATIONS (3cr.)
ELG7186C TOPICS IN COMPUTERS I: SOFTWARE ENGINEERING PROJECT MANAGEMENT
ELG7187 (EACJ 5807) TOPICS IN COMPUTERS II (3cr.)

Duration of the Program

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

Minimum Standards

The passing grade for all courses is C+.

Courses

DCL7302 REGULATION OF INTERNET COMMUNICATIONS (3cr.)
Seminar analyzing the legal challenges posed by the Internet to the rights of free speech and privacy. Topics include online obscenity, hate speech, defamation, as well as national and international approaches to data privacy protection.

CSI5105 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks.
Prerequisites: familiarity with basic concepts in networks, network security, and applied cryptography. For example, relevant background courses may include the following (or equivalents): CEG 4185 or COMP 3203 and/or CSI 4138 or CEG 4394 or COMP 4108, and/or CSI 4108 or ELG 5373 or COMP 4109.

CSI5110 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
Methodologies in formal software specification, development, and verification. The use of theorem proving, automated deduction, and other related formal methods for software correctness. Applications in program verification, mobile code safety, and protocol verification.

CSI5111 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)

CSI5112 (COMP 5207) SOFTWARE ENGINEERING (3cr.)
Topics of current interest in Software Engineering, such as software development systems, structured systems analysis and design, management of software, software tools, validation and verification, programming environments.

CSI5115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
The dimensional and multidimensional data models for data warehousing. Data dependencies and decomposition. Structure and use of data definition and manipulation languages. Database economics, engineering, deployment and evolution. Issues in integrity, security, the Internet and distributed databases. Relationships to decision support systems. Prerequisite: CSI31017 or equivalent

CSI51122 (COMP 5301) SOFTWARE USABILITY (3cr.)
Design principles and metrics for usability. Qualitative and quantitative methods for the evaluation of software system usability: Heuristic evaluation, usability testing, usability inspections and walkthroughs, cognitive walkthroughs, formal usability experimentation. Ethical concerns when performing studies with test users. Economics of usability. Integration of usability engineering into the software engineering lifecycle.

CSI5134 (COMP 5004) FAULT TOLERANCE (3cr.)
Hardware and software techniques for fault tolerance. Topics include modeling and evaluation techniques, error detecting and correcting codes, module and system level fault detection mechanisms, design techniques for fault-tolerant and fail-safe systems, software fault tolerance through recovery blocks, N-version programming, algorithm-based fault tolerance, checkpointing and recovery techniques, and survey of practical fault-tolerant systems.

CSI5140 (COMP 5900) SELECTED TOPICS IN COMPUTER SCIENCE (3cr.)
Selected topics, not covered by other graduate courses. Details will be available from the School at the time of registration.

CSI5161 (COMP 5606) PRINCIPLES OF DISTRIBUTED SIMULATION (3cr.)
Distributed simulation principles and practices. Synchronization protocols: Optimistic vs Conservative, Deadlock detection in conservative simulations, Time warp simulation. Distributed interactive simulation: Data distribution management, Interest management, High Level Architectures (HLA), Run Time Infrastructure (RTI). Distributed web-based simulation. Distributed agent based simulation. Real time applications of distributed simulation. Distributed and collaborative virtual simulations.
CS15166 (COMP 5805) APPLICATIONS OF COMBINATORIAL OPTIMIZATION (3cr.)
Topics in combinatorial optimization with emphasis on applications in Computer Science. Topics include network flows, various routing algorithms, polyhedral combinatorics, and the cutting plane method.

CS15169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer, Media Access Control, Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery, Clustering, Multicasting, Localization, Mobile IP/TCP (Internet Protocol/Transmission Control Protocol), File Systems, Mobility Models, Wireless Applications. (Cannot be combined for credit with ELG 6168)

CS15174 (COMP 5604) VALIDATION METHODS FOR DISTRIBUTED SYSTEMS (3cr.)

CS15380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

CS15387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)

CS15389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

CS15380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

CS15387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)

CS15389 (COMP 5401) ELECTRONIC COMMERCE TECHNOLOGIES (3cr.)

ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS (3cr.)

ELG5124 (EACJ 5204) VIRTUAL ENVIRONMENTS (3cr.)

ELG5191 (EACJ 5203) DESIGN OF DISTRIBUTED SYSTEM SOFTWARE (3cr.)
Distributed systems design and programming issues; distributed computing. Basics of object oriented technology for distributed computing. Distributed objects technologies. Object oriented models for distributed programming. Distributed computing architecture design. Component based distributed software design. Scalability, interoperability, portability and distributed services. Distributed applications design. Prerequisites: an undergraduate degree in Computer Engineering, or Computer Science, or practical experience in system software design. Prerequisite: An undergraduate education in Computer Engineering, or Computer Science, or practical experience in system software design.

ELG5369 (EACJ5369) INTERNETWORKING TECHNOLOGIES (3cr.)
IP Based Internet Technologies: Internet architecture and its protocols. Software/hardware requirements for quality of service (QoS). Integrated services. Scheduling. Fair queueing, Traffic and admission control algorithms. Differentiated services. Multiprotocol label switching (MPLS) and associated software/hardware design issues. Fast internet protocol (IP), asynchronous transfer mode (ATM), internet protocol (IP) over...
synchronous optical network (SONET), wavelength division multiplexing (WDM), satellite implementations. Precludes additional credit for ELG7187/8 (EACJ5808B) Prerequisite: CEG/ELG 4183.

ELG5371 (EACJ 5500) DIGITAL COMMUNICATION BY SATellite (3cr.)
Propagation and interference considerations. Link budget calculations. GEO, LEO, HEO systems. Transponders. Earth stations; modems (PSK, MSK, etc.), low noise amplifiers, high power amplifiers. Error control. Access techniques; FDMA, TDMA, CDMA, random access. Switching, onboard processing, Networking, ATM over satellites. Mobile satellite communications and IMT2000. Prerequisite: ELG 4171 or the equivalent.

ELG5372 (EACJ 5504) ERROR CONTROL CODING (3cr.)

ELG5373 (EACJ 5105) DATA ENCRYPTION (3cr.)

ELG5374 (EACJ 5607) COMPUTER COMMUNICATION NETWORKS (3cr.)
Network applications, structures and their design issues. Resource sharing/access methods. Network transmission and switching techniques. OSI model. Error control, flow control and various issues related to the physical, data link and network layers. Local area networks. Performance issues of delay-throughput in various protocols. Precludes additional credit for SYSC 5201. Prerequisites: an undergraduate course in probability and statistics such as MAT 2377. Prerequisite: an undergraduate course in probability and statistics such as MAT2377.

ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3cr.)

ELG5381 (EACJ 5004) PHOTONICS NETWORKS (3cr.)

ELG5382 (EACJ 5108) SWITCHING AND TRAFFIC THEORY FOR INTEGRATED BROADBAND NETWORKS (3cr.)
Principles of switching theory. Asynchronous Transfer Mode switching architectures. Principle of teletraffic engineering. Queueing theory and performance evaluation techniques as applied to the study of computer network architectures. Current topics in computer network modelling analysis and traffic control for high-speed multimedia networks. Prerequisite: ELG 5374 (EACJ 5607) or ELG 6121 (SYSC 5201), or the equivalent. Co-requisite: ELG 5119 (EACJ 5109) or ELG 6153 (SYSC 5503) or ELG 6103 (SYSC 5003), or the equivalent.

ELG5383 (EACJ 5009) SURVIVABLE OPTICAL NETWORKS (3cr.)
Optical networks design with emphasis on network survivability. Wavelength division multiplexing (WDM), wavelength conversion, optical switch architectures, routing and wavelength assignment algorithms, IP over WDM, optical network protocols, optical network control architectures, protection and restoration, spare capacity allocation, survivable routing, design and performance evaluation. Prerequisites: ELG 5374 or its equivalent.

ELG7178 TOPICS IN COMMUNICATION II (3cr.)

ELG7186 (EACJ 5807) TOPICS IN COMPUTERS I: FORMAL METHODS FOR THE DEVELOPMENT OF REAL-TIME SYSTEM APPLICATIONS (3cr.)

ELG7186C TOPICS IN COMPUTERS I: SOFTWARE ENGINEERING PROJECT MANAGEMENT

ELG7187 (EACJ 5807) TOPICS IN COMPUTERS II (3cr.)

Leadership and Management

(This program is only being offered in French at the present time.)

The Telfer School of Management offers two 15-credit Graduate Diplomas, one being the Diploma in Leadership and Management, the other in Organizational Performance Management.
The diploma in Leadership and Management allows students to develop their understanding of the strategic importance of human resource management as well as to develop their management skills and leadership abilities, in order to improve performance within the organisation.

The diploma offers those who wish to acquire or improve their management skills a means of doing so while maintaining their regular activities.

The diploma is composed solely of courses offered in the MBA and, upon admission to the MBA, students who have completed this diploma (and/or the diploma in Organizational Performance Management) can transfer all credits obtained to the MBA program. This is also the case for the diploma in Organizational Performance Management. All 30 credits of the 2 diplomas can be retained within the MBA program. See the section entitled Program requirements for more information.

This program is offered on a part-time basis. Students may complete it in 3 or in 6 sessions.

Programs

Graduate Diploma Leadership and Management

Admission

Applicants to the program must:

- hold a baccalaureate degree or its equivalent with minimum standing of B;
- have acquired a minimum of 3 years of work experience;
- have achieved at least a 50th percentile score either on the Graduate Management Admission Test (GMAT) or on the TAGE MAGE or have passed the Telfer School of Management admission exam after taking the online mathematics modules;
- provide a letter of intent;
- provide two confidential letters of recommendation;
- have sufficient knowledge of the language of instruction, either English or French.

In some cases, applicants will be interviewed by a program representative.

Program Requirements

1Program Requirements (15 credits)

All courses in the diploma are compulsory.

ADM6260 PROJECT MANAGEMENT I (1.5cr.)
MBA5235 MANAGEMENT SKILLS I (1.5cr.)
MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
MBA5237 CHANGE MANAGEMENT (1.5cr.)
MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
MBA5131 ORGANIZATIONAL BEHAVIOUR (1.5cr.)
MBA5132 HUMAN RESOURCES MANAGEMENT (1.5cr.)
MBA5211 CORPORATE GOVERNANCE AND ETHICS (1.5cr.)
MBA6297 MOBILIZING SEMINAR IN MANAGEMENT I (1.5cr.)

Minimum standards

The passing grade in all graduate courses is C+ (65%). Students who receive failing grades in more than 3 credits (or in the same course twice) must withdraw from the program.

Duration of program

The diploma may be completed in 3 or in 6 sessions. The maximum duration is three years from the time of initial registration in the program.

Retained credits

Students enrolled in the Leadership and Management diploma or the Organizational Performance Management diploma can transfer all course credits to the MBA program, subject to the following conditions:
a. courses must have been completed within the past five years;
b. courses must have been completed with a minimum grade of B (70%).

1 In the event that a student has already been conferred with the Graduate Diploma in Organisational Performance Management, MBA5260 and MBA5265 must be replaced by MBA6396 Integrative Cases and Team Management (3cr.).

Courses

ADM6260 PROJECT MANAGEMENT I (1.5cr.)
Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK®) of the Project Management Institute (PMI®); project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning, realization and close-out). Students will have hands-on experience using MS Project.

MBA5131 ORGANIZATIONAL BEHAVIOUR (1.5cr.)
Determining the key organizational factors (e.g. structure, culture) influencing organizational performance. Understanding and application of principles favoring motivation, workplace satisfaction and mobilization of teams; Understanding of employee diversity and its impact on decision-making. Understanding the notions of power and politics underpinning management decisions. Prerequisite: MBA5235. MBA5131 and MBA5132, together, are equivalent to MBA5330.

MBA5132 HUMAN RESOURCES MANAGEMENT (1.5cr.)
Understanding the strategic importance of human resources and their impact on organizational performance; Acquisition of skills related to employee selection, performance evaluation and managing individual and team performance. Differentiate recognition strategies which foster equity and workplace performance. Differentiate features of human resource management in an international context. Prerequisite: MBA5131. MBA5131 and MBA5132, together, are equivalent to MBA5330.

MBA5235 MANAGEMENT SKILLS I (1.5cr.)
Development of increased skills and understanding of participant preferences for the management of interpersonal and team-based issues and processes in a work environment. Special focus on diversity and ethics in a team environment. Effective business communications, including skills for delivery of high quality business presentations; exposure to common business software for inclusion in the student’s professional toolbox.

MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
Leadership versus management; participatory leadership; transactional leadership; transformational leadership; reciprocity and mutual influence between leaders and followers; leading up (followership); situational determinants of effective leadership; cross-cultural leadership; virtual leadership. Course delivery involves class discussions, experiential exercises, guest speakers and case studies. Prerequisite: MBA 5330 or permission of the MBA program director.

MBA5237 CHANGE MANAGEMENT (1.5cr.)
Development of skills in the effective conceptualization, planning, implementation and evaluation of change interventions in human systems. Behavioral science frameworks explaining and guiding the practice of change in an organizational context. Systemic nature of change and intervention practice, including the generation and management of resistance to change. Organizational change processes at the levels of individual, team, and overall organizational design including the necessary system conditions that underlie effective human system intervention efforts. Cross-cultural change, knowledge based organizations, socio-technical change processes, system vs. cultural change.

MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
Understanding the role of the general manager in setting direction, creating competitive advantage, allocating resources, integrating operations and projects, framing the organizational infrastructure and context and managing change. Introduction to the concept of strategy and alternative models of strategic making.

MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
The focus will be on learning about business intelligence and performance management approaches at operational levels in the organization. Frameworks such as the Balanced Score Card and Quality Management will be covered, as well as the use of business intelligence to explore performance problems.

MBA6297 MOBILIZING SEMINAR IN MANAGEMENT I (1.5cr.)
The seminars focus on current issues and topics in management. The focus of these seminars may change from year to year.

MBA6396 INTEGRATIVE CASES AND TEAM MANAGEMENT (3cr.)
In a team-taught, multi-disciplinary setting, the course integrates management concepts, principles and tools seen in program courses to date. Using the case study approach as well as team presentations, students understand the multifunctional links required to arrive at a sound managerial decision. The inherent characteristics of effective teams and the creative power of high performance teams are integrated via constructive feedback, conflict resolution and the team’s self-assessment. Prerequisite: MBA5235.
Mobile Device Applications

The Graduate Diploma in Mobile Device Applications is offered by the School of Electrical Engineering and Computer Science in conjunction with the Faculty of Graduate and Postdoctoral Studies (FGPS). It can be pursued either full-time or part-time. The program is offered mostly in English with courses in French when enrolments warrant it. According to University of Ottawa Regulations, students have the right to produce assignments, examinations, research papers and theses in either English or French.

Programs

Graduate Diploma Mobile Device Applications

Admission

The minimum admission requirement is an honours four-year Bachelor’s degree in one of the following: Electrical Engineering, Computer Engineering, Software Engineering, and Computer Science (Honours), or equivalent, with an average of at least a B. The admissions committee may, however, also admit other candidates who satisfy the minimum admission requirements of the Faculty of Graduate and Postdoctoral Studies and have demonstrated relevant knowledge and/or experience. In some cases, candidates may be required to complete a maximum of three qualifying courses prior to admission, and achieve a minimum grade of B+ in each of the qualifying courses.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the General Regulations of the FGPS.

On completion of the graduate diploma, students meeting admission requirements may apply to the existing master’s degree in Computer Science. To do so, they must satisfy the conditions set by section A.7.1 of the Faculty of Graduate and Postdoctoral Studies regulations regarding transfer from graduate diploma to master’s.

Program Requirements

The graduate Diploma requirements consist of 6 credits of compulsory courses and 9 credits of optional courses. The optional courses are grouped into three areas: multimedia; networks and communication; and software and systems. Students must take a minimum of 3 credits from at least two different groups.

Compulsory courses (6cr.)

CSI5130 APPLICATIONS DESIGN FOR MOBILE DEVICES (3cr.)
CSI5905 PROJET / PROJECT (3cr.)

Optional courses (9cr.)

9 credits from the following list, with no more than 6 credits in any one group:

Group 1: Multimedia
CSI4133 Computer Methods in Picture Processing and Analysis (3cr.)
CSI5140 (COMP 5906) SELECTED TOPICS IN COMPUTER SCIENCE (3cr.)
CSI5146 (COMP 5402) COMPUTER GRAPHICS (3cr.)
ELE5164 (EACJ 5105) MACHINE VISION (3cr.)
ELE7173 (EACJ 5601) TOPICS IN SIGNAL PROCESSING II (3cr.)

Group 2: Networks and Communication
CSI5156 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
CSI5169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
ELE5121 (EACJ 5401) MULTIMEDIA COMMUNICATIONS (3cr.)

Group 3: Software and Systems
CSI5122 (COMP 5301) SOFTWARE USABILITY (3cr.)
CSI5380 (COMP 5405) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

Duration of the Program

The diploma requirements can be completed within one year. The maximum time permitted is three years from the time of initial registration.
Minimum Standards

The passing grade in all courses is B. Failure in six credits or equivalent or in the same course twice leads to withdrawal from the diploma program.

Courses

CS14133 COMPUTER METHODS IN PICTURE PROCESSING AND ANALYSIS (3cr.)

CS15105 (COMP 5406) NETWORK SECURITY AND CRYPTOGRAPHY (3cr.)
Advanced methodologies selected from symmetric and public key cryptography, network security protocols and infrastructure, identification, secret-sharing, anonymity, intrusion detection, firewalls, defending network attacks and performance in communication networks. Prerequisites: familiarity with basic concepts in networks, network security, and applied cryptography. For example, relevant background courses may include the following (or equivalents): CEG 4185 or COMP 3203 and/or CSI 4138 or CEG 4394 or COMP 4108, and/or CSI 4108 or ELG 5373 or COMP 4109.

CS15122 (COMP 5301) SOFTWARE USABILITY (3cr.)
Design principles and metrics for usability. Qualitative and quantitative methods for the evaluation of software system usability: Heuristic evaluation, usability testing, usability inspections and walkthroughs, cognitive walkthroughs, formal usability experimentation. Ethical concerns when performing studies with test users. Economics of usability. Integration of usability engineering into the software engineering lifecycle.

CS15130 APPLICATIONS DESIGN FOR MOBILE DEVICES (3cr.)

CS15140 (COMP 5900) SELECTED TOPICS IN COMPUTER SCIENCE (3cr.)
Selected topics, not covered by other graduate courses. Details will be available from the School at the time of registration.

CS15146 (COMP 5402) COMPUTER GRAPHICS (3cr.)

CS15169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer, Media Access Control, Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery, Clustering, Multicasting, Localization, Mobile IP/TCP (Internet Protocol/Transmission Control Protocol), File Systems, Mobility Models, Wireless Applications. (Cannot be combined for credit with ELG 6168)

CS15380 (COMP 5403) SYSTEMS AND ARCHITECTURES FOR ELECTRONIC COMMERCE (3cr.)

CS15905 PROJET / PROJECT (3cr.)
Développement d’une application pour appareils mobiles. L’étudiant identifie un projet, qui doit comprendre une importante part de logiciel s’exécutant sur l’appareil mobile et se prétant à une évaluation raisonnablement indépendante d’autres logiciels. Le projet est dirigé par un professeur approuvé par la direction du programme. Le projet est normalement complété en une session. Noté S (satisfaisant) ou NS (non satisfaisant) par le directeur du projet et un autre professeur nommé par le directeur du programme. Préalable : approbation de la direction du programme. Development of an application for mobile devices. Students identify a project that must include a significant portion of software running on device, and should be reasonably self contained. Graded S (satisfactory) or NS (not satisfactory) by the supervisor and by another professor appointed by the program director. The project can normally be completed in one session. Prerequisite: approval of the program director.

ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS (3cr.)

ELG5163 (EACJ 5105) MACHINE VISION (3cr.)
Modelling and Animation for Computer Games Technology

Internet and Virtual Reality (VR) technologies are quickly becoming essential tools in our daily activities.

The Internet is used worldwide as an unlimited source of knowledge and information, as a vehicle for profitable trade and as a forum for discussion. The economic significance of the Internet is tremendous. Billions of dollars in business transactions are conducted each year on websites such as E*TRADE, eBay and Dell. The Internet has become the vehicle for integrated collaborative multimedia (voice/video/graphics/data) communications. It is absorbing within its standards and protocols other well established technologies such as: telephony, facsimile, text messaging, data and entertainment technologies. Its fastest growing service, the World Wide Web, has created a true information revolution and is daily pushing the limits of current technologies to cope with its growth.

The objective of the Graduate Diploma in Modelling and Animation for Computer Games Technology is to educate high-technology professionals for the growing collaborative multimedia and VR technology standards, methods, techniques and applications markets. It includes courses in both the basic theories and applications of collaborative multimedia technology and large scale modeling, as well as courses in the intricate world of Computer Animations (with applications in soft-images, simulation, multimedia teaching, e-training, computer games and many others).

The diploma operates within the framework of the general regulations of the FGPS, which are available on the Website at the following link:

www.etudesup.uottawa.ca/generalregulations

Programs

Graduate Diploma Modelling and Animation for Computer Games Technology

Admission

The minimum admission requirements to the diploma are an honours bachelor’s degree or equivalent in electrical engineering, computer engineering, software engineering, or computer science, with a minimum average of 75% (B+). The admissions committee may, however, also recommend other candidates, who satisfy the minimum admission requirements of the FGPS and have demonstrated knowledge and/or experience of the field. Candidates for whom a list of additional qualifying courses will be required may be considered on an exceptional basis. In this case, they must obtain a minimum grade of B+ in all their additional courses.

On completion of the diploma, qualified students meeting admission requirements for the master’s programs in computer science or electrical engineering (MCS, MEng, MASc), could apply to one of those programs, and upon admission, complete their requirements with credit granted for relevant courses already completed in the diploma. The number of credits remaining would be assessed individually, at the time of admission, with relation to the student’s chosen master’s program. The regulation governing the articulation between graduate diplomas and related master’s programs can be found in the general regulations of the FGPS (section A.7).

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master’s

Students registered in the graduate diploma program can request to transfer to the Master of Applied Science degree (MASc) or to the Master of Engineering degree (MEng) in accordance with section A.7.1 of the general regulations of the FGPS.

Applications should be addressed to the Director, Graduate Diploma in Modelling and Animation for Computer Games Technology, School of Information Technology and Engineering.

Language Requirements

The program is offered in English. A very good knowledge of the English language is therefore required. Students whose first language is neither English nor French must pass the TOEFL or an equivalent test approved by the FGPS.

In accordance with University of Ottawa regulations, examinations and assignments may be written in either one of the two official languages (English or French).
Program Requirements

Use of the masculine gender in the generic sense should be taken to include women as well as men in this publication.

The Diploma requirements are as follows: 3 credits of core courses and 12 credits of elective courses.

The program can be completed either full-time or part-time. Full-time students should expect to take evening courses.

Compulsory course (3 cr.):

ELG5124 (EACJ 5204) VIRTUAL ENVIRONMENTS (3cr.)

Optional courses (12 cr.) to be chosen from the following:

CSI 5122 Software Usability (3 cr.)
CSI 5140 Selected Topics in Computer Science: Computer Graphics (3 cr.)
CSI 5161 Principles of Distributed Simulation (3 cr.)
CSI 5180 Topics in Artificial Intelligence: Natural Language Processing, a Statistical Approach (3 cr.)
ELG 5121 Multimedia Communications (3 cr.)
ELG 5191 Design of Distributed System Software (3 cr.)
ELG 5196 Automata and Neural Networks (3 cr.)
ELG 5176 Image Processing and Image Communication (3 cr.)
ELG 7113 Topics in Systems and Control I: Intelligent Systems Design (3 cr.)
ELG 7186 Topics in Computers I: Software Engineering Project Management (3 cr.)
ELG 7187 Topics in Computers II: Computer Animation (3 cr.)

Duration of the Program

All students must complete the requirements of the diploma within three years following initial registration.

Minimum Standards

The passing grade in all courses is B. Students who fail six credits or the same course twice, must withdraw from the program.

Courses

A. Compulsory Courses

ELG5124 (EACJ 5204) VIRTUAL ENVIRONMENTS (3cr.)

B. Courses optionnels

(12 credits to be chosen from the following courses)

CSI5122 (COMP 5301) SOFTWARE USABILITY (3cr.)
Design principles and metrics for usability. Qualitative and quantitative methods for the evaluation of software system usability: Heuristic evaluation, usability testing, usability inspections and walkthroughs, cognitive walkthroughs, formal usability experimentation. Ethical concerns when performing studies with test users. Economics of usability. Integration of usability engineering into the software engineering lifecycle.

CSI 5140 SELECTED TOPICS IN COMPUTER SCIENCE: COMPUTER GRAPHICS (3 cr.)
Acquisition and display of appearance models of physical objects in computer graphics. Review of coordinate and viewing transforms. Physics of light transport. Overview of digital camera technology, geometric and photometric camera calibration and color imaging. Rendering equation, global illumination overview, ray tracing and radiosity. Optical material properties, acquisition of Bidirectional Reflectance Distribution Functions. Image-based rendering, plenoptic function, light fields and lumigraph

CSI5161 (COMP 5606) PRINCIPLES OF DISTRIBUTED SIMULATION (3cr.)
Distributed simulation principles and practices. Synchronization protocols: Optimistic vs Conservative, Deadlock detection in conservative simulations, Time warp simulation. Distributed interactive simulation: Data distribution management, Interest management, High Level Architectures (HLA), Run Time Infrastructure (RTI). Distributed web-based simulation. Distributed agent based simulation. Real time applications of distributed simulation. Distributed and
CSI 5180 TOPICS IN ARTIFICIAL INTELLIGENCE: NATURAL LANGUAGE PROCESSING, A STATISTICAL APPROACH (3 cr.)
Statistical approaches to natural language processing (NLP); n-gram models and markov models. Information retrieval, text characterization, clustering, and statistical machine translation.

ELG5121 (EACJ 5201) MULTIMEDIA COMMUNICATIONS (3cr.)

ELG5191 (EACJ 5203) DESIGN OF DISTRIBUTED SYSTEM SOFTWARE (3cr.)
Distributed systems design and programming issues; distributed computing. Basics of object oriented technology for distributed computing. Distributed objects technologies. Object oriented models for distributed programming. Distributed computing architecture design. Component based distributed software design. Scalability, interoperability, portability and distributed services. Distributed applications design. Prerequisites: an undergraduate degree in Computer Engineering, or Computer Science, or practical experience in system software design. Prerequisite: An undergraduate education in Computer Engineering, or Computer Science, or practical experience in system software design.

ELG5196 (EACJ 5709) AUTOMATA AND NEURAL NETWORKS (3cr.)

ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3cr.)

ELG 7113 TOPICS IN SYSTEMS AND CONTROL: INTELLIGENT SYSTEMS DESIGN (3 cr.)


ELG 7186 TOPICS IN COMPUTERS I: SOFTWARE ENGINEERING PROJECT MANAGEMENT (3 cr.)
Management of software engineering projects. Software development processes, software system engineering management and organization methods; work breakdown structure and task determination; effort, duration and cost estimation; scheduling and project planning. Project monitoring and control; analysis of options; management of risks, change, and expectations.


ELG 7187 TOPICS IN COMPUTER II: COMPUTER ANIMATION (3 cr.)
Techniques underlying computer animation, such as computer graphics, computer vision, physics, robotics, biomechanics, and applied mathematics. Computer animation techniques in computer-generated films, computer games, virtual reality and human computer interactions. Relevant algorithms and techniques.

Topics to include principles of animation; human modeling, motion capture, inverse kinematics, motion editing/retargeting, flexible bodies, facial animation, clothes animation, high-level behaviours and various applications.

Orchestral Studies

The graduate diploma in Orchestral Studies is designed for specialised, intensive work in performance by talented instrumentalists who have already achieved a significant level of proficiency on the instrument of their choice, and whose career goal is to become orchestral musicians. Graduates of this program will be recognized as being fully-ready to hold a position in a world-class orchestra. The diploma program combines a tutorial/apprenticeship approach with graduate theoretical courses and a practical course dealing specifically with the challenges of a professional career as a musician. The diploma can normally be completed in one academic year (September to April) and consists of the courses
listed below. The orchestral practicum will normally consist of students’ performing in the OSO (Ottawa Symphony Orchestra) and other ensembles as assigned by the director of the program. The diploma may be pursued before, after or rather than the MMus. All students will be required to complete it within a maximum of three years. Graduates of the diploma who subsequently wish to pursue a master’s in Music may apply for admission and complete the master’s degree with credit granted for relevant diploma courses.

Programs

Graduate Diploma Orchestral Studies

Admission

Please note that this program is only offered for string instrumentalists at this point in time.

Candidates are required to have one of the following: a BMus; a four-year honours baccalaureate in music; an equivalent degree, or diploma. A 75 per cent (B+) average is required for the undergraduate degree or diploma. In addition, applicants must pass an audition. Students must understand, speak and write either English or French fluently. In addition, they must have a passive knowledge of Canada’s other official language, French or English. According to university regulations, students can write their papers and exams in the official language of their choice (either English or French).

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master’s

Students registered in the graduate diploma program can request to transfer to the master of music (MMus) or the master ès arts in music (MA(Mus)) in accordance with section A.7.1 of the general regulations of the FGPS.

Program Requirements

The requirements of the Diploma in Orchestral Studies are as follows: 9 credits of core courses and 6 credits of optional courses.

Core courses (9 credits):

MUS6900 INTERPRÉTATION ORCHESTRALE PROFESSIONNELLE / PROFESSIONAL ORCHESTRAL PERFORMANCE (3cr.)
MUS6905 LEÇONS ORCHESTRALES PARTICULIÈRES / APPLIED ORCHESTRAL LESSONS (3cr.)
MUS5902 STAGE / PRACTICUM (3cr.)

Optional courses (6 credits) to be chosen from the following:

MUS6904 MUSIQUE ET AFFAIRES / THE BUSINESS OF MUSIC (3cr.)
MUS6970 RÉPERTOIRE DE MUSIQUE DE CHAMBRE / CHAMBER MUSIC REPERTOIRE (3cr.)
MUS6993 THÈMES EN INTERPRÉTATION / TOPICS IN PERFORMANCE (3cr.)
MUS6996 ÉTUDE INDIVIDUELLE EN INTERPRÉTATION / INDEPENDENT STUDIES IN PERFORMANCE (3cr.)

Duration of the Program

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

Minimum Standards

The passing grade in all courses is C+ and students who fail two courses (six credits) must withdraw.

Courses

MUS5902 STAGE / PRACTICUM (3cr.)
Stage dirigé permettant aux étudiantes et aux étudiants de mettre en pratique leurs connaissances et leur expertise. Rédaction d’un rapport évalué par le superviseur de stage et un professeur du programme. Noté : S/NS. / A supervised practicum designed to allow students to put their
knowledge and developing expertise to work. Students will be required to submit a written report that will be evaluated by the practicum supervisor and a professor. Graded: S/NS. Préalables : Permission du professeur superviseur de l'étudiant et du directeur des études supérieures; disponibilité d'un stage jugé convenable par l'École de musique. / Prerequisites: Permission of the student's supervisor and director of graduate studies; availability of a placement deemed suitable by the School of Music.

MUS6904 MUSIQUE ET AFFAIRES / THE BUSINESS OF MUSIC (3cr.)
Étude d'institutions et d'entreprises contemporaines professionnelles rattachées à la gestion d'une carrière de musicien professionnel. / The study of present-day institutions and industries connected to the performance of music and aspects of professional preparation, organization, and presentation.

MUS6905 LEÇONS ORCHESTRALES PARTICULIÈRES / APPLIED ORCHESTRAL LESSONS (3cr.)
Leçons particulières à l'instrument réparties sur deux sessions. Noté : S/NS. / Private lessons on the student's instrument offered over two sessions. Graded: S/NS.

MUS6909 INTERPRÉTATION ORCHESTRALE PROFESSIONNELLE / PROFESSIONAL ORCHESTRAL PERFORMANCE (3cr.)

MUS6910 RÉPERTOIRE DE MUSIQUE DE CHAMBRE / CHAMBER MUSIC REPERTOIRE (3cr.)
Étude d'une partie du répertoire de musique de chambre du point de vue de l'interprète : bibliographie, techniques d'ensemble, techniques d'interprétation. Travaux pratiques (interprétation). / Study of selected chamber music repertoire from the performer's perspective: literature, ensemble techniques, performance practices. Practical work.

MUS6903 THÈMES EN INTERPRÉTATION / TOPICS IN PERFORMANCE (3cr.)
Thèmes liés à l'interprétation et aux différentes habiletés requises : technique, mémorisation, contrôle de l'anxiété liée à la performance. / Topics relating to performance and the various skills required: technique, memorization, controlling performance anxiety.

MUS6906 ÉTUDE INDIVIDUELLE EN INTERPRÉTATION / INDEPENDENT STUDIES IN PERFORMANCE (3cr.)
Recherche supervisée en atelier où l'on explore un sujet de recherche en interprétation sous la direction d'un professeur. / Guided research in a workshop setting where the student pursues an individual research topic in interpretation under the supervision of a professor.

Organizational Performance Management

(This program is only being offered in French at the present time.)

The Telier School of Management offers two 15-credit Graduate Diplomas, one being the diploma in Organizational Performance Management, the other in Leadership and Management.

The diploma in Organizational Performance Management is based on courses which lead to understanding the foundations of organizational performance and how to improve it, based on information-driven decision making.

Its design targets those who want to acquire organizational performance management skills, but it is shorter than the MBA. It allows its participants to continue their regular activities while undertaking a graduate program.

This diploma is composed solely of courses offered in the MBA, and upon admission to the MBA, students who have successfully completed the diploma can transfer all 15 credits to their program. This is also the case for the diploma in Leadership and Management. All 30 credits of the 2 diplomas can be retained within the MBA program. See the section entitled “Program requirements” for more information.

This program is offered on a part-time basis. Students may complete it in 3 or in 6 sessions.

Programs

Graduate Diploma Organizational Performance Management

Admission

Applicants to the program must:
In the event that a student has already been conferred with the Graduate Diploma in Organisational Performance Management, MBA5260 and (3cr.)

All students, whether full- or part-time, must complete all diploma requirements within three years of having first registered in the program.

examinations, assignments and the research paper or thesis may be written in either one of the two official languages (English or French).

Transfer from Graduate Diploma to Master's

improvement.

PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS (3cr.)

Ottawa

The diploma is offered in English and in French.

NSG5401 Integrative practicum

students only.

PSY7102 FIELD RESEARCH IN SOCIAL AND COMMUNITY INTERVENTIONS

Concepts et mesures du stress et des stresseurs. Analyse critique des modèles théoriques et des recherches empiriques concernant les événements de la vie,

evaluating these applications. Identification of the issues that CIO's face in their attempts to provide the right information to the right people, at the right time.

opportunity for hands-on computation (workshops).

minimization analysis, cost-utility analysis (including determination of utilities), cost-benefit analysis, cost of illness studies and use of economic methods in

methodological issue in population health risk assessment required.

advisory, and technological approaches to population health risk management; community action and social marketing; selection of risk management strategies;

studies; availability of a placement deemed suitable by the School of Music.

(Mus)) in accordance with section A.7.1 of the general regulations of the FGPS.

may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Market analysis and demand.

within the global economic context, centered on technology and sustainable development.

are equivalent to MBA5320.

The passing grade in all graduate courses is C+ (65%).

MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)


Students who receive failing grades in more than 3 credits (or in the same course twice)

Minimum standards

The passing grade in all graduate courses is C+ (65%). Students who receive failing grades in more than 3 credits (or in the same course twice) must withdraw from the program.

Duration of program

The diploma may be completed in 3 or in 6 sessions. The maximum duration is three years from the initial registration in the program.

Retained credits

Students enrolled in the Leadership and Management diploma or the Organizational Performance Management diploma can transfer all course credits to the MBA program, subject to the following conditions:

a. courses must have been completed within the past five years;

b. courses must have been completed with a minimum grade of B (70%).

1. Where a student has already been conferred the Graduate Diploma in Leadership and Management, MBA5260 and MBA5265 must be replaced by MBA6996 Integrative Cases and Team Management (3cr.).

Courses

MBA5100 FOUNDATIONS IN STATISTICS: DESCRIBE AND CONVINCE (1.5cr.)

Data analysis as used to support performance based decision-making and in dealing with change. Understanding of how to analyse data and the
MBA5120 STRATEGIC MARKETING MANAGEMENT I (1.5cr.)
Issues in marketing management. Differences between product and service types. Pricing policy. Distribution and logistics. Electronic marketing and communication. Understanding of key strategic marketing concepts, including tools and procedures, analysis of market opportunities, and establishing performance objectives. MBA5120 and MBA5125, together, are equivalent to MBA5320.

MBA5125 STRATEGIC MARKETING MANAGEMENT II (1.5cr.)
Practical applications, using case studies, of key concepts in strategic marketing management. Development of a marketing plan, including its implementation using a simulation in order to satisfy targets in an ethical manner. Prerequisite MBA5120. MBA5120 and MBA5125, together, are equivalent to MBA5320.

MBA5140 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS I (1.5cr.)
Use of accounting information in decision-making by internal users. The role of accounting in the evaluation, control, and decision-making of business managers. Using ratio analysis, perform a business diagnostic in terms of management, profit, liquidity and solvency. The relationship between cost structures and profit (profit threshold, cost-volume-benefit analysis). Use of appropriate costs in making performance-driven decisions. Understanding budgets for planning purposes. Differentiate different types of budget. Gap analysis in budgetary control. MBA5141 and MBA5142, together, are equivalent to MBA5340.

MBA5141 FINANCIAL ACCOUNTING INFORMATION AND DECISIONS II (1.5cr.)
Activities accounting. Treatment of indirect costs in costing (products and services). Activity and process management. Use of cost indicators in cost management strategy. Evaluating performance. Accounting issues related to sustainable development. Prerequisite: MBA5140. MBA5140 and MBA5141, together, are equivalent to MBA5340.

MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
This course focuses on the role of the accounting function internal to the organization. It takes a broad view of managerial accounting, introducing students to various costing systems, cost behaviour patterns and cost structures. It demonstrates the use of accounting for the evaluation of product, managerial and divisional performance thus helping students to understand what accounting can do for decision makers and how accounting choices affect decisions. Emphasis the strategic importance of aligning accounting systems with firm technologies and goals. Current issues in management accounting and internal reporting are discussed.

MBA5260 THE WORLD OF THE GENERAL MANAGER AND OF STRATEGIC MANAGEMENT (1.5cr.)
Understanding the role of the general manager in setting direction, creating competitive advantage, allocating resources, integrating operations and projects, framing the organizational infrastructure and context and managing change. Introduction to the concept of strategy and alternative models of strategic making.

MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
The focus will be on learning about business intelligence and performance management approaches at operational levels in the organization. Frameworks such as the Balanced Score Card and Quality Management will be covered, as well as the use of business intelligence to explore performance problems.

MBA5266 PERFORMANCE MANAGEMENT: BUSINESS PROCESS MODELLING (1.5cr.)
This course will build on the functional knowledge students have gained in the program thus far to explore the use of business intelligence at strategic levels in the organization. Core concepts will include strategy mapping, business modelling, firm-level analytics and decision models as well as the contribution of key business processes to organizational performance across a variety of different industries. Prerequisite: MBA 5265

MBA5280 OPERATIONS MANAGEMENT (1.5cr.)
Strategic issues and long-term planning in manufacturing and service operations. Concepts, problem solving and quantitative techniques commonly used in decision making and in monitoring production systems. Operational strategy, forecasting, aggregate planning, enterprise resource planning and material requirements planning, supply chain and inventory management, lean operations and quality management. Sustainability issues as they relate to operations management as well as the challenges associated with integrating new technologies. Prerequisite: MBA5300. Exclusion: MBA5380/ADX5380.

MBA5330 CORPORATE FINANCIAL MANAGEMENT (3cr.)

MBA6120 MARKETING IN THE 21ST CENTURY (1.5cr.)
Marketing’s place in society and in business. Overview of the marketing function: creating value for consumers, the organization and society, all within the global economic context, centered on technology and sustainable development. Measurement and performance factors in marketing. Types of competition in the marketplace and their impact on the organization’s marketing strategy. Consumer and corporate buying behavior, Market analysis and demand. Market segmentation and positioning. Relationship between marketing management and organizational strategy.

MBA642 Managerial Accounting II (1.5cr.)
This course allows students to discover specific topics in managerial accounting. It focuses on the management of activities and processes, evaluation and performance and accounting issues related to sustainable development. Prerequisite: MBA5241.
MBA6396 INTEGRATIVE CASES AND TEAM MANAGEMENT (3cr.)
In a team-taught, multi-disciplinary setting, the course integrates management concepts, principles and tools seen in program courses to date. Using the case study approach as well as team presentations, students understand the multifunctional links required to arrive at a sound managerial decision. The inherent characteristics of effective teams and the creative power of high performance teams are integrated via constructive feedback, conflict resolution and the team’s self-assessment. Prerequisite: MBA5235.

Piano Pedagogy Research

A large percentage of music majors become piano teachers either in private studios or in specialised music schools and a significant number of those teachers are interested in continuing their training, either immediately after their undergraduate program or a few years after becoming integrated into the work force. This Graduate Diploma in Piano Pedagogy Research has been created to meet the needs of those students.

Interest in research into the theory and practice of piano pedagogy is in a growth period. This program will provide an in-depth study of the research done in piano pedagogy or related disciplines as it contributes to our understanding of the processes involved in learning to play the piano. This graduate diploma will enable piano teachers to incorporate scientific knowledge into their own practice of piano teaching and will contribute to developing highly qualified professionals with a strong interest in research in the field.

The Graduate Diploma in Piano Pedagogy Research is offered both on a part-time basis and a full-time basis. Full-time students will normally complete the Diploma within two sessions (September to April). All students will be required to complete it within three years.

On completion of the diploma, qualified students meeting admission requirements may apply to the MMus or the MA in Music and, on admission, complete the requirements for those programs with credit granted for relevant courses already completed in the diploma. The number of credits remaining would be assessed individually with relation to the student’s chosen master’s program.

Programs

Graduate Diploma Piano Pedagogy Research

Admission

Candidates are required to have one of the following: a BMus; a four-year honours BA in music; an equivalent degree, or diploma. They must have achieved a 75 per cent (B+) average in their undergraduate degree or equivalent diploma. Students must understand, speak and write either English or French fluently. In addition, they must have a passive knowledge of Canada’s other official language, French or English. According to university regulations, students can write their papers and exam in the official language of their choice (either English or French).

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master’s

Students registered in the graduate diploma program can request to transfer to the Master of Music (MMus) or the Master of Arts in Music (MA (Mus)) in accordance with section A.7.1 of the general regulations of the FGPS.

Program Requirements

The Graduate Diploma in Piano Pedagogy Research requires successful completion of five courses (15 credits), of which 12 are optional courses, and an oral examination.

- Compulsory courses (3 cr.):
  MUS6935 EXAMEN ORAL / ORAL EXAMINATION
  and at least one of the following two courses:
  MUS6931 THÈMES EN PÉDAGOGIE DE LA MUSIQUE / TOPICS IN MUSICAL PEDAGOGY (3cr.)
  or
  MUS6932 THÈMES EN PÉDAGOGIE DU PIANO / TOPICS IN PIANO PEDAGOGY (3cr.)
- Optional courses (12 cr.):
  Students are strongly encouraged to take MUS5902 (Practicum) as one of their optional courses. A maximum of six credits of EDU courses can be included with the prior approval of the Director of Graduate Studies in Music.
In the event that a student has already been conferred with the Graduate Diploma in Organisational Performance Management, MBA5260 and
(1.5cr.)
(3cr.)
(3cr.)
Ethical components of development and underdevelopment theories. Rights and obligations of wealthy countries towards poor countries. Ethical
turning to renaissance and modern thinkers. Contemporary ethics of war, the nature of the soldier and the peacekeeper. Theoretical discussions
program.
Minimum Standards
PAP6102 DEMOCRATIC GOVERNANCE (3cr.)
EPE6320 SELECTED TOPICS IN ETHICS (3cr.)
To be admitted to the graduate diploma program, candidates must:
for students wishing to specialize in public ethics at the graduate level or to prepare themselves for doctoral work; for mid-career professionals
repeated measures, regression, and log-linear analyses.
EDU6433 PROGRAM IMPLEMENTATION IN EDUCATIONAL ORGANIZATIONS
Community methods of intervention; responsibility and limits. Use of community resources. Participation in correction and social action.
diplôme. Exclusion : PSY 5104.
la théorie et/ou la pratique en évaluation de programmes. Préalables : a) EDU 5299 ou EDU 5699 ou PSY 7503 ou PSY 7103 ou CRM 6759 ou CRM 6359;
On completion of the graduate diploma, qualified students meeting admission requirements could apply to one of the related master's programs,
Telephone: 613-532-5800 ext. 4197
E-mail: educprog@uottawa.ca
Part­time – 3 years
Completion of the graduate diploma requires the completion of a total of 18 credits, including the completion of three credits from each of the following:
Program Requirements
Must have completed all of the following courses:
MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
Understanding the role of the general manager in setting direction, creating competitive advantage, allocating resources, integrating operations
MBA5265 PERFORMANCE MANAGEMENT (1.5cr.)
Organizational Performance Management.
The diploma in Leadership and Management allows students to develop their ...
states and/or New Information and Communications Technologies (NTIC) on privacy and the confidentiality
Minimum Standards
The passing grade in all courses is C+ and students who fail two courses (six credits) must withdraw.
Courses
MUS4158 PIANO PEDAGOGY I (3cr.)
Pedagogical principles applied to the teaching of the piano. Technique, repertoire, skills. Prerequisite: Permission of the Department. Previously:
MUS4158. BMus (piano).
MUS4159 PIANO PEDAGOGY II (3cr.)
Continuation of MUS4158. Prerequisite: MUS4158. Previously MUS3159.
MUS5902 STAGE / PRACTICUM (3cr.)
Stage dirigé permettant aux étudiantes et aux étudiants de mettre en pratique leurs connaissances et leur expertise. Rédaction d’un rapport
évalué par le superviseur de stage et un professeur du programme. Noté : S/NS. / A supervised practicum designed to allow students to put their
knowledge and developing expertise to work. Students will be required to submit a written report that will be evaluated by the practicum
supervisor and a professor. Graded: S/NS. Préalables : Permission du professeur superviseur de l’étudiant et du directeur des études supérieures;
disponibilité d’un stage jugé convenable par l’École de musique. / Prerequisites: Permission of the student’s supervisor and director of graduate
studies; availability of a placement deemed suitable by the School of Music.
MUS5903 PROSÉMINAIRE EN MUSICOLOGIE / PROSEMINAR IN MUSICOLOGY (3cr.)
Survol des méthodes de recherche actuelles en musicologie, y compris la musicologie historique, l’étude de genre, la théorie critique, l’étude
critique de l’interprétation et l’étude des médias. / Survey of different current research methodologies in musicology, including historical
musicology, genre studies, critical theory, performance studies, and media studies.
MUS5904 MÉTHODES DE RECHERCHE EN PÉDAGOGIE MUSICALE / RESEARCH METHODOLOGIES IN MUSIC
PEDAGOGY (3cr.)
Exploration des méthodes de recherche en pédagogie musicale, y compris des approches et des cadres théoriques issus des sciences sociales. / 
Exploration of research methodologies in music pedagogy research, including theoretical frameworks and methodologies derived from the social
sciences.
MUS5910 SÉMINAIRE DE RECHERCHE / RESEARCH SEMINAR
Forum de discussion sur la méthodologie, les problèmes et le cadre théorique de la recherche, dans le contexte des recherches poursuivies par les
étudiants et les étudiantes inscrites. / Discussion of research methodology, problems and theoretical frameworks in relation to participating
students’ research.
MUS5911 SÉMINAIRE DE RECHERCHE / RESEARCH SEMINAR (3cr.)
Forum of discussion on the methodology, the problems and the cadre théorique de la recherche, dans le contexte des recherches poursuivies par les
étudiants et les étudiantes inscrites. Préalable : Connaissance passive de l’anglais. / Discussion of research methodology, problems and theoretical
frameworks in relation to participating students’ research. Prerequisite: Passive knowledge of French.
MUS6931 THÈMES EN PÉDAGOGIE DE LA MUSIQUE / TOPICS IN MUSICAL PEDAGOGY (3cr.)
Les thèmes étudiés comprennent les facteurs cognitifs liés aux habiletés en lecture musicale; le contrôle de la dimension expressive dans
Population Health Risk Assessment and Management

Population health risk assessment is the comprehensive assessment of health risks in the general population based on environmental, genetic, economic, social and behavioural determinants of health. This leads to evidence-based population health risk policy analysis, and ultimately, cost effective population health risk management decisions.

The Graduate Diploma in Population Health Risk Assessment and Management is specially designed for those individuals employed and/or interested in population health analysis and risk assessment. The diploma aims to provide the professional skills and knowledge needed to pursue careers in both the public and the private sectors. The diploma is offered both full- and part-time.

Students who have completed the Graduate Diploma in Population Health Risk Assessment and Management may request admission to the MSc in Epidemiology. Admission to the MSc is competitive and the number of candidates admitted is limited. If admission is granted, some credits from the Graduate Diploma may be retained in the MSc. This evaluation is made on a case-by-case basis by the MSc Epidemiology Program Committee.

The diploma operates within the framework of the general regulations of the FGPS, which are available on the website at the following link:

www.etudesup.uottawa.ca/generalregulations

Programs

Graduate Diploma Population Health Risk Assessment and Management

Admission
Admission is competitive. Candidates must normally hold a bachelor’s degree with honours in science, health sciences and/or social sciences with an average of 75% (B+) or above, calculated in accordance with FGPS guidelines. Candidates holding credentials that may not exactly match these standards but who meet the FGPS minimum admission requirements may be admitted based on having demonstrated knowledge and skills obtained through relevant training and/or experience. Proficiency in English is required. Ideally, applicants would have successfully completed EPI 5240 and EPI 5242 prior to their admission. Students who have not completed courses in biostatistics and epidemiology will be required to attend a non-credit one-week each intensive courses at the end of August. These courses are offered by the University of Ottawa.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master’s

Students registered in the graduate diploma program can request to transfer to the Master of Science degree in Epidemiology in accordance with section A.7.1 of the general regulations of the FGPS.

Language Requirements

The core courses are offered in English. In accordance with University of Ottawa regulations, however, all students have the option of writing exams and assignments in either English or French.

Program Requirements

Graduate Diploma Requirements (15 credits)

The graduate diploma requirements consist of 15 credits, with 9 credits of core courses and 6 credits of electives.

Core Courses (9 credits):

- PHR5181 POPULATION HEALTH RISK ASSESSMENT I (3cr.)
- PHR6182 POPULATION HEALTH RISK ASSESSMENT II (3cr.)
- PHR6101 RISK MANAGEMENT IN GOVERNMENT (3cr.)

Optional Courses (6 credits) to be chosen from the following:

- EPI5188 HEALTH TECHNOLOGY ASSESSMENT (3cr.)
- EPI5189 HEALTH ECONOMIC EVALUATION (3cr.)
- EPI5213 CHRONIC DISEASE EPIDEMIOLOGY (3cr.)
- EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
- EPI5251 MEASUREMENT IN HEALTH (3cr.)
- EPI6181 SOCIAL ASPECTS OF EPIDEMIOLOGY (3cr.)
- EPI6188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
- EPI6276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
- EPI6278 ADVANCED CLINICAL TRIALS (3cr.)
- EPI6283 PHARMACOEPIDEMILOGY (3cr.)
- EPI6481 SOCIAL ASPECTS OF EPIDEMIOLOGY (3cr.)
- EPI7181 EPIDEMIOLOGY FOR HEALTH POLICY (3cr.)
- MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)
- MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
- MHA6351 HEALTH ECONOMICS (3cr.)
- MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
- PHR6900 ÉTUDES DIRIGÈES EN ÉVALUATION DU RISQUE EN SANTÉ DES POPULATIONS / DIRECTED STUDIES IN POPULATION HEALTH RISK ASSESSMENT (3cr.)
- PHR6910 STAGE EN ÉVALUATION ET GESTION DU RISQUE EN SANTÉ DES POPULATIONS / PRACTICUM IN POPULATION HEALTH RISK ASSESSMENT AND MANAGEMENT (3cr.)
- PSY6905 PSYCHOLOGIE COMMUNAUTAIRE / COMMUNITY PSYCHOLOGY (3cr.)
- PSY6929 RECHERCHE SUR LE STRESS PSYCHOSOCIAL / PSYCHOSOCIAL STRESS RESEARCH (3cr.)
- PSY6982 LA PSYCHOLOGIE ET LA SANTÉ / PSYCHOLOGY AND HEALTH (3cr.)
- PSY7102 FIELD RESEARCH IN SOCIAL AND COMMUNITY INTERVENTIONS (3cr.)
- PSY7103 PROGRAM EVALUATION (3cr.)

Duration of the Program

The diploma requirements must be completed within a maximum of three years.

Minimum Standards

The passing grade in all courses is C+. Students who fail six credits or the same course twice must withdraw from the program.
Courses

Core Courses

PHR5181 POPULATION HEALTH RISK ASSESSMENT I (3cr.)
National and international policy frameworks for health risk assessment and management, including determinants of population health; epidemiological, clinical, and toxicological methods for identifying health hazards; population health surveillance; methods of population health risk assessment; regulatory, economic, advisory, and technological approaches to population health risk management; community action and social marketing; selection of risk management strategies; risk perception and risk communication. Lectures and case studies. Preparation of term paper on a current issue in population health risk assessment. Exclusion: EPI 5181.

PHR6182 POPULATION HEALTH RISK ASSESSMENT II (3cr.)
Scientific methods for population health risk assessment; characterization of population health risks, and attendant uncertainties; risk modeling; combining risk information from different sources; risk acceptability; principles of risk management decision making; evidence-based risk management policy development; audit and evaluation of risk interventions; priority setting; case studies on current population health risk assessment issues. Term paper on a current methodological issue in population health risk assessment required. Prerequisite: PHR 5181. Exclusion EPI 6182.

PHR6101 RISK MANAGEMENT IN GOVERNMENT (3cr.)
Study of risk management frameworks, guidelines and principles for decision makers; review of ethical grounding and risk evaluation techniques and follow-up. Written report to be submitted by the student on a current risk management project. Prerequisite: Permission of instructor.

Optional Courses

EPI5188 HEALTH TECHNOLOGY ASSESSMENT (3cr.)
Definition and scope of health technology assessment; needs assessment; practice variations; use of administrative databases; evaluation of diagnostic tests; development and use of practice guidelines and clinical prediction rules; health technology assessment in the developing world. Lectures, seminars and case studies. Prerequisite: Permission of the program director.

EPI5189 HEALTH ECONOMIC EVALUATION (3cr.)
Brief overview of economics and health economics; examination of analyses used in epidemiologic and clinical research: cost-effectiveness analysis, cost-minimization analysis, cost-utility analysis (including determination of utilities), cost-benefit analysis, cost of illness studies and use of economic methods in priority-setting. Lectures and seminars. Written report required, presenting an economic evaluation or a detailed review of the economic literature in a particular area. Prerequisite: Permission of the program director.

EPI5213 CHRONIC DISEASE EPIDEMIOLOGY (3cr.)
Review of the descriptive epidemiology (distribution, trends, risk factors) of the major chronic diseases, with emphasis on circulatory diseases, cancer, injuries, and mental health problems. Approaches to primary and secondary prevention. Lectures, presentations by invited experts, and student presentations. Prerequisite: Permission of the program director.

EPI5241 EPIDEMIOLOGY II - ADVANCED EPIDEMIOLOGY (3cr.)
This second level epidemiology course covers major principles of design, analysis, and interpretation of epidemiologic research. Material presented in a quantitative manner. Prerequisites: EPI 5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology); EPI 6276 may be taken concurrently with the permission of the program director. Prerequisites: EPI5240 (Epidemiology I) and EPI 6276 (Quantitative Methods in Epidemiology).

EPI5251 MEASUREMENT IN HEALTH (3cr.)
An overview of measurement theory as applied to health measurement; a review of existing measurements of health status in clinical and research applications, plus practical experience of how to develop and test new measurement methods. Prerequisite: Permission of the program director.

EPI6181 SOCIAL ASPECTS OF EPIDEMIOLOGY (3cr.)
This course will analyze the way in which behavioural, social and emotional forces influence patterns of disease. The links between these processes and physiological changes; inferences on how best to intervene to modify "lifestyle" risk factors; recent prevention and health promotion trials will be reviewed. May also be offered in French: EPI 6581. Prerequisite: Permission of the program director.

EPI6188 SYSTEMATIC REVIEWS AND META-ANALYSIS (3cr.)
Approaches to the systematic review of evidence in the health sciences. Searching for the evidence, selection of studies, quality and validity of included studies, heterogeneity, statistical analysis and other quantitative and qualitative methods. Students will be required to do a meta-analysis on a topic of their own interest. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5240 and EPI5242 and permission of instructor.

EPI6276 QUANTITATIVE METHODS IN EPIDEMIOLOGY (3cr.)
Application of advanced topics in statistical methods for epidemiologic data analysis: logistic regression and discriminant analysis, Poisson regression, contingency table analysis (including log-linear modelling), time series, survival analysis, Cox regression with and without time-dependent covariates, principle
components and factor analysis. Prerequisites: EPI 5240 and EPI 5242 and permission of the program director. Prerequisites: EPI5242 or equivalent, and EPI 5241 (may be done concurrently), or permission of the professor.

EPI6278 ADVANCED CLINICAL TRIALS (3cr.)
Lectures and laboratories on the detailed principles, design, methodology and statistical techniques associated with clinical trials. Emphasis on emerging topics and procedures. Prerequisites: EPI 5242 and EPI 6178 and permission of the program director. Prerequisites: EPI5242 and EPI6178 and permission of instructor.

EPI6283 PHARMACOEPIDEMIOLOGY (3cr.)
Issues in and methodology of pharmacoepidemiology. Discussion on the biases and confounders possible at every stage of a pharmacoepidemiological study, in drug utilization review, drug effectiveness, risk/benefit assessment and other topics. This course will normally be given every second year. Prerequisites: EPI 5240 or equivalent and permission of the program director. Prerequisite: EPI5240 or equivalent and permission of instructor.

EPI7181 EPIDEMIOLOGY FOR HEALTH POLICY (3cr.)
Exploration of key issues relating to health policy within and outside Canada. Topics covered: rationale for public provision and funding of health care in Canada; historical and current perspectives regarding structure and process of Canadian health care system; specific micro and macro policy issues relating to health and health care provision (Canadian and international). Seminar based. Student presentations and written reports required. Prerequisites: EPI5240 and permission of instructor.

MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)
Governance models for health care organizations. Definition, resolution and handling of ethical problems of administrators, professionals and researchers in health organizations. Reconciliation of conflicting interests of the stakeholders according to ethical principles.

MHA6301 POPULATION HEALTH AND EPIDEMIOLOGY (3cr.)
Provides a survey of epidemiology; viewed through a "population health" lens. Course will provide a survey of: measures of health status (including measures of mortality and morbidity); and measures of association. The basic epidemiological designs (observational, case-control, cohort, time series, and randomized control studies) will be reviewed. The factors affecting the precision and validity of these studies (e.g. statistical power, confounding, effect modification, and causality criterion) will be reviewed. Emphasis will be placed on equipping students with an ability to critically evaluate clinical, epidemiological, and health administration evidence in support of decisions. Guidance will also be provided to help select appropriate outcome indicators and critically evaluate interventions/programs. Students will get hands on experience computing effect measures (e.g. odds, ratios) from study results, as well as with assessing the precision and validity of results. Prerequisite: MBA 5300.

MHA6351 HEALTH ECONOMICS (3cr.)
The course provides a macro-economic perspective on the demand and supply of healthcare, highlighting the market failures that are archetypical within the health domain. It contrasts Welfarist and Extra-Welfarist perspectives on resource allocation (contrasting technical versus allocative efficiency). The course will also review cost-benefit, cost-effectiveness, and cost-utility approaches of evaluating health interventions; and in so doing the course will provide students an opportunity for hands-on computation (workshops). The course will also consider the issue of equity and methods for incorporating equity into health economic evaluations.

MHA6370 INTRODUCTION TO HEALTH INFORMATICS (3cr.)
Overview of current developments, issues and challenges in the emerging field of health informatics. Historical development as well as basic foundations of health informatics including theoretical, methodological and ethical/legal underpinnings will be studied. Critical examination of information management principles and methods in Canadian health care organizations both public and private. Emerging applications in health informatics as well as approaches to understanding and evaluating these applications. Identification of the issues that CIO’s face in their attempts to provide the right information to the right people, at the right time.

PHR6900 ÉTUDES DIRIGÉES EN ÉVALUATION DU RISQUE EN SANTÉ DES POPULATIONS / DIRECTED STUDIES IN POPULATION HEALTH RISK ASSESSMENT (3cr.)
Recherche et rédaction d’un travail sur un sujet lié à l’évaluation du risque en santé des populations, tel que le risque ayant trait à l’environnement, aux facteurs sociaux, à la génétique et au système de soins de santé, le tout sous la direction d’un professeur membre de la faculté. Le sujet doit être approuvé par le directeur de programme. Noté : S/NS. Préalable : Permission du directeur de programme. Exclusion : PHR 6910. / Opportunity to conduct research and write a paper on a current topic in population health risk assessment, including risk issues related to the environment, social factors, genetics or the health system, under the direction of a faculty member. Topic must be approved by the Program Director. Graded S/NS. Prerequisite: Permission of the Program Director. Exclusion: PHR 6910.

PHR6910 STAGE EN ÉVALUATION ET GESTION DU RISQUE EN SANTÉ DES POPULATIONS / PRACTICUM IN POPULATION HEALTH RISK ASSESSMENT AND MANAGEMENT (3cr.)
Stage (10 hours/week) dans un milieu de politiques de la santé au sein d'une organisation d'accueil, approuvée par un membre du Conseil consultatif du diplôme. Expérience dans le domaine des politiques de la gestion de l'évaluation du risque. L'étudiant doit soumettre un rapport sur l'application de l'évaluation des risques. Note S/NS par un membre de la faculté en consultation avec le superviseur de stage. Préalables : PHR 5181 et permission du coordonnateur du stage. / Placement (10 hours/week) in a health policy setting in a host organization approved by a faculty member of the Diploma Advisory Board. Hands-on experience in the risk policy and evaluation field. Written report to be submitted by the student on the application of risk assessment. Graded S/NS by a faculty member in consultation with the placement supervisor. Prerequisites: PHR 5181, and permission of practicum coordinator. Préalables / Prerequisites: EPI5181 et permission du coordonnateur du stage / EPI 5181, and permission of practicum coordinator.
PSY605 PSYCHOLOGIE COMMUNAUTAIRE / COMMUNITY PSYCHOLOGY (3cr.)

PSY623 RECHERCHE SUR LE STRESS PSYCHOSOCIAL / PSYCHOSOCIAL STRESS RESEARCH (3cr.)

PSY6082 LA PSYCHOLOGIE ET LA SANTÉ / PSYCHOLOGY AND HEALTH (3cr.)

PSY7102 FIELD RESEARCH IN SOCIAL AND COMMUNITY INTERVENTIONS (3cr.)
Practical experience in carrying out applied research and program evaluation in a community agency or organization. Prerequisite: PSY 7103

PSY7103 PROGRAM EVALUATION (3cr.)

Primary Health Care for Nurse Practitioners

The School of Nursing offers a diploma in Primary Health Care for Nurse Practitioners. The goal of the program is to educate registered nurses for an advanced practice role as a primary health care nurse practitioner (NP). The graduates of this program are prepared to assume leadership roles in improving the quality of nursing care as nurse practitioners in various primary health care settings.

The program provides rigorous academic preparation based on theory, research, and practice to address health-related phenomena experienced by individuals, families, groups and communities.

The School of Nursing is committed to assisting students to achieve the following objectives:

- Synthesize complex health information using advanced diagnostic reasoning and critical thinking skills.
- Critically appraise current evidence to support best practices.
- Provide comprehensive evidence based on primary health care to clients and families across the lifespan applying clinical, theoretical and research knowledge.
- Evaluate existing community level primary health care programs and develop new programs to meet the primary health care needs of the community.
- Evaluate and influence policies affecting the health of the community.
- Practice autonomously within a collaborative, interprofessional model to promote client health.
- Deliver primary health care utilizing the roles (researcher, educator, and leader, collaborator, and change agent) recognized as advanced nursing practice.

The Diploma is offered in English and French as a post master’s degree option on a full-time or part-time basis. According to university regulations, students have the right to use French or English in their dealings with the Central Administration and the General Services and with the administration of the faculty or school where they are registered. Except in language courses, students have the right to produce their work and answer examination questions in the official language of their choice (either English or French).

Courses are offered using a combination of face-to-face and distance modalities. Clinical placements must occur within the geographical zone/catchment of the Ottawa area.

Programs

Diploma Primary Health Care for Nurse Practitioners

Admission

Candidates for the Primary Health Care for Nurse Practitioners Diploma will be considered for admission under the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).
The admission requirements are as follows:

- Bachelor’s degree in nursing;
- Master’s degree in nursing or related discipline (e.g., education, health administration, public health);
- Overall average of at least 70% (B) calculated in accordance with FGPS guidelines;
- Current certificate of competence from the College of Nurses of Ontario;
- The equivalent of two years nursing practice (3,640 hours) as a registered nurse within the last five years.

**Application deadline**

The application deadline for a fall admission is the February 1st. However, applications received after the deadline will be reviewed and admission offers could be made providing that space is still available in the program. Please note that because of course sequencing and others factors, a student can only be admitted for a fall entry to the program. Preference is given to Ontario applicants.

Please note that all students admitted to the School of Nursing must comply with the immunization regulations of the Faculty of Health Sciences - (immunization, CPR) prior to registration.

**Documents required**

The following documents are required to be submitted to the Graduate Studies Office of the Faculty of Health Sciences, Roger Guindon Hall, Room RNG 2016, 451 Smyth Road, Ottawa, K1H 8M5:

- The official "Application for Admission On-line - Graduate Studies" form;
- Official transcripts of all postsecondary studies;
- Two letters of recommendation (at least one letter from a health professional with whom you have worked);
- Verification of Employment Hours Form documenting 3,640 hours of nursing practice within the last 5 years;
- Personal Essay from responding to three questions (maximum 1,500 words.)
- A copy of a current certificate of registration from the College of Nurses of Ontario.

**Program Requirements**

**The diploma requires 30 credits as follows:**

- NSG5350 Pathophysiology for the nurse practitioner (3cr.)
  This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
- NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
  This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
- NSG5370 Advanced health assessment and diagnosis I (3cr.)
- NSG5375 Advanced health assessment and diagnosis II (3cr.)
- NSG5380 Therapeutics in primary health care I (3cr.)
- NSG5385 Therapeutics in primary health care II (3cr.)
- NSG5401 Integrative practicum (12cr.)

**A typical program sequence would be the following:**

**Full-time**

- **Fall, session 1**
  - NSG5350 Pathophysiology for the nurse practitioner (3cr.)
    This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
  - NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
    This course is divided into two segments equivalent to 1.5 cr. each.
  - NSG5370 Advanced health assessment and diagnosis I (3cr.)
  - NSG5380 Therapeutics in primary health care I (3cr.)
- **Winter, session 2**
  - NSG5350 Pathophysiology for the nurse practitioner (3cr.)
    This course is divided into two segments equivalent to 1.5 cr. each.
  - NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
    This course is divided into two segments equivalent to 1.5 cr. each.
  - NSG5375 Advanced health assessment and diagnosis II (3cr.)
  - NSG5385 Therapeutics in primary health care II (3cr.)
Spring, session 3
- NSG5401 Integrative practicum (12cr.)

Part-time – 2 years

- Fall, year 1, session 1
  - NSG5350 Pathophysiology for the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
  - NSG5370 Advanced health assessment and diagnosis I (3cr.)

- Winter, year 1, session 2
  - NSG5350 Pathophysiology for the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
  - NSG5375 Advanced health assessment and diagnosis II (3cr.)

- Fall, year 2, session 3
  - NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
  - NSG5380 Therapeutics in primary health care I (3cr.)

- Winter, year 2, session 4
  - NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
  - NSG5385 Therapeutics in primary health care II (3cr.)

- Spring, year 2, session 5
  - NSG5401 Integrative practicum (12cr.)

Part-time – 3 years

- Fall, year 1, session 1
  - NSG5350 Pathophysiology for the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
  - NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.

- Winter, year 1, session 2
  - NSG5350 Pathophysiology for the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.
  - NSG5360 Roles and responsibilities of the nurse practitioner (3cr.)
  - This course is divided into two segments (1 in autumn, 1 in winter) equivalent to 1.5 cr. each.

- Fall, year 2, session 3
  - NSG5370 Advanced health assessment and diagnosis I (3cr.)

- Winter, year 2, session 4
  - NSG5375 Advanced health assessment and diagnosis II (3cr.)

- Fall, year 3, session 5
  - NSG5380 Therapeutics in primary health care I (3cr.)

- Winter, year 3, session 6
  - NSG5385 Therapeutics in primary health care II (3cr.)

- Spring, year 3, session 7
  - NSG5401 Integrative practicum (12cr.)

Minimum Standards

The minimum passing grade in all courses is B (70%). Students who fail two courses or the same course twice or NSG5401 must withdraw.

Duration of the Program

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

Courses

**NSG5350 Pathophysiology for the nurse practitioner** (3cr.)
Examine theoretical and practice related concepts in pathophysiology as a basis for advanced nursing practice. Explore alterations in physiological function with an emphasis on age-related, acute, episodic, and chronic conditions found in primary health care practice. Seminar:
3 hours/week. Course for PHCNP students only.

**NSG5360 Roles and responsibilities of the nurse practitioner** (3cr.)
Compare and contrast advanced practice nursing and related frameworks to develop, integrate, sustain, and evaluate the role of the nurse practitioner within primary health care. Critically analyze and develop strategies to implement advanced practice nursing competencies with a focus on the community. Seminar: 3 hours/week Course for PHCNP students only.

**NSG5370 Advanced health assessment and diagnosis I** (3cr.)
Analyze and critique concepts and frameworks essential to advanced health assessment and diagnosis using clinical reasoning skills. Apply clinical, theoretical and research knowledge in comprehensive and focused health assessment for the individual client’s diagnostic plan of care. Course for PHCNP students only. Prerequisite or co-requisite: NSG5350.

**NSG5375 Advanced health assessment and diagnosis II** (3cr.)
Integrate knowledge and apply conceptual frameworks integral to advanced health assessment and diagnosis in advanced nursing practice. Demonstrate initiative, responsibility, and accountability in complex decision making for individuals, groups, and/or families within the nurse practitioner scope of practice based on current research findings. Seminar: 3 hours per week. Clinical: 6 hours per week. Course for PHCNP students only. Prerequisite: NSG5370.

**NSG5380 Therapeutics in primary health care I** (3cr.)
Critically appraise and interpret concepts and frameworks integral to pharmacotherapy, advanced counseling, and complementary therapies for common conditions across the lifespan. Develop, initiate, manage, and evaluate therapeutic plans of care that incorporate client values and acceptability, goals of therapy, analysis of different approaches, pharmacotherapeutic principles. Course for PHCNP students only. Prerequisite or co-requisite: NSG5370.

**NSG5385 Therapeutics in primary health care II** (3cr.)
Integrate conceptual frameworks and evidence underlying the study of pharmacotherapy, advanced counseling, and complementary therapies for complex client situations. Demonstrate substantive initiative, responsibility, and accountability in complex decision making. Course for PHCNP students only. Prerequisite: NSG5380. Co-requisite: NSG5375.

**NSG5401 Integrative practicum** (12cr.)
Synthesize the competencies essential to advanced nursing practice to provide primary health care for clients across the life span. Demonstrate autonomy, decision-making, and critical analysis of organizational and system issues that influence scope of practice, professional accountability, and outcomes. Course for PHCNP students only. Prerequisites: NSG 5350, NSG 5360, NSG 5370, NSG 5375, NSG 5380 and NSG 5385.

**Program Evaluation**

The University of Ottawa Graduate Diploma in Program Evaluation is offered, in French and in English, as an interdisciplinary program through the collaboration of the Faculty of Education and the School of Psychology in the Faculty of Social Sciences. The program is housed in the Centre for Research on Educational and Community Services, which is jointly sponsored by the two faculties.

The objective of the graduate diploma is to offer advanced training in program evaluation to individuals in the public, private, and not-for-profit sectors. Program evaluation involves the use of social science methods to inform the development and improvement of programs, organizations, and public policies. The curriculum is designed to provide students with the necessary competencies to enable them to conduct independent program evaluations of high quality.

The diploma is offered in English and in French.

In accordance with University of Ottawa regulations, examinations and assignments may be written in either one of the two official languages (English or French).

The diploma operates within the framework of the general regulations of the FGPS, which are available on the Website at the following link:

[www.etudesup.uottawa.ca/generalregulations](http://www.etudesup.uottawa.ca/generalregulations)

For more information on the diploma, please contact either:

Faculty of Education
Academic Secretariat
145, Jean-Jacques Lussier Street
Ottawa ON K1N 6N5
Canada
Telephone: 613-562-5804
Fax: 613-562-5963
E-mail: educprog@uottawa.ca

Faculty of Social Sciences
Mireille Côté, Administrator, Graduate Studies
School of Psychology
Lamoureux Hall, room 352
Programs

Graduate Diploma Program Evaluation

Admission

Candidates are required to have:

- an Honours Bachelor’s degree in Education, Social Sciences, Health Sciences or Psychology (or equivalent);
- a minimum of 70% (B) average calculated in accordance with FGPS guidelines;
- proficiency in either English or French;
- completion of an undergraduate course in research methods including statistics with a minimum grade of 70% (B).*

*Candidates who have not already completed such a course will be required to do so on a special-student basis prior to admission.

On completion of the graduate diploma, qualified students meeting admission requirements could apply to one of the related master’s programs, in particular the MA in Education or the MEd and, upon admission, complete the requirements for those programs with credit granted for relevant courses already completed in the diploma. The number of credits remaining would be assessed individually, at the time of admission, with relation to the student’s chosen master’s program. The regulation governing the articulation between graduate diplomas and related master’s programs can be found in the general regulations of the FGPS (section A.7).

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master’s

Students registered in the graduate diploma program can request to transfer to the Master in education (MEd) in accordance with section A.7.1 of the general regulations of the FGPS.

Program Requirements

The curriculum consists of courses in evaluation theory, evaluation methods and practice, contemporary issues in program evaluation, and a practicum (PSY 7102).

Compulsory courses (12 credits)

EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE (3cr.)
OR
PSY7103 PROGRAM EVALUATION (3cr.)
OR
CRM6359 EVALUATION OF CRIMINAL JUSTICE PROGRAMS, POLICIES AND LEGISLATION (3cr.)

PSY7102 FIELD RESEARCH IN SOCIAL AND COMMUNITY INTERVENTIONS (3cr.)
EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
PSY5104 INTEGRATION SEMINAR IN PROGRAM EVALUATION (3cr.)
Optional courses (3 credits) to be chosen from the following:

CRM6342 COMMUNITY INTERVENTION IN CRIMINOLOGY (3cr.)
EDU5391 INTERACTION OF RESEARCH AND PRACTICE (3cr.)
EDU5399 DEVELOPMENT OF ASSESSMENT INSTRUMENTS (3cr.)
EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS (3cr.)
EDU6191 QUANTITATIVE RESEARCH (3cr.)
EDU6433 PROGRAM IMPLEMENTATION IN EDUCATIONAL ORGANIZATIONS (3cr.)
EDU7190 QUALITATIVE RESEARCH I (3cr.)
PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS (3cr.)
PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS (3cr.)
PSY6116 COMMUNITY PSYCHOLOGY (3cr.)

Duration of the Program

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

Courses

Core courses

CRM6359 EVALUATION OF CRIMINAL JUSTICE PROGRAMS, POLICIES AND LEGISLATION (3cr.)
Evaluation principles, approaches, models and methods; analysis of programs, policies and their theoretical underpinnings; selection of evaluation questions, preparation of a proposal and development of evaluation research tools.

EDU5299 PROGRAM EVALUATION: METHODS AND PRACTICE (3cr.)
Exploration of principles of effective program evaluation methods; planning; instrument development; data collection, processing and analysis; reporting and follow-up; survey of diverse models of evaluation. Prerequisite: EDU5190

EDU5504 SÉMINAIRE D'INTÉGRATION EN ÉVALUATION DE PROGRAMMES (3cr.)
Intégration des théories, de la recherche et de la pratique en rapport avec l’évaluation de programmes. Production d’un rapport de recherche sur un thème lié à la théorie et/ou la pratique en évaluation de programmes. Préalables : a) EDU 5299 ou EDU 5699 ou PSY 7503 ou PSY 7103 ou CRM 6759 ou CRM 6359; b) EDU 6299 ou EDU 6699; c) PSY 7102 ou PSY 7502. Il est préférable que l’étudiant ait complété, en plus, un cours facultatif approuvé par la direction du diplôme. Exclusion : PSY 5104.

EDU6299 PROGRAM EVALUATION: THEORY AND CONTEMPORARY ISSUES (3cr.)
Critical exploration of theoretical orientations to program evaluation and in-depth examination of selected contemporary issues confronting evaluators. Prerequisite: EDU 5299 or PSY 7103 or PSY 7503 or CRM 6359 or CRM 6759 (Diploma in Program Evaluation).

PSY5104 INTEGRATION SEMINAR IN PROGRAM EVALUATION (3cr.)
Integration of program evaluation practice, research and theory leading to a written report related to advances in program evaluation practice and theory. Exclusion: EDU5504. Prerequisites: a)EDU5299 or EDU5699 or PSY7103 or PSY7503 or CRM6359 or CRM6759; b) EDU6299 or EDU6699; c) PSY7102 or PSY7502. It is preferable that the student have completed, in addition, one elective course approved by the director of the diploma.

PSY7102 FIELD RESEARCH IN SOCIAL AND COMMUNITY INTERVENTIONS (3cr.)
Practical experience in carrying out applied research and program evaluation in a community agency or organization. Prerequisite: PSY 7103

PSY7103 PROGRAM EVALUATION (3cr.)

Optional courses

CRM6342 COMMUNITY INTERVENTION IN CRIMINOLOGY (3cr.)
Community methods of intervention; responsibility and limits. Use of community resources. Participation in correction and social action.

EDU5391 INTERACTION OF RESEARCH AND PRACTICE (3cr.)
Examination of the strengths, challenges, limitations and possibilities for enhancing research-based practice and practitioner-relevant research using quantitative and/or qualitative research.

EDU5461 MANAGING CHANGE IN EDUCATIONAL ORGANIZATIONS (3cr.)
In the event that a student has already been conferred with the Graduate Diploma in Organisational Performance Management, MBA5260 and (1.5cr.) Transfer from Graduate Diploma to Master's

PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS
Exploration of the theoretical and practical issues of curriculum and program design in relation to culture and technology; examination of the relationships between curriculum, information culture, and E-learning; investigation of the impact of cyber curriculum on cultural identities of teachers and learners.

EDU5399 DEVELOPMENT OF ASSESSMENT INSTRUMENTS (3cr.)
Study of the modalities of assessment of knowledge, skills, attitudes and performance; strategies for developing instruments to assess students learning; examination of instrument quality.

EDU6191 QUANTITATIVE RESEARCH (3cr.)
Planning, analysis and interpretation of quantitative research within experimental and quasi-experimental frameworks; application of analysis of variance, analysis of covariance and techniques of linear regression (explanation, prediction) to educational contexts. Prerequisite: EDU5191 or equivalent.

EDU6433 PROGRAM IMPLEMENTATION IN EDUCATIONAL ORGANIZATIONS (3cr.)
Exploration of principles of effective program implementation in educational settings.

EDU7190 QUALITATIVE RESEARCH I (3cr.)
Critical review of fundamental aspects of qualitative research in education: approaches, characteristics and strategies.

PSY5120 ADVANCED STATISTICS IN PSYCHOLOGY: UNIVARIATE DATA ANALYSIS (3cr.)
Topics covered include general linear approaches to analysis of variance and covariance, basic assumptions of parametric techniques, expected mean square and error term selection, multiple comparison and trend procedures, power of statistical tests. Attention to be paid to selected factorial designs including repeated measures, regression, and log-linear analyses. Prerequisite: PSY 3104 or its equivalent.

PSY5121 ADVANCED STATISTICS IN PSYCHOLOGY: MULTIVARIATE DATA ANALYSIS (3cr.)
Principles of multivariate statistics in general, and of those of multiple regression, discriminant function analysis, multivariate analysis of variance and canonical correlation, in particular. Each statistical procedure to be accompanied by required computer application work involving major statistical packages. Prerequisite: PSY5120

PSY6116 COMMUNITY PSYCHOLOGY (3cr.)
Study of the socio-historical context of community psychology. Values, paradigms, and objectives of community psychology. Community mental health, primary prevention, and intervention strategies.

Public Ethics

The Faculty of Philosophy at Saint Paul University, in collaboration with the Faculties of Theology and of Human Sciences, offers a Graduate Diploma in Public Ethics and a program leading to the Master of Arts in Public Ethics (MA Pub.Ethics). This degree is conferred jointly by the Senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The program is based upon course and seminar work, reflection on practical experience, and research in public ethics. The program is designed for students wishing to specialize in public ethics at the graduate level or to prepare themselves for doctoral work; for mid-career professionals wishing to reflect and build on their professional experience and previous studies and who may wish to advance their careers, make career changes, or prepare for doctoral studies.

Program Objectives

The program is designed to prepare graduates who are public ethics analysts and consultants with competencies in the following:

- To discern the values and ethical concerns involved in particular policy statements or social and political practices and to propose appropriate strategies for taking these values and ethical concerns into consideration in the further formulation of policy statements and establishment of such practices at regional, national and international levels;
- To study more deeply the major ethical questions raised by society;
- To discern the values and the ethical concerns arising from, or involved in, a society defined more and more in terms of information creation and transfer and to propose appropriate strategies for taking these values and ethical concerns into consideration in the further evolution of an information-oriented communication society.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS). The specific regulations of the programs and the course descriptions are approved by the Senate of both the University of Ottawa and of Saint Paul University.

Programs
Graduate Diploma Public Ethics
Master of Arts Public Ethics

Admission

To be admitted to the graduate diploma program, candidates must:

- Have obtained an honours bachelor's degree, or the equivalent, in philosophy, ethics, political science, governance studies, public policy, or in another discipline judged relevant, with a minimum average of 70% (B);
- Submit two letters of reference, at least one of which must be from a professor;
- Be proficient in at least one of Canada's two official languages and have a good enough reading knowledge of the other language to be able to read texts in that language.

In exceptional cases, candidates who do not hold the equivalent of an honours bachelor's degree as defined above may be admitted to the graduate diploma program, provided they can demonstrate, to the satisfaction of the Admissions Committee, that they possess adequate knowledge and professional experience (for example, experience as a policy analyst in the public sector). In some cases, such candidates may be required to complete qualifying courses in pertinent disciplines prior to admission.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master's

Students registered in the graduate diploma program can request to transfer to a related master's program in accordance with section A.7. of the general regulations of the FGPS.

Language of Instruction

The program is offered in French and in English. In accordance with Saint Paul University and the University of Ottawa regulations, examinations, assignments and the research paper or thesis may be written in either one of the two official languages (English or French).

Program Requirements

Diploma Requirements

The Graduate Diploma in Public Ethics program consists of 15 credits of course and seminar work. It is a one-year program, with the year divided into two sessions of full-time study. The program can also be taken on a part-time basis.

Core courses (6cr.)

EPE6300 MAIN ETHICAL THEORIES I (3cr.)
EPE6310 SEMINAR IN PUBLIC ETHICS I (3cr.)

Electives (9cr.)

Three courses (9cr.) chosen from among the following:

EPE6301 MILITARY AND PEACEKEEPING ETHICS (3cr.)
EPE6302 ENVIRONMENTAL ETHICS (3cr.)
EPE6303 ETHICS AND HUMAN RIGHTS (3cr.)
EPE6304 ETHICS AND INTERNATIONAL DEVELOPMENT (3cr.)
EPE6305 ETHICS AND HEALTH CARE (3cr.)
EPE6306 ETHICS, PRIVACY AND INFORMATION (3cr.)
EPE6320 SELECTED TOPICS IN ETHICS (3cr.)
EPE6901 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)
ECS5304 ETHICAL DIMENSIONS OF CONFLICT (3cr.)
CMNN115 COMMUNICATION ETHICS (3cr.)
PAP6102 DEMOCRATIC GOVERNANCE (3cr.)
SOC7150 INTERETHNIC RELATIONS: CRITICAL EXAMINATION OF THEORIES AND RESEARCH (3cr.)
Duration of the Program

All students, whether full- or part-time, must complete all diploma requirements within three years of having first registered in the program. Serious efforts are made to accommodate the schedules of part-time students.

Minimum Standards

The passing grade in all courses is C+. Students who fail two courses (equivalent to 6 credits) or the same course twice must withdraw from the program.

Courses

EPE5101 SOCIAL PHILOSOPHY (3cr.)
Study of the philosophical underpinnings of social life from the theoretical approaches of living together and of the common good, to problems of contemporary societies, such as solidarity and social citizenship rights.

EPE6300 MAIN ETHICAL THEORIES I (3cr.)
Study of the classic and canonical works of Aristotelian or virtue ethics, deontology, contractualism, and consequentialism including utilitarianism. Initiation to the basic concepts grounding each theory and assessment of their strengths and weaknesses.

EPE6301 MILITARY AND PEACEKEEPING ETHICS (3cr.)
Examination of the thought on ethics by philosophers and military personnel. Readings from Cicero, Julius Caesar, Marcus Aurelius before turning to renaissance and modern thinkers. Contemporary ethics of war, the nature of the soldier and the peacekeeper. Theoretical discussions and a detailed look at current policies and thinking at the Department of National Defence.

EPE6302 ENVIRONMENTAL ETHICS (3cr.)
Ethical analysis of environmental policies. Nature of the relationship between humans and the environment.

EPE6303 ETHICS AND HUMAN RIGHTS (3cr.)

EPE6304 ETHICS AND INTERNATIONAL DEVELOPMENT (3cr.)
Ethical components of development and underdevelopment theories. Rights and obligations of wealthy countries towards poor countries. Ethical critique of policies governing international aid.

EPE6305 ETHICS AND HEALTH CARE (3cr.)

EPE6306 ETHICS, PRIVACY AND INFORMATION (3cr.)
Analysis of the impact of the development of New Information and Communications Technologies (NTIC) on privacy and the confidentiality of personal information.

EPE6307 MAIN ETHICAL THEORIES II (3cr.)
Study of the main 20th- and 21st-century versions of the classical ethical theories, and of how these theories are challenged by and attempt to respond to contemporary ethical issues. Prerequisites: EPE6300 MAIN ETHICAL THEORIES I

EPE6308 SECULARISM AND PUBLIC LIFE (3cr.)
Study of the relationship between secularism and public life in contemporary liberal democratic societies, focusing especially on institutions, government and the Canadian public sphere.

EPE6309 ETHICS, PHILOSOPHY AND PUBLIC POLICY (3cr.)
Study of the concrete and normative aspects of public policy and of their ethical and philosophical implications, both locally and globally. Study of the main public policy issues and challenges in Canada as well as in other countries.

EPE6310 SEMINAR IN PUBLIC ETHICS I (3cr.)
Acquiring essential skills for developing a research question in public ethics. Methodologies include literature review, case-study approaches and critical analyses of texts. Preparation and approval of research plan.

EPE6311 SEMINAR IN PUBLIC ETHICS II (3cr.)
Critical analyses of policies and philosophical and ethical texts that are relevant to the major research paper or the thesis. Prerequisites: EPE6310

EPE6320 SELECTED TOPICS IN ETHICS (3cr.)
Study of a specialized area in ethics.

EPE6901 LECTURES DIRIGÉES / DIRECTED READINGS (3cr.)
Étude avancée d’un sujet déjà analysé dans le cadre du programme, exploration d’un thème dans un domaine particulier de l’éthique. / Advanced study of a question already analysed within the framework of the program, exploration of a theme in a particular area of ethics.
MBA5250 INTRODUCTION TO CORPORATE FINANCE

Satisfactory completion of a completed technology management project. Requirements to consist of exit interviews, a review of bidding strategies, network analysis using deterministic and stochastic methods for time and cost management.

Students must successfully complete 15 credits.

All students must complete 15 credits as follows:

Financial Support
Language Requirements

The program is under review. Therefore, we will not admit students until further notice.

The primary aim of the graduate diploma is to provide students with both a strong conceptual foundation for understanding and analyzing problems of governance and an effective tool-kit of skills and techniques required to operate in an increasingly complex managerial and organizational environment.

Governance is about effective coordination and decision-making in a world where knowledge and power are increasingly distributed. In this perspective, governance challenges are increasingly important to public, private and civic organizations – both within such organizations and across them.

This program was created for students who wish to increase their skills and knowledge in public management by adding an interdisciplinary dimension via courses from the Telfer School of Management and the School of Political Studies.

Programs

Graduate Diploma Public Management and Governance

Admission

The program is under review. Therefore, we will not admit students until further notice.

Candidates must meet the normal requirements for admission in a master’s level program at the University of Ottawa (namely, an honour’s baccalaureate degree, or its equivalent, with at least second class "B" standing from a recognized post-secondary institution). Advanced standing for up to 4.5 credits will be given to qualified students in recognition of comparable studies as determined by the Program Committee. To be
eligible, the credits in question must not have counted towards the requirements of a previously conferred diploma or degree.

Candidates are required to submit a resume as well as a narrative statement. In the narrative statement, we recommend that they identify and explain the reasons why this program is of interest to them, and highlight elements of their current or past professional experience (paid or voluntary) that may have given them some insights or sparked interest in public management and/or governance. The candidates may also wish to identify what they hope to gain from the diploma in terms of learning and/or endeavours that they believe the diploma will better position them to undertake. The statement should be between 300 and 500 words in length.

A maximum of three credits in equivalencies or advanced standing may be granted. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

Transfer from Graduate Diploma to Master’s

Students registered in the graduate diploma program can request to transfer to the Master of Arts (MA) in public administration in accordance with section A.7.1 of the general regulations of the FGPS.

Language Requirements

Proficiency in either English or French is required. Applicants whose first language is neither English nor French must provide proof of proficiency in one or the other. The list of acceptable proofs is indicated in the “Admission” section of the general regulations of the FGPS.

Program Requirements

The graduate diploma requirements consist of 15 credits, with 12 credits of core courses and three credits for a project, including a written report on an applied governance issue.

Compulsory courses (12 credits):

[[ADM6210]] [[ADM6212]] PAP6101 GLOBALIZATION AND CONTINENTAL INTEGRATION (3cr.)

PAP6102 DEMOCRATIC GOVERNANCE (3cr.)

Project (3 credits):

ADM6901 PROJET / PROJECT (3cr.)

or

PAP6901 PROJET / PROJECT (3cr.)

(Registration in the ADM or the PAP project depends on the Faculty / School of the project supervisor.)

Duration of the Program

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

Courses

PAP6101 GLOBALIZATION AND CONTINENTAL INTEGRATION (3cr.)

Examination of the impacts of socio-economic, technological and cultural globalization on our systems of governance both internationally and domestically. Analysis of the role of the nation-state in a context of simultaneous decentralization and internationalization, with a particular focus on global institutions and North American integration.

PAP6102 DEMOCRATIC GOVERNANCE (3cr.)

This seminar provides an examination of how democratic governments structure their decision-making processes for effectiveness, representation and accountability. A particular focus of this seminar is a critical evaluation of the New Public Management reforms, and an in-depth review of different models of government intervention and policy-making from a comparative perspective.

PAP6901 PROJET / PROJECT (3cr.)

Étude approfondie d’un domaine de la gestion publique ou de la gouvernance. Étude de cas ou projet en collaboration avec une ou plusieurs agences du secteur public. Rapport écrit. Noté: S/NS par le professeur responsable / In-depth study of a particular area of public management on governance. Case study or project to be conducted in collaboration with one or more public sector organizations. Written report. Graded: S/NS by the professor in-charge.
ADM6901 PROJET / PROJECT (3cr.)
Étude approfondie d’un domaine de la gestion publique ou de la gouvernance. Étude de cas ou projet en collaboration avec une ou plusieurs agences du secteur public. Rapport écrit. Noté : par le professeur responsable. In-depth study of a particular area of public management or governance. Case studies or project to be conducted in collaboration with one or more public sector organizations. Written report. Graded: S/NS by the professor in-charge.

Scientific Management and Leadership

The Graduate Diploma in Scientific Management and Leadership is offered by the Telfer School of Management in conjunction with the Faculty of Graduate and Postdoctoral Studies. The Graduate Diploma is open to students already enrolled in any of the MSc or PhD programs in the Faculty of Science. To receive the diploma, the requirements of both the primary program and of the diploma must be met. Both credentials are awarded simultaneously. The compulsory diploma courses are offered in English and in French. The optional courses are available in sufficient number in both languages to allow a student to complete all the diploma requirements in either English or French.

In accordance with the University of Ottawa regulation, students have a right to produce their assignments, their thesis, and to answer examination questions in French or in English.

Students who have completed the graduate diploma as well as their MSc or PhD are eligible to apply to another program offered by the Telfer School Management. The Admissions Committee of that program will determine whether some or all of the credits successfully completed for the diploma can be transferred.

Participating Programs

- Biology (MSc/PhD)
- Chemistry (MSc/PhD)
- Earth Sciences (MSc/PhD)
- Mathematics (MSc/PhD)
- Physics (MSc/PhD)

Programs

Graduate Diploma Scientific Management and Leadership

Admission

Applicants at the master’s level must apply for admission to the diploma at the same time as for the MSc program or, at the latest, towards the end of their first session of registration in the master’s. Applicants at the doctoral level must apply no later than the beginning of the second year of registration in their PhD program. All applicants must provide the following:

- A letter outlining their career plans and the relevance of the Diploma to those plans.
- A plan of study, indicating the proposed schedule for completion of the requirements of both the diploma and their primary program.
- A letter of support signed by their thesis supervisor and co-signed by the student’s primary program director.

Language requirement

Applicants whose first language is other than English and who intend to take the diploma courses in English must provide one of the following:

- A score of at least 250 (100 Internet-based) on the Test of English as a Foreign Language (TOEFL), with a score of at least 5 on the Test of Written English (TWE) and a score of at least 50 on the Test of Spoken English (TSE).
- A score of at least 7 in at least three of the four International English Language Testing System (IELTS) tests (Reading, Listening, Writing, Speaking) and at least 6 in the fourth.
- A score of at least 14 on the CANTEST, with no individual test score below 4.0, along with a score of 4.5 on the oral component of the test.
- Proof of completion within the last five years, of a previous degree program in an English or French language university.
- Proof of recent prolonged residence and exercise of a profession in an English or French speaking country (normally at least four years over the last six years).
Program Requirements

In addition to the requirements of their primary program of study, students must successfully complete 9 credits of coursework as follows:

Compulsory courses (6cr.):

MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
ADM6260 PROJECT MANAGEMENT I (1.5cr.)
ADM6261 PROJECT MANAGEMENT II (1.5cr.)

Optional Courses (3cr.)

At least one of:

MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
MBA5250 INTRODUCTION TO CORPORATE FINANCE (1.5cr.)

At most one of:

MBA5237 CHANGE MANAGEMENT (1.5cr.)
MBA5238 MANAGEMENT SKILLS 2 (1.5cr.)
MBA6262 ENTREPRENEURSHIP (1.5cr.)
MHA6203 PROGRAM EVALUATION FOR HEALTH CARE MANAGERS (1.5cr.)
MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)
MHA6215 MANAGEMENT AND EVALUATION OF QUALITY OF PATIENT CARE (1.5cr.)
MHA6230 HUMAN RESOURCE MANAGEMENT IN HEALTH CARE (1.5cr.)

Duration of the program

The requirements of the diploma are normally completed within one year.

Minimum standards

The passing grade in all diploma courses is C+. Students who fail 4.5 credits must withdraw from the diploma program. Students required to withdraw from their primary program are automatically withdrawn from the diploma.

Courses

ADM6260 PROJECT MANAGEMENT I (1.5cr.)
Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK®) of the Project Management Institute (PMI®); project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning, realization and close-out). Students will have hands-on experience using MS Project.

ADM6261 PROJECT MANAGEMENT II (1.5cr.)
Focus on projects that have incomplete and/or unstable requirements such as IT projects or software development projects. Topics covered include: portfolio management; risk management; determining requirements and solutions; quality management; communication management; design methods (Quality Function deployment, Value Analysis); iterative and adaptive project management; fast tracking and concurrent methods of project management.

MBA5235 MANAGEMENT SKILLS 1 (1.5cr.)
Development of increased skills and understanding of participant preferences for the management of interpersonal and team-based issues and processes in a work environment. Special focus on diversity and ethics in a team environment. Effective business communications, including skills for delivery of high quality business presentations; exposure to common business software for inclusion in the student’s professional toolbox.

MBA5236 LEADERSHIP AND MANAGEMENT (1.5cr.)
Leadership versus management; participatory leadership; transactional leadership; transformational leadership; reciprocity and mutual influence between leaders and followers; leading up (followership); situational determinants of effective leadership; cross-cultural leadership; virtual leadership. Course delivery involves class discussions, experiential exercises, guest speakers and case studies. Prerequisite: MBA 5330 or permission of the MBA program director.

MBA5238 MANAGEMENT SKILLS 2 (1.5cr.)
Understanding and development of the management skills required to manage people and processes in an organizational setting. Conflict
resolution, negotiation, problem-solving, team development and applied emotional intelligence. Prerequisite: MBA 5235 or permission of the MBA program director.

**MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)**
This course focuses on the role of the accounting function internal to the organization. It takes a broad view of managerial accounting, introducing students to various costing systems, cost behaviour patterns and cost structures. It demonstrates the use of accounting for the evaluation of product, managerial and divisional performance thus helping students to understand what accounting can do for decision makers and how accounting choices affect decisions. Emphasis the strategic importance of aligning accounting systems with firm technologies and goals. Current issues in management accounting and internal reporting are discussed.

**MBA5250 INTRODUCTION TO CORPORATE FINANCE (1.5cr.)**

**MBA6202 ENTREPRENEURSHIP (1.5cr.)**
Creating, growing, and sustaining or exiting a new firm in a technology-intensive industry. Issues important to the technology (the scope and nature of technological knowledge and intellectual property protection), financing (seed capital, venture capital, and initial public offerings), and inter-firm relationships (spin-offs, alliances and equity alliances, and acquisitions). The course is practically oriented and will draw upon local expertise to enhance its pertinence and appeal.

**MHA6203 PROGRAM EVALUATION FOR HEALTH CARE MANAGERS (1.5cr.)**
This course is intended for future health care managers who will contract out or procure program evaluations within their organizations. It covers the development of evaluation questions and standards of effectiveness, program evaluation designs, sampling, collecting information (primary and secondary), evaluation measures, managing evaluation data, analyzing evaluation data, evaluation reports, and development of “Requests for Proposals (RFPs)” that form the basis for these evaluations. Students prepare an evaluation proposal similar to the kind of proposal that is submitted by consulting firms and/or academic groups in response to RFPs from health care managers. At the conclusion of this course, students will be able to develop RFPs and to adequately assess evaluation proposals, i.e., be able ask to right questions, and to know which disciplines should be represented on the proposal review team.

**MHA6212 GOVERNANCE AND ETHICAL MANAGEMENT IN HEALTH CARE ORGANIZATIONS (1.5cr.)**
Governance models for health care organizations. Definition, resolution and handling of ethical problems of administrators, professionals and researchers in health organizations. Reconciliation of conflicting interests of the stakeholders according to ethical principles.

**MHA6215 MANAGEMENT AND EVALUATION OF QUALITY OF PATIENT CARE (1.5cr.)**
This course will apply concepts from the literature to analyze and understand quality management and patient safety issues, and discuss these concepts in relation to accountability. It will prepare students for the health care workplace by exposing them to practices and aspects related to patient safety and quality in health care, and by identifying contemporary approaches to address them. Various models and approaches for assessing and improving quality will be discussed, including evidence-based medicine and management, systematic reviews, clinical practice guidelines, and quality improvement approaches. Various quality initiatives and quality improvement tools will be discussed and evaluated.

**MHA6230 HUMAN RESOURCE MANAGEMENT IN HEALTH CARE (1.5cr.)**
Focus on the major issues unique to effective health human resources management. Topics covered include measuring needs and planning for the current and future supply of human resources. Recruitment, retention and development strategies to meet changing workforce conditions. Understanding the unique regulatory environments where many professions are regulated by provincial laws and professional colleges while others are not. Labor relation issues and approaches in this highly unionized environment. Funding, team work and inter-professional practice, scope of practice issues and organizational design. Interactions of organizational and professional accreditation mechanisms (such as professional colleges and associations, and accreditation bodies).

**Supportive Care and Spirituality in Palliation**

The Faculty of Human Sciences at Saint Paul University offers a Graduate Diploma in Supportive Care and Spirituality in Palliation. This diploma is conferred jointly by the Senates of Saint Paul University and the University of Ottawa under the terms of the federation agreement between them.

The Graduate Diploma in Supportive Care and Spirituality in Palliation is intended for people who already work in the field: nurses, doctors, nurses’ aides, psychologists, psychotherapists, pastoral workers, volunteers, etc.

**Programs**

Graduate Diploma Supportive Care and Spirituality in Palliation

**Admission**
Candidates must satisfy the following conditions:

- Hold an Honours Bachelor’s degree or its equivalent in psychology, health sciences, nursing, practical theology, or in a related discipline, with an average of at least B, or an undergraduate medical degree (MD).
- Comply with one of the following criteria (in each case, the candidate should provide a confirmation letter from a third party, in which the duration of the activity is described):
  - Have relevant work experience (in medicine, nursing, etc.) or volunteer experience in a palliative care setting for a minimum of one year.
  - Have relevant work experience with individuals who are severely ill or who are at the end of life, as a psychologist or psychotherapist for a minimum of one year.
  - Have relevant experience in pastoral care for a minimum of one year.
- Provide the following documents:
  - Letter of intent (500 words) and curriculum vitae.
  - Two (2) letters of recommendation (from professors, employers, professional mentors, religious leaders etc.); for candidates who have graduated within the previous seven years, at least one letter must be from a university professor.
- Undergo an interview with the program coordinators (to verify the candidate’s goals and his or her suitability for the program).

Program Requirements

The program requires successful completion of the following five courses (15 credits):

- IPA6151 SPIRITUALITY AND ADAPTATION TO ILLNESS (3cr.)
- IPA6131 GRIEF (3cr.)
- IPA6132 THEMES RELATED TO END OF LIFE (3cr.)
- IPA6133 END OF LIFE PAIN MANAGEMENT (3cr.)
- IPA6134 ETHICAL ISSUES AT THE END OF LIFE (3cr.)

Duration of the program

Students may complete the diploma requirements part-time over the course of two or, at most, three years.

Minimum standards

The passing grade in all courses is 65% (C+). Students who fail two courses or the same course twice are withdrawn from the program.

Courses

IPA6151 SPIRITUALITY AND ADAPTATION TO ILLNESS (3cr.)
Examines the phenomenology and etiology of health and illness. Emphasizes the creation of opportunities for human and spiritual growth. It examines the tensions that negatively affect certain types of terminal illness, their implications and effects on individuals, their families, and the community. It also examines the role of pastoral workers and how fears, guilt, feelings of inadequacy, and troubled interpersonal relationships can lead to Hope, forgiveness, self-fulfillment, and human and spiritual growth. This course will enrich the critical thinking of professionals working with individuals who are at the end of life and with those close to them.

IPA6131 GRIEF (3cr.)
Is intended to provide an understanding of the process of grieving and an awareness of how loss can be integrated, in order to guide service providers in their work. Through examining these issues, the student will become familiar with the psychological and spiritual dimensions of mourning, signs of distress, and factors that influence the grieving process.

IPA6132 THEMES RELATED TO END OF LIFE (3cr.)
The psychological, social, spiritual, and religious components of themes related to end of life. This course will enrich critical thinking of the professionals working with individuals who are at the end and with those close to them. Prerequisites: IPA6151 and IPA6131. Equivalent to the course N966135 Palliative/End of Life Care: An Interprofessional Approach.

IPA6133 END OF LIFE PAIN MANAGEMENT (3cr.)
This course will be offered in a modular format and will touch on physical management of pain, as well as psychological, spiritual, and religious aspects of pain. Prerequisites: IPA6151 and IPA6131. Students having completed the course PHT6544 Mécanisme et prise en charge de la douleur en physiothérapie (1.5cr.) or ERC6550 Perspective particulière en ergothérapie : Pain and Occupational Therapy (1.5cr.) will be credited half of the modules.

IPA6134 ETHICAL ISSUES AT THE END OF LIFE (3cr.)
This course aims to provide training in bioethics, focusing on problems that may arise at the end of life. The course will examine the values that
underlie bioethical dilemmas. Prerequisites: IPA6131 and IPA6131.

**Systems Science**

The Systems Science Program provides qualified students with the opportunity for master's-level study in a broad range of areas that emphasize transdisciplinary work in the context of general systems analysis. The emphasis in Systems Science is on the development of analytical and integration skills for use in the resolution of complex applied problems that require a broad-based perspective.

Many professors in Information Technology and Engineering, Mathematics and Statistics, Administration, Economics, and other disciplines are active in the Systems Science program as instructors, student advisers and thesis directors. Others are interested in ongoing Systems Science activities including the seminar series, and Systems Science applications days. Their areas of research, both theoretical and applied, span a wide variety of fields in operations research, deterministic and probabilistic modelling, optimization, computer science, information systems, control, and economic modelling.

**General Information**

The graduate program in System Science is an interdisciplinary program specially designed for those who are interested in the analysis and modelling (mathematical and computer) of natural and man-made systems. It provides the professional with skills and knowledge required to understand, control, predict and optimize behaviour in a variety of fields from engineering and computer science to management and applied economics. The program is supervised by a Committee composed of representatives from the Department of Economics, the School of Information Technology and Engineering, the Telfer School of Management, and the Department of Mathematics and Statistics.

You are invited to consult the site www.systems-science.uottawa.ca for additional information about the Program.

The Program offers streams leading to three different credentials: a graduate diploma; a master’s in Systems Science; an MSc. To accommodate part-time students, the core courses are usually offered in the late afternoon or evening.

Systems Science is a participating unit in the collaborative program in Environmental Sustainability (at the master’s level).

Most of the courses in the graduate programs are offered in English. Research activities can be conducted either in English, French or both, depending on the language used by the professor and the members of his or her research group.

The program is governed by the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

**Programs**

Graduate Diploma Systems Science

Master of Science Systems Science

Master of Science Systems Science Specialization in Environmental Sustainability

Master of Systems Science

**Admission**

A four-year undergraduate degree in Computer Science, Economics, Engineering, Mathematics, Operations Research, Science or a related area with at least a “B” average is required for admission to the Program.

Undergraduate courses in probability, linear algebra, differential equations and computer programming are prerequisites for the core courses of the Program. Details regarding the level and content of prerequisite courses are included in the information package which is sent to all applicants. If a student lacks any of these courses, he will normally be required to complete them as a condition of admission. Entering students who lack the required undergraduate preparation may be permitted to enter a qualifying program.

Admission is offered either on a full-or part-time basis. Students admitted full-time to the master’s are required to register full-time for three sessions. Specific admission requirements are listed at the beginning of the description of each stream.

Students should specify on the application form whether they are applying for the graduate diploma, the MSc in systems science or the master’s in systems science.

Students are normally admitted initially to the graduate diploma and are admitted to the master’s only upon successful completion of the core courses and a positive recommendation from the program committee.

Applicants to the master’s in systems science are invited to include with their application a letter of intent stating their motivation for studying systems science and outlining their preferences for key areas of study in the program. They must clearly select the program without thesis on their application form.
A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, consult section B.2.7. of the general regulations of the FGPS.

**Transfer from Graduate Diploma to Master’s**

Students registered in the graduate diploma program can request to transfer to the master’s in systems science (MSysSc) or to the master of science in systems science (MSc) in accordance with section A.7.1 of the general regulations of the FGPS.

**Language Requirements**

Some of the requirements of the program must be fulfilled in English. A very good knowledge of the English language is therefore required. Students whose first language is neither English nor French are required to take the TOEFL examination or an equivalent (as determined by the Faculty of Graduate and Postdoctoral Studies) as a condition of admission.

**Financial Support**

Candidates are encouraged to seek financial assistance by applying directly for scholarships or student loans to provincial, federal or international agencies. MSc students may be provided with full or partial financial support from the research grants of their respective thesis supervisors. They are also eligible to apply for teaching assistantships, though the number available is limited.

**Program Requirements**

All students must complete 15 credits as follows:

Core courses (15 credits):

Four from among the following five courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS5100</td>
<td>SYSTEMS ENGINEERING</td>
<td>3 cr.</td>
</tr>
<tr>
<td>SYS5110</td>
<td>FOUNDATIONS OF MODELLING AND SIMULATION</td>
<td>3 cr.</td>
</tr>
<tr>
<td>SYS5120</td>
<td>APPLIED PROBABILITY</td>
<td>3 cr.</td>
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<tr>
<td>SYS5130</td>
<td>SYSTEMS OPTIMIZATION AND MANAGEMENT</td>
<td>3 cr.</td>
</tr>
<tr>
<td>SYS5140</td>
<td>ECONOMIC SYSTEM DESIGN</td>
<td>3 cr.</td>
</tr>
<tr>
<td>SYS5160</td>
<td>SYSTEMS INTEGRATION</td>
<td>3 cr.</td>
</tr>
</tbody>
</table>

The Graduate Diploma may be completed by an adequately prepared full-time student in three sessions.

Students enrolled in the graduate diploma who have successfully completed the required 15 credits may apply for admission to one of the master’s programs in systems science instead of accepting the graduate diploma. Applicants for the MSc must present an outline of their research approved by their potential thesis supervisor. If admitted to the master’s, the residency requirements and the diploma courses will be counted towards the requirements of the master’s. Admission is competitive, based on academic and professional experience prior to and concurrent with performance in the diploma courses. Diploma students are invited to consult representatives of the program committee regarding their intention to seek acceptance into one of the master’s programs.

**Duration of the Program**

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

**Courses**

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**Core Courses**

**SYS5100 SYSTEMS ENGINEERING (3cr.)**

Controllability and observability, Euler-Lagrange equations, Pontryagin maximum principle, dynamic programming, linear quadratic regulator problem, matrix Ricatti differential equations and properties of their solution, design of optimal regulator based on steady state solution of the Ricatti differential equation, time optimal control, LaSalle bang-bang principle, applications to motor speed control, satellite attitude control, etc. Prerequisites: CSI1100 and MAT2341 and (MAT 2324 or MAT 2331) and MAT2371 and MAT2375.

**SYS5110 FOUNDATIONS OF MODELLING AND SIMULATION (3cr.)**

Introduction to simulation languages. Prerequisites: CSI1100 and MAT2341 and (MAT2324 or MAT 2331) and MAT2371 and MAT2375.

SYS5120 APPLIED PROBABILITY (3cr.)
An introduction to stochastic processes, with emphasis on regenerative phenomena. Review of limit theorems and conditioning. The Poisson process. Renewal theory and limit theorems for regenerative processes; Discrete-time and continuous-time Markov processes with countable state space. Applications to queuing. Prerequisites: MAT2341 and MAT2371 and MAT2375.

SYS5130 SYSTEMS OPTIMIZATION AND MANAGEMENT (3cr.)
Analysis of user requirements and model design. Data mining. Use of optimization software. Systems thinking and its application to economic systems and hierarchical systems. Applications to economic systems simulation, modeling, optimization and management. Prerequisites: CSI100 and MAT2341 and (MAT2324 or MAT2331).

SYS5140 ECONOMIC SYSTEM DESIGN (3cr.)
Introduction to the epistemology of systems thinking and its application to economic systems. Basic concepts of complex systems thinking including hierarchical systems and economic systems simulation and behaviour. Soft systems thinking. Examples from other fields of application will be reviewed from an interdisciplinary perspective. Prerequisites: CSI100 and MAT2341 and (MAT2324 or MAT2331) and MAT2371 and MAT2375.

OR

ECO6108 ECONOMIC SYSTEM DESIGN (3cr.)
Deterministic dynamic optimization methods: economic and managerial applications of the maximum principle of Pontryagin and of dynamic programming. Discrete time stochastic dynamic optimization methods: Bayesian and Markovian decision theory, measures of risk-aversion and risk, portfolio theory, elements of search theory, applications of discrete time stochastic control to economics. Prerequisites: ECO3141 and ECO4186 or MAT2341, MAT2324, MAT2171 or (MAT2371 and MAT2375).

AND

SYS5160 SYSTEMS INTEGRATION (3cr.)
Planning, design of complex systems from continuous to discrete time. Synthesis of systems methodology. State estimation. Parameters indentification. Discretization and stochastic effects. Dynamic, logic control. Modelling, discrete event, simulation examples. Prerequisites: Two of the following: SYS 5100, SYS 5110, SYS 5120, SYS 5130, SYS 5140. Prerequisites: Four of the following: SYS5100, SYS5110, SYS5120, SYS5130, SYS5140.

Elective Courses
The following lists of elective courses are provided as suggested programs of study in key areas of Applied Systems Science. Course descriptions may be found in the listing of the academic unit concerned.

ADM = Administration; CSI = Computer Science; ECO = Economics; ELG = Electrical Engineering; EMP = Engineering Management; GEG = Geography; MAT = Mathematics; MCG = Mechanical Engineering; SYS = Systems Science

Courses last one session and carry 3 credits, unless otherwise noted. The courses listed below are not necessarily offered each year. Students are asked to confer with their academic advisers concerning their area of choice and selection of elective courses, which may have codes related to other academic units of the University, e.g. BIO = Department of Biology, SEG = School of Information Technology and Engineering.

Note on prerequisite courses: It is the students' responsibility to verify that they have the prerequisites for the elective courses that they wish to take. After consultation with the academic adviser, they may be required to obtain permission from the professors teaching these courses.

GNG5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

GNG5122 OPERATIONAL EXCELLENCE AND LEAN SIX SIGMA (3cr.)
Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

Software Engineering

CSI4106 INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3cr.)

CSI4106 INTRODUCTION TO ARTIFICIAL INTELLIGENCE (3cr.)
CSI5110 (COMP 5707) PRINCIPLES OF FORMAL SOFTWARE DEVELOPMENT (3cr.)
Methodologies in formal software specification, development, and verification. The use of theorem proving, automated deduction, and other related formal methods for software correctness. Applications in program verification, mobile code safety, and protocol verification.

CSI5111 (COMP 5501) SOFTWARE QUALITY ENGINEERING (3cr.)

CSI5112 (COMP 5207) SOFTWARE ENGINEERING (3cr.)
Topics of current interest in Software Engineering, such as software development systems, structured systems analysis and design, management of software, software tools, validation and verification, programming environments.

CSI5118 (COMP 5302) AUTOMATED VERIFICATION AND VALIDATION OF SOFTWARE (3cr.)
Topics in formal test derivation methods, test management, high-level, CASE-based verification and validation, data-flow & control-flow measures and metrics for assessing quality of designs and code, regression analysis & testing. Prerequisite: a four-year undergraduate degree in computer science, computer engineering, or software engineering.

CSI5122 (COMP 5301) SOFTWARE USABILITY (3cr.)
Design principles and metrics for usability. Qualitative and quantitative methods for the evaluation of software system usability: Heuristic evaluation, usability testing, usability inspections and walkthroughs, cognitive walkthroughs, formal usability experimentation. Ethical concerns when performing studies with test users. Economics of usability. Integration of usability engineering into the software engineering lifecycle.

CSI5125 SIMULATION
Topics in modelling and simulation within the context of both discrete and continuous systems. Estimation of model parameters. Experiment design and statistical analysis of simulation results. Distributed simulation. Stiffness and discontinuity handling in continuous system simulation. Artificial Intelligence in modelling and simulation. Validation and quality assurance of simulation models. Prerequisite: CS4124 or permission of the instructor.

CSI5180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)
A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive systems. Assignments will be both (a) programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special topics in current A.I. journals.

CSI5307 expert systems
Survey of some landmark expert systems; types of architecture and knowledge representation; inferencing techniques; approximate reasoning; truth maintenance; explanation facilities; knowledge acquisition. A project to implement a small expert system will be assigned.

CSI5386 (COMP 5505) NATURAL LANGUAGE PROCESSING (3cr.)
Definitions, applications, challenges, lexicons, thesauri, corpora and other linguistic resources. Morphological analysis; tagging. Selected syntactic theories: phrase structure grammars, unification-based grammars. Parsing techniques: chart, deterministic parsing, logic grammars. Selected semantic representations: logic, logical forms, conceptual graphs. Element of semantic and pragmatic analysis; reference, scope, focus. Elements of statistical language processing and text mining. Introduction to corpus linguistics. Term projects, one on syntax and one on semantics, will be done in Prolog and logic grammars. Prerequisite: CS4106 or permission of the instructor.

Communication Systems
ADM6270 SYSTEMS FOR ELECTRONIC COMMERCE

ADM6271 BUSINESS TELECOMMUNICATIONS SYSTEMS (1.5cr.)
Concepts of voice, data, image and video communications and their integration into local and long distance networks. Business communication systems examples.

CSI5169 (COMP 5304) WIRELESS NETWORKS AND MOBILE COMPUTING (3cr.)
Computational aspects and applications of design and analysis of mobile and wireless networking. Topics include Physical, Link Layer, Media Access Control, Wireless, Mobile LANs (Local Area Networks), Ad-Hoc, Sensor Networks, Power Consumption optimization, Routing, Searching, Service Discovery, Clustering, Multicasting, Localization, Mobile IP/TCP (Internet Protocol/Transmission Control Protocol), File Systems, Mobility Models, Wireless Applications. (Cannot be combined for credit with ELG 6168)
CSI5174 (COMP 5604) VALIDATION METHODS FOR DISTRIBUTED SYSTEMS (3cr.)

ELG5103 OPTICAL COMMUNICATIONS SYSTEMS (3cr.)
Optical communication system concepts and basic characteristics. Optical Transmitters. Optical detection. Optical noise sources and their mathematical models. Non-coherent (direct) detection: system model, direct detection of intensity modulation, application of photo-multiplication, optimal post-detection processing, and subcarrier systems. Coherent detection: heterodyne receivers, the field matching problem and receiver performance. Optical binary digital system, single-mode binary and heterodyne binary systems. Block coded digital optical communication systems: PPM, PAM, PSK, and FSK signalling. Integration of device technology and system architecture. Selected topics in optical communications and networking. Prerequisites: ELG 5119, and ELG 5375 or the equivalents. Prerequisites: ELG5119, and ELG5375, or the equivalents.

ELG5119 (EACJ 5109) STOCHASTIC PROCESSES (3cr.)

ELG5122 (EACJ 5202) MODELLING, ANALYSIS AND PERFORMANCE EVALUATION IN COMPUTER COMMUNICATIONS (3cr.)
Network performance issues and their mathematical analysis techniques. Interruptibly available server model, probing and tree search, delay cycle, switch/network topology and reliability. Analysis of controlled and random access methods, routing allocation/control, topological design. Selected topics from current literature on various network applications. Precludes additional credit for ELG 7186 (EACJ 5606). Prerequisites: ELG 5120 (EACJ 5200), ELG 5374 (EACJ 5607), or SYSC 5201 (ELG 6121), or the equivalents. Prerequisites: ELG5120 (EACJ5200), ELG5374 (EACJ5607), or SYSC 5201 (ELG6121), or the equivalents.

ELG5125 (EACJ 5205) QUALITY OF SERVICE MANAGEMENT FOR MULTIMEDIA APPLICATIONS (3cr.)
Design principles: layering, protocols, interface; models for open distributed processing; real-time requirement; request-response and stream processing, real-time scheduling, design for performance and scalability; other quality of services issues; user perspective versus system performance parameters, cost/performance trade-off, negotiations; adaptive and mobile applications; examples of multimedia applications and protocols. Prerequisite: ELG 5374 (EACJ 5607) or SYSC 5201 (ELG 6121) or equivalent.

ELG5180 (EACJ 5704) ADVANCED DIGITAL COMMUNICATIONS (3cr.)
Techniques and performance of digital signalling and equalization over linear bandlimited channels with additive Gaussian noise. Fading multipath channels: diversity concepts, modelling and error probability performance evaluation. Synchronization in digital communications. Spread spectrum in digital transmission over multipath fading channels. Precludes additional credit for SYSC 5605. Prerequisite: SYSC 5504 or ELG 5375 or the equivalent.

ELG5375 (EACJ 5506) PRINCIPLES OF DIGITAL COMMUNICATION (3cr.)
Elements of communication theory and information theory applied to digital communications systems. Characterization of noise and channel models. Analysis of digital data transmission techniques for additive Gaussian noise channels. Efficient modulation and coding for reliable transmission. Spread spectrum and line coding techniques. Prerequisite: ELG 5119 or SYSC 5503 or the equivalent (may be taken concurrently).

ELG5376 (EACJ 5507) DIGITAL SIGNAL PROCESSING (3cr.)

ELG5378 (EACJ 5509) IMAGE PROCESSING AND IMAGE COMMUNICATIONS (3cr.)

ELG5382 (EACJ 5108) SWITCHING AND TRAFFIC THEORY FOR INTEGRATED BROADBAND NETWORKS (3cr.)
Principles of switching theory. Asynchronous Transfer Mode switching architectures. Principle of teletraffic engineering. Queueing theory and performance evaluation techniques as applied to the study of computer network architectures. Current topics in computer network modelling analysis and traffic control for high-speed multimedia networks. Prerequisite: ELG 5374 (EACJ 5607) or ELG 6121 (SYSC 5201), or the equivalent. Co-requisite: ELG 5119 (EACJ 5109) or ELG 6133 (SYSC 5503) or ELG 6103 (SYSC 5003), or the equivalent.

Information Systems
ADM6272 PLANNING AND DEVELOPMENT OF INFORMATION SYSTEMS

ADM6273 INFORMATION SYSTEMS FOR DECISION-MAKING
CSI5115 (COMP 5503) DATABASE ANALYSIS AND DESIGN (3cr.)
The dimensional and multidimensional data models for data warehousing. Data dependencies and decomposition. Structure and use of data definition and manipulation languages. Database economics, engineering, deployment and evolution. Issues in integrity, security, the Internet and distributed databases. Relationships to decision support systems. **Prerequisite:** CSI3317 or equivalent

CSI5180 (COMP 5100) TOPICS IN ARTIFICIAL INTELLIGENCE (3cr.)
A programming-oriented introduction to selected topics in Artificial Intelligence (A.I.). Topics for consideration include: A.I. programming techniques, pattern matching systems, natural language systems rule-based systems, constraint systems, learning systems, and cognitive systems. Assignments will be both (a) programming-oriented, requiring implementation and/or extensions of prototypes in Lisp and/or Prolog and (b) research-oriented, requiring readings of special topics in current A.I. journals.

CSI5386 (COMP 5505) NATURAL LANGUAGE PROCESSING (3cr.)
Definitions, applicators, challenges, lexicons, thesauri, corpora and other linguistic resources. Morphological analysis; tagging. Selected syntactic theories: phrase structure grammars, unification-based grammars. Parsing techniques: chart, deterministic parsing, logic grammars. Selected semantic representations: logic, logical forms, conceptual graphs, Element of semantic and pragmatic analysis: reference, scope, focus. Elements of statistical language processing and text mining. Introduction to corpus linguistics. Term projects, one on syntax and one on semantics, will be done in Prolog and logic grammars. **Prerequisite:** CSI4106 or permission of the instructor

CSI5387 (COMP 5706) DATA MINING AND CONCEPT LEARNING (3cr.)

ELG5170 (EACJ 5501) INFORMATION THEORY (3cr.)
Measure of information: entropy, relative entropy, mutual information, asymptotic equipartition property, entropy rates for stochastic processes; Data compression: Huffman code, arithmetic coding; Channel capacity: random coding bound, reliability function, Blahut-Arimoto algorithm, Gaussian channels, colored Gaussian noise and “water-filling”; Rate distortion theory; Network information theory. **Prerequisite:** ELG 5119 (EACJ 5109) or SYSC 5503 (ELG 5119) or the equivalent.

Production Management

ADM6280 CURRENT PRACTICES IN OPERATIONS MANAGEMENT (1.5cr.)

ADM6281 SUPPLY CHAIN MANAGEMENT (1.5cr.)
Introduction to supply chain management; overview of its role in the organization as an operational, a strategic, and a competitive tool; role of information systems and technology in supply chain management; managing the flow of materials, and inventory management across the supply chain; developing and maintaining supply chain relationships; future challenges including sharing risks in inter-organizational relationships, managing the global supply chain and design for supply chain management. **Prerequisite:** MBA 5380 or equivalent for MBA students or EMP 5101 for EMP students.

ADM6282 INTRODUCTION TO QUALITY MANAGEMENT (1.5cr.)

ADM6283 QUALITY MANAGEMENT TECHNIQUES AND IMPLEMENTATION

EMP5169 ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

EMP5179 MANUFACTURING SYSTEMS ANALYSIS (3cr.)

MCG5159 (MAAJ 5509) ADVANCED PRODUCTION PLANNING AND CONTROL (3cr.)
MCG5169 (MAAJ 5609) ADVANCED TOPICS IN RELIABILITY ENGINEERING (3cr.)

MCG5179 (MAAJ 5709) MANUFACTURING SYSTEM ANALYSIS (3cr.)

**Corporate Managerial Modelling**
ADM6200 PHYSICIAN SKILLS DEVELOPMENT (PART I)
This longitudinal course introduces the student to interviewing skills with an emphasis on establishing good communication between the physician and the patient, effective history taking and physical examination. Small group sessions occur with tutors, and students have a first exposure to clinical settings

ADM6201 FORECASTING FOR MANAGEMENT II

ADM6262 TECHNOLOGY IN THE NATIONAL AND INTERNATIONAL ENVIRONMENTS (1.5cr.)

ADM6263 TECHNOLOGY ADAPTATION AND INNOVATION IN A CORPORATE ENVIRONMENT (1.5cr.)

ADM6264 TECHNOLOGY R & D (1.5cr.)

ADM6265 HIGH-TECH ENTREPRENEURSHIP

ADM6284 MANAGING TECHNOLOGICAL RISK (1.5cr.)

MAT5307 (MATH 5804) TOPICS IN OPERATIONS RESEARCH (3cr.)

**Environmental Economic Systems**
Environmental Economic Systems examines the impact of management decision making on the ecosystem. This study program is carried out in conjunction with several University departments and the Institute for Research on the Environment and Economy (IRÉE). Students in this area are invited to attend the IRÉE's regular seminars, and to participate in workshops as part of their systems study in this area.

ECO6143 (ECON 5803) ECONOMICS OF NATURAL RESOURCES (3cr.)

ECO6151 (ECON 5804) ECONOMICS OF THE ENVIRONMENT (3cr.)
Theory of environmental regulation, including command and control, incentive based mechanisms, effects of market structure, and interactions with pre-existing taxes. Valuation of non-marketed goods, including existence value, contingent valuation, hedonic price methods, health impacts, irreversibility, and recreational benefits. **Prerequisite:** ECO6150 or the permission of the Department.

ECO6143 (ECON 5803) ECONOMICS OF NATURAL RESOURCES (3cr.)

GEG5102 RESTRUCTURING AND GLOBALISATION
Advanced analysis of the global systems and their consequences at the international, national, regional and intra-urban scales.

GEG6101 DATA ANALYSIS AND MODELLING (3cr.)
Techniques of analysis of empirical data: quantitative, semi-quantitative and qualitative. Multivariate and time-series data analysis.

GEG6103 SPATIAL DATA ANALYSIS (3cr.)
Visualisation and analysis of spatial data: point-pattern analysis, spatial interpolation and estimation, spatial autocorrelation. Analysis of spatial interaction and spatio-temporal dynamics.

*General Codes – Systems Science*
Program Requirements

**Technology Project Management**

The graduate diploma is awarded upon successful completion of 15 credits. It is offered mainly in English. In accordance with University of Ottawa Policy, except in language courses and courses in Lettres françaises and English, every student has a right to produce his or her work and to answer examination questions in French or in English.

The program operates within the framework of the general regulations of the Faculty of Graduate and Postdoctoral Studies (FGPS).

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**Admission**

To be considered for admission, applicants must have successfully completed a four-year bachelor’s degree in engineering or science with a least a 70% (B) average, calculated in accordance with FGPS guidelines.

NOTE: Admission to the program is very competitive. Preference will be given to candidates who have a few years of full-time experience in engineering or a related field as well as a high level of proficiency in the English language.

A maximum of three credits in equivalencies or advanced standing may be granted. To be eligible, the credits in question must not have counted towards the requirements of a previous diploma or degree. Candidates who have already successfully completed some of the compulsory credits may be allowed to replace those credits with elective credits. For details, see section B.2.7. of the general regulations of the FGPS.

**Transfer from graduate diploma to master’s**

Students registered in the graduate diploma program can request to transfer to the Master of Engineering Management (MEng) program in accordance with section A.7.1 of the general regulations of the FGPS.

**Language requirements**

Applicants whose first language is not English are required to provide evidence of proficiency in English. The list of acceptable proofs can be found in the specific requirements for your program.

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**Program Requirements**
Students must successfully complete 15 credits.

Courses

- Six credits are compulsory:
  ADM6260 PROJECT MANAGEMENT I (1.5cr.)
  ADM6261 PROJECT MANAGEMENT II (1.5cr.)
  EMP5100 INTRODUCTION TO ENGINEERING MANAGEMENT (3cr.)

- Six credits must be chosen from the following list:
  MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
  MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
  MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
  MBA5250 INTRODUCTION TO CORPORATE FINANCE (1.5cr.)
  MBA5270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
  ADM6276 ENTERPRISE RESOURCE PLANNING SYSTEMS MANAGEMENT (1.5cr.)

The program committee may approve replacement of up to three credits of these six credits with alternative graduate courses in management or engineering.

- Three credits must be chosen from the following list:
  EMP5101 INDUSTRIAL ORGANIZATION (3cr.)
  EMP5102 SYSTEMS ENGINEERING AND INTEGRATION (3cr.)
  EMP5103 RELIABILITY, QUALITY AND SAFETY ENGINEERING (3cr.)
  EMP5109 TOPICS IN ENGINEERING MANAGEMENT (3cr.)
  EMP5118 TECHNOLOGY PROJECT MANAGEMENT PRACTICE (3cr.)
  EMP5119 PROJECT INFORMATION MANAGEMENT (3cr.)
  EMP5120 PRODUCT DEVELOPMENT AND MANAGEMENT (3cr.)
  EMP5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)
  EMP5999 PROJET EN GESTION DE LA TECHNOLOGIE / PROJECT IN MANAGEMENT OF TECHNOLOGY (3cr.)

Students are strongly encouraged to choose EMP5999.

- Seminar
  Students are strongly encouraged to attend a seminar series to be offered in a variety of topics including: Continuous Risk Management, IT Procurement, and Software Rollout.

Duration of the Program

The requirements of the diploma are usually fulfilled within three years of initial registration to the program.

Minimum Standards

The passing grade in all courses is C+. Failure in 6 credits leads to withdrawal from the program.

Courses

ADM6260 PROJECT MANAGEMENT I (1.5cr.)
Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK®) of the Project Management Institute (PMI®); project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning, realization and close-out). Students will have hands-on experience using MS Project.

ADM6261 PROJECT MANAGEMENT II (1.5cr.)
Focus on projects that have incomplete and/or unstable requirements such as IT projects or software development projects. Topics covered include: portfolio management; risk management; determining requirements and solutions; quality management; communication management; design methods (Quality Function deployment, Value Analysis); iterative and adaptive project management; fasttracking and concurrent methods of project management.

ADM6276 ENTERPRISE RESOURCE PLANNING SYSTEMS MANAGEMENT (1.5cr.)
EMP5109 TOPICS IN ENGINEERING MANAGEMENT (3cr.)
Current topics in industrial practices.

EMP5118 TECHNOLOGY PROJECT MANAGEMENT PRACTICE (3cr.)

EMP5119 PROJECT INFORMATION MANAGEMENT (3cr.)
Topics relating to the contractual relationship within the project team, including the different types of contracts and their application, the preparation of project documents, the evaluation of different types of project organization structures and associated project delivery systems, bidding strategies, network analysis using deterministic and stochastic methods for time and cost management.

EMP5120 PRODUCT DEVELOPMENT AND MANAGEMENT (3cr.)
Product development and management, including engineering aspects of the process. The latest trends and practices, insight into processes which facilitate product management and development, understanding of product management and development practices via case studies, development of the leadership and management skills required to create, initiate, develop, bring to market and implement new technological products and services.

EMP5121 PLANNING OF EXPERIMENTS IN ENGINEERING DESIGN (3cr.)

EMP5999 PROJET EN GESTION DE LA TECHNOLOGIE / PROJECT IN MANAGEMENT OF TECHNOLOGY (3cr.)
Analyse d’un projet complété en gestion de la technologie : entretiens de départ, étude de la documentation accumulée, présentation d’un sommaire des leçons retenues, conférence sur les résultats de l’analyse. Le projet, à choisir par l’étudiant, doit être approuvé par un superviseur nommé par le directeur du programme. Le superviseur dirigera les travaux de l’étudiant et soumettra la note finale S (satisfaisant) ou NS (non satisfaisant). / Post-mortem analysis of a completed technology management project. Requirements to consist of exit interviews, a review of extant documentation, presenting a lesson-learned summary and giving a lecture on the findings. The project, to be chosen by the student, will have to be approved by a supervisor appointed by the program director. The supervisor will oversee the student’s work and provide the final grade S (satisfactory) or NS (not satisfactory).

MBA5241 MANAGERIAL ACCOUNTING INFORMATION AND DECISIONS (1.5cr.)
This course focuses on the role of the accounting function internal to the organization. It takes a broad view of managerial accounting, introducing students to various costing systems, cost behaviour patterns and cost structures. It demonstrates the use of accounting for the evaluation of product, managerial and divisional performance thus helping students to understand what accounting can do for decision makers and how accounting affects decisions. Emphasis is placed on the strategic importance of aligning accounting systems with firm technologies and goals. Current issues in management accounting and internal reporting are discussed.

MBA5250 INTRODUCTION TO CORPORATE FINANCE (1.5cr.)

MBA5270 KNOWLEDGE AND INFORMATION MANAGEMENT (1.5cr.)
Role of information in organizations. Overview of systems used to capture, transform and disseminate information to managers. Linkages between information and knowledge management. The process of knowledge creation and application within and among organizations.

MBA5320 STRATEGIC MARKETING MANAGEMENT (3cr.)
Overview of the Marketing process: key concepts, tools and procedures, in the context of a technology-intensive global economy. Definition of Marketing, the Marketing Concept and Marketing Management, and the significance of operating in a technology-intensive global economy. Analyzing market opportunities, setting performance goals, formulating marketing and implementation plans to meet those goals. Introduction to e-marketing management and some of the e-marketing tools available. MBA5120 and MBA5125, together, are equivalent to MBA5320.

MBA5330 ORGANIZATIONAL BEHAVIOUR AND HUMAN RESOURCES MANAGEMENT (3cr.)
The strategic advantage of understanding and integrating organizational behaviour (OB) frameworks in designing and implementing effective human resource (HR) activities (namely attraction, development, maintenance and retention of employees), in measuring performance and in achieving high-performance outcomes in various global organizational contexts. OB topics covered include motivation, rewards, leadership, group dynamics, organizational politics, job and organization design, and culture. Prerequisite: MBA 5235 for MBA students only. MBA5131 and MBA5132, together, are equivalent to MBA5330.