MASTER OF SCIENCE HEALTH SYSTEMS SPECIALIZATION IN ENVIRONMENTAL SUSTAINABILITY

The Telfer School of Management (TSoM) 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 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 MSc in Health Systems is one of the participating programs in the collaborative program 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 MSc in Health Systems is acceptable as a basis for admission to the PhD in management.

The program is governed by the general regulations (http://www.grad.uottawa.ca/Default.aspx?tabid=1807/) in effect for graduate studies. It is offered in both English and French, primarily on a full-time basis.

Admission Requirements

For the most accurate and up to date information on application deadlines, language tests and other admission requirements, please visit the specific requirements (https://www.uottawa.ca/graduate-studies/programs-admission/apply/specific-requirements/) webpage.

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 graduate studies guidelines.

The academic profile of applicants must contain a background in analysis including the equivalent of at least 6 units 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 Études 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 units 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 units with elective units in the program. To be eligible for exemption, the units must have been completed with a grade of 70% (B) or better no more than five years prior to admission to the MSc. The maximum number of units for which an exemption can be granted is six. The general regulations in effect for graduate studies, section B 2.7, apply for transfer of units.

Students are normally admitted to the program on a full-time basis and are required to enroll full-time for three terms. 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.ets.org/toefl (https://www.ets.org/toefl/)
- 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 (http://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.
- 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 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.ets.org/toefl (https://www.ets.org/toefl/)
- 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 (http://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.
- 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 1.4 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.

Collaborative Program

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 term of enrollment.

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 (https://www.uottawa.ca/environment/grad-programs/specialization/apply/);
• 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.

Program Requirements

The MSc in Health Systems requires successful completion of 30 units consisting of 12 course units, a 6-unit Health Systems Research Internship and 12 units for the thesis.

Compulsory Courses (9.5 units)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>MHS 5301</td>
<td>Research Design Methodologies and the Conduct of Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives (1.5 units)

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. Enrollment 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 enrollment 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 units.

1. Health Services and Policy

<table>
<thead>
<tr>
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<th>Units</th>
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<tbody>
<tr>
<td>MHA 6203</td>
<td>Program Evaluation for Health Care Managers</td>
<td>1.5</td>
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<tr>
<td>MHA 6212</td>
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<td>1.5</td>
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<tr>
<td>MHA 6216</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>MHA 6250</td>
<td>Health Care Finance</td>
<td>1.5</td>
</tr>
<tr>
<td>MHA 6351</td>
<td>Health Economics</td>
<td>3</td>
</tr>
<tr>
<td>MHA 6360</td>
<td>Health Care in Canada in a Comparative Context</td>
<td>3</td>
</tr>
<tr>
<td>NSG 6160</td>
<td>Policy, Political Action and Change in Health Care</td>
<td>3</td>
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2. Public Health and Health Promotion

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<thead>
<tr>
<th>Course Code</th>
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<th>Units</th>
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</thead>
<tbody>
<tr>
<td>MHA 6301</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
<tr>
<td>MBA 5320</td>
<td>Strategic Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>EPI 5181</td>
<td>Population Health Risk Assessment I</td>
<td>3</td>
</tr>
<tr>
<td>EPI 5210</td>
<td>Public Health Governance</td>
<td>3</td>
</tr>
<tr>
<td>EPI 5271</td>
<td>Health Promotion</td>
<td>3</td>
</tr>
</tbody>
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3. Health Care Organizations

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>MHA 6230</td>
<td></td>
<td>1.5</td>
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<tr>
<td>MHA 6361</td>
<td>Organizational Behavior and Change in Health Care</td>
<td>3</td>
</tr>
<tr>
<td>MHA 6250</td>
<td>Health Care Finance</td>
<td>1.5</td>
</tr>
<tr>
<td>MBA 5237</td>
<td>Change Management</td>
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### 4. Health Systems Analysis and Optimization

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<tr>
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<tbody>
<tr>
<td>MHA 6271</td>
<td>Application of Information Technology in Health Care</td>
<td>1.5</td>
</tr>
<tr>
<td>MHA 6370</td>
<td>Health Informatics</td>
<td>3</td>
</tr>
<tr>
<td>MHA 6380</td>
<td>Quantitative Methods and Their Applications to Health Care Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>MBA 5280</td>
<td>Operations Management</td>
<td>1.5</td>
</tr>
<tr>
<td>ADM 6275</td>
<td>Business Intelligence Technologies and Big Data Analytics</td>
<td>1.5</td>
</tr>
<tr>
<td>SYS 5130</td>
<td>Systems Optimization and Management</td>
<td>3</td>
</tr>
<tr>
<td>SYS 5140</td>
<td>Economic System Design</td>
<td>3</td>
</tr>
<tr>
<td>EPI 5242</td>
<td>Biostatistics I</td>
<td>3</td>
</tr>
<tr>
<td>EPI 6188</td>
<td>Systematic Review and Meta-Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5307</td>
<td>Topics in Operations Research</td>
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### 5. Health Informatics and Technology

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<td>3</td>
</tr>
<tr>
<td>EPI 5188</td>
<td>Health Technology Assessment</td>
<td>3</td>
</tr>
<tr>
<td>CSI 5115</td>
<td>Database Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>CSI 5387</td>
<td>Data Mining and Concept Learning</td>
<td>3</td>
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### 6. Quality of Care

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>MHA 6301</td>
<td>Epidemiology and Population Health</td>
<td>3</td>
</tr>
<tr>
<td>MHA 6216</td>
<td>Managing Customer Relations and the Sales Process</td>
<td>1.5</td>
</tr>
<tr>
<td>MBA 6220</td>
<td>Organizational Behavior and Change in Health Care</td>
<td>3</td>
</tr>
<tr>
<td>MHA 6360</td>
<td>Health Care in Canada in a Comparative Context</td>
<td>3</td>
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<tr>
<td>MHA 6215</td>
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<td>1.5</td>
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### 7. Clinical Decision Making and Support

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<tr>
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<tbody>
<tr>
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<td>Program Evaluation for Health Care Managers</td>
<td>1.5</td>
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<tr>
<td>MHA 6216</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>MHA 6380</td>
<td>Quantitative Methods and Their Applications to Health Care Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>MBA 5280</td>
<td>Operations Management</td>
<td>1.5</td>
</tr>
<tr>
<td>NSG 6133</td>
<td>Decision Making in Clinical Practice</td>
<td>3</td>
</tr>
<tr>
<td>EPI 5181</td>
<td>Population Health Risk Assessment I</td>
<td>3</td>
</tr>
<tr>
<td>EPI 6276</td>
<td>Quantitative Methods in Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHR 6101</td>
<td>Risk Management in Government</td>
<td>3</td>
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### Master's Thesis and Health Systems Research Internship (18 units)

The research deliverables of the program are comprised of the Master's thesis and the research internship for a total of 18 units:

- **THM 7999** Master's Thesis
- **MHS 7991** Health Systems Research Internship

Students registered for the MSc in HS must submit to their Thesis Committee, before the end of the second term of enrollment 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 term and no later than the end of the third. A student must register in the Masters thesis in the term 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.

The completed thesis will be evaluated by a Thesis Examining Board composed of at least two professors who are involved in the MSc in Health Systems. For information regarding the thesis, consult section G of the General Regulations in effect for graduate studies and the guide 'Preparing a Thesis or a Research Paper,' which are both accessible through the graduate studies website at www.gradstud.uottawa.ca.

Once the thesis proposal is accepted, students will be eligible to begin their Health Systems Research Internship with one of the collaborating organizations.

All MSc students will be required to undertake a one-term 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 term 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.
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 units completed for the specialization count also towards the primary degree. Additional units are not required.

The requirements specific to the collaborative program are as follows:

- Satisfactory completion of the Seminar in Environmental Sustainability (EVD 5100).
- 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

Students are expected to fulfill all requirements within two years. The maximum time permitted is four years from the date of initial enrollment in the program.

Minimum Standards

The minimum passing grade in all courses taken as part of the program is 65% (C+). Students who has incurred failures in two courses or a practicum, or whose thesis proposal is rejected twice (NS grade in MHS 7991) is withdrawn from the program.

Research

Research Fields & Facilities

Located in the heart of Canada’s capital, a few steps away from Parliament Hill, the University of Ottawa is among Canada’s top 10 research universities.

uOttawa focuses research strengths and efforts in four Strategic Areas of Development in Research (SADRs):

- Canada and the World
- Health
- e-Society
- Molecular and Environmental Sciences

With cutting-edge research, our graduate students, researchers and educators strongly influence national and international priorities.

Research at the Telfer School of Management

For more information, consult the Professors by area of expertise (http://www.telfer.uottawa.ca/en/directory/professors-by-area-of-expertise/) page.

Courses

MHA 5140 Financial Accounting (1.5 unit)
Introduction to the foundations of financial accounting including theoretical aspects, the principles of financial reporting and preparation of financial statements and accounting for inventory and capital assets. Creation and interpretation of financial performance measurements.
Course Component: Lecture
MHA 5140 and MHA 5141 cannot be combined for credit with MBA 5340 or with MBA 5140 and MBA 5141.

MHA 5141 Managerial Accounting (1.5 unit)
Introduction to the preparation and use of accounting information to support managerial decision making. Topics include product and process costing and activity based costing and management.
Course Component: Lecture
MHA 5140 and MHA 5141 cannot be combined for credit with MBA 5340 or with MBA 5140 and MBA 5141.

MHA 5300 Fundamentals of Data Analytics: Making Data Useful for Health Care Managers (3 units)
Analysis and data modelling skills, develop the ability to interpret large amounts of data and draw sound implications for the health care problem at hand, and to exhibit the usefulness of data analytics in health care problem solving and decision-making.
Course Component: Lecture
MBA 5300 and MHA 5300 cannot be combined for credit.

MHA 5330 Human Resource Management in Health Care (3 units)
Focus on the major issues unique to effective health human resources management. 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 professions are regulated by provincial laws and professional colleges. Labor relation issues and approaches in 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).
Course Component: Lecture
MHA 5300 and MBA 5300 cannot be combined for credit.

MHA 6203 Program Evaluation for Health Care Managers (1.5 unit)
Provides students with an overview of planning, designing and conducting applied program evaluations, which are applicable in health care organizations and community settings. Topics include: types of evaluations; formulation of evaluation questions; evaluation designs, methodologies, and tools; evaluation results to different stakeholders, and critical appraisal of evaluation research and reports.
Course Component: Lecture
MHA 6203 and MBA 6203 cannot be combined for credit with MBA 6203 and MBA 6213.

MHA 6213 Directed Readings in Health Care Management (3 units)
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.
Course Component: Research
Prerequisites: must have completed the common core and at least 10.5 MHA units.
MHA 6250 Health Care Finance (1.5 unit)
Overview of financial concepts, including time-value of money analysis, risk and rate of return, bond and equity pricing, and financial planning. Financial decision-making and risk assessment tools in administrative decisions within the unique context of health care organizations.
Course Component: Lecture

MHA 6260 Project Planning and Management (1.5 unit)
Introduction to program planning and management of health management projects. Program planning and management methods including management of a project throughout its life cycle (identification, design, planning, realization and close-out).
Course Component: Lecture
MHA 6260 cannot be combined for credit with ADM 6260.

MHA 6271 Application of Information Technology in Health Care (1.5 unit)
Provides an overview of timely topics related to the application of information technologies (IT) in health care, and prepares students to better understand and work with IT in the current healthcare environment. The course discusses research and evidence on contemporary health IT solutions and their role in improving, transforming and supporting the delivery of health care, as well as the decisions and challenges that managers face when considering the implementation of these new technologies.
Course Component: Lecture
Prerequisite: MHA 6370

MHA 6301 Epidemiology and Population Health (3 units)
Understanding of the principles of epidemiology and research designs in the health-related fields, and the ability to critically evaluate clinical, epidemiological, and health care management evidence in support of decision-making. Topics include: determining research designs most appropriate to specific research conditions; overview of epidemiologic approaches; important measures; issues related to validity, confounding effect, selection bias, misclassification bias, and effect modification; and general concepts related to population health.
Course Component: Lecture
Prerequisite: MBA 5300

MHA 6312 Strategy, Governance, and Ethical Management in Health (3 units)
Key concepts and theories on each of strategy, governance, and ethical management. Interdependencies among strategy, governance, and ethical management and how these topics span beyond organizational boundaries to a system level.
Course Component: Lecture

MHA 6315 Quality and Performance Management in Health Care (3 units)
Overview of approaches and tools used for managing, evaluating, and promoting quality in health care. Emphasizes the importance of context and stakeholder engagement in quality improvement and performance management initiatives. Topics include: important key theories and concepts related to quality; patient safety measures and practices; performance management; evidence-based management; and quality improvement strategies.
Course Component: Lecture

MHA 6351 Health Economics (3 units)
An economists’ perspective illuminating the systems behavior of Health-Care. Such insights inform strategies for managing/improving Health-care. The survey course introduces key concepts from economics (e.g., micro-economics, trade-offs, opportunity costs, efficiency, equity) that are pivotal to this illumination. The unique attributes of health-care (e.g., uncertainty of demand and information asymmetry) and the incentives (some perverse) that ensue are discussed. Indices of population health impact and their links to health economic valuation are covered, including cost-effectiveness and benefit-cost analysis.
Course Component: Lecture

MHA 6360 Health Care in Canada in a Comparative Context (3 units)
Overview of the Canadian health care system including its history and evolution with an emphasis on the relationship between federal government and the provincial/territorial systems. Current forces (e.g. societal, political, economic) that influence health care policy. Canadian system compared to international health care systems.
Course Component: Lecture

MHA 6361 Organizational Behavior and Change in Health Care (3 units)
Overview of organizational behavior and change in the health care context. Motivation, stress and stress management, group dynamics, power and negotiation. Leadership of change and different types of change that can be pursued in various contexts are considered.
Course Component: Lecture

MHA 6370 Health Informatics (3 units)
Overview of current developments, issues and challenges in the emerging field of health informatics, with an emphasis on the role it plays in health care transformation initiatives. Historical development and basic foundations of health informatics including theoretical, methodological and ethical/legal underpinnings will be studied. Management implications of health informatics.
Course Component: Lecture

MHA 6380 Quantitative Methods and Their Applications to Health Care Decision Making (3 units)
Provide health care decision makers with an overview of several useful quantitative methods that can provide insight and support for complex decisions. Mathematical model formulation, linear programming and optimization, queuing theory and simulation modeling. Mathematical tools available to help optimally utilize the resources.
Course Component: Lecture

MHA 6990 Residency and / or Field Project (6 crédits / 6 units)
Capstone course where students apply what they have learned in the classroom to a health care management project.
Volet / Course Component: Recherche / Research

EVD 5100 Seminar in Environmental Sustainability (3 units)
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.
Course Component: Seminar
EVD 5101 Economics of Environmental Law and Policy (3 units)
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.

Course Component: Lecture

EVD 5109 Applied Environmental Sustainability (3 units)
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.

Course Component: Seminar

EVD 5111 Capstone Seminar in Environmental Sustainability (3 units)
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.

Course Component: Seminar

EVD 5113 Foundations of Environmental Policy (3 units)
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.

Course Component: Seminar

EVD 5114 Professional Skills for Environmental Sustainability (1.5 unit)
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.

Course Component: Seminar

EVD 5121 Foundations of Environmental Science (3 units)
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.

Course Component: Seminar

EVD 5122 Foundations of Environmental Economics (3 units)
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.

Course Component: Seminar

EVD 5123 Evidence Synthesis and Evaluation (3 units)
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.

Course Component: Seminar

EVD 5124 Foundations of Environmental Law (3 units)
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.

Course Component: Seminar

EVD 5500 Séminaire en durabilité de l'environnement (3 crédits)
Survol des enjeux en durabilité de l’environnement en se servant du changement climatique comme exemple. Application d’analyses intégrant des concepts en sciences, en droit, en science économique et en études politiques. Le débat au sujet de la preuve scientifique du changement climatique et les efforts sur le plan international pour négocier une entente. Les dimensions économiques, sociales et politiques du changement climatique et les mesures à ce jour pour atténuer ses effets, au niveau international et au niveau national.

Volet : Séminaire

EVD 5501 Approche économique et le droit de l’environnement (3 crédits)
Les enjeux environnementaux et le système de réglementation du point de vue de la science économique. Étude de la théorie qui sous-tend certains concepts économiques, tels l’efficacité, la défaillance du marché, les externalités et la valuation. Survol des concepts macroéconomiques, tels la croissance économique et la comptabilité environnementale. Application de ces concepts théoriques aux défis environnementaux tels le changement climatique, la réglementation de l’énergie, la gestion des services écologiques et la conservation de la biodiversité. Les divers outils de réglementation pour la gestion des défis liés à l’environnement, incluant la réglementation traditionnelle de type « commande et contrôle », les moyens économiques tels que la taxation environnementale et les systèmes de droits d’échanges. Évaluation de l’efficacité environnementale, sociale et économique des diverses approches, et intégration de la théorie économique dans le développement de la réglementation environnementale.

Volet : Cours magistral

EVD 5509 Développement durable appliqué (3 crédits)
Étude de cas en développement durable (changements climatiques, par exemple) pour apprendre à synthétiser l’information sur un problème à partir de plusieurs perspectives disciplinaires, pour évaluer l’information selon un schéma critique, en faisant usage de méthodes rigoureuses, et pour concevoir et évaluer des politiques ou réglements.
Volet : Séminaire

EVD 5511 Séminaire d’intégration sur le développement durable (3 crédits)
Partenariat avec des organisations travaillant en développement durable. Les étudiants forment des équipes multidisciplinaires pour étudier les dimensions scientifiques, économiques, juridiques et sociales d’un problème environnemental particulier, pour évaluer un éventail de solutions possibles et pour recommander les mesures à prendre.
Volet : Cours magistral

EVD 5513 Rudiments des politiques environnementales (3 crédits)
Volet : Cours magistral

EVD 5514 Compétences professionnelles pour le développement durable (1.5 crédit)
Compétences orales et écrites en communication, notamment les présentations aux comités parlementaires, la préparation de mémoires au cabinet, la rédaction d’éditoriaux, les entrevues médiatiques et la production de rapports multidisciplinaires sur les politiques publiques. Gestion de projet et de processus faisant intervenir de nombreux joueurs.
Volet : Cours magistral

EVD 5521 Rudiments des sciences de l’environnement (3 crédits)
Donne aux étudiants une compréhension thématique de l’état actuel des sciences environnementales. Principaux thèmes : éventail des enjeux environnementaux d’importance au Canada et à l’étranger; les démarches scientifiques déployées pour comprendre et prédire les conséquences des activités humaines pour les écosystèmes; la nature des preuves apportées par les sciences de l’environnement; la perspective des sciences de l’environnement sur le développement durable.
Volet : Cours magistral

EVD 5522 Rudiments de l’économie de l’environnement (3 crédits)
Principaux éléments de l’économie, y compris les modèles économiques officiels et les présuppositions afférentes à l’élaboration de politiques de développement durable. Étude de divers concepts : patrimoine commun; échec des marchés; non évaluation des valeurs courantes; mesures incitatives; économie du bien-être; réglementation; équilibre entre équité et efficience; instruments reposant sur les mécanismes de marché. On examinera plus en détail les concepts fondamentaux de l’économie et leurs avantages et inconvénients pour l’examen des enjeux au carrefour de l’économie et de l’environnement. Étude de la gestion des ressources renouvelables (pêches, forêts, etc.) et non renouvelables (pétrole, gaz, minerai, etc.) et d’autres sujets en économie de l’environnement appliquée (ex. changements climatiques, destruction de la couche d’ozone, programmes de plafonnement et d’échange). Étude des institutions et programmes de compensation auxquels sont confrontés les individus et les gouvernements dans le contexte des politiques de développement durable.
Volet : Cours magistral

EVD 5523 Synthèse et évaluation de données probantes (3 crédits)
La recherche vise soit à produire des données probantes, soit à évaluer les données probantes existantes en ce qu’elles ont trait à des interventions politiques, réglementaires et étatiques, y compris les lacunes en la matière. Ainsi, les étudiants acquièrent les compétences nécessaires qui leur permettent de concevoir un programme de recherche de façon à en optimiser la valeur probante (en fonction des contraintes existantes) et de synthétiser les résultats de recherches existantes et d’évaluer leur valeur probante.
Volet : Cours magistral

EVD 5524 Rudiments du droit de l’environnement (3 crédits)
Rudiments du droit de l’environnement, y compris la théorie du développement durable, la division constitutionnelle des pouvoirs, les démarches visant à réglementer les questions environnementales, avec exemples de cadres légaux pour différents problèmes environnementaux et access à la justice.
Volet : Séminaire

EVD 6001 Stage coop I / Co-Op Work Term I (6 crédits / 6 units)
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. Préalable : permission du responsable des études supérieures. / 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.
Volet / Course Component: Stage / Work Term

EVD 6002 Stage coop II / Co-Op Work Term II (6 crédits / 6 units)
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. Préalable : permission du responsable des études supérieures. / 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.
Volet / Course Component: Stage / Work Term

EVD 6112 Selected Topics in Environmental Sustainability (3 units)
In-depth examination of a question or topic linked to new trends or research areas in environmental sustainability.
Course Component: Lecture
EVD 6512 Thèmes choisis en durabilité de l'environnement (3 crédits)
Analyze 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.
Volet : Cours magistral

EVD 6912 Thèmes choisis en durabilité de l'environnement / Selected Topics in Environmental Sustainability (3 crédits / 3 units)
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.
Volet / Course Component: Cours magistral / Lecture
Préalable : connaissance passive de l'anglais. / Prerequisite: passive knowledge of French

EVD 6932 Lectures dirigées en durabilité de l'environnement / Directed Readings in Environmental Sustainability (3 crédits / 3 units)
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 is granted only under exceptional circumstances.
Volet / Course Component: Recherche / Research
Préalable: Connaissance passive de l'anglais. / Prerequisite: Passive knowledge of French.

EVD 6999 Mémoire / Research Paper (6 crédits / 6 units)
Volet / Course Component: Recherche / Research

EVD 7997 Projet de thèse / Thesis Proposal
Volet / Course Component: Recherche / Research

EVD 8100 Theory and Practice in Environmental Sustainability (3 units)
Characterization of environmental sustainability from the perspective of economics, political science, environmental science, and law. Demonstration of how often-divergent perspectives and values of stakeholders from various backgrounds frame both sustainability problems themselves, and acceptable solutions.
Course Component: Seminar

EVD 8500 Théorie et pratique en durabilité environnementale (3 crédits)
La caractérisation de la durabilité environnementale du point de vue de la science économique, de la science politique, de la science environnementale et du droit. Démonstration de comment les perspectives et les valeurs divergentes des parties prenantes de divers horizons définissent à la fois les problèmes et les solutions acceptables en durabilité.
Volet : Séminaire

EVD 8901 Conception de recherche et méthodologie pour la recherche en durabilité de l'environnement / Research Design and Methods for Environmental Sustainability (3 crédits / 3 units)
Vue d'ensemble des méthodes de recherche employées dans les quatre domaines principaux de la durabilité (science de l'environnement, droit, politique et économie). À l'aide d'études de cas, examen des types d'inférences causales que l'on peut ou ne peut pas tirer d'un plan de recherche, les menaces à la déduction valable et les plans de recherche pouvant atténuer ces menaces. Accent particulier sera mis sur la relation entre les conceptions de recherche et la force de l'inférence causale. / Overview of research methods employed in the four main subject areas underlying sustainability (environmental science, law, policy and economics). Through case studies, examination of the kinds of causal inferences one can and cannot draw from a research design, threats to valid inference, and research designs that can mitigate those threats. Particular emphasis placed on the relationship between research designs and strength of causal inference.
Volet / Course Component: Séminaire / Seminar

EVD 9997 Examen d'entrée / Qualifying Examination
Examen d'entrée / Qualifying Examination
Volet / Course Component: Recherche / Research

EVD 9998 Projet de thèse / PhD Thesis Proposal
Projet de thèse / PhD Thesis Proposal
Volet / Course Component: Recherche / Research