MASTER OF SCIENCE SYSTEMS SCIENCE SPECIALIZATION IN ENVIRONMENTAL SUSTAINABILITY

Summary
- Degree offered: Master of Science (MSc)
- Registration status options: Full-time; Part-time
- Language of instruction: English
- Primary program: MSc Systems Science
- Collaborative specialization: Environmental Sustainability
- Program option (expected duration of the program):
  - within two years of full-time study

Program Description
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.

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.

To accommodate part-time students, the core courses are usually offered in the late afternoon or evening.

Collaborative Specialization Description
The Institute of the Environment offers a master's level collaborative specialization in Environmental Sustainability and an interdisciplinary Master of Science (MSc) in Environmental Sustainability. The master's level collaborative specialization in Environmental Sustainability allows students enrolled in one of the participating master's programs to specialize in environmental sustainability.

The guiding objective of the collaborative specialization 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.”

Main Areas of Research
Their areas of research, both theoretical and applied, span a wide variety of fields:
- Operations research
- Deterministic and probabilistic modelling
- Optimization
- Computer science
- Information systems
- Control
- Economic modelling

Other Programs Offered Within the Same Discipline or in a Related Area
- Graduate Diploma Systems Science
- Master of Science Systems Science (MSc)
- Master of Systems Science (M SysSc)

Fees and Funding
- Program fees:
  - The estimated amount for university fees (https://www.uottawa.ca/university-fees/) associated with this program are available under the section Finance your studies (http://www.uottawa.ca/graduate-studies/programs-admission/finance-studies/).
  - International students enrolled in a French-language program of study may be eligible for a differential tuition fee exemption (https://www.uottawa.ca/university-fees/differential-tuition-fees-exemption/).

  - To learn about possibilities for financing your graduate studies, consult the Awards and financial support (https://www.uottawa.ca/graduate-studies/students/awards/) section.

Notes
- Programs are governed by the academic regulations (http://www.uottawa.ca/graduate-studies/students/general-regulations/) in effect for graduate studies.
- In accordance with the University of Ottawa regulation, students have the right to complete their assignments, examinations, research papers, and theses in French or 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.

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.

To be eligible, candidates must:

• Have a bachelor's degree in Computer Science, Economics, Engineering, Mathematics, Operations Research, Science or a related area with a minimum average of B (70%).

Note: International candidates must check the admission equivalencies (https://www.uottawa.ca/graduate-studies/international/study-uottawa/admission-equivalencies/) for the diploma they received in their country of origin.

• 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.

• Identify at least one professor who is willing to supervise your research and thesis. We recommend that you contact potential thesis supervisors as soon as possible.

Language Requirements

Applicants must be able to understand and fluently speak the language of instruction (French or English) in the program to which they are applying. Proof of linguistic proficiency may be required.

Applicants whose first language is neither French nor English must provide proof of proficiency in the language of instruction.

Note: Candidates are responsible for any fees associated with the language tests.

Notes

• The admission requirements listed above are minimum requirements and do not guarantee admission to the program.

Documents Required for Admission

In addition to the documents required (http://www.uottawa.ca/graduate-studies/programs-admission/apply/required-documents/) for graduate and postdoctoral studies, candidates must submit the following documents:

• A resume
• Two letters of intent or motivation or statement of purpose
  • One letter of 350 words outlining your proposed research.
  • One letter indicating what research topic or area you would like to pursue, and why you wish to do so as part of the collaborative program (to be submitted along with the application form).
• Two confidential letters of recommendation from professors who have known the applicant and are familiar with the student work.

You are strongly encouraged to contact your referee(s) prior to submitting your application in order to confirm their email address and their availability to complete your letter of recommendation.

• Transcripts from all universities attended:
  • You must submit official transcripts from all the universities you have attended.
  • This applies to all courses and programs at any university you attended, including regular programs (completed or not), exchanges, letters of permission, online or correspondence courses, courses taken as a special student or visiting student, etc.
  • If the transcript and degree certificate are not in English or French, a certified translation (signed and stamped/sealed) must be submitted.
• A collaborative specialization enrollment form (http://www.uottawa.ca/environment/grad-programs/specialization/apply/)
• A letter of recommendation from a professor confirming that he or she is willing to act as thesis supervisor.

Note: Documents that are not required for admission will not be consulted, conserved or returned to the student. These documents will be destroyed according to our administrative procedures.
Program Requirements

Master’s with Collaborative Specialization

Students must meet the following requirements for the master’s with collaborative specialization:

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

Compulsory Courses (SYS): ¹

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS 5160</td>
<td>Systems Integration</td>
<td>3</td>
</tr>
</tbody>
</table>

12 course units from:

- SYS 5100 Systems Engineering
- SYS 5110 Foundation of Modelling and Simulation
- SYS 5120 Applied Probability
- SYS 5130 Systems Optimization and Management
- SYS 5140 Economic System Design

3 optional course units from the list of optional courses ²

Compulsory Course (EVD):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVD 5100</td>
<td>Seminar in Environmental Sustainability</td>
<td>3</td>
</tr>
</tbody>
</table>

Thesis Proposal:

- SYS 7990 Master Thesis Proposal ³

Thesis:

- THM 7999 Master’s Thesis ⁴, ⁵

List of Optional Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>ADM 6260</td>
<td>Project Management I</td>
<td>1.5</td>
</tr>
<tr>
<td>ADM 6261</td>
<td>Project Management II</td>
<td>1.5</td>
</tr>
<tr>
<td>CSI 5122</td>
<td>Software Usability</td>
<td>3</td>
</tr>
<tr>
<td>EBC 6230</td>
<td>Business Process Management and Performance Measurement</td>
<td>3</td>
</tr>
<tr>
<td>DTI 5175</td>
<td>Mobile Commerce Technologies</td>
<td>3</td>
</tr>
<tr>
<td>DTI 5380</td>
<td>Systems and Architectures for Electronic Commerce</td>
<td>3</td>
</tr>
<tr>
<td>DTI 6130</td>
<td>Web Services</td>
<td>1.5</td>
</tr>
<tr>
<td>EBC 6170</td>
<td>Cyber Security Systems and Strategies</td>
<td>1.5</td>
</tr>
<tr>
<td>ECO 6143</td>
<td>Economics of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>ELG 5103</td>
<td>Optical Communications Systems</td>
<td>3</td>
</tr>
<tr>
<td>ELG 5119</td>
<td>Stochastic Processes</td>
<td>3</td>
</tr>
<tr>
<td>ELG 5170</td>
<td>Information Theory</td>
<td>3</td>
</tr>
<tr>
<td>ELG 5375</td>
<td>Digital Communications</td>
<td>3</td>
</tr>
<tr>
<td>ELG 5376</td>
<td>Digital Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>ELG 5378</td>
<td>Image Processing and Image Communications</td>
<td>3</td>
</tr>
<tr>
<td>EMP 5116</td>
<td>Issues in Management and Operation of Communication Networks</td>
<td>3</td>
</tr>
<tr>
<td>EMP 5120</td>
<td>Product Development and Management</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5120</td>
<td>Technology entrepreneurship for Engineers and Computer Scientists</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5121</td>
<td>Planning of Experiments in Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5122</td>
<td>Operational Excellence and Lean Six Sigma</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5123</td>
<td>Enterprise Architecture</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5124</td>
<td>Internet Technologies and Mobile Commerce</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5125</td>
<td>Data Science Applications</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5130</td>
<td>Communication and Influence for Engineers</td>
<td>3</td>
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<tr>
<td>GNG 5131</td>
<td>Sales and Influence for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5140</td>
<td>Engineering Design</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5141</td>
<td>Creativity and Innovation</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5231</td>
<td>Sales Engineer Internship Project</td>
<td>6</td>
</tr>
<tr>
<td>GNG 5300</td>
<td>Topics in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>GNG 5310</td>
<td>Topics in Industry Practice</td>
<td>3</td>
</tr>
<tr>
<td>MCG 5169</td>
<td>Advanced Topics in Reliability Engineering</td>
<td>3</td>
</tr>
<tr>
<td>MCG 5179</td>
<td>Manufacturing System Analysis</td>
<td>3</td>
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</tbody>
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Note(s)

¹ Students enrolled in the Master’s who have successfully completed the core courses (15 units) and who are not continuing in the program, may be awarded the Graduate Diploma in Systems Science.

² Consult the department for the list of elective courses and for the regulations governing the selection of these courses.

³ Candidates enrolled for the MSc degree must submit to the program committee, by the middle of their third term of enrollment 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 term. A student must enroll in the Master’s Thesis (THM 7999) 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. 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.

⁴ 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 Specialization 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 specialization.

⁵ Students are responsible for ensuring they have met all of the thesis requirements (http://www.uottawa.ca/graduate-studies/students/theses/).

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

Research at the Faculty of Engineering

Areas of research:

- Chemical and Biological Engineering
- Civil Engineering
- Electrical Engineering and Computer Science
- Mechanical Engineering

For more information, refer to the list of faculty members and their research fields on Uniweb.

IMPORTANT: Candidates and students looking for professors to supervise their thesis or research project can also consult the website of the faculty or department (https://www.uottawa.ca/graduate-studies/students/academic-unit-contact-information/) of their program of choice. Uniweb does not list all professors authorized to supervise research projects at the University of Ottawa.

Courses

SYS 5100 Systems Engineering (3 units)
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.

Course Component: Lecture
The following courses are recommended as prerequisites: CSI 1100, MAT 2341, (MAT 2324 or MAT 2331), MAT 2371, MAT 2375.

SYS 5110 Foundation of Modelling and Simulation (3 units)

Course Component: Lecture
The following courses are recommended as prerequisites: CSI 1100, MAT 2341, (MAT 2324 or MAT 2331), MAT 2371, MAT 2375.

SYS 5120 Applied Probability (3 units)
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 queueing.

Course Component: Lecture
The following courses are recommended as prerequisites: CSI 1100, MAT 2341, (MAT 2324 or MAT 2331), MAT 2371, MAT 2375.

SYS 5130 Systems Optimization and Management (3 units)
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.

Course Component: Lecture
The following courses are recommended as prerequisites: CSI 1100, MAT 2341, (MAT 2324 or MAT 2331), MAT 2371, MAT 2375.

SYS 5140 Economic System Design (3 units)
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.

Course Component: Lecture
The following courses are recommended as prerequisites: CSI 1100, MAT 2341, (MAT 2324 or MAT 2331), MAT 2371, MAT 2375.

SYS 5160 Systems Integration (3 units)

Course Component: Lecture
Prerequisites: 6 course units from SYS 5100, SYS 5110, SYS 5120, SYS 5130, SYS 5140.

SYS 5190 Directed Readings in Systems Science (3 units)
Directed Readings in Systems Science

Course Component: Research
Courses SYS 5190, SYS 5975 cannot be combined for units.

SYS 5975 Projet en science des systèmes / Project in Systems Science
(6 crédits / 6 units)

Volet / Course Component: Recherche / Research
Les cours SYS 5190, SYS 5975 ne peuvent être combinés pour l'obtention de crédits. / Courses SYS 5190, SYS 5975 cannot be combined for units.

SYS 7990 Proposition de thèse de maîtrise / Master Thesis Proposal

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 5114 Professional Skills for Environmental Sustainability (1.5 unit)
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 5111 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 règlements.
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)
Étude des principaux facteurs politiques et administratifs influençant la formulation et la mise en œuvre des politiques environnementales, y compris les institutions démocratiques, les méthodes de participation des citoyens et des parties prenantes et leur influence sur les processus décisionnels des gouvernements, l'opinion publique et la définition des problèmes, le rôle des valeurs et de la science dans la formulation des politiques, le lobbying et la représentation des intérêts, le fédéralisme et la gouvernance multi-niveaux des enjeux environnementaux, et la politique internationale de l'environnement. Des études de cas situeront le Canada dans une perspective comparée et exploreront l'importance de ces facteurs politiques dans divers secteurs des politiques environnementales.
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 (pêcheries, 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 accès 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)
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.
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'inferences 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'influence 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