



**McGill School of Environment**  
**Programs, Courses and University Regulations**  
**2011-2012**



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**Note: Throughout this publication, "you" refers to students newly admitted, readmitted or returning to McGill.**

## ***Publication Information***

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## 1 About the McGill School of Environment

McGill's Faculties of Agricultural and Environmental Sciences, Arts, Science, and Law have forged a unique approach to the study of environment through the inter-faculty, trans-disciplinary McGill School of Environment (MSE).

The growth of technology, globalizing economies, and rapid increase in population have had dramatic and significant environmental impacts. These changes have been accompanied by an increasing awareness of the relationship between human activity and the environment. Environmental problems range from local and short-term degradation through to the perturbation observed over the entire globe and for many years. The importance of human-environment relations for environmental and social well-being, and the complexity and conflict involved in environmental analysis and decision making, requires a depth and breadth of knowledge. The MSE has developed its programs with the approach of introducing students to a broad range of ideas early in the program to provide a foundation and an openness upon which more specialized, disciplinary knowledge can be built.

## 2 Mission of the School

The mission of the McGill School of Environment is:

- to provide a program that will develop a broad-based environmental literacy in the undergraduate population;
- to develop opportunities for graduate students to pursue studies of the environment at an advanced level to create future leaders and researchers; and
- to generate new ideas, new insights, new technologies, and new approaches to understanding and redressing environmental problems through academic research and outreach that draws on the University's existing strength in research and spans disciplinary boundaries.

Through a range of research and educational initiatives, the MSE aims to aid society in making environmental choices, in the context of diverse environmental world views that will sustain healthy societies within a flourishing biosphere.

Focusing on six themes:

- Biodiversity, Ecosystem Function, and Services
- Climate and Energy
- Disease and Environment
- Environmental Ethics
- Food Security
- Water

## 3 Revisions – McGill School of Environment

### Minor in Environment

*section 8.1: Bachelor of Arts (B.A.) – Minor Concentration Environment (18 credits)*

*section 8.2: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Minor Environment (18 credits)*

### B.A. Faculty Program in Environment

*section 9.1.1: Bachelor of Arts (B.A.) – Faculty Program Environment – Ecological Determinants of Health in Society (54 credits)*

*section 9.2.1: Bachelor of Arts (B.A.) – Faculty Program Environment – Economics and the Earth's Environment (54 credits)*

### Bachelor of Arts and Science (B.A. & Sc.) – Interfaculty Program in Environment

*section 10.1: Bachelor of Arts and Science (B.A. & Sc.) – Interfaculty Program Environment (54 credits)*

### Major in Environment – B.Sc.(Ag.Env.Sc.) and B.Sc.

*section 11.1.1: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Biodiversity and Conservation (63 credits)*

**Major in Environment – B.Sc.(Ag.Env.Sc.) and B.Sc.**

*section 11.2.1: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Ecological Determinants of Health – Cellular (63 credits)*

*section 11.2.2: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Ecological Determinants of Health – Population (63 credits)*

*section 11.4.1: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Food Production and Environment (63 credits)*

*section 11.6.1: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Renewable Resource Management (63 credits)*

**Major in Environment – B.Sc.**

*section 12.2.1: Bachelor of Science (B.Sc.) – Major Environment – Earth Sciences and Economics (66 credits)*

**section 14: Joint Honours Component Environment *new***

*section 14.1: Bachelor of Arts (B.A.) - Joint Honours Component Environment (36 credits) **new***

**Diploma in Environment**

*section 15.1: Diploma in Environment (30 credits)*

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## 4 About the School (Undergraduate)

The people and the programs of the McGill School of Environment are described in the following sections.

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### 4.1 Location

For advising, contact:

Program Adviser, Ms. Kathy Roulet  
Telephone: 514-398-4306  
Fax: 514-398-1643  
Email: [kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)

Website: [www.mcgill.ca/mse](http://www.mcgill.ca/mse)

Downtown Campus  
3534 University Street  
Montreal, Quebec H3A 2A7  
Telephone: 514-398-2827  
Fax: 514-398-1643

Macdonald Campus  
Rowles House  
21,111 Lakeshore Road  
Sainte-Anne-de-Bellevue, Quebec H9X 3V9  
Telephone: 514-398-7559  
Fax: 514-398-7846

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### 4.2 Administrative Officers

Chandra Madramootoo; B.Sc.(Agr.Eng.), M.Sc., Ph.D.(McG.)

**Dean, Faculty of Agricultural and Environmental Sciences**



Christopher Manfredi; B.A.(Calg.), M.A., Ph.D.(Claremont)	<b>Dean, Faculty of Arts</b>
Daniel Jutras; LL.B.(Montr.), LL.M.(Harv.)	<b>Dean, Faculty of Law</b>
Martin Grant; B.Sc.(PEI), M.Sc., Ph.D.(Tor.)	<b>Dean, Faculty of Science</b>
Marilyn Scott; B.Sc.(New Br.), Ph.D.(McG.)	<b>Director</b>
George McCourt; B.Sc., M.Sc.(Alta.), M.Sc.(McG.)	<b>Associate Director, Undergraduate Affairs</b>
Anthony Ricciardi; B.Sc.(Agr.), M.Sc., Ph.D.(McG.)	<b>Associate Director, Research</b>
Kathryn Roulet; B.Sc.(Trent), M.Sc.(Guelph)	<b>Program Adviser</b>

### 4.3 Academic Staff

#### Professors

Peter G. Brown; B.A.(Haver.), M.A., Ph.D.(Col.) (*joint appt. with Geography and Natural Resource Sciences*)

Colin Chapman; B.Sc., M.A., Ph.D.(Alta.) (*joint appt. with Anthropology*)

#### Associate Professors

Madhav Badami; B.Tech., M.Sc.(IIT), M.E.Des.(Calg.), Ph.D.(Br. Col.) (*joint appt. with School of Urban Planning*)

Sylvie de Blois; B.Sc.(Agr.)(McG.), M.Sc., Ph.D.(Montr.) (*joint appt. with Plant Science*)

Jaye Ellis; B.A.(Calg.), LL.B., B.C.L.(McG.), LL.M.(Br. Col.) (*joint appt. with Law*)

Frédéric Fabry; B.Sc., M.Sc., Ph.D.(McG.) (*joint appt. with Atmospheric and Oceanic Sciences*)

Brian Leung; B.Sc.(Br. Col.), Ph.D.(Car.) (*joint appt. with Biology*)

Gregory Mikkelson; B.A.(Trinity), M.S., Ph.D.(Chic.) (*joint appt. with Philosophy*)

Anthony Ricciardi; B.Sc.(Agr.), M.Sc., Ph.D.(McG.) (*joint appt. with Redpath Museum*)

Raja Sengupta; B.Sc.(Bombay), M.Sc.(IIT), Ph.D.(S. Illinois) (*joint appt. with Geography*)

Renée Sieber; B.Sc.(Mich. St.), M.P.A.(W. Mich.), Ph.D.(Rutg.) (*joint appt. with Geography*)

#### Assistant Professors

Elena Bennett; B.A.(Oberlin), M.Sc., Ph.D.(Wisc.) (*joint appt. with Natural Resource Sciences*)

Iwao Hirose; Ph.D.(St. And.) (*joint appt. with Philosophy*)

Nicolas Kosoy; B.Sc. (Universidad Simon Bolivar Venezuela), M.Sc. (Kent U at Canterbury), Ph.D. (Universidad Autonoma de Barcelona) (*joint appt. with Natural Resource Sciences*)

Jeanine Rhemtulla; B.Sc.(McG.), M.Sc.(Alta.), Ph.D.(Wisc.)

Ismael Vaccaro; B.A.(Barcelona), D.E.A.(Paris), M.A., Ph.D.(Wash.) (*joint appt. with Anthropology*)

#### Faculty Lecturers

George McCourt; B.Sc., M.Sc.(Alta.), M.Sc.(McG.)

Joan Marshall; B.A.(McG.), M.A.(Tor.), Ph.D.(McG.)

Kathryn Roulet; B.Sc.(Trent), M.Sc.(Guelph)

#### Associate Members

Animal Science: Sarah Kimmins

Anthropology: Andre Costopoulos, John Galaty

Atmospheric and Oceanic Sciences: Parisa Ariya

Biology: Lauren Chapman, Andrew Gonzalez, Irene Gregory-Eaves, Martin Lechowicz, Catherine Potvin, Michel Loreau

Bioresource Engineering: Jan Adamowski, Suzelle Barrington, Grant Clark, Chandra Madramootoo

### Associate Members

Chemical Engineering: Nathalie Tufenkji, Viviane Yargeau

Civil Engineering and Applied Mechanics: Susan Gaskin, Van-Thanh-Van Nguyen, Jim Nicell

Earth and Planetary Sciences: Jeanne Paquette

Economics: Robert Cairns, Chris Green, Tom Naylor

Electrical and Computer Engineering: Geza Joos

Epidemiology and Biostatistics: Mark Goldberg

Geography: Gail Chmura, Oliver Coomes, Thom Meredith, Tim Moore, Wayne H. Pollard, Navin Ramankutty, Nigel Roulet

Law, Faculty of: Jane Glenn, Richard Janda

Management, Desautels Faculty of: Dror Etzion, Steve Maguire, Vedat Verter

Natural Resource Sciences: Benoit Côté, Christopher Buddle, Jim W. Fyles, William Hendershot, Gordon Hickey, Ian Strachan, Paul Thomassin, Joann Whalen, Terry Wheeler

Parasitology, Institute of: Marilyn Scott

Pathology: Bruce Case

Philosophy: Philip Buckley

Plant Science: Caroline Begg, Pierre Dutilleul, Don Smith, Marcia Waterway

Political Science: Philip Oxhorn

Redpath Museum: David M. Green, Claire Seizilles de Mazancourt

Urban Planning, School of: Nik Luka

### Adjunct Professors

Holly Dressel; B.A.(Ind.), M.A.(S. Fraser)

Nicholas Ogden; B.V.Sc.(Liv.), D.Phil.(Oxf.)

Jessica Rothman; B.Sc., M.Sc., Ph.D. (C'nell)

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## 5 Admission, Registration, and Regulations

Information concerning admission to the McGill School of Environment and the regulations concerning the Environment programs is provided in these sections:

[\*section 5.1: Admission\*](#)

[\*section 5.2: Degree Requirements\*](#)

[\*section 5.3: Advising in the MSE\*](#)

[\*section 5.4: Important Information about Program Selection\*](#)

[\*section 5.5: Course Numbering System at McGill\*](#)

[\*section 5.6: Examination Regulations\*](#)

[\*section 5.7: Courses Outside the Student's Faculty\*](#)

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### 5.1 Admission

You may be admitted to a B.A., B.A.&Sc., B.Sc.(Ag.Env.Sc.), or B.Sc. program offered by the MSE on the University's two campuses: the Macdonald campus (B.Sc.(Ag.Env.Sc.) program) and the Downtown campus (B.A., B.A.&Sc., and B.Sc. programs). You register as a student within your faculty of admission and are governed by all rules and regulations of your faculty.

If you have already completed a Bachelor or an equivalent degree, you may be admitted to the Diploma in Environment through the Faculty of Agricultural and Environmental Sciences, the Faculty of Arts, or the Faculty of Science. You register as a student within your faculty of admission and are governed by all rules and regulations of your faculty relative to the Diploma.

Please see the *Undergraduate Admissions Guide*, found at [www.mcgill.ca/applying](http://www.mcgill.ca/applying).

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## 5.2 Degree Requirements

To be eligible for a B.A. degree, you must fulfil all the faculty and program requirements as indicated in *Faculty of Arts > Faculty of Arts Degrees*.

To be eligible for a B.A. & Sc. degree, you must fulfil all the faculty and program requirements as indicated in *Bachelor of Arts and Science > Degree Requirements*.

To be eligible for a B.Sc.(Ag.Env.Sc.) degree, you must fulfil all the faculty and program requirements as indicated in *Faculty of Agricultural and Environmental Sciences > Degree Requirements*.

To be eligible for a B.Sc. degree, you must fulfil all the faculty and program requirements as indicated in *Faculty of Science > Faculty Degree Requirements*.

To be eligible for the Diploma in Environment, you must fulfil all program requirements as specified in *Diploma in Environment*.

To be eligible for an Honours degree, you must fulfil all the faculty and program requirements as indicated in the *Honours and First Class Honours* section under your home faculty. In addition, you must also fulfil the honours program requirements outlined in Honours Program in Environment.

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## 5.3 Advising in the MSE

Each domain in the MSE has its own mentor who is available to answer your questions and offer you guidance about working and learning within the particular field of the domain. However, if you have questions about program requirements or rules, transfer credits, study abroad programs, course substitutions, or any forms that need to be signed, you should contact the MSE Program Adviser, Kathy Roulet, at [kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca).

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## 5.4 Important Information about Program Selection

The MSE uses students' program selections to identify which students are in the School's major programs (and, by extension, which students are in the McGill Environment Students' Society).

While in U1, if you are unsure of the domain that you want to pursue, you may register in the Major or Faculty program in Environment without picking a domain. However, you must pick a domain by your U2 year.



**Note:** You must select a domain in order to graduate; you cannot graduate without choosing a domain.

(This section does not apply to students in the B.A.&Sc., Minor or Diploma programs.)

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## 5.5 Course Numbering System at McGill

The first four characters of a McGill course number refer to the unit offering the course. For example, MSE courses begin with the Subject Code ENVR.

The three numbers following the Subject Code refer to the course itself, with 200-level courses usually taken by U1 students, 300-level by U2 students, and 400-level by U3 students. As a senior undergraduate student, you can also take some 500-level courses, but you should limit yourself to no more than one per term. See *Course Information, Regulations and Descriptions* in this publication for more information.

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## 5.6 Examination Regulations

Regulations concerning the method of evaluation of any course (including those governing supplemental examinations) are those of the faculty that offers the course. You should note that supplemental exams are available for courses taught in the Faculties of Arts, of Science, and of Education, but **not** for courses taught in the **Faculties of Agricultural and Environmental Sciences, Engineering, or Management**.



**Note:** All ENVR courses, regardless of where they are taught, are offered only by the Faculty of Science.

See *University Regulations and Resources > Examinations* for more information on the University regulations and procedures.

## 5.7 Courses Outside the Student's Faculty

Students in the School's B.A., B.A. & Sc., B.Sc., and B.Sc.(Ag.Env.Sc.) programs may take courses outside their faculty according to the regulations of their faculty of admission.

These regulations are **not identical**:

- Arts students, see *Faculty of Arts > Courses Outside the Faculties of Arts and Science*.
- Arts and Science students, see *Bachelor of Arts and Science > Courses Outside the Faculties of Arts and Science*.
- Science students, see *Faculty of Science > Courses Outside the Faculties of Arts and Science*.
- Agricultural and Environmental Sciences students, see *Faculty of Agricultural and Environmental Sciences > Minimum Credit Requirement*.
- Faculty of Science students in particular should be aware that some courses are restricted and cannot be taken for credit. See the Science Office for Undergraduate Student Advising (SOUSA) website at [www.mcgill.ca/science/sousa](http://www.mcgill.ca/science/sousa). Check under *Bachelor of Science degree > General course requirements > Restricted courses outside the Faculty of Science > Policy concerning courses outside Faculty of Science*.
- Students in the Diploma of Environment follow the program as specified; see [section 15: Diploma in Environment](#).

## 6 Overview of Programs Offered

The McGill School of Environment has developed eight programs, which are offered on the Downtown and Macdonald campuses:

1. A **Minor in Environment** is open to all undergraduate students. For more information, see [section 8: Minor in Environment](#).
2. A **Faculty Program in Environment leading to a B.A.** is open to students meeting the entrance requirements of the Faculty of Arts. For more information, see [section 9: B.A. Faculty Program in Environment](#).
3. An **Interfaculty Program in Environment leading to a B.A. & Sc.** is open to students meeting the entrance requirements for the Bachelor of Arts and Science. For more information, see [section 10: Bachelor of Arts and Science \(B.A. & Sc.\) – Interfaculty Program in Environment](#).
4. An **Interfaculty Program in Sustainability, Science and Society** leading to a B.A. & Sc. is offered by the McGill School of Environment in partnership with the Department of Geography. It is open to students meeting the entrance requirements for the Bachelor of Arts and Science. For more information, see [Bachelor of Arts and Science > Bachelor of Arts and Science \(B.A. & Sc.\) - Interfaculty Program in Sustainability, Science and Society \(54 credits\)](#).
5. A **Major in Environment leading to a B.Sc.(Ag.Env.Sc.)** is open to students meeting the entrance requirements of the Faculty of Agricultural and Environmental Sciences. For more information, see [section 11: Major in Environment – B.Sc.\(Ag.Env.Sc.\) and B.Sc.](#)
6. A **Major in Environment leading to a B.Sc.** is open to students meeting the entrance requirements of the Faculty of Science. For more information, see [section 11: Major in Environment – B.Sc.\(Ag.Env.Sc.\) and B.Sc.](#)
7. An **Honours Program in Environment** is open to senior Environment students in the B.A., B.A. & Sc., B.Sc.(Ag.Env.Sc.) and B.Sc. degrees. For more information, see [section 13: Honours Program in Environment](#).
8. A **Diploma in Environment** is available only to students who have already completed a Bachelor or an equivalent degree, and who want to return to university for further undergraduate study. The Diploma is offered by the Faculty of Agricultural and Environmental Sciences, the Faculty of Arts, and the Faculty of Science. For more information, see [section 15: Diploma in Environment](#).

These programs strive to offer the flexibility necessary to deal with the environment through a set of core courses that provide the general knowledge base of the program combined with a progressive series of courses in a trans-disciplinary area of environmental specialization, referred to as a domain.

The programs are designed to prepare students for further study in environment or discipline-based graduate programs, and for employment in industry, government, and education.

## 7 Suggested Courses for Freshmen Students

The MSE does not recommend that students in their Freshman (U0) year take the ENVR Core courses. Students in their U1 to U3 years are welcome to take selected ENVR courses, even if they are not in the Environment programs. For Freshman year course selections, students should refer to the website of their respective faculty.

Students in the B.Sc. degree, see [www.mcgill.ca/science/sousa/new\\_students/u0/bsc\\_freshman/specific](http://www.mcgill.ca/science/sousa/new_students/u0/bsc_freshman/specific).

Students in the B.Sc.(Ag.Env.Sc.) degree, see [www.mcgill.ca/macdonald/prospective/freshmanyar/courses](http://www.mcgill.ca/macdonald/prospective/freshmanyar/courses).

Students in the B.A. & Sc. degree, see [www.mcgill.ca/science/sousa/new\\_students/u0/basc\\_freshman/requirements/#env](http://www.mcgill.ca/science/sousa/new_students/u0/basc_freshman/requirements/#env).

Students in the B.A. degree, see [www.mcgill.ca/oasis/ba/freshman/selection](http://www.mcgill.ca/oasis/ba/freshman/selection).

## 8 Minor in Environment

The Minor in Environment is intended to complement an expertise obtained through a major, major concentration, or Faculty program offered by an academic unit **other than** the MSE. Students taking the Minor in Environment are exposed to different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie environmental problems.

Students, after consulting with their adviser in their major program or concentration and the MSE Program Adviser, can declare their intention to do a Minor in Environment.

To obtain a Minor in Environment, students must:

- register for the Minor online, using Minerva;
- submit their program of courses already taken and to be taken for the Minor in Environment to the MSE Program Adviser for approval (**only courses at the 200 level and above will be approved**);
- pass all courses counted toward the Minor with **a grade of C or higher**;
- complete 18 credits from the courses listed under *section 8.1: Bachelor of Arts (B.A.) – Minor Concentration Environment (18 credits)* or *section 8.2: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Minor Environment (18 credits)* in this publication and which are not otherwise counted towards the student's major program or concentration or a second minor program; and
- ensure that all 18 credits are taken outside the discipline or field of the student's major program or concentration.

### 8.1 Bachelor of Arts (B.A.) – Minor Concentration Environment (18 credits)

**Revision, August 2011. Start of revision.**

This 18-credit Minor Concentration Environment is intended for Arts students in the multi-track system and Law students.

#### Advising Note:

Consultation with the Program Adviser for approval of course selection to meet program requirements is obligatory. Only courses at the 200 level and above will be approved.

For more information, contact:

Ms. Kathy Roulet, MSE Program Adviser

Email: [kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)

Telephone: 514-398-4306

#### Complementary Courses (18 credits)

18 credits of complementary courses are selected as follows:

12 credits of MSE core courses:

Location Note: Core courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 400	(3)	Environmental Thought

6 credits of environmentally related courses selected with the approval of the Program Adviser (at least 3 credits must be in natural sciences). A list of Suggested Courses is given below.

#### Suggested Course List

The Suggested Course List is divided into two thematic categories: Social Sciences and Policy; and Natural Sciences and Technology.

Most courses listed at the 300 level and higher have prerequisites. You are urged to prepare your program of study with this in mind.

This list is not meant to be exhaustive. You are also encouraged to examine the course lists of the various domains in the Environment program for other courses that might interest you. Courses not on the Suggested Course List may be included in the Minor with the permission of the Program Adviser.

**Location Note:**

When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

**Social Sciences and Policy**

\* Note: If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

AGEC 231	(3)	Economic Systems of Agriculture
AGEC 333	(3)	Resource Economics
AGEC 430	(3)	Agriculture, Food and Resource Policy
AGEC 442	(3)	Economics of International Agricultural Development
AGRI 210	(3)	Agro-Ecological History
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
ANTH 206	(3)	Environment and Culture
ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
ANTH 512	(3)	Political Ecology
CIVE 433	(3)	Urban Planning
ECON 205	(3)	An Introduction to Political Economy
ECON 225	(3)	Economics of the Environment
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 405	(3)	Natural Resource Economics
ENVB 437	(3)	Assessing Environmental Impact
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 400	(3)	Environmental Thought
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 210	(3)	Global Places and Peoples
GEOG 216	(3)	Geography of the World Economy
GEOG 221	(3)	Environment and Health
GEOG 300	(3)	Human Ecology in Geography
GEOG 301	(3)	Geography of Nunavut
GEOG 302	(3)	Environmental Management 1
GEOG 303	(3)	Health Geography
GEOG 370	(3)	Protected Areas
GEOG 382	(3)	Principles Earth Citizenship
GEOG 403	(3)	Global Health and Environmental Change
GEOG 408	(3)	Geography of Development
GEOG 410	(3)	Geography of Underdevelopment: Current Problems
GEOG 508	(3)	Resources, People and Power
GEOG 530	(3)	Global Land and Water Resources

GEOG 551	(3)	Environmental Decisions
MGPO 440	(3)	Strategies for Sustainability
NRSC 221	(3)	Environment and Health
NRSC 512	(3)	Water: Ethics, Law and Policy
NRSC 540	(3)	Socio-Cultural Issues in Water
PHIL 230	(3)	Introduction to Moral Philosophy 1
PHIL 237	(3)	Contemporary Moral Issues
PHIL 334	(3)	Ethical Theory
PHIL 343	(3)	Biomedical Ethics
PHIL 348	(3)	Philosophy of Law 1
POLI 211	(3)	Comparative Government and Politics
POLI 212	(3)	Government and Politics - Developed World
POLI 227	(3)	Developing Areas/Introduction
POLI 345	(3)	International Organizations
POLI 445	(3)	International Political Economy: Monetary Relations
POLI 466	(3)	Public Policy Analysis
PSYC 215	(3)	Social Psychology
RELG 270	(3)	Religious Ethics and the Environment
RELG 340	(3)	Religion and the Sciences
RELG 370	(3)	Religion and Human Rights
RELG 376	(3)	Religious Ethics
SOCI 222	(3)	Urban Sociology
SOCI 234	(3)	Population and Society
SOCI 235	(3)	Technology and Society
SOCI 254	(3)	Development and Underdevelopment
SOCI 386	(3)	Contemporary Social Movements
URBP 201	(3)	Planning the 21st Century City
URBP 506	(3)	Environmental Policy and Planning
URBP 530	(3)	Urban Environmental Planning
WILD 415*	(2)	Conservation Law

### Natural Sciences and Technology

\*\* Note: you may take MIMM 211 or LSCI 230, but not both; you may take ENVB 315 or BIOL 432, but not both; you may take BIOL 308 or ENVB 305, but not both.

AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 435	(3)	Soil and Water Quality Management
ANSC 326	(3)	Fundamentals of Population Genetics
ANTH 311	(3)	Primate Behaviour and Ecology
ARCH 375	(2)	Landscape
ARCH 377	(3)	Energy, Environment and Buildings
ARCH 378	(3)	Site Usage
ATOC 215	(3)	Oceans, Weather and Climate
BIOL 240	(3)	Monteregian Flora

BIOL 305	(3)	Animal Diversity
BIOL 308**	(3)	Ecological Dynamics
BIOL 310	(3)	Biodiversity and Ecosystems
BIOL 342	(3)	Marine Biology
BIOL 418	(3)	Freshwater Invertebrate Ecology
BIOL 432**	(3)	Limnology
BIOL 436	(3)	Evolution and Society
BIOL 465	(3)	Conservation Biology
BREE 217	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 518	(3)	Bio-Treatment of Wastes
BTEC 502	(3)	Biotechnology Ethics and Society
CHEE 230	(3)	Environmental Aspects of Technology
CHEM 212	(4)	Introductory Organic Chemistry 1
CHEM 281	(3)	Inorganic Chemistry 1
CHEM 462	(3)	Green Chemistry
CIVE 225	(4)	Environmental Engineering
CIVE 323	(3)	Hydrology and Water Resources
CIVE 550	(3)	Water Resources Management
ENTO 340	(3)	Field Entomology
ENVB 210	(3)	The Biophysical Environment
ENVB 301	(3)	Meteorology
ENVB 305**	(3)	Population & Community Ecology
ENVB 315**	(3)	Science of Inland Waters
ENVB 410	(3)	Ecosystem Ecology
ENVB 415	(3)	Ecosystem Management
ENVB 430	(3)	GIS for Natural Resource Management
ENVR 200	(3)	The Global Environment
ENVR 202	(3)	The Evolving Earth
EPSC 201	(3)	Understanding Planet Earth
EPSC 233	(3)	Earth and Life History
EPSC 425	(3)	Sediments to Sequences
EPSC 549	(3)	Hydrogeology
ESYS 301	(3)	Earth System Modelling
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 201	(3)	Introductory Geo-Information Science
GEOG 205	(3)	Global Change: Past, Present and Future
GEOG 272	(3)	Earth's Changing Surface
GEOG 308	(3)	Principles of Remote Sensing
GEOG 321	(3)	Climatic Environments
GEOG 322	(3)	Environmental Hydrology
GEOG 372	(3)	Running Water Environments
GEOG 470	(3)	Wetlands



LSCI 230**	(3)	Introductory Microbiology
MICR 331	(3)	Microbial Ecology
MIME 308	(3)	Social Impact of Technology
MIME 320	(3)	Extraction of Energy Resources
MIMM 211**	(3)	Introductory Microbiology
MIMM 314	(3)	Immunology
MIMM 323	(3)	Microbial Physiology
MIMM 324	(3)	Fundamental Virology
NRSC 333	(3)	Pollution and Bioremediation
NRSC 340	(3)	Global Perspectives on Food
NRSC 384	(3)	Field Research Project
NRSC 510	(3)	Agricultural Micrometeorology
NRSC 514	(3)	Freshwater Ecosystems
PARA 410	(3)	Environment and Infection
PARA 515	(3)	Water, Health and Sanitation
PLNT 304	(3)	Biology of Fungi
PLNT 305	(3)	Plant Pathology
PLNT 358	(3)	Flowering Plant Diversity
PLNT 426	(3)	Plant Ecophysiology
PLNT 460	(3)	Plant Ecology
SOIL 300	(3)	Geosystems
WILD 421	(3)	Wildlife Conservation

**Revision, August 2011. End of revision.**

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## **8.2 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Minor Environment (18 credits)**

**Revision, August 2011. Start of revision.**

This 18-credit Minor is intended for Faculty of Agricultural and Environmental Science students and Faculty of Science students, but is open to students from other faculties as well, except Arts and Law.

### **Advising Note:**

Consultation with the Program Adviser for approval of course selection to meet program requirements is obligatory. Only courses at the 200 level and above will be approved.

For information about the Minor in Environment, contact:

Ms. Kathy Roulet, MSE Program Adviser

Email: [kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)

Telephone: 514-398-4306

### **Complementary Courses (18 credits)**

18 credits of complementary courses are selected as follows:

12 credits of MSE core courses:

Location Note: MSE core courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 400	(3)	Environmental Thought

6 credits of environmentally related courses selected with the approval of the Program Adviser (at least 3 credits must be in social sciences). A list of Suggested Courses is given below.

### **Suggested Course List**

The Suggested Course List is divided into two thematic categories: Social Sciences and Policy; and Natural Sciences and Technology.

Most courses listed at the 300 level and higher have prerequisites. You are urged to prepare your program of study with this in mind.

This list is not meant to be exhaustive. You are also encouraged to examine the course lists of the various domains in the Environment program for other courses that might interest you. Courses not on the Suggested Course list may be included in the Minor with the permission of the MSE Program Adviser.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

### **Social Sciences and Policy**

\* Note: If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

AGEC 231	(3)	Economic Systems of Agriculture
AGEC 333	(3)	Resource Economics
AGEC 430	(3)	Agriculture, Food and Resource Policy
AGEC 442	(3)	Economics of International Agricultural Development
AGRI 210	(3)	Agro-Ecological History
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
ANTH 206	(3)	Environment and Culture
ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
ANTH 512	(3)	Political Ecology
CIVE 433	(3)	Urban Planning
ECON 205	(3)	An Introduction to Political Economy
ECON 225	(3)	Economics of the Environment
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 405	(3)	Natural Resource Economics
ENVB 437	(3)	Assessing Environmental Impact
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 400	(3)	Environmental Thought
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 210	(3)	Global Places and Peoples
GEOG 216	(3)	Geography of the World Economy
GEOG 221	(3)	Environment and Health
GEOG 300	(3)	Human Ecology in Geography

GEOG 301	(3)	Geography of Nunavut
GEOG 302	(3)	Environmental Management 1
GEOG 303	(3)	Health Geography
GEOG 370	(3)	Protected Areas
GEOG 382	(3)	Principles Earth Citizenship
GEOG 403	(3)	Global Health and Environmental Change
GEOG 408	(3)	Geography of Development
GEOG 410	(3)	Geography of Underdevelopment: Current Problems
GEOG 508	(3)	Resources, People and Power
GEOG 530	(3)	Global Land and Water Resources
GEOG 551	(3)	Environmental Decisions
MGPO 440	(3)	Strategies for Sustainability
NRSC 221	(3)	Environment and Health
NRSC 512	(3)	Water: Ethics, Law and Policy
NRSC 540	(3)	Socio-Cultural Issues in Water
PHIL 230	(3)	Introduction to Moral Philosophy 1
PHIL 237	(3)	Contemporary Moral Issues
PHIL 334	(3)	Ethical Theory
PHIL 343	(3)	Biomedical Ethics
PHIL 348	(3)	Philosophy of Law 1
POLI 211	(3)	Comparative Government and Politics
POLI 212	(3)	Government and Politics - Developed World
POLI 227	(3)	Developing Areas/Introduction
POLI 345	(3)	International Organizations
POLI 445	(3)	International Political Economy: Monetary Relations
POLI 466	(3)	Public Policy Analysis
PSYC 215	(3)	Social Psychology
RELG 270	(3)	Religious Ethics and the Environment
RELG 340	(3)	Religion and the Sciences
RELG 370	(3)	Religion and Human Rights
RELG 376	(3)	Religious Ethics
SOCI 222	(3)	Urban Sociology
SOCI 234	(3)	Population and Society
SOCI 235	(3)	Technology and Society
SOCI 254	(3)	Development and Underdevelopment
SOCI 386	(3)	Contemporary Social Movements
URBP 201	(3)	Planning the 21st Century City
URBP 506	(3)	Environmental Policy and Planning
URBP 530	(3)	Urban Environmental Planning
WILD 415*	(2)	Conservation Law

### Natural Sciences and Technology

\* Note: you may take LSCI 230 or MIMM 211, but not both; you may take BIOL 432 or ENVB 315, but not both; you may take BREE 217 or GEOG 322, but not both; you may take ENVB 430 or GEOG 201, but not both; you may take BIOL 308 or ENVB 305, but not both.

AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 435	(3)	Soil and Water Quality Management
ANSC 326	(3)	Fundamentals of Population Genetics
ANTH 311	(3)	Primate Behaviour and Ecology
ARCH 375	(2)	Landscape
ARCH 377	(3)	Energy, Environment and Buildings
ARCH 378	(3)	Site Usage
ATOC 215	(3)	Oceans, Weather and Climate
BIOL 240	(3)	Monteregian Flora
BIOL 305	(3)	Animal Diversity
BIOL 308*	(3)	Ecological Dynamics
BIOL 310	(3)	Biodiversity and Ecosystems
BIOL 342	(3)	Marine Biology
BIOL 418	(3)	Freshwater Invertebrate Ecology
BIOL 432*	(3)	Limnology
BIOL 436	(3)	Evolution and Society
BIOL 465	(3)	Conservation Biology
BREE 217*	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 518	(3)	Bio-Treatment of Wastes
BTEC 502	(3)	Biotechnology Ethics and Society
CHEE 230	(3)	Environmental Aspects of Technology
CHEM 212	(4)	Introductory Organic Chemistry 1
CHEM 281	(3)	Inorganic Chemistry 1
CHEM 462	(3)	Green Chemistry
CIVE 225	(4)	Environmental Engineering
CIVE 323	(3)	Hydrology and Water Resources
CIVE 550	(3)	Water Resources Management
ENTO 340	(3)	Field Entomology
ENVB 210	(3)	The Biophysical Environment
ENVB 301	(3)	Meteorology
ENVB 305*	(3)	Population & Community Ecology
ENVB 315*	(3)	Science of Inland Waters
ENVB 410	(3)	Ecosystem Ecology
ENVB 415	(3)	Ecosystem Management
ENVB 430*	(3)	GIS for Natural Resource Management
ENVR 200	(3)	The Global Environment
ENVR 202	(3)	The Evolving Earth
EPSC 201	(3)	Understanding Planet Earth
EPSC 233	(3)	Earth and Life History
EPSC 425	(3)	Sediments to Sequences

EPSC 549	(3)	Hydrogeology
ESYS 301	(3)	Earth System Modelling
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 201*	(3)	Introductory Geo-Information Science
GEOG 205	(3)	Global Change: Past, Present and Future
GEOG 272	(3)	Earth's Changing Surface
GEOG 308	(3)	Principles of Remote Sensing
GEOG 321	(3)	Climatic Environments
GEOG 322*	(3)	Environmental Hydrology
GEOG 372	(3)	Running Water Environments
GEOG 470	(3)	Wetlands
LSCI 230*	(3)	Introductory Microbiology
MICR 331	(3)	Microbial Ecology
MIME 308	(3)	Social Impact of Technology
MIME 320	(3)	Extraction of Energy Resources
MIMM 211*	(3)	Introductory Microbiology
MIMM 314	(3)	Immunology
MIMM 323	(3)	Microbial Physiology
MIMM 324	(3)	Fundamental Virology
NRSC 333	(3)	Pollution and Bioremediation
NRSC 340	(3)	Global Perspectives on Food
NRSC 384	(3)	Field Research Project
NRSC 510	(3)	Agricultural Micrometeorology
NRSC 514	(3)	Freshwater Ecosystems
PARA 410	(3)	Environment and Infection
PARA 515	(3)	Water, Health and Sanitation
PLNT 304	(3)	Biology of Fungi
PLNT 305	(3)	Plant Pathology
PLNT 358	(3)	Flowering Plant Diversity
PLNT 426	(3)	Plant Ecophysiology
PLNT 460	(3)	Plant Ecology
SOIL 300	(3)	Geosystems
WILD 421	(3)	Wildlife Conservation

**Revision, August 2011. End of revision.**

## 9 B.A. Faculty Program in Environment

The B.A. Faculty Program has two components: Core and Domain. Students follow three steps in their degree program.

- 1. Core:** The Core consists of four introductory courses and one intermediate-level course where students are exposed to the different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie most environmental problems. Through the core program, students go beyond the confines of their individual views of environment.
- 2. Domain:** Domains provide a trans-disciplinary study of a particular theme or component of the environment. You can choose to follow one of three domains within the B.A. Faculty Program in Environment:

- Ecological Determinants of Health in Society
- Economics and the Earth's Environment
- Environment and Development

**3. Senior Core and Research:** In the two senior courses of the core, students will apply the general and specialized knowledge that they have gained in the program to the analysis of some specific, contemporary environmental problems.

To obtain a B.A. Faculty Program in Environment, students must:

- register in a domain online, using Minerva;
- satisfy the co- and/or prerequisites for the program (Calculus and a Basic Science course);
- pass all courses counted towards the Faculty Program with a **grade of C or higher**;
- confirm that their course selection satisfies the required components of the MSE core and their chosen domain, and that the complementary courses are approved courses in their chosen domain; and
- fulfil all Faculty requirements as specified for the B.A. in the Arts, see *Faculty of Arts > Faculty of Arts Degree Requirements*, which include meeting the minimum credit requirement as specified in their letter of admission.

## 9.1 Ecological Determinants of Health in Society Domain

This domain is open only to students in the B.A. Faculty Program in Environment.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Marilyn Scott Email: <a href="mailto:marilyn.scott@mcgill.ca">marilyn.scott@mcgill.ca</a> Telephone: 514-398-7996

### 9.1.1 Bachelor of Arts (B.A.) – Faculty Program Environment – Ecological Determinants of Health in Society (54 credits)

**Revision, August 2011. Start of revision.**

An understanding of the interface between human health and environment depends not only on an appreciation of the biological and ecological determinants of health, but equally on an appreciation of the role of social sciences in the design, implementation, and monitoring of interventions. Demographic patterns and urbanization, economic forces, ethics, indigenous knowledge and culture, and an understanding of how social change can be effected are all critical if we are to be successful in our efforts to assure health of individuals and societies in the future. Recognizing the key role that nutritional status plays in maintaining a healthy body, and the increasing importance of infection as a health risk linked intimately with the environment, this domain prepares students to contribute to the solution of problems of nutrition and infection by tying the relevant natural sciences to the social sciences.

#### Program Prerequisites or Corequisites

All B.A. Environment students **MUST** take these pre- or corequisite courses, or their equivalents. These courses should be taken in the Freshman year if possible. Quebec students can take them in U1.

#### Calculus

3 credits of calculus from the following, or equivalent (e.g., CEGEP objective 00UN):

MATH 139	(4)	Calculus 1 with Precalculus
MATH 140	(3)	Calculus 1

#### Basic Science

3 credits of basic science from the following, or equivalent (e.g., CEGEP objective 00UK):

AEBI 120	(3)	General Biology
BIOL 111	(3)	Principles: Organismal Biology

#### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

**Program Requirements**

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses, but does not include the program prerequisites or corequisites listed above.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

**Core: Required Courses (18 credits)**

Location Note: Core required courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Complementary Courses (33 credits)**

33 credits of complementary courses are chosen as follows:

18 credits of Fundamentals, maximum 3 credits from any one category

9 credits from List A

6 credits from List B

**Fundamentals:**

18 credits of Fundamentals (3 credits from each category):

**Health and Environment**

GEOG 221	(3)	Environment and Health
NRSC 221	(3)	Environment and Health

**Health and Infection**

GEOG 403	(3)	Global Health and Environmental Change
PARA 410	(3)	Environment and Infection

**Health and Pollution**

ANTH 227	(3)	Medical Anthropology
NRSC 333	(3)	Pollution and Bioremediation

**Economics**

AGEC 200	(3)	Principles of Microeconomics
ECON 208	(3)	Microeconomic Analysis and Applications

**Nutrition**

NUTR 200	(3)	Contemporary Nutrition
NUTR 207	(3)	Nutrition and Health

**Statistics**

One of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Arts.

AEMA 310	(3)	Statistical Methods 1
MATH 203	(3)	Principles of Statistics 1
SOCI 350	(3)	Statistics in Social Research

**List A:**

9 credits from List A (maximum 3 credits from any one category):

**Health and Society**

GEOG 303	(3)	Health Geography
SOCI 234	(3)	Population and Society
SOCI 309	(3)	Health and Illness

**Hydrology and Climate**

BREE 217	(3)	Hydrology and Water Resources
GEOG 321	(3)	Climatic Environments
GEOG 322	(3)	Environmental Hydrology
NRSC 510	(3)	Agricultural Micrometeorology

**Agriculture**

AGRI 210	(3)	Agro-Ecological History
AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 411	(3)	Global Issues on Development, Food and Agriculture

**Decision Making**

AGEC 242	(3)	Management Theories and Practices
BTEC 502	(3)	Biotechnology Ethics and Society
ECON 440	(3)	Health Economics
PHIL 343	(3)	Biomedical Ethics
URBP 520	(3)	Globalization: Planning and Change

**Biology Fundamentals:**

\* You may take BIOL 308 or ENVB 305, but not both.



AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
BIOL 200	(3)	Molecular Biology
BIOL 205	(3)	Biology of Organisms
BIOL 308*	(3)	Ecological Dynamics
ENVB 305*	(3)	Population & Community Ecology
LSCI 211	(3)	Biochemistry 1
PHGY 202	(3)	Human Physiology: Body Functions

**Development and Ecology**

ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
GEOG 300	(3)	Human Ecology in Geography
SOCI 254	(3)	Development and Underdevelopment

**List B:**

6 credits from List B (maximum 3 credits from any one category):

**Advanced Ecology**

BIOL 465	(3)	Conservation Biology
BIOL 553	(3)	Neotropical Environments
ENVB 410	(3)	Ecosystem Ecology

**Pest Management**

BIOL 350	(3)	Insect Biology and Control
ENTO 352	(3)	Biocontrol of Pest Insects

**Techniques and Management**

\* You may take ENVB 430 or GEOG 201, but not both.

CHEE 230	(3)	Environmental Aspects of Technology
ENVB 430*	(3)	GIS for Natural Resource Management
GEOG 201*	(3)	Introductory Geo-Information Science
GEOG 302	(3)	Environmental Management 1
GEOG 380	(3)	Adaptive Environmental Management
PARA 515	(3)	Water, Health and Sanitation

**Social Change**

EDER 461	(3)	Society and Change
HIST 292	(3)	History and the Environment

**Immunology and Infectious Disease**

MIMM 314	(3)	Immunology
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MIMM 324	(3)	Fundamental Virology
MIMM 413	(3)	Parasitology
PARA 438	(3)	Immunology
WILD 424	(3)	Parasitology

### Populations and Place

CANS 407	(3)	Regions of Canada
GEOG 498	(3)	Humans in Tropical Environments
PSYC 533	(3)	International Health Psychology
SOCI 520	(3)	Migration and Immigrant Groups
SOCI 550	(3)	Developing Societies
SOCI 565	(3)	Social Change in Panama

Revision, August 2011. End of revision.

## 9.2 Economics and the Earth's Environment Domain

This domain is open only to students in the B.A. Faculty Program in Environment.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Jeanne Paquette Email: <a href="mailto:jeanne.paquette@mcgill.ca">jeanne.paquette@mcgill.ca</a> Telephone: 514-398-4402

### 9.2.1 Bachelor of Arts (B.A.) – Faculty Program Environment – Economics and the Earth's Environment (54 credits)

Revision, August 2011. Start of revision.

Understanding Earth's geologic processes provides us with the knowledge to mitigate many of our society's environmental impacts due to resource extraction and waste disposal. This knowledge is not always enough, as economics often plays a controlling role in how we use and abuse our environment.

This domain educates students in the fundamentals of economics and Earth sciences. The fundamentals of economics are provided, as is their application to the effects of economic choices on Earth's environment. Examples of these applications include the economic effects of public policy toward resource industries and methods of waste disposal, and the potential effects of global warming on the global economy. Students also learn of minerals, rocks, soils, and waters that define much of Earth's environment and how these materials interact with each other and with the atmosphere. Courses in specific subdisciplines of Earth sciences combined with courses presenting a global vision of how the Earth and its environment operate provide the student with the necessary knowledge of geologic processes. Examples of this knowledge include the effects of mineral and energy extraction on the environment and how industrial waste interacts with solids and liquids in the environment. The Earth science and economics studies merge in the final year when the students apply what they have learned in the domain to current environmental issues.

#### Program Prerequisites or Corequisites

All B.A. Environment students must take these courses, or their equivalents. These courses should be taken in the Freshman year if possible. Quebec students can take them in U1.

#### Calculus

3 credits of Calculus, one of the following, or equivalent (e.g., CEGEP objective OOUN):

MATH 139	(4)	Calculus 1 with Precalculus
MATH 140	(3)	Calculus 1

#### Basic Science

3 credits of Basic Science, one of the following, or their equivalents (e.g., CEGEP objectives Biology OOUK, Chemistry OOUL, Physics OOUR):

BIOL 111	(3)	Principles: Organismal Biology
CHEM 110	(4)	General Chemistry 1
PHYS 101	(4)	Introductory Physics - Mechanics

### Other Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

### Program Requirements

Note: Students are required to take a maximum of 34 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses, but does not include the domain prerequisites or corequisites listed above.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

### Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

### Core: Complementary Course – Senior Research Project (3 credits)

Only 3 credits will be applied to the program: extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

### Domain: Required Courses (15 credits)

ECON 230D1	(3)	Microeconomic Theory
ECON 230D2	(3)	Microeconomic Theory
ECON 405	(3)	Natural Resource Economics
EPSC 210	(3)	Introductory Mineralogy
EPSC 212	(3)	Introductory Petrology

### Domain: Complementary Courses (18 credits)

18 credits are selected from various domains as follows:

#### Statistics

One of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Arts.

AEMA 310	(3)	Statistical Methods 1
GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1

**Economics**

6 credits from:

AGEC 333	(3)	Resource Economics
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 416	(3)	Topics in Economic Development 2
ECON 525	(3)	Project Analysis

**Advanced Courses**

9 credits from:

\* Note: If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

AGRI 435	(3)	Soil and Water Quality Management
AGRI 452	(3)	Water Resources in Barbados
AGRI 550	(3)	Sustained Tropical Agriculture
ANTH 339	(3)	Ecological Anthropology
BIOL 305	(3)	Animal Diversity
BIOL 308	(3)	Ecological Dynamics
ECON 305	(3)	Industrial Organization
ECON 313	(3)	Economic Development 1
ECON 314	(3)	Economic Development 2
ECON 408	(3)	Public Sector Economics 1
ECON 409	(3)	Public Sector Economics 2
ECON 412	(3)	Topics in Economic Development 1
ENVB 305	(3)	Population & Community Ecology
ENVB 437	(3)	Assessing Environmental Impact
EPSC 455	(3)	Sedimentary Geology
EPSC 549	(3)	Hydrogeology
GEOG 302	(3)	Environmental Management 1
GEOG 322	(3)	Environmental Hydrology
GEOG 380	(3)	Adaptive Environmental Management
GEOG 404	(3)	Environmental Management 2
GEOG 498	(3)	Humans in Tropical Environments
SOIL 510	(3)	Environmental Soil Chemistry
URBP 520	(3)	Globalization: Planning and Change
WILD 415*	(2)	Conservation Law

**Revision, August 2011. End of revision.**

### 9.3 Environment and Development Domain

This domain is open only to students in the B.A. Faculty Program in Environment.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Prof. Gregory Mikkelson Email: <a href="mailto:gregory.mikkelson@mcgill.ca">gregory.mikkelson@mcgill.ca</a> Telephone: 514-398-4583

#### 9.3.1 Bachelor of Arts (B.A.) - Faculty Program Environment - Environment and Development (54 credits)

The quest for sustainable paths to economic development requires scholars and practitioners to transcend the boundaries of traditional disciplines. This domain offers students sufficient depth and breadth of study to acquire a strong grasp of current theories, concepts, and approaches to environment and development. It prepares them for graduate study in interdisciplinary programs (e.g., development studies or environmental studies) as well as in integrative social sciences (e.g., anthropology, geography, etc.).

##### Program Prerequisites or Corequisites

All B.A. Environment students must take these courses, or their equivalents. These courses should be taken in the Freshman year if possible. Quebec students can take them in U1.

##### Calculus

3 credits of calculus from the following, or equivalent (e.g., CEGEP objective OOUN):

MATH 139	(4)	Calculus 1 with Precalculus
MATH 140	(3)	Calculus 1

##### Basic Science

3 credits of basic science from the following, or equivalent (e.g., CEGEP objectives: Biology OOUK, Chemistry OOUL, Physics OOUR):

BIOL 111	(3)	Principles: Organismal Biology
CHEM 110	(4)	General Chemistry 1
PHYS 101	(4)	Introductory Physics - Mechanics

##### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

##### Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

##### Core: Required Courses (18 credits)

Location Note: Core required courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment

ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Domain: Required Courses (12 credits)**

ANTH 339	(3)	Ecological Anthropology
ECON 313	(3)	Economic Development 1
ECON 314	(3)	Economic Development 2
GEOG 302	(3)	Environmental Management 1

**Domain: Complementary Courses (21 credits)**

21 credits of complementary courses are chosen from various domains as follows:

**Microeconomics**

One of:

AGEC 200	(3)	Principles of Microeconomics
ECON 208	(3)	Microeconomic Analysis and Applications

**Statistics**

3 credits, one of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Arts.

AEMA 310	(3)	Statistical Methods 1
GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1
PSYC 204	(3)	Introduction to Psychological Statistics

**Advanced Development Courses**

6 credits from:

AGEC 442	(3)	Economics of International Agricultural Development
ANTH 418	(3)	Environment and Development
GEOG 408	(3)	Geography of Development
GEOG 410	(3)	Geography of Underdevelopment: Current Problems

**Natural Sciences**

3 credits from:

AGRI 550	(3)	Sustained Tropical Agriculture
BIOL 308	(3)	Ecological Dynamics

BIOL 465	(3)	Conservation Biology
BIOL 553	(3)	Neotropical Environments
ENVB 305	(3)	Population & Community Ecology
GEOG 305	(3)	Soils and Environment
GEOG 322	(3)	Environmental Hydrology
NUTR 403	(3)	Nutrition in Society
NUTR 501	(3)	Nutrition in Developing Countries
PARA 410	(3)	Environment and Infection

### Social Sciences

6 credits from:

AGEC 333	(3)	Resource Economics
AGEC 442	(3)	Economics of International Agricultural Development
AGRI 210	(3)	Agro-Ecological History
AGRI 452	(3)	Water Resources in Barbados
ANTH 439	(3)	Theories of Development
ANTH 445	(3)	Property and Land Tenure
CANS 407	(3)	Regions of Canada
ECON 326	(3)	Ecological Economics
ECON 405	(3)	Natural Resource Economics
GEOG 201	(3)	Introductory Geo-Information Science
GEOG 300	(3)	Human Ecology in Geography
GEOG 311	(3)	Economic Geography
GEOG 331	(3)	Urban Social Geography
GEOG 380	(3)	Adaptive Environmental Management
GEOG 404	(3)	Environmental Management 2
GEOG 408	(3)	Geography of Development
GEOG 416	(3)	Africa South of the Sahara
GEOG 496	(3)	Geographical Excursion
GEOG 498	(3)	Humans in Tropical Environments
GEOG 508	(3)	Resources, People and Power
GEOG 510	(3)	Humid Tropical Environments
GEOG 551	(3)	Environmental Decisions
MGPO 440	(3)	Strategies for Sustainability
POLI 445	(3)	International Political Economy: Monetary Relations
POLI 472	(3)	Developing Areas/Social Movements
SOCI 565	(3)	Social Change in Panama
URBP 507	(3)	Planning and Infrastructure
URBP 520	(3)	Globalization: Planning and Change

## 10 Bachelor of Arts and Science (B.A. & Sc.) – Interfaculty Program in Environment

The Interfaculty Program in Environment is open only to students in the B.A. & Sc. degree.

### Adviser

Ms. Kathy Roulet, MSE Program Adviser

Email: [kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)

Telephone: 514-398-4306

To obtain a B.A. & Sc. Interfaculty Program in Environment, students must:

- register in the program online, using Minerva;
- satisfy the co- / prerequisites for the program;
- pass all courses counted toward the Interfaculty Program with a grade of C or higher;
- confirm that their course selection satisfies the required components of the program;
- fulfil all requirements specified for the B.A. & Sc. in *Bachelor of Arts and Science > Degree Requirements*, which include meeting the minimum credit requirement as specified in their letter of admission.

### 10.1 Bachelor of Arts and Science (B.A. & Sc.) – Interfaculty Program Environment (54 credits)

#### Revision, August 2011. Start of revision.

The growth of technology, globalization of economies, and rapid increases in population and per capita consumption have all had dramatic environmental impacts. The Interfaculty Program Environment for the Bachelor of Arts and Science is designed to provide students with a broad "Liberal Arts/Science" training. In combination with careful mentoring, this program offers a great degree of flexibility, allowing students to develop the skills and knowledge base required to face the myriad of environmental problems that currently need to be addressed.

#### Program Requirements

1. Students are required to take a maximum of 21 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes Required courses.
2. Students must complete at least 30 credits in the Faculty of Arts and at least 30 in the Faculty of Science as part of their interfaculty program and their minor or minor concentration. ENVR courses are considered courses in both Arts and Science, and so the credits are split between the two faculties for the purpose of this regulation.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught on both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

#### Required Courses (18 credits)

Location Note: Core required courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

#### Complementary Courses (36 credits)

36 credits of complementary courses are selected as follows:



3 credits - Senior Research Project

3 credits - Statistics

30 credits - chosen from amongst 12 Areas of focus

### Senior Research Project

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

### Statistics:

One of:

AEMA 310	(3)	Statistical Methods 1
BIOL 373	(3)	Biometry
GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1
PSYC 204	(3)	Introduction to Psychological Statistics

### Areas:

30 credits from at least three of the following Areas. At least 6 credits must be at the 400 level or higher, selected either from these lists or in consultation with the Program Adviser.

#### Area 1: Population, Community, and Ecosystem Ecology

\* Note: you may take BIOL 540 or ENVR 540, but not both; you may take BIOL 308 or ENVB 305, but not both.

BIOL 308*	(3)	Ecological Dynamics
BIOL 432	(3)	Limnology
BIOL 441	(3)	Biological Oceanography
BIOL 540*	(3)	Ecology of Species Invasions
ENVB 305*	(3)	Population & Community Ecology
ENVB 410	(3)	Ecosystem Ecology
ENVR 540*	(3)	Ecology of Species Invasions
GEOG 350	(3)	Ecological Biogeography
PLNT 460	(3)	Plant Ecology

#### Area 2: Biodiversity and Conservation

BIOL 305	(3)	Animal Diversity
BIOL 341	(3)	History of Life
BIOL 355	(3)	Trees: Ecology & Evolution
BIOL 427	(3)	Herpetology
BIOL 465	(3)	Conservation Biology
ENTO 440	(3)	Insect Diversity
MICR 331	(3)	Microbial Ecology
PLNT 358	(3)	Flowering Plant Diversity
WILD 307	(3)	Natural History of Vertebrates

WILD 350	(3)	Mammalogy
WILD 420	(3)	Ornithology

**Area 3: Field Studies in Ecology and Conservation**

BIOL 240	(3)	Monteregian Flora
BIOL 331	(3)	Ecology/Behaviour Field Course
BIOL 334	(3)	Applied Tropical Ecology
BIOL 553	(3)	Neotropical Environments
GEOG 495	(3)	Field Studies - Physical Geography
GEOG 499	(3)	Subarctic Field Studies
WILD 475	(3)	Desert Ecology

**Area 4: Hydrology and Water Resources**

\* Note: you may take only one of: GEOG 322, BREE 217, or CIVE 323.

BREE 217*	(3)	Hydrology and Water Resources
CIVE 323*	(3)	Hydrology and Water Resources
EPSC 549	(3)	Hydrogeology
GEOG 322*	(3)	Environmental Hydrology
GEOG 372	(3)	Running Water Environments
GEOG 522	(3)	Advanced Environmental Hydrology
GEOG 537	(3)	Advanced Fluvial Geomorphology
NRSC 540	(3)	Socio-Cultural Issues in Water

**Area 5: Human Health**

\* Note: you may take ANSC 330 or NUTR 307, but not both; you may take PHAR 303 or NUTR 420, but not both.

ANSC 330*	(3)	Fundamentals of Nutrition
NUTR 307*	(3)	Human Nutrition
NUTR 420*	(3)	Toxicology and Health Risks
PARA 410	(3)	Environment and Infection
PATH 300	(3)	Human Disease
PHAR 303*	(3)	Principles of Toxicology

**Area 6: Earth and Soil Sciences**

ATOC 215	(3)	Oceans, Weather and Climate
EPSC 201	(3)	Understanding Planet Earth
GEOG 272	(3)	Earth's Changing Surface
GEOG 305	(3)	Soils and Environment
GEOG 321	(3)	Climatic Environments
SOIL 326	(3)	Soils in a Changing Environment

**Area 7: Economics**

\* Note: you may take AGECE 200 or ECON 208, but not both.

AGEC 200*	(3)	Principles of Microeconomics
AGEC 333	(3)	Resource Economics
ECON 208*	(3)	Microeconomic Analysis and Applications
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 405	(3)	Natural Resource Economics
GEOG 216	(3)	Geography of the World Economy

**Area 8: Development and Underdevelopment**

ANTH 212	(3)	Anthropology of Development
ANTH 418	(3)	Environment and Development
ECON 313	(3)	Economic Development 1
ECON 314	(3)	Economic Development 2
GEOG 408	(3)	Geography of Development
GEOG 410	(3)	Geography of Underdevelopment: Current Problems
POLI 227	(3)	Developing Areas/Introduction
POLI 445	(3)	International Political Economy: Monetary Relations
SWRK 374	(3)	Community Development/Social Action

**Area 9: Cultures and People**

ANTH 206	(3)	Environment and Culture
ANTH 339	(3)	Ecological Anthropology
GEOG 210	(3)	Global Places and Peoples

**Area 10: Human Ecology and Health**

ANTH 227	(3)	Medical Anthropology
GEOG 300	(3)	Human Ecology in Geography
GEOG 303	(3)	Health Geography
PHIL 343	(3)	Biomedical Ethics
SOCI 225	(3)	Medicine and Health in Modern Society
SOCI 309	(3)	Health and Illness

**Area 11: Spirituality, Philosophy, and Thought**

EDER 461	(3)	Society and Change
PHIL 220	(3)	Introduction to History and Philosophy of Science 1
PHIL 221	(3)	Introduction to History and Philosophy of Science 2
PHIL 237	(3)	Contemporary Moral Issues
PHIL 341	(3)	Philosophy of Science 1
PHIL 348	(3)	Philosophy of Law 1
RELG 270	(3)	Religious Ethics and the Environment
RELG 340	(3)	Religion and the Sciences
RELG 370	(3)	Religion and Human Rights

**Area 12: Environmental Management**

\* Note: If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

AGRI 210	(3)	Agro-Ecological History
AGRI 435	(3)	Soil and Water Quality Management
AGRI 452	(3)	Water Resources in Barbados
ENVB 437	(3)	Assessing Environmental Impact
GEOG 302	(3)	Environmental Management 1
GEOG 380	(3)	Adaptive Environmental Management
GEOG 404	(3)	Environmental Management 2
NRSC 333	(3)	Pollution and Bioremediation
NRSC 382	(3)	Ecological Monitoring and Analysis
NRSC 383	(3)	Land Use: Redesign and Planning
SOIL 335	(3)	Soil Ecology and Management
WILD 401	(4)	Fisheries and Wildlife Management
WILD 415*	(2)	Conservation Law
WOOD 441	(3)	Integrated Forest Management

**Revision, August 2011. End of revision.**

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## 10.2 Bachelor of Arts and Science (B.A. & Sc.) – Interfaculty Program in Sustainability, Science and Society

The Interfaculty Program in Sustainability, Science and Society is open only to students in the B.A. & Sc. degree.

Adviser: Prof. Navin Ramankutty  
 Email: [navin.ramankutty@mcgill.ca](mailto:navin.ramankutty@mcgill.ca)  
 Telephone: 514-398-8428

For further information about this program, see *Bachelor of Arts and Science > Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Sustainability, Science and Society (54 credits)*.

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## 11 Major in Environment – B.Sc.(Ag.Env.Sc.) and B.Sc.

Students in the Faculty of Agricultural and Environmental Sciences B.Sc.(Ag.Env.Sc.) program and students in the Faculty of Science B.Sc. program can register in the Major in Environment.

The Major has two components: core and domain. Students follow three steps in their degree program.

- 1. Core:** The core consists of four introductory courses and one intermediate-level course where students are exposed to the different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie most environmental problems. Through the core program, students go beyond the confines of their individual views of environment.
- 2. Domain:** Domains provide a trans-disciplinary study of a particular theme or component of the environment. B.Sc.(Ag.Env.Sc.) and B.Sc. students can choose to follow one of the following domains:
  - Biodiversity and Conservation
  - Ecological Determinants of Health (Population and Cellular stream options)
  - Environmetrics
  - Food Production and Environment
  - Land Surface Processes and Environmental Change
  - Renewable Resource Management
  - Water Environments and Ecosystems (Biological and Physical stream options)

B.Sc. students in the Faculty of Science can also choose from the following two domains:

- Atmospheric Environment and Air Quality
- Earth Sciences and Economics

**3. Senior Core and Research:** In the two senior courses of the core, students will apply the general and specialized knowledge that they have gained in the program to the analysis of some specific, contemporary environmental problems.

To obtain a Major in Environment, students must:

- register in a domain online using Minerva;
- pass all courses counted toward the Major with **a grade of C or higher**;
- confirm that their course selection satisfies the required components of the MSE core and their chosen domain, and that the complementary courses are approved courses in their chosen domain; and
- fulfil all faculty requirements as specified by the faculty in which they are registered: for the B.Sc.(Ag.Env.Sc.), refer to *Faculty of Agricultural and Environmental Sciences > Faculty Information and Regulations*; for the B.Sc., see *Faculty of Science > Faculty Degree Requirements*. This includes meeting the minimum credit requirement as specified in their letter of admission.

## 11.1 Biodiversity and Conservation Domain

This domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Graham Bell Email: <a href="mailto:graham.bell@mcgill.ca">graham.bell@mcgill.ca</a> Telephone: 514-398-6485

### 11.1.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Biodiversity and Conservation (63 credits)

#### Revision, August 2011. Start of revision.

This domain (63 credits including core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. Major in Environment program.

This domain links the academic study of biological diversity with the applied field of conservation biology. The study of biological diversity, or "biodiversity", lies at the intersection of evolution with ecology and genetics, combining the subdisciplines of evolutionary ecology, evolutionary genetics, and ecological genetics. It has two main branches: the creation of diversity and the maintenance of diversity. Both processes are governed by a general mechanism of selection acting over different scales of space and time. This gives rise to a distinctive set of principles and generalizations that regulate rates of diversification and levels of diversity, as well as the abundance or rarity of different species. Conservation biology constitutes the application of these principles in the relevant social and economic context to the management of natural systems, with the object of preventing the extinction of rare species and maintaining the diversity of communities. As the impact of industrialization and population growth on natural systems has become more severe, conservation has emerged as an important area of practical endeavour.

#### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

#### Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

#### Core: Required Courses (18 credits)

Location Note: Core required courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth

ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Domain: Complementary Courses (42 credits)**

42 credits of complementary courses are selected as follows:

9 credits - basic courses in the Biological Principles of Diversity, Systematics, and Conservation

3 credits - Ecology

3 credits - Statistics

9 credits - Interface between Science, Policy, and Management

3 credits - Field Courses

6 credits - General Scientific Principles

3 credits - Social Science

6 credits - Organisms and Diversity

**Biological Principles of Diversity/Systematics/Conservation:**

9 credits are chosen from basic courses in the biological principles of diversity, systematics, and conservation as follows:

One of:

AEBI 212	(3)	Evolution and Phylogeny
BIOL 304	(3)	Evolution

One of:

AEBI 211	(3)	Organisms 2
BIOL 305	(3)	Animal Diversity

One of:

BIOL 465	(3)	Conservation Biology
WILD 421	(3)	Wildlife Conservation

**Ecology:**

One of:

BIOL 308	(3)	Ecological Dynamics
ENVB 305	(3)	Population & Community Ecology

**Statistics:**

One of:

AEMA 310	(3)	Statistical Methods 1
BIOL 373	(3)	Biometry

**Science, Policy, and Management:**

9 credits are chosen from interface between science, policy, and management as follows:

\* Note: you may take AGECE 200 or ECON 208, but not both.

AGECE 200*	(3)	Principles of Microeconomics
AGRI 550	(3)	Sustained Tropical Agriculture
ANTH 418	(3)	Environment and Development
ECON 208*	(3)	Microeconomic Analysis and Applications
ECON 225	(3)	Economics of the Environment
GEOG 302	(3)	Environmental Management 1
GEOG 370	(3)	Protected Areas
GEOG 380	(3)	Adaptive Environmental Management
GEOG 408	(3)	Geography of Development
GEOG 410	(3)	Geography of Underdevelopment: Current Problems

**Field Courses**

One of:

AGRI 452	(3)	Water Resources in Barbados
BIOL 331	(3)	Ecology/Behaviour Field Course
BIOL 334	(3)	Applied Tropical Ecology
BIOL 553	(3)	Neotropical Environments
GEOG 495	(3)	Field Studies - Physical Geography
GEOG 497	(3)	Ecology of Coastal Waters
GEOG 499	(3)	Subarctic Field Studies
WILD 475	(3)	Desert Ecology

**General Scientific Principles**

6 credits of general scientific principles selected from the following:

\* Note: you may take ENVB 430 or GEOG 306, but not both.

(A second field course from the domain curriculum may also be taken.)

\*\* Note: you may take BIOL 432 or ENVB 315, but not both.

BIOL 324	(3)	Ecological Genetics
BIOL 341	(3)	History of Life
BIOL 342	(3)	Marine Biology
BIOL 432**	(3)	Limnology
BIOL 441	(3)	Biological Oceanography
BIOL 505	(3)	Diversity and Systematics Seminar
ENVB 313	(3)	Phylogeny and Biogeography
ENVB 315**	(3)	Science of Inland Waters
ENVB 410	(3)	Ecosystem Ecology
ENVB 430*	(3)	GIS for Natural Resource Management

ENVB 437	(3)	Assessing Environmental Impact
GEOG 272	(3)	Earth's Changing Surface
GEOG 306*	(3)	Raster Geo-Information Science
GEOG 321	(3)	Climatic Environments
GEOG 322	(3)	Environmental Hydrology
GEOG 350	(3)	Ecological Biogeography
MICR 331	(3)	Microbial Ecology
PLNT 460	(3)	Plant Ecology
WILD 311	(3)	Ethology
WOOD 420	(3)	Environmental Issues: Forestry

**Social Science:**

One of:

\* Note: If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

AGEC 333	(3)	Resource Economics
ANTH 339	(3)	Ecological Anthropology
ANTH 416	(3)	Environment/Development: Africa
ECON 326	(3)	Ecological Economics
GEOG 404	(3)	Environmental Management 2
GEOG 498	(3)	Humans in Tropical Environments
GEOG 510	(3)	Humid Tropical Environments
URBP 520	(3)	Globalization: Planning and Change
WILD 415*	(2)	Conservation Law

**Organisms and Diversity:**

6 credits of organisms and diversity selected as follows:

\* Note: you may take BIOL 350 or ENTO 350, but not both; you may take BIOL 540 or ENVR 540, but not both.

AGRI 340	(3)	Principles of Ecological Agriculture
ANTH 311	(3)	Primate Behaviour and Ecology
BIOL 335	(3)	Marine Mammals
BIOL 350*	(3)	Insect Biology and Control
BIOL 355	(3)	Trees: Ecology & Evolution
BIOL 427	(3)	Herpetology
BIOL 540*	(3)	Ecology of Species Invasions
ENTO 350*	(3)	Insect Biology and Control
ENTO 352	(3)	Biocontrol of Pest Insects
ENTO 440	(3)	Insect Diversity
ENVR 540*	(3)	Ecology of Species Invasions
PLNT 304	(3)	Biology of Fungi
PLNT 358	(3)	Flowering Plant Diversity
WILD 307	(3)	Natural History of Vertebrates
WILD 350	(3)	Mammalogy
WILD 420	(3)	Ornithology



WILD 424 (3) Parasitology

**Revision, August 2011. End of revision.****11.2 Ecological Determinants of Health Domain**

This domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

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**11.2.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment - Ecological Determinants of Health – Cellular (63 credits)****Revision, August 2011. Start of revision.**

The Cellular concentration in this domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

This domain considers the interface between the environment and human well-being, with particular focus on the triad that ties human health to the environment through the elements of food and infectious agents. Each of these elements is influenced by planned and unplanned environmental disturbances. For example, agricultural practices shift the balance between beneficial and harmful ingredients of food. Use of insecticides presents dilemmas with regard to the environment, economics, and human health. The distribution of infectious diseases is influenced by the climatic conditions that permit vectors to coexist with man, by deforestation, by urbanization, and by human interventions ranging from the building of dams to provision of potable water.

In designing interventions that aim to prevent or reduce infectious contaminants in the environment, or to improve food production and nutritional quality, not only is it important to understand methods of intervention, but also to understand social forces that influence how humans respond to such interventions.

Students in the Cellular concentration will explore these interactions in more depth, at a physiological level. Students in the Population concentration will gain a depth of understanding at an ecosystem level that looks at society, land, and population health.

**Suggested First Year (U1) Courses**

For suggestions on courses to take in your first year (U1), consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

**Program Requirements**

Note: Students are required to take a maximum of 31 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

**Core: Required Courses (18 credits)**

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Domain: Required Course (3 credits)**

PARA 410	(3)	Environment and Infection
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**Domain: Complementary Courses (39 credits)**

39 credits of the complementary courses are selected as follows:

21 credits - Fundamentals, 3 credits from each category

12 credits - Human Health, maximum of 3 credits from any one category

6 credits - Natural Environment, maximum of 3 credits from any one category

**Fundamentals:**

21 credits of Fundamentals, 3 credits from each category.

**Health, Society, and Environment**

\* Note: you may take GEOG 221 or NRSC 221, but not both.

GEOG 221*	(3)	Environment and Health
GEOG 303	(3)	Health Geography
NRSC 221*	(3)	Environment and Health
SOCI 234	(3)	Population and Society
SOCI 309	(3)	Health and Illness

**Toxicology**

ANSC 312	(3)	Animal Health and Disease
NUTR 420	(3)	Toxicology and Health Risks
PHAR 303	(3)	Principles of Toxicology

**Cellular Biology**

ANSC 234	(3)	Biochemistry 2
BIOL 201	(3)	Cell Biology and Metabolism
LSCI 202	(3)	Molecular Cell Biology

**Genetics**

BIOL 202	(3)	Basic Genetics
LSCI 204	(3)	Genetics

**Molecular Biology**

BIOL 200	(3)	Molecular Biology
LSCI 211	(3)	Biochemistry 1

**Statistics**

One of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

AEMA 310	(3)	Statistical Methods 1
MATH 203	(3)	Principles of Statistics 1

### Nutrition

\* Note: NUTR 307 - Video conference Downtown and at the Macdonald campus.

ANSC 330	(3)	Fundamentals of Nutrition
NUTR 307*	(3)	Human Nutrition

### Human Health:

12 credits chosen from Human Health, maximum of 3 credits from any one category:

#### Immunology and Pathogenicity

MICR 341	(3)	Mechanisms of Pathogenicity
MIMM 314	(3)	Immunology
PARA 438	(3)	Immunology
PATH 300	(3)	Human Disease

#### Infectious Disease

ANSC 400	(3)	Eukaryotic Cells and Viruses
MIMM 324	(3)	Fundamental Virology
MIMM 413	(3)	Parasitology
WILD 424	(3)	Parasitology

### Nutrition

NUTR 403	(3)	Nutrition in Society
NUTR 512	(3)	Herbs, Foods and Phytochemicals

### Drugs and Hormones

ANSC 424	(3)	Metabolic Endocrinology
PHAR 300	(3)	Drug Action

### Physiology

ANSC 323	(3)	Mammalian Physiology
PHGY 209	(3)	Mammalian Physiology 1

### Natural Environment:

6 credits chosen from the Natural Environment, maximum of 3 credits from any one category:

#### Hydrology and Climate

\* Note: you may take BREE 217 or GEOG 322, but not both.

AGRI 452	(3)	Water Resources in Barbados
BREE 217*	(3)	Hydrology and Water Resources
GEOG 321	(3)	Climatic Environments
GEOG 322*	(3)	Environmental Hydrology
NRSC 510	(3)	Agricultural Micrometeorology

### Techniques and Management

BREE 322	(3)	Organic Waste Management
CHEE 230	(3)	Environmental Aspects of Technology
ENVB 437	(3)	Assessing Environmental Impact
GEOG 302	(3)	Environmental Management 1
URBP 507	(3)	Planning and Infrastructure

### Pest Management

\* Note: you may take BIOL 350 or ENTO 350, but not both.

BIOL 350*	(3)	Insect Biology and Control
ENTO 350*	(3)	Insect Biology and Control
ENTO 352	(3)	Biocontrol of Pest Insects

### Pollution Control and Management

BREE 518	(3)	Bio-Treatment of Wastes
NRSC 333	(3)	Pollution and Bioremediation

### Ecology

\* Note: you may take ENVR 540 or BIOL 540, but not both.

BIOL 432	(3)	Limnology
BIOL 465	(3)	Conservation Biology
BIOL 540*	(3)	Ecology of Species Invasions
BIOL 553	(3)	Neotropical Environments
ENVB 410	(3)	Ecosystem Ecology
ENVR 540*	(3)	Ecology of Species Invasions
MICR 331	(3)	Microbial Ecology
PLNT 304	(3)	Biology of Fungi
PLNT 460	(3)	Plant Ecology

**Revision, August 2011. End of revision.**

## 11.2.2 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Ecological Determinants of Health – Population (63 credits)

**Revision, August 2011. Start of revision.**

The Population concentration in this domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

This domain considers the interface between the environment and human well-being, with particular focus on the triad that ties human health to the environment through the elements of food and infectious agents. Each of these elements is influenced by planned and unplanned environmental disturbances. For example, agricultural practices shift the balance between beneficial and harmful ingredients of food. Use of insecticides presents dilemmas with regard to the environment,

economics, and human health. The distribution of infectious diseases is influenced by the climatic conditions that permit vectors to coexist with man, by deforestation, by urbanization, and by human interventions ranging from the building of dams to provision of potable water.

In designing interventions that aim to prevent or reduce infectious contaminants in the environment, or to improve food production and nutritional quality, not only is it important to understand methods of intervention, but also to understand social forces that influence how humans respond to such interventions.

Students in the Population concentration will gain a depth of understanding at an ecosystem level that looks at society, land, and population health. Students in the Cellular concentration will explore these interactions in more depth, at a physiological level.

### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

### Program Requirements

Note: Students are required to take a maximum of 31 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

### Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

### Core: Complementary Course - Senior Research Project (3 credits)

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

### Domain: Required Course (3 credits)

PARA 410	(3)	Environment and Infection
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### Domain: Complementary Courses (39 credits)

39 credits of complementary courses are selected as follows:

21 credits - Fundamentals, maximum of 3 credits from each category

6 credits - List A categories, maximum of 3 credits from any one category

12 credits - List B categories, maximum of 3 credits from any one category

#### Fundamentals:

21 credits of fundamentals, 3 credits from each category:

#### Health and Environment

GEOG 221	(3)	Environment and Health
NRSC 221	(3)	Environment and Health

**Health and Society**

GEOG 303	(3)	Health Geography
SOCI 234	(3)	Population and Society
SOCI 309	(3)	Health and Illness

**Toxicology**

ANSC 312	(3)	Animal Health and Disease
NUTR 420	(3)	Toxicology and Health Risks
PHAR 303	(3)	Principles of Toxicology

**Biology**

BIOL 200	(3)	Molecular Biology
BIOL 201	(3)	Cell Biology and Metabolism
LSCI 211	(3)	Biochemistry 1

**Statistics**

One of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

AEMA 310	(3)	Statistical Methods 1
MATH 203	(3)	Principles of Statistics 1

**Nutrition**

\* Note: NUTR 307 (Video conference Downtown and at the Macdonald campus)

ANSC 330	(3)	Fundamentals of Nutrition
NUTR 207	(3)	Nutrition and Health
NUTR 307*	(3)	Human Nutrition

**Advanced Ecology**

\* Note: you may take ENVR 540 or BIOL 540, but not both.

BIOL 465	(3)	Conservation Biology
BIOL 540*	(3)	Ecology of Species Invasions
BIOL 553	(3)	Neotropical Environments
ENVB 410	(3)	Ecosystem Ecology
ENVB 506	(3)	Quantitative Methods in Ecology
ENVR 540*	(3)	Ecology of Species Invasions
MICR 331	(3)	Microbial Ecology
PLNT 460	(3)	Plant Ecology

**List A:**

6 credits from the following List A categories, maximum of 3 credits from any one category:

**Hydrology, Climate, and Agriculture**

\* Note: you may take BREE 217 or GEOG 322, but not both.

AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 452	(3)	Water Resources in Barbados
AGRI 550	(3)	Sustained Tropical Agriculture
BREE 217*	(3)	Hydrology and Water Resources
GEOG 321	(3)	Climatic Environments
GEOG 322*	(3)	Environmental Hydrology
NRSC 510	(3)	Agricultural Micrometeorology

**Decision Making and Social Change**

\* Note: you may take AGECE 200 or ECON 208, but not both.

AGECE 200*	(3)	Principles of Microeconomics
AGECE 242	(3)	Management Theories and Practices
BTEC 502	(3)	Biotechnology Ethics and Society
ECON 208*	(3)	Microeconomic Analysis and Applications
EDER 461	(3)	Society and Change
GEOG 302	(3)	Environmental Management 1
GEOG 404	(3)	Environmental Management 2
PHIL 343	(3)	Biomedical Ethics
URBP 520	(3)	Globalization: Planning and Change

**Development and History**

AGRI 210	(3)	Agro-Ecological History
ANTH 212	(3)	Anthropology of Development
HIST 292	(3)	History and the Environment
SOCI 254	(3)	Development and Underdevelopment

**List B:**

12 credits from the following List B categories, maximum of 3 credits from any one category:

**Techniques and Management**

\* Note: you may take ENVB 430 or GEOG 201, but not both.

CHEE 230	(3)	Environmental Aspects of Technology
ENVB 430*	(3)	GIS for Natural Resource Management
ENVB 437	(3)	Assessing Environmental Impact
GEOG 201*	(3)	Introductory Geo-Information Science
URBP 507	(3)	Planning and Infrastructure

**Immunology and Infectious Disease**

ANSC 400	(3)	Eukaryotic Cells and Viruses
MIMM 314	(3)	Immunology

MIMM 324	(3)	Fundamental Virology
MIMM 413	(3)	Parasitology
PARA 438	(3)	Immunology
WILD 424	(3)	Parasitology

### Nutrition and Agriculture

\* Note: NUTR 512 (Video conference Downtown and at the Macdonald campus)

AGRI 411	(3)	Global Issues on Development, Food and Agriculture
NUTR 403	(3)	Nutrition in Society
NUTR 501	(3)	Nutrition in Developing Countries
NUTR 512*	(3)	Herbs, Foods and Phytochemicals

### Populations and Place

CANS 407	(3)	Regions of Canada
GEOG 300	(3)	Human Ecology in Geography
GEOG 498	(3)	Humans in Tropical Environments
PSYC 533	(3)	International Health Psychology

### Pollution and Pest Management

BIOL 350	(3)	Insect Biology and Control
BREE 322	(3)	Organic Waste Management
ENTO 352	(3)	Biocontrol of Pest Insects
NRSC 333	(3)	Pollution and Bioremediation

### Genetics

BIOL 202	(3)	Basic Genetics
LSCI 204	(3)	Genetics

Revision, August 2011. End of revision.

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## 11.3 Environmetrics Domain

This domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

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### 11.3.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Environmetrics (63 credits)

This domain (63 credits including core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. Major in Environment program.



In view of the crucial need for sound study design and appropriate statistical methods for analyzing environmental changes and their impacts on humans and various life forms and their ecological relationships, this program is intended to provide students with a strong background in the use of statistical methods of data analysis in environmental sciences.

Graduates will be capable of effectively participating in the design of environmental studies and adequately analyzing data for use by the environmental community. Accordingly, the list of courses for the Environmetrics Domain is composed primarily of statistics courses and mathematically oriented courses with biological and ecological applications. The list is completed by general courses that refine the topics introduced in the MSE core courses by focusing on the ecology of living organisms, soil sciences or water resources, and impact assessment. These courses should allow the students to understand their interlocutors and be understood by them in their future job. Students can further develop their background in applied or mathematical statistics and their expertise in environmental sciences by taking complementary courses along each of two axes: statistics and mathematics, and environmental sciences. An internship is also offered to students to provide them with preliminary professional experience.

### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" (available on the MSE website at <http://www.mcgill.ca/mse>), or contact Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

Prerequisites and equivalent courses are common with Math courses, so check with your adviser when choosing your courses. Be especially careful with Statistics courses, as you will receive no credit (and no warning!) for a course that is considered equivalent to one you have already taken. Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

Statistics courses BIOL 373 OR AEMA 310 can be taken in U1, but do not take them if you want to follow Option 1 (below), as they overlap with MATH 324.

### Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

### Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course if you want to take it on the Downtown campus, and in Section 051 of an ENVR course if you want to take it on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

### Core: Complementary Course - Senior Research Project (3 credits)

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

### Domain: Required Courses (6 credits)

AEMA 403	(3)	Environmetrics Stage
AEMA 414	(3)	Temporal and Spatial Statistics 01

### Domain - Complementary Courses (36 credits)

36 credits of complementary courses are selected as follows:

12 credits - Fundamentals

3 credits - Basic Environmental Science

6 credits - Statistics, one of two options

15 credits - List 1 and List 2

**Fundamentals:**

12 credits of Fundamentals, 3 credits from each category.

**Ecology**

BIOL 308	(3)	Ecological Dynamics
ENVB 305	(3)	Population & Community Ecology

**Impact**

ENVB 437	(3)	Assessing Environmental Impact
MIME 308	(3)	Social Impact of Technology

**Modelling**

BIOL 309	(3)	Mathematical Models in Biology
ENVB 506	(3)	Quantitative Methods in Ecology

**GIS Techniques**

ENVB 430	(3)	GIS for Natural Resource Management
GEOG 201	(3)	Introductory Geo-Information Science

**Basic Environmental Science:**

One of:

BREE 217	(3)	Hydrology and Water Resources
CIVE 323	(3)	Hydrology and Water Resources
ENVB 210	(3)	The Biophysical Environment
GEOG 305	(3)	Soils and Environment
GEOG 322	(3)	Environmental Hydrology
GEOG 350	(3)	Ecological Biogeography

**Statistics:**

6 credits of Statistics are selected from one of the following two options.

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science. Several Statistics courses overlap (especially with MATH 324) and cannot be taken together. These rules do not apply to B.Sc.(Ag.Env.Sc.) students.

**Option 1**

MATH 323	(3)	Probability
MATH 324	(3)	Statistics

**Option 2**

One of:

AEMA 310	(3)	Statistical Methods 1
BIOL 373	(3)	Biometry

And one of:

AEMA 411	(3)	Experimental Designs 01
CIVE 555	(3)	Environmental Data Analysis
GEOG 351	(3)	Quantitative Methods
SOCI 461	(3)	Quantitative Data Analysis

A total of 15 credits are chosen from the following two lists.

### List 1

3 credits minimum of statistics and mathematics chosen from:

\* Note: or equivalent courses to BREE 252 or BREE 319.

BIOL 434	(3)	Theoretical Ecology
BREE 252*	(3)	Computing for Engineers
BREE 319*	(3)	Engineering Mathematics
GEOG 501	(3)	Modelling Environmental Systems
MATH 223	(3)	Linear Algebra
MATH 326	(3)	Nonlinear Dynamics and Chaos
MATH 423	(3)	Regression and Analysis of Variance
MATH 447	(3)	Introduction to Stochastic Processes
MATH 525	(4)	Sampling Theory and Applications
SOCI 504	(3)	Quantitative Methods 1
SOCI 505	(3)	Quantitative Methods 2
SOCI 580	(3)	Social Research Design and Practice

### List 2

3 credits minimum of environmental sciences chosen from:

AGRI 452	(3)	Water Resources in Barbados
AGRI 550	(3)	Sustained Tropical Agriculture
BIOL 331	(3)	Ecology/Behaviour Field Course
BIOL 553	(3)	Neotropical Environments
ENVB 313	(3)	Phylogeny and Biogeography
GEOG 300	(3)	Human Ecology in Geography
GEOG 302	(3)	Environmental Management 1
GEOG 404	(3)	Environmental Management 2
GEOG 494	(3)	Urban Field Studies
GEOG 497	(3)	Ecology of Coastal Waters
GEOG 499	(3)	Subarctic Field Studies
NRSC 333	(3)	Pollution and Bioremediation
PLNT 460	(3)	Plant Ecology

WILD 401	(4)	Fisheries and Wildlife Management
WOOD 300	(3)	Urban Forests and Trees
WOOD 420	(3)	Environmental Issues: Forestry

## 11.4 Food Production and Environment Domain

This domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Caroline Begg Email: <a href="mailto:caroline.begg@mcgill.ca">caroline.begg@mcgill.ca</a> Telephone: 514-398-8749

### 11.4.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Food Production and Environment (63 credits)

#### Revision, August 2011. Start of revision.

This domain (63 credits including core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. in Environment program.

The business of food production is an area of human activity with a large and intimate interaction with the environment. Modern agriculturalists must strike a delicate balance between trying to provide food for themselves, their families, and urban dwellers and trying to minimize environmental damage. When negative effects due to agricultural activities do occur, they are not usually the classic point-source effects that we have come to associate with industry or large cities. Rather, the effects are over extremely large land areas cumulating, perhaps, in pollution of river systems or lakes some distance away. As world populations grow, and as diets change, potentially negative interactions between agricultural systems and other facets of the environment will become more frequent. In the same way, urban sprawl will make conflicts between agriculture and urbanites more common.

With a judicious choice of courses, graduates of this domain may be eligible to apply for membership in the Ordre des agronomes du Québec (OAQ) and the Agricultural Institute of Canada (AIC).

#### Program Prerequisites or Corequisites

All students in this program MUST take these pre- or corequisite courses, or their equivalents. These courses are taken as follows:

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

One of the following courses or CEGEP equivalent (e.g., CEGEP objective 00XU):

BIOL 112	(3)	Cell and Molecular Biology
LSCI 211	(3)	Biochemistry 1

One of the following courses or CEGEP equivalent (e.g., CEGEP objective 00XV):

CHEM 212	(4)	Introductory Organic Chemistry 1
FDSC 230	(4)	Organic Chemistry

#### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

#### Program Requirements

Note: Students are required to take a maximum of 34 credits at the 200 level and a minimum of 15 credits at the 400 level or higher in this program. This includes core and required courses, but does not include the domain prerequisites or corequisites listed above.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

**Core: Required Courses (18 credits)**

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Domain: Required Courses (9 credits)**

AEBI 210	(3)	Organisms 1
AGRI 210	(3)	Agro-Ecological History
PLNT 300	(3)	Cropping Systems

**Domain: Complementary Courses (33 credits)**

33 credits of complementary courses selected as follows:

15 credits - Basic Sciences

12 credits - Applied Sciences

6 credits - Social Sciences/Humanities

**Basic Sciences:**

15 credits of Basic Sciences selected as follows:

One of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

AEMA 310	(3)	Statistical Methods 1
MATH 203	(3)	Principles of Statistics 1

One of:

AGRI 340	(3)	Principles of Ecological Agriculture
ANSC 250	(3)	Principles of Animal Science

One of:

BIOL 202	(3)	Basic Genetics
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LSCI 204 (3) Genetics

One of:

ENVB 210 (3) The Biophysical Environment

GEOG 305 (3) Soils and Environment

One of:

BIOL 308 (3) Ecological Dynamics

ENVB 305 (3) Population & Community Ecology

### Applied Sciences:

12 credits of Applied Sciences from the following:

\* Note: you may take BREE 217 or GEOG 322, but not both; you may take FDSC 200 or NUTR 207, but not both.

AGRI 411 (3) Global Issues on Development, Food and Agriculture

AGRI 435 (3) Soil and Water Quality Management

AGRI 550 (3) Sustained Tropical Agriculture

BIOL 465 (3) Conservation Biology

BIOL 553 (3) Neotropical Environments

BREE 217\* (3) Hydrology and Water Resources

BREE 322 (3) Organic Waste Management

BREE 518 (3) Bio-Treatment of Wastes

ENVB 437 (3) Assessing Environmental Impact

FDSC 200\* (3) Introduction to Food Science

FDSC 535 (3) Food Biotechnology

GEOG 302 (3) Environmental Management 1

GEOG 322\* (3) Environmental Hydrology

GEOG 380 (3) Adaptive Environmental Management

MICR 331 (3) Microbial Ecology

NRSC 333 (3) Pollution and Bioremediation

NUTR 207\* (3) Nutrition and Health

NUTR 403 (3) Nutrition in Society

NUTR 420 (3) Toxicology and Health Risks

PARA 410 (3) Environment and Infection

PHAR 303 (3) Principles of Toxicology

PLNT 434 (3) Weed Biology and Control

SOIL 315 (3) Soil Fertility and Fertilizer Use

SOIL 445 (3) Agroenvironmental Fertilizer Use

SOIL 510 (3) Environmental Soil Chemistry

WILD 401 (4) Fisheries and Wildlife Management

### Social Sciences/Humanities:

6 credits in Social Sciences and Humanities are selected as follows:

\* Note: You may take AGECE 200 or ECON 208, but not both; you may take AGECE 333 or ECON 405, but not both.

\*\* Note: If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

AGECE 200*	(3)	Principles of Microeconomics
AGECE 320	(3)	Intermediate Microeconomic Theory
AGECE 333*	(3)	Resource Economics
AGECE 430	(3)	Agriculture, Food and Resource Policy
AGECE 442	(3)	Economics of International Agricultural Development
ANTH 418	(3)	Environment and Development
ECON 208*	(3)	Microeconomic Analysis and Applications
ECON 225	(3)	Economics of the Environment
ECON 405*	(3)	Natural Resource Economics
ENVR 465	(3)	Environment and Social Change
GEOG 404	(3)	Environmental Management 2
GEOG 410	(3)	Geography of Underdevelopment: Current Problems
GEOG 498	(3)	Humans in Tropical Environments
GEOG 510	(3)	Humid Tropical Environments
SOCI 254	(3)	Development and Underdevelopment
SOCI 565	(3)	Social Change in Panama
WILD 415**	(2)	Conservation Law

**Revision, August 2011. End of revision.**

## 11.5 Land Surface Processes and Environmental Change Domain

This domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Ian Strachan Email: <a href="mailto:ian.strachan@mcgill.ca">ian.strachan@mcgill.ca</a> Telephone: 514-398-7935

### 11.5.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.)-Major Environment - Land Surface Processes and Environmental Change (63 credits)

This domain (63 credits including core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. Major in Environment programs.

The thin soil layer on the planet's land surfaces controls the vital inputs of water, nutrients, and energy to terrestrial and freshwater aquatic ecosystems. Widespread occurrences around the globe of desertification, soil erosion, deforestation, and land submergence over water reservoirs indicate that this dynamic system is under increasing pressure from population growth and changes in climate and land uses. Production of key greenhouse gases (water vapour, CO<sub>2</sub>, and methane) is controlled by complex processes operating at the land surface, involving climate change feedbacks that need to be fully understood, given current global warming trends.

The program introduces students to the interacting physical and biogeochemical processes at the atmosphere-lithosphere interface, which fashion land surface habitats and determine their biological productivity and response to anthropogenic or natural environmental changes. Through an appropriate selection of courses, students can prepare for graduate training in emerging research areas such as earth system sciences, environmental hydrology, and landscape ecology.

#### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

**Program Requirements**

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

**Core: Required Courses (18 credits)**

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Domain Required Course (3 credits)**

GEOG 203	(3)	Environmental Systems
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**Domain: Complementary Courses (39 credits)**

39 credits of complementary courses are selected as follows:

9 credits - 3 credits from each category of Statistics, GIS and Remote Sensing Techniques, Weather and Climate

9 credits of fundamental land surface processes

3 credits of environment and resource management

3 credits of field course

3 credits of social science

12 credits total of advanced studies chosen from the List A: Particular Environments and the List B: Surface Processes

**Statistics**

One of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

AEMA 310	(3)	Statistical Methods 1
GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1

**GIS and Remote Sensing Techniques**

One of:

ENVB 430	(3)	GIS for Natural Resource Management
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GEOG 201	(3)	Introductory Geo-Information Science
GEOG 308	(3)	Principles of Remote Sensing

**Weather and Climate**

One of:

ATOC 215	(3)	Oceans, Weather and Climate
ENVB 301	(3)	Meteorology

**Fundamental Land Surface Processes:**

9 credits of fundamental land surface processes chosen as follows:

GEOG 321	(3)	Climatic Environments
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And/or one of:

GEOG 272	(3)	Earth's Changing Surface
SOIL 300	(3)	Geosystems

And/or one of:

GEOG 305	(3)	Soils and Environment
SOIL 326	(3)	Soils in a Changing Environment

And/or one of:

BREE 217	(3)	Hydrology and Water Resources
GEOG 322	(3)	Environmental Hydrology

**Environment and Resource Management:**

One of:

\* Note: you may take BIOL 308 or ENVB 305, but not both.

AGRI 435	(3)	Soil and Water Quality Management
AGRI 452	(3)	Water Resources in Barbados
AGRI 550	(3)	Sustained Tropical Agriculture
BIOL 308*	(3)	Ecological Dynamics
BIOL 465	(3)	Conservation Biology
CHEE 230	(3)	Environmental Aspects of Technology
CIVE 225	(4)	Environmental Engineering
ENVB 305*	(3)	Population & Community Ecology
ENVB 437	(3)	Assessing Environmental Impact
ESYS 301	(3)	Earth System Modelling
GEOG 302	(3)	Environmental Management 1
GEOG 380	(3)	Adaptive Environmental Management
GEOG 404	(3)	Environmental Management 2
WILD 421	(3)	Wildlife Conservation

WOOD 420	(3)	Environmental Issues: Forestry
WOOD 441	(3)	Integrated Forest Management

**Field Course:**

One of:

BIOL 553	(3)	Neotropical Environments
GEOG 495	(3)	Field Studies - Physical Geography
GEOG 496	(3)	Geographical Excursion
GEOG 499	(3)	Subarctic Field Studies
NRSC 382	(3)	Ecological Monitoring and Analysis
WILD 475	(3)	Desert Ecology

**Social Science:**

One of:

AGEC 333	(3)	Resource Economics
ANTH 339	(3)	Ecological Anthropology
ECON 225	(3)	Economics of the Environment
ECON 326	(3)	Ecological Economics
ECON 405	(3)	Natural Resource Economics
GEOG 221	(3)	Environment and Health
GEOG 408	(3)	Geography of Development
GEOG 498	(3)	Humans in Tropical Environments
GEOG 508	(3)	Resources, People and Power
NRSC 221	(3)	Environment and Health
SOCI 565	(3)	Social Change in Panama
URBP 520	(3)	Globalization: Planning and Change

12 credits total of advanced studies chosen from the following two lists:

**List A - Particular Environments:**

3-9 credits of advanced study of Particular Environments:

\* Note: you may take BIOL 432 or ENVB 315, but not both.

BIOL 432*	(3)	Limnology
ENVB 315*	(3)	Science of Inland Waters
ENVB 410	(3)	Ecosystem Ecology
GEOG 350	(3)	Ecological Biogeography
GEOG 372	(3)	Running Water Environments
GEOG 470	(3)	Wetlands
GEOG 536	(3)	Geocryology
GEOG 550	(3)	Historical Ecology Techniques
PLNT 358	(3)	Flowering Plant Diversity
PLNT 460	(3)	Plant Ecology

**List B - Surface Processes:**

3-9 credits advanced study of Surface Processes:

ATOC 315	(3)	Thermodynamics and Convection
BREE 509	(3)	Hydrologic Systems and Modelling
EPSC 549	(3)	Hydrogeology
EPSC 580	(3)	Aqueous Geochemistry
GEOG 501	(3)	Modelling Environmental Systems
GEOG 505	(3)	Global Biogeochemistry
GEOG 522	(3)	Advanced Environmental Hydrology
GEOG 537	(3)	Advanced Fluvial Geomorphology
NRSC 333	(3)	Pollution and Bioremediation
SOIL 331	(3)	Soil Physics
SOIL 510	(3)	Environmental Soil Chemistry

**11.6 Renewable Resource Management Domain**

This domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

Adviser	Mentor
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**11.6.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) – Major Environment – Renewable Resource Management (63 credits)****Revision, August 2011. Start of revision.**

This domain (63 credits including core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. Major in Environment program.

Renewable resource management is an emerging field that focuses on the ecosystem structures and processes required to sustain the delivery, to humanity, of ecosystem goods and services such as food, clean water and air, essential nutrients, and the provision of beauty and inspiration. Renewable resource management recognizes humans as integral components of ecosystems and is used to develop goals that are consistent with sustainability and ecosystem maintenance.

The Renewable Resource Management domain provides students with an understanding of: 1) the interactions between physical and biological factors that determine the nature and dynamics of populations and entities in the natural environment; 2) the ways in which ecosystems can be managed to meet specific goals for the provision of goods and services; 3) the economic and social factors that determine how ecosystems are managed; 4) the ways in which management of natural resources can affect the capability of natural ecosystems to continue to supply human needs in perpetuity; and 5) the approaches and technologies required to monitor and analyze the dynamics of natural and managed ecosystems.

**Program Prerequisites or Corequisites**

All students in this program MUST take the following pre- or corequisite courses:

One of the following biology courses or CEGEP equivalent (e.g., CEGEP objective 00XU):

BIOL 112	(3)	Cell and Molecular Biology
LSCI 211	(3)	Biochemistry 1

One of the following chemistry courses or CEGEP equivalent (e.g., CEGEP objective 00XV):

CHEM 212	(4)	Introductory Organic Chemistry 1
FDSC 230	(4)	Organic Chemistry

### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

### Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses, but does not include the domain prerequisites or corequisites listed above.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

### Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

### Core: Complementary Course - Senior Research Project (3 credits)

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

### Domain: Complementary Courses (42 credits)

42 credits of complementary courses are selected as follows:

9 credits - Basic Principles of Ecosystem Processes and Diversity

6 credits - 3 credits from each category of Statistics and GIS

6 credits - Advanced Ecosystem Components

6 credits - Advanced Ecological Processes

6 credits - Social Processes

9 credits - Ecosystem Components or Management of Ecosystems

### Basic Principles of Ecosystem Processes:

9 credits of basic principles of ecosystem processes and diversity are selected as follows:

One of:

AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
BIOL 305	(3)	Animal Diversity

One of:

BIOL 308	(3)	Ecological Dynamics
ENVB 305	(3)	Population & Community Ecology

One of:

ENVB 210	(3)	The Biophysical Environment
GEOG 305	(3)	Soils and Environment

### Statistics

One of:

AEMA 310	(3)	Statistical Methods 1
BIOL 373	(3)	Biometry

### GIS Methods

One of:

ENVB 430	(3)	GIS for Natural Resource Management
GEOG 201	(3)	Introductory Geo-Information Science

### Advanced Ecosystem Components:

6 credits of advanced ecosystem components selected from:

BIOL 553	(3)	Neotropical Environments
GEOG 372	(3)	Running Water Environments
PLNT 358	(3)	Flowering Plant Diversity
SOIL 326	(3)	Soils in a Changing Environment
WILD 307	(3)	Natural History of Vertebrates

### Advanced Ecological Processes:

6 credits of advanced ecological processes selected from:

\* Note: you may take BIOL 432 or ENVB 315, but not both; you can take BREE 217 or GEOG 322, but not both.

BIOL 432*	(3)	Limnology
BIOL 465	(3)	Conservation Biology
BREE 217*	(3)	Hydrology and Water Resources
ENVB 315*	(3)	Science of Inland Waters
ENVB 410	(3)	Ecosystem Ecology
GEOG 322*	(3)	Environmental Hydrology
MICR 331	(3)	Microbial Ecology
NRSC 333	(3)	Pollution and Bioremediation
PLNT 460	(3)	Plant Ecology

### Social Processes:

6 credits of social processes selected as follows:

\* If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

\*\* Note: you may take AGECE 333 and ECON 405, but not both.

AGEC 242	(3)	Management Theories and Practices
AGEC 333**	(3)	Resource Economics
ANTH 339	(3)	Ecological Anthropology
CANS 407	(3)	Regions of Canada
ECON 405**	(3)	Natural Resource Economics
GEOG 382	(3)	Principles Earth Citizenship
GEOG 498	(3)	Humans in Tropical Environments
RELG 270	(3)	Religious Ethics and the Environment
SOCI 565	(3)	Social Change in Panama
URBP 520	(3)	Globalization: Planning and Change
WILD 415*	(2)	Conservation Law

### Ecosystem Components or Management of Ecosystems:

9 credits of ecosystem components or management of ecosystems selected from:

AGRI 435	(3)	Soil and Water Quality Management
AGRI 452	(3)	Water Resources in Barbados
AGRI 550	(3)	Sustained Tropical Agriculture
ENVB 437	(3)	Assessing Environmental Impact
GEOG 302	(3)	Environmental Management 1
GEOG 380	(3)	Adaptive Environmental Management
GEOG 404	(3)	Environmental Management 2
PLNT 300	(3)	Cropping Systems
SOIL 335	(3)	Soil Ecology and Management
WILD 401	(4)	Fisheries and Wildlife Management
WOOD 441	(3)	Integrated Forest Management

**Revision, August 2011. End of revision.**

## 11.7 Water Environments and Ecosystems Domain

This domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment programs.

### Water Environments and Ecosystems – Biological

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Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Brian Leung Email: <a href="mailto:brian.leung2@mcgill.ca">brian.leung2@mcgill.ca</a> Telephone: 514-398-6460

### Water Environments and Ecosystems – Physical

Adviser	Mentor
Ms. Kathy Roulet	Professor Nigel Roulet

Adviser	Mentor
Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Email: <a href="mailto:nigel.roulet@mcgill.ca">nigel.roulet@mcgill.ca</a> Telephone: 514-398-4945

### 11.7.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment -Water Environments and Ecosystems - Biological (60 credits)

This concentration (60 credits including core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. Major in Environment program.

To educate students in both the ecological and physical facets of the water environment, this domain offers two concentrations, with students choosing one or the other.

Those electing the Biological concentration will focus on the mechanisms regulating the different forms of life in water bodies. They will acquire, as well, a good understanding of the physical mechanisms controlling water properties. Students interested in studying the transport and transformation mechanisms of water on the planet, from rivers to the oceans and atmosphere, will select the Physical concentration. They will acquire, as well, a solid background in the biological processes taking place in water bodies.

Graduates of this domain are qualified to enter the work force or to pursue advanced studies in fields such as marine biology, geography, physical oceanography, and atmospheric science.

#### Suggested First Year (U1) Courses

For suggestions of courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

#### Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

#### Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

#### Core: Complementary Course - Senior Research Project (3 credits)

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

#### Domain: Required Courses (6 credits)

ATOC 214	(3)	Introduction: Physics of the Atmosphere
ATOC 215	(3)	Oceans, Weather and Climate

**Domain: Complementary Courses (33 credits)**

33 credits of complementary courses are selected as follows:

6 credits - Hydrology/Water Resources, Population/Community and Ecology

3 credits - Math and Statistics

3 credits - Field Course

3 credits - Social Sciences and Policy

18 credits chosen in total from List A and List B

**Hydrology/Water Resources, Population/Community and Ecology:**

6 credits selected as follows:

One of:

BREE 217	(3)	Hydrology and Water Resources
GEOG 322	(3)	Environmental Hydrology

And one of:

BIOL 308	(3)	Ecological Dynamics
ENVB 305	(3)	Population & Community Ecology

**Math and Statistics:**

One of:

\* Note: AEMA 310 or equivalent

AEMA 202	(3)	Intermediate Calculus
AEMA 310*	(3)	Statistical Methods 1
MATH 203	(3)	Principles of Statistics 1
MATH 222	(3)	Calculus 3

**Field Course:**

3 credits selected from the following courses or an equivalent Aquatic Field course:

AGRI 452	(3)	Water Resources in Barbados
BIOL 331	(3)	Ecology/Behaviour Field Course
GEOG 495	(3)	Field Studies - Physical Geography

**Social Sciences and Policy:**

One of:

AGEC 333	(3)	Resource Economics
ANTH 339	(3)	Ecological Anthropology
ANTH 418	(3)	Environment and Development
ECON 225	(3)	Economics of the Environment
ECON 326	(3)	Ecological Economics
GEOG 404	(3)	Environmental Management 2
GEOG 498	(3)	Humans in Tropical Environments



POLI 345	(3)	International Organizations
POLI 466	(3)	Public Policy Analysis
SOCI 565	(3)	Social Change in Panama
URBP 520	(3)	Globalization: Planning and Change

18 credits chosen in total from List A and List B as follows:

**List A**

9-12 credits chosen from:

\* Note: you may take BIOL 540 or ENVR 540, but not both; you may take ENVB 210 or GEOG 305, but not both; you may take BIOL 432 or ENVB 315, but not both.

AGRI 435	(3)	Soil and Water Quality Management
BIOL 342	(3)	Marine Biology
BIOL 432*	(3)	Limnology
BIOL 441	(3)	Biological Oceanography
BIOL 465	(3)	Conservation Biology
BIOL 540*	(3)	Ecology of Species Invasions
BIOL 553	(3)	Neotropical Environments
BIOL 570	(3)	Advanced Seminar in Evolution
ENTO 535	(3)	Aquatic Entomology
ENVB 210*	(3)	The Biophysical Environment
ENVB 315*	(3)	Science of Inland Waters
ENVR 540*	(3)	Ecology of Species Invasions
GEOG 305*	(3)	Soils and Environment
GEOG 350	(3)	Ecological Biogeography
MICR 331	(3)	Microbial Ecology
NRSC 333	(3)	Pollution and Bioremediation
PARA 410	(3)	Environment and Infection
WILD 401	(4)	Fisheries and Wildlife Management

**List B**

6-9 credits chosen from:

\* Note: you may take ATOC 219 or CHEM 219, but not both; you may take ATOC 419 or CHEM 419, but not both; you may take ENVB 430 or GEOG 201, but not both; CHEM 287 and CHEM 297 must be taken together.

ATOC 219*	(3)	Introduction to Atmospheric Chemistry
ATOC 419*	(3)	Advances in Chemistry of Atmosphere
CHEM 219*	(3)	Introduction to Atmospheric Chemistry
CHEM 287*	(2)	Introductory Analytical Chemistry
CHEM 297*	(1)	Introductory Analytical Chemistry Laboratory
CHEM 419*	(3)	Advances in Chemistry of Atmosphere
ENVB 430*	(3)	GIS for Natural Resource Management
EPSC 220	(3)	Principles of Geochemistry
GEOG 201*	(3)	Introductory Geo-Information Science
GEOG 308	(3)	Principles of Remote Sensing

GEOG 372	(3)	Running Water Environments
GEOG 522	(3)	Advanced Environmental Hydrology
GEOG 537	(3)	Advanced Fluvial Geomorphology
GEOG 550	(3)	Historical Ecology Techniques

### 11.7.2 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Water Environments and Ecosystems - Physical (63 credits)

This concentration (60 credits including core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. Major in Environment program.

To educate students in both the ecological and physical facets of the water environment, this domain offers two concentrations, with students choosing one or the other.

Students interested in studying the transport and transformation mechanisms of water on the planet, from rivers to the oceans and atmosphere, will select the Physical concentration. They will acquire, as well, a solid background in the biological processes taking place in water bodies. Those electing the Biological concentration will focus on the mechanisms regulating the different forms of life in water bodies. They will acquire, as well, a good understanding of the physical mechanisms controlling water properties.

Graduates of this domain are qualified to enter the work force or to pursue advanced studies in fields such as marine biology, geography, physical oceanography and atmospheric science.

#### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Ms. Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

#### Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

#### Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

#### Core: Complementary Course - Senior Research Project (3 credits)

Note: Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

#### Domain: Required Courses (12 credits)

ATOC 214	(3)	Introduction: Physics of the Atmosphere
ATOC 215	(3)	Oceans, Weather and Climate

ATOC 315	(3)	Thermodynamics and Convection
GEOG 372	(3)	Running Water Environments

**Domain: Complementary Courses (30 credits)**

30 credits of complementary courses are selected as follows:

6 credits - Hydrology/Water Resources, Population, Community and Ecology

3 credits - Statistics or Calculus

3 credits - Field course

12 credits chosen from List A

6 credits chosen from List B

**Hydrology/Water Resources, Population/Community and Ecology**

6 credits selected as follows:

One of:

BREE 217	(3)	Hydrology and Water Resources
GEOG 322	(3)	Environmental Hydrology

And one of:

BIOL 308	(3)	Ecological Dynamics
ENVB 305	(3)	Population & Community Ecology

**Statistics or Calculus:**

One of:

\* Note: AEMA 310 or equivalent.

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

AEMA 202	(3)	Intermediate Calculus
AEMA 310*	(3)	Statistical Methods 1
MATH 203	(3)	Principles of Statistics 1
MATH 222	(3)	Calculus 3

**Field Course:**

3 credits selected from the following courses or an equivalent Aquatic Field course:

AGRI 452	(3)	Water Resources in Barbados
GEOG 495	(3)	Field Studies - Physical Geography

**List A:**

12 credits chosen from:

AGRI 435	(3)	Soil and Water Quality Management
ATOC 309	(3)	Weather Radars and Satellites
ATOC 568	(3)	Ocean Physics
BREE 416	(3)	Engineering for Land Development

CIVE 323	(3)	Hydrology and Water Resources
EPSC 549	(3)	Hydrogeology
GEOG 201	(3)	Introductory Geo-Information Science
GEOG 308	(3)	Principles of Remote Sensing
GEOG 537	(3)	Advanced Fluvial Geomorphology
NRSC 510	(3)	Agricultural Micrometeorology
URBP 520	(3)	Globalization: Planning and Change

And/or one of:

AEMA 305	(3)	Differential Equations
MATH 315	(3)	Ordinary Differential Equations

And/or one of:

BREE 506	(3)	Advances in Drainage Management
BREE 509	(3)	Hydrologic Systems and Modelling
GEOG 522	(3)	Advanced Environmental Hydrology

And/or one of:

ENVB 210	(3)	The Biophysical Environment
GEOG 305	(3)	Soils and Environment

And/or one of:

ENVB 430	(3)	GIS for Natural Resource Management
GEOG 306	(3)	Raster Geo-Information Science

**List B:**

6 credits chosen from:

\* Note: you can take BIOL 432 or ENVB 315, but not both.

BIOL 342	(3)	Marine Biology
BIOL 432*	(3)	Limnology
BIOL 441	(3)	Biological Oceanography
BIOL 465	(3)	Conservation Biology
BIOL 553	(3)	Neotropical Environments
ENVB 315*	(3)	Science of Inland Waters
GEOG 350	(3)	Ecological Biogeography
GEOG 505	(3)	Global Biogeochemistry
WILD 401	(4)	Fisheries and Wildlife Management

## 12 Major in Environment – B.Sc.

In addition to the domains available to students in the Major program in either the Faculty of Science or the Faculty of Agricultural and Environmental Sciences, “Major in Environment - B.Sc.” students in the Faculty of Science can choose from one of the following two domains:

- Atmospheric Environment and Air Quality, or
- Earth Sciences and Economics.

Refer to [section 11: Major in Environment – B.Sc.\(Ag.Env.Sc.\) and B.Sc.](#) for the general guidelines and regulations, which apply to all domains in the Major in Environment program.

### 12.1 Atmospheric Environment and Air Quality Domain

This domain is open only to students in the B.Sc. Major in Environment program in the Faculty of Science.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Frédéric Fabry Email: <a href="mailto:frederic.fabry@mcgill.ca">frederic.fabry@mcgill.ca</a> Telephone: 514-398-3652

#### 12.1.1 Bachelor of Science (B.Sc.) - Major Environment - Atmospheric Environment and Air Quality (60 credits)

The rapid expansion of industrialization has been accompanied by a host of environmental problems, many, if not most, involving the atmosphere. Some problems are of a local nature, such as air pollution in large urban centres, while others are global, or at least reach areas far removed from industrial activities.

The emphasis in this domain is on the mechanisms of atmospheric flow and on atmospheric chemistry. Courses examine how the atmosphere transports pollution, lifting it to great heights into the stratosphere or keeping it trapped near the ground, moving it around the globe or imprisoning it locally, or how it simply cleanses itself of the pollution through rainfall. The domain also gives students the training required to understand the important chemical reactions taking place within the atmosphere, as well as the know-how necessary to measure and analyze atmospheric constituents.

#### Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>).

#### Program Requirements

Note: Students are required to take a maximum of 31 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

#### Core: Required Courses

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Domain: Required Courses (18 credits)**

18 credits are selected from:

\* Note: you may take ATOC 219 or CHEM 219, but not both.

ATOC 214	(3)	Introduction: Physics of the Atmosphere
ATOC 215	(3)	Oceans, Weather and Climate
ATOC 219*	(3)	Introduction to Atmospheric Chemistry
ATOC 315	(3)	Thermodynamics and Convection
CHEM 219*	(3)	Introduction to Atmospheric Chemistry
CHEM 307	(3)	Analytical Chemistry of Pollutants
GEOG 308	(3)	Principles of Remote Sensing

**Domain: Complementary Courses (21 credits)**

21 credits of complementary courses are selected as follows:

6 credits - Analytical Chemistry/Calculus courses

3 credits - Statistics

9 credits - Math or Physical Science

3 credits - Social Science

**Analytical Chemistry/Calculus:**

One of:

AEMA 202	(3)	Intermediate Calculus
MATH 222	(3)	Calculus 3

and 3 credits from:

Note: CHEM 287 and CHEM 297 must be taken together.

CHEM 287	(2)	Introductory Analytical Chemistry
CHEM 297	(1)	Introductory Analytical Chemistry Laboratory
FDSC 213	(3)	Analytical Chemistry 1

**Statistics:**

3 credits of Statistics courses or equivalent from:

AEMA 310	(3)	Statistical Methods 1
MATH 203	(3)	Principles of Statistics 1

**Math or Physical Science:**

9 credits of Math or Physical Science (at least 6 credits of which are at the 300 level or above):

\* Note: you may take ATOC 419 or CHEM 419, but not both; you may take AEMA 305 or MATH 315, but not both.

AEMA 305*	(3)	Differential Equations
ATOC 309	(3)	Weather Radars and Satellites
ATOC 412	(3)	Atmospheric Dynamics
ATOC 419*	(3)	Advances in Chemistry of Atmosphere
ATOC 540	(3)	Synoptic Meteorology 1
CHEE 230	(3)	Environmental Aspects of Technology
CHEM 243	(2)	Introductory Physical Chemistry 2
CHEM 377	(3)	Instrumental Analysis 2
CHEM 419*	(3)	Advances in Chemistry of Atmosphere
CIVE 225	(4)	Environmental Engineering
COMP 208	(3)	Computers in Engineering
GEOG 505	(3)	Global Biogeochemistry
MATH 223	(3)	Linear Algebra
MATH 315*	(3)	Ordinary Differential Equations
NRSC 333	(3)	Pollution and Bioremediation
NRSC 510	(3)	Agricultural Micrometeorology

#### Social Science:

One of:

ANTH 206	(3)	Environment and Culture
ANTH 418	(3)	Environment and Development
ECON 225	(3)	Economics of the Environment
ECON 347	(3)	Economics of Climate Change
ENVR 465	(3)	Environment and Social Change
GEOG 302	(3)	Environmental Management 1
GEOG 380	(3)	Adaptive Environmental Management
GEOG 404	(3)	Environmental Management 2
GEOG 498	(3)	Humans in Tropical Environments
POLI 466	(3)	Public Policy Analysis
RELG 270	(3)	Religious Ethics and the Environment

## 12.2 Earth Sciences and Economics Domain

This domain is open only to students in the B.Sc. Major Environment program in the Faculty of Science.

Adviser	Mentor
Ms. Kathy Roulet Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a> Telephone: 514-398-4306	Professor Jeanne Paquette Email: <a href="mailto:jeanne.paquette@mcgill.ca">jeanne.paquette@mcgill.ca</a> Telephone: 514-398-4402

**12.2.1 Bachelor of Science (B.Sc.) – Major Environment – Earth Sciences and Economics (66 credits)****Revision, August 2011. Start of revision.**

The resources necessary for human society are extracted from the Earth, used as raw materials in our factories and refineries, and then returned to the Earth as waste. Geological processes produce resources humans depend on, and they also determine the fate of wastes in the environment. Understanding Earth's geologic processes provides us with the knowledge to mitigate many of our society's environmental impacts due to resource extraction and waste disposal. Additionally, economics frequently affects what energy sources power our society and how our wastes are treated. Earth sciences and economics are essential for our understanding of the many mechanisms, both physical and social, that affect Earth's environment.

This domain includes the fundamentals of each discipline. Students learn of minerals, rocks, soils, and waters and how these materials interact with each other and with the atmosphere. Fundamental economic theory and the economic effects of public policy toward resource industries, methods of waste disposal, and the potential effects of global warming on the global economy are also explored.

**Suggested First Year (U1) Courses**

For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook 2011-2012" available on the MSE website (<http://www.mcgill.ca/mse>), or contact Kathy Roulet, the Program Adviser ([kathy.roulet@mcgill.ca](mailto:kathy.roulet@mcgill.ca)).

**Program Requirements**

Note: Students are required to take a maximum of 34 credits at the 200 level and a minimum of 15 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

**Core: Required Courses (18 credits)**

Location Note: Core required courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

**Core: Complementary Course - Senior Research Project (3 credits)**

Only 3 credits will be applied to the program; extra credits will count as electives.

AGRI 519	(6)	Sustainable Development Plans
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama

**Domain: Required Courses (21 credits)**

ECON 230D1	(3)	Microeconomic Theory
ECON 230D2	(3)	Microeconomic Theory
ECON 405	(3)	Natural Resource Economics
EPSC 210	(3)	Introductory Mineralogy
EPSC 212	(3)	Introductory Petrology
EPSC 220	(3)	Principles of Geochemistry
EPSC 455	(3)	Sedimentary Geology

**Domain: Complementary Courses (24 credits)**



24 credits of complementary courses are selected as follows:

3 credits - Statistics courses

9 credits - List A

12 credits - List B

**Statistics:**

One of the following Statistics courses or equivalent.

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

AEMA 310	(3)	Statistical Methods 1
GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1

**List A:**

9 credits from:

AGEC 333	(3)	Resource Economics
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 416	(3)	Topics in Economic Development 2
ECON 525	(3)	Project Analysis
ENVB 437	(3)	Assessing Environmental Impact

**List B:**

12 credits from:

AGRI 435	(3)	Soil and Water Quality Management
ANTH 339	(3)	Ecological Anthropology
BIOL 305	(3)	Animal Diversity
BIOL 553	(3)	Neotropical Environments
ECON 305	(3)	Industrial Organization
ECON 313	(3)	Economic Development 1
ECON 314	(3)	Economic Development 2
ECON 408	(3)	Public Sector Economics 1
ECON 409	(3)	Public Sector Economics 2
ECON 412	(3)	Topics in Economic Development 1
EPSC 312	(3)	Spectroscopy of Minerals
EPSC 331	(3)	Field School 2
EPSC 341	(3)	Field School 3
EPSC 425	(3)	Sediments to Sequences
EPSC 435	(3)	Applied Geophysics
EPSC 452	(3)	Mineral Deposits
EPSC 519	(3)	Isotope Geology
EPSC 542	(3)	Chemical Oceanography
EPSC 549	(3)	Hydrogeology
EPSC 580	(3)	Aqueous Geochemistry

EPSC 590	(3)	Applied Geochemistry Seminar
GEOG 302	(3)	Environmental Management 1
GEOG 322	(3)	Environmental Hydrology
SOIL 510	(3)	Environmental Soil Chemistry

**Revision, August 2011. End of revision.**

## 13 Honours Program in Environment

### Adviser

Ms. Kathy Roulet, MSE Program Adviser  
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 Telephone: 514-398-4306

This Program is open only to students in the B.Sc. Major in Environment, B.Sc.(Ag.Env.Sc.) Major in Environment, B.A. Faculty Program in Environment, and the B.A. & Sc. Interfaculty Program in Environment.

The Honours Program in Environment offers students the opportunity to undertake a year-long research project in close association with a professor. Honours research provides excellent preparation for graduate studies, but is not required for such studies. The Honours in Environment **adds 6 credits of research to the regular Environment program**. Since the Honours research is carried out in the final year at the same time as the regular courses, it does not add to the length (duration) of the degree. Students simply have 6 fewer credits of electives. If, for some reason, students cannot complete the Honours requirements, they may still graduate with the regular Environment program.

### 13.1 Bachelor of Arts (B.A.) - Honours Environment (60 credits)

This program is open only to students in the B.A. Faculty Program Environment. To be eligible for Honours, students must satisfy the requirements set by their B.A. degree.

In addition, students must satisfy the following:

1. Students apply for the Honours program in March of their U2 year. See the Program Adviser for details.
2. Applicants must have a minimum Program GPA (GPA of all required and complementary courses for the program in Environment taken at McGill) of 3.3 to enter the Honours program.
3. Students must earn a B grade (3.0) or higher for the Honours Research course (ENVR 495).
4. Students are required to achieve a minimum overall CGPA of 3.0 at graduation, and a minimum Program GPA of 3.3 to obtain Honours.
5. Arts (B.A.) students in the Honours Environment program must also complete a minor concentration in an academic unit other than the McGill School of Environment. Please refer to the Faculty of Arts regulations on Honours programs found under "Faculty Degree Requirements", "About Program Requirements" and "Departmental Programs".

Students in the B.A. Honours programs complete the core and domain courses (54 credits) according to their chosen domain as well as the 6 credits of Honours required courses.

At the completion of your Honours research, you are expected to present your results at an Honours Symposium, and are required to submit a copy of your final report to the MSE Program Adviser.

#### Honours Required Courses (6 credits)

Note: you take either ENVR 495D1 and ENVR 495D2 (6 credits over consecutive terms) or ENVR 495N1 and ENVR 495N2 (6 credits over non-consecutive terms).

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

### 13.2 Bachelor of Science (B.Sc.) - Honours Environment (72 credits)

This program is open only to students in the B.Sc. Major Environment. To be eligible for Honours, students must satisfy the requirements set by their B.Sc. degree.

In addition, students must satisfy the following:

1. Students apply for the Honours program in March of their U2 year. See the Program Adviser for details.
2. Applicants must have a minimum Program GPA (GPA of all required and complementary courses for the program in Environment taken at McGill) of 3.3 to enter the Honours program.
3. Students must earn a B grade (3.0) or higher for the Honours Research course (ENVR 495).
4. Students are required to achieve a minimum overall CGPA of 3.0 at graduation, and a minimum Program GPA of 3.3 to obtain Honours.

Students in the B.Sc. Honours programs complete the core and domain courses (60 to 66 credits) according to their chosen domain as well as the 6 credits of Honours required courses.

At the completion of your Honours research, you are expected to present your results at an Honours Symposium, and are required to submit a copy of your final report to the MSE Program Adviser.

#### Honours Required Courses (6 credits)

Note: you take either ENVR 495D1 and ENVR 495D2 (6 credits over consecutive terms) or ENVR 495N1 and ENVR 495N2 (6 credits over non-consecutive terms).

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

### 13.3 Bachelor of Arts and Science (B.A. & Sc.) - Honours Environment (60 credits)

This program is open only to students in the B.A. & Sc. Interfaculty Program Environment.

To be eligible for Honours, students must satisfy the requirements set by their B.A. & Sc. degree.

In addition, students must satisfy the following:

1. Students apply for the Honours program in March of their U2 year. See the Program Adviser for details.
2. Applicants must have a minimum Program GPA (GPA of all required and complementary courses for the program in Environment taken at McGill) of 3.3 to enter the Honours program.
3. Students must earn a B grade (3.0) or higher for the Honours Research course (ENVR 495).
4. Students are required to achieve a minimum overall CGPA of 3.0 at graduation, and a minimum Program GPA of 3.3 to obtain Honours.
5. B.A. & Sc. students must complete at least 30 credits in the Faculty of Arts and at least 30 in the Faculty of Science as part of their Honours program and their Minor concentration or Minor program. For a list of available Minor concentrations or Minor programs, see "Overview of Programs Offered" and "Minor Concentrations or Minors".

Students in the B.A. & Sc. Honours programs complete the coursework (54 credits) for the Interfaculty Program in Environment as well as the Honours required courses (6 credits).

At the completion of your Honours research, you are expected to present your results at an Honours Symposium, and are required to submit a copy of your final report to the MSE Program Adviser.

#### Honours Required Courses (6 credits)

Note: you take either ENVR 495D1 and ENVR 495D2 (6 credits over consecutive terms) or ENVR 495N1 and ENVR 495N2 (6 credits over non-consecutive terms).

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

### 13.4 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Environment (69 credits)

This program is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment. To be eligible for Honours, students must satisfy the requirements set by their B.Sc.(Ag.Env.Sc.) degree.

In addition, students must satisfy the following:

1. Students apply for the Honours program in March of their U2 year. See the Program Adviser for details.
2. Applicants must have a minimum Program GPA (GPA of all required and complementary courses for the program in Environment taken at McGill) of 3.3 to enter the Honours program.
3. Students must earn a B grade (3.0) or higher for the Honours Research courses (ENVR 496 and ENVR 497).
4. Students are required to achieve a minimum overall CGPA of 3.0 at graduation, and a minimum Program GPA of 3.3 to obtain Honours.

Students in the B.Sc.(Ag.Env.Sc.) Honours program complete the core and domain courses (60 to 63 credits) according to their chosen domain as well as the 6 credits of required Honours courses.

At the completion of your Honours research, you are expected to present your results at an Honours Symposium, and are required to submit a copy of your final report to the MSE Program Adviser.

#### Honours - Required Courses (6 credits)

ENVR 496	(3)	Honours Research Part 1
ENVR 497	(3)	Honours Research Part 2

## 14 Joint Honours Component Environment

**Revision, August 2011. Start of revision.**

#### Adviser

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 Telephone: 514-398-4306

This program is open only to students in the B.A. Faculty Program in Environment.

The Joint Honours Component Environment offers students the opportunity to undertake a year-long, interdisciplinary research project in their final year in close association with a professor. Honours research provides excellent preparation for graduate studies, but is not required for such studies. If, for some reason, students cannot complete the Joint Honours requirements, they may still graduate with a Minor Concentration Environment.

**Revision, August 2011. End of revision.**

### 14.1 Bachelor of Arts (B.A.) - Joint Honours Component Environment (36 credits)

**Revision, August 2011. Start of revision. New program.**

Students wishing to study at the honours level in two disciplines can combine joint honours program components in any two Arts disciplines. For a list of available joint honours programs, see "Overview of Programs Offered" and "Joint Honours Programs".

Joint Honours students should consult an adviser in each department for approval of their course selection and their interdisciplinary honours research project.

Students will enter the Joint Honours at the end of their U1 year, and will be required to maintain a PGPA of 3.30 and an overall CGPA of 3.0. Whereas the Faculty Program Environment Honours requires the student to undertake a Minor as well, the Joint Honours Environment component does not.

This program comprises 36 credits, including: Honours research (6 credits); Environment core (21 credits); statistics (3 credits); and complementary courses (6 credits).

#### Program Prerequisites or Corequisites

The program corequisites (6-8 credits), which are common to the stand-alone Environment Honours program, are in addition to the overall credit account. Students are required to complete these courses by the end of their U1 year.

3 credits of Basic Science, one of the following, or their equivalents (e.g., CEGEP objectives Biology 00UK, Chemistry 00UL, Physics 00UR):

BIOL 111	(3)	Principles: Organismal Biology
CHEM 110	(4)	General Chemistry 1
PHYS 101	(4)	Introductory Physics - Mechanics

And one of the following:

3 credits of Calculus or equivalent (e.g., CEGEP objective 00UN):

MATH 139	(4)	Calculus 1 with Precalculus
MATH 140	(3)	Calculus 1

### Required Courses (27 credits)

21 credits of Environment core courses as follows:

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought
ENVR 401	(3)	Environmental Research

And 6 credits of honours research from the following:

Note: you take either ENVR 495D1 and ENVR 495D2 (6 credits over consecutive terms) or ENVR 495N1 and ENVR 495N2 (6 credits over non-consecutive terms).

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

### Complementary Courses (9 credits)

One of the following Statistics courses or equivalent:

BIOL 373	(3)	Biometry
GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1
PSYC 204	(3)	Introduction to Psychological Statistics

And 6 credits chosen with approval of the Program Adviser, at least 3 credits of which must be at the 400 level or higher.

**Revision, August 2011. End of revision.**

## 15 Diploma in Environment

### Adviser

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### 15.1 Diploma in Environment (30 credits)

#### Revision, August 2011. Start of revision.

The Diploma in Environment is designed for students with an undergraduate degree who wish to enrich or reorient their training, supplementing their specialization with additional undergraduate-level course work in Environment.

The diploma requires 30 credits of full-time or part-time studies at McGill; it may be started in either January or September. The diploma is a one-year program if taken full-time.

Students holding a B.Sc. or a B.A. degree or equivalent in good standing will be permitted to register for the diploma through the Faculty of Agricultural and Environmental Sciences, the Faculty of Arts, or the Faculty of Science, provided they are otherwise acceptable for admission to the University.

#### Advising Note:

Consultation with the Program Adviser for approval of course selection to meet program requirements is obligatory. All courses must be at the 200 level and above, and completed with a grade of C or better.

#### Location Note:

When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

#### Required Courses (18 credits)

Location Note: The ENVR courses are offered on both campuses. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought

#### Complementary Courses (12 credits)

12 credits of complementary courses are selected as follows:

3 credits - must be taken with the approval of the Program Adviser in an area outside of the student's previous degree (e.g., those with a B.A. or equivalent degree must take at least 3 credits in the natural sciences; those with a B.Sc. or equivalent degree must take at least 3 credits in the social sciences). A list of Suggested Courses is given below.

9 credits - must be taken in an area of focus chosen by the student with the approval of the Program Adviser. At least 6 credits must be taken at the 400 level or higher. A list of Suggested Courses is given below.

#### Suggested Course List

The Suggested Course List is divided into two thematic categories: Social Sciences and Policy; and Natural Sciences and Technology.

Most courses listed at the 300 level and higher have prerequisites. You are urged to prepare your program of study with this in mind.

This list is not meant to be exhaustive. You are also encouraged to examine the course lists of the various domains in the Environment program for other courses that might interest you. Courses not on the Suggested Course List may be included in the diploma with the permission of the Program Adviser.

### Social Sciences and Policy

\* Note: If WILD 415 is taken, 1 additional credit of complementary courses must be taken.

AGEC 231	(3)	Economic Systems of Agriculture
AGEC 333	(3)	Resource Economics
AGEC 430	(3)	Agriculture, Food and Resource Policy
AGEC 442	(3)	Economics of International Agricultural Development
AGRI 210	(3)	Agro-Ecological History
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
ANTH 206	(3)	Environment and Culture
ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
ANTH 512	(3)	Political Ecology
CIVE 433	(3)	Urban Planning
ECON 205	(3)	An Introduction to Political Economy
ECON 225	(3)	Economics of the Environment
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 405	(3)	Natural Resource Economics
ENVB 437	(3)	Assessing Environmental Impact
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 400	(3)	Environmental Thought
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 210	(3)	Global Places and Peoples
GEOG 216	(3)	Geography of the World Economy
GEOG 221	(3)	Environment and Health
GEOG 300	(3)	Human Ecology in Geography
GEOG 301	(3)	Geography of Nunavut
GEOG 302	(3)	Environmental Management 1
GEOG 303	(3)	Health Geography
GEOG 370	(3)	Protected Areas
GEOG 382	(3)	Principles Earth Citizenship
GEOG 403	(3)	Global Health and Environmental Change
GEOG 408	(3)	Geography of Development
GEOG 410	(3)	Geography of Underdevelopment: Current Problems
GEOG 508	(3)	Resources, People and Power
GEOG 530	(3)	Global Land and Water Resources
GEOG 551	(3)	Environmental Decisions
MGPO 440	(3)	Strategies for Sustainability
NRSC 221	(3)	Environment and Health
NRSC 512	(3)	Water: Ethics, Law and Policy

NRSC 540	(3)	Socio-Cultural Issues in Water
PHIL 230	(3)	Introduction to Moral Philosophy 1
PHIL 237	(3)	Contemporary Moral Issues
PHIL 334	(3)	Ethical Theory
PHIL 343	(3)	Biomedical Ethics
PHIL 348	(3)	Philosophy of Law 1
POLI 211	(3)	Comparative Government and Politics
POLI 212	(3)	Government and Politics - Developed World
POLI 227	(3)	Developing Areas/Introduction
POLI 345	(3)	International Organizations
POLI 445	(3)	International Political Economy: Monetary Relations
POLI 466	(3)	Public Policy Analysis
PSYC 215	(3)	Social Psychology
RELG 270	(3)	Religious Ethics and the Environment
RELG 340	(3)	Religion and the Sciences
RELG 370	(3)	Religion and Human Rights
RELG 376	(3)	Religious Ethics
SOCI 222	(3)	Urban Sociology
SOCI 234	(3)	Population and Society
SOCI 235	(3)	Technology and Society
SOCI 254	(3)	Development and Underdevelopment
SOCI 386	(3)	Contemporary Social Movements
URBP 201	(3)	Planning the 21st Century City
URBP 506	(3)	Environmental Policy and Planning
URBP 530	(3)	Urban Environmental Planning
WILD 415*	(2)	Conservation Law

### Natural Sciences and Technology

\* Note: you may take LSCI 230 or MIMM 211, but not both; you may take BIOL 432 or ENVB 315, but not both; you may take ENVB 430 or GEOG 201, but not both; you may take BREE 217 or GEOG 322, but not both.

AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 435	(3)	Soil and Water Quality Management
ANSC 326	(3)	Fundamentals of Population Genetics
ANTH 311	(3)	Primate Behaviour and Ecology
ARCH 375	(2)	Landscape
ARCH 377	(3)	Energy, Environment and Buildings
ARCH 378	(3)	Site Usage
ATOC 215	(3)	Oceans, Weather and Climate
BIOL 240	(3)	Monteregian Flora
BIOL 305	(3)	Animal Diversity
BIOL 308	(3)	Ecological Dynamics
BIOL 310	(3)	Biodiversity and Ecosystems
BIOL 342	(3)	Marine Biology



BIOL 418	(3)	Freshwater Invertebrate Ecology
BIOL 432*	(3)	Limnology
BIOL 436	(3)	Evolution and Society
BIOL 465	(3)	Conservation Biology
BREE 217*	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 518	(3)	Bio-Treatment of Wastes
BTEC 502	(3)	Biotechnology Ethics and Society
CHEE 230	(3)	Environmental Aspects of Technology
CHEM 212	(4)	Introductory Organic Chemistry 1
CHEM 281	(3)	Inorganic Chemistry 1
CHEM 462	(3)	Green Chemistry
CIVE 225	(4)	Environmental Engineering
CIVE 323	(3)	Hydrology and Water Resources
CIVE 550	(3)	Water Resources Management
ENTO 340	(3)	Field Entomology
ENVB 210	(3)	The Biophysical Environment
ENVB 301	(3)	Meteorology
ENVB 305	(3)	Population & Community Ecology
ENVB 315*	(3)	Science of Inland Waters
ENVB 410	(3)	Ecosystem Ecology
ENVB 415	(3)	Ecosystem Management
ENVB 430*	(3)	GIS for Natural Resource Management
ENVR 200	(3)	The Global Environment
ENVR 202	(3)	The Evolving Earth
EPSC 201	(3)	Understanding Planet Earth
EPSC 233	(3)	Earth and Life History
EPSC 425	(3)	Sediments to Sequences
EPSC 549	(3)	Hydrogeology
ESYS 301	(3)	Earth System Modelling
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 201*	(3)	Introductory Geo-Information Science
GEOG 205	(3)	Global Change: Past, Present and Future
GEOG 272	(3)	Earth's Changing Surface
GEOG 308	(3)	Principles of Remote Sensing
GEOG 321	(3)	Climatic Environments
GEOG 322*	(3)	Environmental Hydrology
GEOG 372	(3)	Running Water Environments
GEOG 470	(3)	Wetlands
LSCI 230*	(3)	Introductory Microbiology
MICR 331	(3)	Microbial Ecology
MIME 308	(3)	Social Impact of Technology
MIME 320	(3)	Extraction of Energy Resources

MIMM 211*	(3)	Introductory Microbiology
MIMM 314	(3)	Immunology
MIMM 323	(3)	Microbial Physiology
MIMM 324	(3)	Fundamental Virology
NRSC 333	(3)	Pollution and Bioremediation
NRSC 340	(3)	Global Perspectives on Food
NRSC 384	(3)	Field Research Project
NRSC 510	(3)	Agricultural Micrometeorology
NRSC 514	(3)	Freshwater Ecosystems
PARA 410	(3)	Environment and Infection
PARA 515	(3)	Water, Health and Sanitation
PLNT 304	(3)	Biology of Fungi
PLNT 305	(3)	Plant Pathology
PLNT 358	(3)	Flowering Plant Diversity
PLNT 426	(3)	Plant Ecophysiology
PLNT 460	(3)	Plant Ecology
SOIL 300	(3)	Geosystems
WILD 421	(3)	Wildlife Conservation

**Revision, August 2011. End of revision.**

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## 16 Field Studies

Field study semesters are available in Africa, Barbados, and Panama. See *Field Studies and Study Abroad*. > *Field Study Semesters and Off-Campus Courses* in this publication for details.