



**McGill School of Environment**  
**Programs, Courses and University Regulations**  
**2013-2014**



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## *Publication Information*

Published by

### **Enrolment Services**

McGill University  
3415 McTavish Street  
Montreal, Quebec, H3A 0C8  
Canada

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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.

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## 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

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## 3 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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### 3.1 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  
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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

### 3.2 Administrative Officers

#### Administrative Officers

Chandra Madramootoo; B.Sc.(Agr.Eng.), M.Sc., Ph.D.(McG.)	<b>Dean, Faculty of Agricultural and Environmental Sciences</b>
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>
Sylvie de Blois; B.Sc.(Agr.)(McG.), M.Sc., Ph.D.(Montr.)	<b>Associate Director, Graduate Affairs</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>

### 3.3 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*)  
 Elena Bennett; B.A.(Oberlin), M.Sc., Ph.D.(Wisc.) (*joint appt. with Natural Resource Sciences*)  
 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.(Bom.), 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*)  
 Ismael Vaccaro; B.A.(Barcelona), D.E.A.(Paris), M.A., Ph.D.(Wash.) (*joint appt. with Anthropology*)

#### Assistant Professors

Christopher Barrington-Leigh; B.Sc.(MIT), Ph.D.(Stan.), Ph.D.(Br.Col.) (*joint appt. with Institute for Health and Social Policy*)  
 Jeffrey Cardille; B.Sc.(Carn.Mell), M.Sc.(Georgia Tech.), 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.)



**Faculty Lecturers**

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

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

**Associate Members**

Agricultural Economics: Paul Thomassin

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

Bioresource Engineering: Jan Adamowski, Grant Clark, Mark Lefsrud, Chandra Madramootoo

Chemical Engineering: Nathalie Tufenkji, Viviane Yargeau

Civil Engineering and Applied Mechanics: Susan Gaskin, Marianne Hatzopoulou, 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

History and Classical Studies: Daviken Studnicki-Gizbert

Languages, Literatures, and Cultures: Stephanie Posthumus

Law, Faculty of: Armand De Mestral, Jane Glenn, Richard Gold, Richard Janda, Hoi Kong

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

Natural Resource Sciences: Benoit Côté, Christopher Buddle, Jim W. Fyles, William Hendershot, Gordon Hickey, Chris Solomon, Ian Strachan, 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

Urban Planning, School of: Nik Luka

**Adjunct Professors**

Thomas Dietz; B.G.S.(Kent State Univ.), Ph.D.(Calif.-Davis)

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

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

Katia Opalka; B.A., LL.B./B.C.L.(McG.)

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## 4 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:

## Admission, Registration, and Regulations

*section 4.1: Admission*

*section 4.2: Degree Requirements*

*section 4.3: Advising in the MSE*

*section 4.4: Important Information about Program Selection*

*section 4.5: Course Numbering System at McGill*

*section 4.6: Examination Regulations*

*section 4.7: Courses Outside the Student's Faculty*

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### 4.1 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 Do

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## 4.5 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. For more information, see *Programs, Courses and University Regulations > University Regulations and Resources > Undergraduate > Registration > : Course Information and Regulations*.

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## 4.6 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.

For more information on the University regulations and procedures, see *Programs, Courses and University Regulations > University Regulations and Resources > Undergraduate > : Examinations: General Information*.

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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
BREE 503	(3)	Water: Society, Law and Policy
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



WILD 415\*

(2)

Conservation Law

**Natural Sciences and Technology**

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)	Intermediate 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 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

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

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 about 43% of the Program

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 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 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

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 (3)BREE 217* OrgOceans,

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 214	(3)	Introductory Immunology: Elements of Immunity
MIMM 323	(3)	Microbial Physiology
MIMM 324	(3)	Fundamental Virology
NRSC 333	(3)	Pollution and Bioremediation
NRSC 340	(3)	Global Perspectives on Food
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

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## 8 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:

**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 2012-2013" 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 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.

AEBI 427	(6)	Barbados Interdisciplinary Project
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
GEOG 493	(3)	Health and Environment in Africa
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**

EDKP 292	(3)	Nutrition and Wellness
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 Ov

GEOG 321	(3)	Climatic Environments
GEOG 322*	(3)	Environmental Hydrology
NRSC 510	(3)	Agricultural Micrometeorology

### **Agriculture**

AEBI 425	(3)	Tropical Energy and Food
AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
AGRI 550	(3)	Sustained Tropical 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
RELG 270	(3)	Religious Ethics and the Environment
URBP 507	(3)	Planning and Infrastructure

### **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

### **Development and Ecology**

ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
ANTH 512	(3)	Political Ecology
GEOG 300	(3)	Human Ecology in Geography
GEOG 310	(3)	Development and Livelihoods
SOCI 254	(3)	Development and Underdevelopment
SOCI 365	(3)	Health and Development



AEBI 421	(3)	Tropical Horticultural Ecology
BIOL 451	(3)	Research in Ecology and Development in Africa
BIOL 465*	(3)	Conservation Biology
BIOL 553	(3)	Neotropical Environments
ENVB 410	(3)	Ecosystem Ecology
NRSC 451	(3)	Research in Ecology and Development In Africa
WILD 421*	(3)	Wildlife Conservation

### **Pest Management**

BIOL 350	(3)	Insect Biology and Control
ENTO 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.

AEBI 423	(3)	Sustainable Land Use
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 404	(3)	Environmental Management 2
PARA 515	(3)	Water, Health and Sanitation

### **Social Change**

GEOG 406	(3)	Human Dimensions of Climate Change
GEOG 514	(3)	Climate Change Vulnerability and Adaptation
HIST 249	(3)	Health and the Healer in Western History
SOCI 307	(3)	Sociology of Globalization
URBP 520	(3)	Globalization: Planning and Change

### **Immunology and Infectious Disease**

MIMM 314	(3)	Intermediate Immunology
MIMM 323t91I93gy	(3)	Fundamental Virology

GEOG 451	(3)	Research in Society and Development in Africa
GEOG 498	(3)	Humans in Tropical Environments
HIST 335	(3)	Science and Medicine in Canada
HIST 510	(3)	Environmental History of Latin America (Field)
PSYC 533	(3)	International Health Psychology
SOCI 520	(3)	Migration and Immigrant Groups
SOCI 525	(3)	Health Care Systems in Comparative Perspective

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For suggestions on courses to take in your first year (U1), you can consult the "MSE Student Handbook" 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)).

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: You can take BREE 217 or GEOG 322 but not both; you can take ENVB 305 or BIOL 308 but not both.

AEBI 423	(3)	Sustainable Land Use
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
ANTH 451	(3)	Research in Society and Development in Africa
BIOL 305	(3)	Animal Diversity
BIOL 308*	(3)	Ecological Dynamics
BIOL 451	(3)	Research in Ecology and Development in Africa
BREE 217*	(3)	Hydrology and Water Resources
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
ENVB 305*	(3)	Population & Community Ecology
ENVB 437	(3)	Assessing Environmental Impact
EPSC 355	(3)	Sedimentary Geology
EPSC 549	(3)	Hydrogeology
GEOG 302	(3)	Environmental Management 1
GEOG 322*	(3)	Environmental Hydrology
GEOG 404	(3)	Environmental Management 2
GEOG 451*	(3)	Research in Society and Development in Africa
GEOG 498	(3)	Humans in Tropical Environments
HIST 510	(3)	Environmental History of Latin America (Field)
NRSC 451	(3)	Research in Ecology and Development In Africa
SOIL 510	(3)	Environmental Soil Chemistry
URBP 507	(3)	Planning and Infrastructure
URBP 520	(3)	Globalization: Planning and Change

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**8.3 Environment and Development Domain**

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

**Adviser**

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

**Mentor**

Prof. Gregory Mikkelson  
Telephone: 514-398-4583  
Email: [gregory.mikkelson@mcgill.ca](mailto:gregory.mikkelson@mcgill.ca)

**8.3.1 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**

To graduate from the Faculty Program in Environment, students are required to complete these courses by the end of their U1 year. These courses can be taken using the Satisfactory/Unsatisfactory option. See: [http://www.mcgill.ca/study/university\\_regulations\\_and\\_resources/undergraduate/gi\\_courses\\_taken\\_under\\_the\\_satisfactory\\_unsatisfactory\\_option](http://www.mcgill.ca/study/university_regulations_and_resources/undergraduate/gi_courses_taken_under_the_satisfactory_unsatisfactory_option) for details.

**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 2012-2013" 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 tak

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

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

AEBI 427	(6)	Barbados Interdisciplinary Project
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 categories 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
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
GEOG 310	(3)	Development and Livelihoods
GEOG 408	(3)	Geography of Development
GEOG 409	(3)	Geographies of Developing Asia
GEOG 410	(3)	Geography of Underdevelopment: Current Problems
URBP 520	(3)	Globalization: Planning and Change

**Natural Sciences**

3 credits from:



GEOG 514	(3)	Climate Change Vulnerability and Adaptation
HIST 510	(3)	Environmental History of Latin America (Field)
MGPO 440	(3)	Strategies for Sustainability

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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 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 3222t6 BREE10.72t6 or CIVE2t63.

**Area 7: Economics**

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

AGECE 200*	(3)	Principles of Microeconomics
AGECE 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
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

**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 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 404	(3)	Environmental Management 2
NRSC 333	(3)	Pollution and Bioremediation
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

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## 9.2 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

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

For further information about this program, see *Programs, Courses and University Regulations > Faculties & Schools > Bachelor of Arts and Science > Undergraduate > Academic Programs > Sustainability, Science and Society > : Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Sustainability, Science and Society (54 credits)*.

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Major in EnvirSo 0 ps.(So 0 pr)Tj1 ps.(So 0 pr)T.erfa(Ag. 1 265.049 638.86.956(vir)Tj1 0 0 275.085 366.82

- 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 *Programs, Courses and University Regulations > Faculties & Schools > Faculty of Agricultural and Environmental Sciences > Undergraduate > : Faculty Information and Regulations*; for the B.Sc., see *Programs, Courses and University Regulations > Faculties & Schools > Faculty of Science > : Faculty Degree Requirements*. This includes meeting the minimum credit requirement as specified in their letter of admission.

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## 10.1 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 Telephone: 514-398-4306 Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a>	Professor Graham Bell Telephone: 514-398-6485 Email: <a href="mailto:graham.bell@mcgill.ca">graham.bell@mcgill.ca</a>

### 10.1.1 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)

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 conserv

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 3051 0 0 1 70.52 366.ppt(One of: 9 credits - Interf

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
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 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 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 342	(3)	Marine Biology
BIOL 432**	(3)	Limnology
BIOL 441	(3)	Biological Oceanography
ENVB 313	(3)	Phylogeny and 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
		Environment/Development:



**Adviser**

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

**Mentor**

Professor Marilyn Scott  
Telephone: 514-398-7996  
Email: [marilyn.scott@mcgill.ca](mailto:marilyn.scott@mcgill.ca)

**10.2.1 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)**

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 distrib

**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
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 214	(3)	Introductory Immunology: Elements of Immunity
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**

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

## **10.2.2 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)**

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 humans, 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 2013-2014" 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**



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: 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.

AGEC 200*	(3)	Principles of Microeconomics
AGEC 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 214	(3)	Introductory Immunology: Elements of Immunity
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

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### 10.3 Environmetrics Domain

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

Adviser	Mentor
Ms. Kathy Roulet Telephone: 514-398-4306 Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a>	Professor Pierre Dutilleul Telephone: 514-398-7870 Email: <a href="mailto:pierre.dutilleul@mcgill.ca">pierre.dutilleul@mcgill.ca</a>

#### 10.3.1 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 statisticiiePmans and



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)**

(3)	Environmetrics Stage
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**Modelling**

BIOL 309	(3)	Mathematical Models in Biology
ENVB 506	(3)	Quantitative Methods: 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 499	(3)	Subarctic Field Studies
NRSC 333	(3)	Pollution and Bioremediation
PLNT 460	(3)	Plant Ecology
WILD 401	(4)	Fisheries and Wildlife Management
WOOD 420	(3)	Environmental Issues: Forestry

## 10.4 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 Telephone: 514-398-4306 Email: <a href="mailto:kathy.roulet@mcgill.ca">kathy.roulet@mcgill.ca</a>	Professor Caroline Begg Telephone: 514-398-8749 Email: <a href="mailto:caroline.begg@mcgill.ca">caroline.begg@mcgill.ca</a>

### 10.4.1 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)

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

**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
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
MICR 331	(3)	Microbial Ecology
NRSC 333	(3)	Pollution and Bioremediation
NUTR 207*	(3)	Nutrition and Health
NUTR 403	(3)	Nutrition in Society
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
ECON 208*	(3)	Microeconomic Analysis and Applications
ECON 225	(3)	Economics of the Environment
ECON 405*	(3)	Natural Resource Economics
GEOG 404	(3)	Environmental Management 2
GEOG 410	(3)	Geography of Underdevelopment: Current Problems

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**10.5 Land Surface Processes and Environmental Change Domain**

This domain is open only to students in the B.Sc.(Ag.Env

GEOG 203 (3) Environmental Systems

**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 List A: Particular Environments and 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
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:

Earth's Changing Surface





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, b

**10.6.1 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)**

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 en

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.

AGECE 242	(3)	Management Theories and Practices
AGECE 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 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

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## 10.7 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

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

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:**





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 537	(3)	Advanced Fluvial Geomorphology
GEOG 550	(3)	Historical Ecology Techniques

#### **10.7.2 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 work0 0 j-0.elect

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/WWPublisheou(ysics of th504.989)T7 1 j1 0 April 01, 2493(GEOG 372)Tj/42.469T7 1 j1 0 66 creETedits - H0 241193lcm42.469759.5lm56968.

**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

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

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## 11 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

## The Global Environn

(3)

Statistical Methods 1



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



GEOG 322	(3)	Environmental Hydrology
SOIL 510	(3)	Environmental Soil Chemistry

## 12 Honours Program in Environment

### Adviser

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

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.

### 12.1 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

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## **12.2 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. Appl 7Re.

## 12.4 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

## 13 Joint Honours Component Environment

### Adviser

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

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.

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

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
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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.

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## 14 Diploma in Environment

### Adviser

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

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**14.1 Diploma in Environment (30 credits)**

The Diploma in En

ANTH 206	(3)	Environment and Culture
ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
ANTH 512	(3)	Political Ecology
BREE 503	(3)	Water: Society, Law and Policy
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

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 Climatic Environmentg



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

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## 15 Field Studies

Field study semesters are available in Africa, Barbados, and Panama. For details, see *Programs, Courses and University Regulations > Faculties & Schools > Field Studies > Undergraduate > : [Field Study Semesters and Off-Campus Courses](#)*.

