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

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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 w

**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 En vironment - Ecological Determinants of Health Cellular (63 cr edits)*

*section 11.2.2: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) Major En vironment Ecolo gical Determinants of Health P opulation (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 En vironment F ood 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 En vironment Rene wable Resource Management (63 credits)*

**Major in Environment B.Sc.**

*section 12.2.1: Bachelor of Science (B.Sc.) Major En vironment Earth Sciences and Economics (66 cr edits)*

***sctia : Jin 14 tHa iCmp n meren ew t tEn***

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

**Diploma in Environment**

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

# 4 About the Sc hool (Under graduate)

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

## 4.1 Location

For advising, contact:

Program Adviser, Ms. Kathy Roulet
Telephone: 514-398-4306
Fax: 514-398-1643
Email: *kathy.roulet@mcgill.ca*

Website: *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

## 4.2 Administrative Officer s

| | |
|---|---|
| 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) | **Dean, Faculty of Arts** |
| Daniel Jutras; LL.B.(Montr.), LL.M.(Harv.) | **Dean, Faculty of Law** |
| Martin Grant; B.Sc.(PEI), M.Sc., Ph.D.(Tor.) | **Dean, Faculty of Science** |
| Marilyn Scott; B.Sc.(New Br.), Ph.D.(McG.) | **Director** |
| George McCourt; B.Sc., M.Sc.(Alta.), M.Sc.(McG.) | **Associate Director, Undergraduate Affairs** |
| Anthony Ricciardi; B.Sc.(Agr.), M.Sc., Ph.D.(McG.) | **Associate Director, Research** |
| | **Program Adviser** |

If you ha

# 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

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 nto

| | | |
|---|---|---|
| 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 |
| | | Public Polic |

(3) Animal Diversity

| | | |
|---|---|---|
| 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 re vision.

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## 8.2 Bachelor of Science (Agricultural and En vironmental Sciences) (B.Sc.(Ag.En v.Sc.)) or Bachelor of Science (B.Sc.) Minor En vironment (18 credits)

Revision, August 2011. Start of re vision.

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 0 1lLa

| | | |
|---|---|---|
| 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 |
| | (3) | Inorganic Chemistry 1 |

| | | |
|---|---|---|
| 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 re vision.

## 9 B.A. Faculty Pr ogram in En vir onment

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 Tms: Core and D52 222.52 Tm(WILD 421)hat wi3sMj1 0 0 1 111.e dif

- 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<br>Email: *kathy.roulet@mcgill.ca*<br>Telephone: 514-398-4306 | Professor Marilyn Scott<br>Email: *marilyn.scott@mcgill.ca*<br>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).

### 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 |

### Hydr ology 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 |
| Elogy03) | (3) | Ecosystem Ecology |

| | | |
|---|---|---|
| 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<br>Email: *kathy.roulet@mcgill.ca*<br>Telephone: 514-398-4306 | Professor Jeanne Paquette<br>Email: *jeanne.paquette@mcgill.ca*<br>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 hlLd 67Srent485ided,c,r0 1 103.965 33vw0.056 Tc664 Tm(aters )Tj-0.402 Tw-0.056 002 Tw-Pc66 0023onomic6.233 4h0d waters woOo350.407ng2.284 O0

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).

### 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 Cour ses

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 re vision.

| | | |
|---|---|---|
| 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 |
| | | En |

# 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*
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 specifi

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 Conser vation

| | | |
|---|---|---|
| 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: Hydr ology and Water Resour ces

* 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 AGEC 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 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 |
| | | En(3)(3) |

| | | |
|---|---|---|
| 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 , Polic y, and Mana gement:

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

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

| | | |
|---|---|---|
| AGEC 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 Cour ses

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 Diver sity:

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 |
| | | Primate Beha |

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.

| Adviser | Mentor |
|---|---|
| Ms. Kathy Roulet<br>Email: *kathy.roulet@mcgill.ca*<br>Telephone: 514-398-4306 | Professor Marilyn Scott<br>Email: *marilyn.scott@mcgill.ca*<br>Telephone: 514-398-7996 |

### 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.

| | | |
|---|---|---|
| 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 |

### 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 |
| | | Health Geog0H0t |

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 Environment330

| | | |
|---|---|---|
| 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 Mana gement

| | | |
|---|---|---|
| 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 Mana gement

* 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 Contr ol and Mana gement

| | | |
|---|---|---|
| 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 re vision.

### 11.2.2 Bac helor of Science (Agricultural and En vir onmental Sciences) (B.Sc.(Ag.En v.Sc.)) or Bac helor of Science (B.Sc.) Major Envir onment Ecological Determinants of Health P opulation (63 credits)

Revision, August 2011. Star t of re vision.

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 en

### 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 AGEC 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 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

Re3)3)3)

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 en

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<br>Email: *kathy.roulet@mcgill.ca*<br>Telephone: 514-398-4306 | Professor Caroline Begg<br>Email: *caroline.begg@mcgill.ca*<br>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):

| | | |
|---|---|---|
| | (4) | Introductory Organic Chemistry 1 |

| | | |
|---|---|---|
| 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 |

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

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

(3) Principles of Microeconomics

| | | |
|---|---|---|
| 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 Pr ocesses:

9 credits of fundamental land surface processes chosen as follows:

| | | |
|---|---|---|
| GEOG 321 | (3) | Climatic Environments |

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 |

### Envir onment and Resour ce Mana gement:

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 |
| | | Adaptive Environmental Management(3) |

| | | |
|---|---|---|
| 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 Pr ocesses:

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 Resour ce 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 |
|---|---|
| Ms. Kathy Roulet, MSE Program Adviser<br>Email: *kathy* | Professor Joann Whalen<br>Email: *joann.whalen@mcgill.ca* |

| | | |
|---|---|---|
| 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" a

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 Pr ocesses:

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 Pr ocesses:

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 AGEC 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 Mana gement 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 re vision.

## 11.7 Water En vir onments 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<br>Email: *kathy.roulet@mcgill.ca*<br>Telephone: 514-398-4306 | Professor Brian Leung<br>Email: *brian.leung2@mcgill.ca*<br>Telephone: 514-398-6460 |

**Water Environments and Ecosystems Ph ysical**

| Adviser | Mentor |
|---|---|
| Ms. Kathy Roulet | Professor Nigel Roulet |

| Adviser | Mentor |
| --- | --- |
| Email: *kathy.roulet@mcgill.ca*<br>Telephone: 514-398-4306 | Email: *nigel.roulet@mcgill.ca*<br>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 fi

### 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 |

International Or

| | | |
|---|---|---|
| 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<br>Email: *kathy.roulet@mcgill.ca* | Professor Frédéric Fabry<br>Email: *frederic.fabry@mcgill.ca*<br>T |

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** |
|---|---|

### 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 refi

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 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 re vision.

## 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

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**

Ms. Kathy Roulet, MSE Program Adviser
Email: *kathy.roulet@mcgill.ca*
Telephone: 514-398-4306

## 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 P olic y

* 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 |
| | (3) | Public Policy Analysis |

| | | |
|---|---|---|
| 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 |
| | | En |

| | | |
|---|---|---|
| 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 |
| | | Plant P |