

# McGILL SCHOOL OF ENVIRONMENT

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## 1 The School

### 1.1 Location

#### Macdonald Campus

Macdonald-Stewart Building, Room MS2-083  
21,111 Lakeshore Road  
Sainte-Anne-de-Bellevue, QC H9X 3V9  
Telephone: (514) 398-7559

#### Downtown Campus

3534 University Street  
Montreal, QC H3A 2A7  
Telephone: (514) 398-2827  
Fax: (514) 398-1643  
Website: <http://www.mcgill.ca/mse>

#### For advising, contact:

Program Coordinator, Mr. Peter Barry  
Telephone: (514) 398-4306  
Fax: (514) 398-1643  
Email: [envstud@geog.mcgill.ca](mailto:envstud@geog.mcgill.ca)

### 1.2 Administrative Officers

DEBORAH BUSZARD, B.Sc.(Bath), Ph.D.(Lond.) **Dean,  
Faculty of Agricultural and Environmental Sciences**

CARMAN MILLER, B.A., B.Ed.(Acad.), M.A.(Dal.), Ph.D.(Lond.)  
**Dean, Faculty of Arts**

ALAN G. SHAVER, B.Sc.(Car.), Ph.D.(M.I.T.)  
**Dean, Faculty of Science**

PETER G. BROWN, B.A.(Hartford), M.A., Ph.D.(C'bia) **Director**

JAMES FYLES, B.Sc., M.Sc.(Vict.), Ph.D.(Alta.)  
**Associate Director**

PETER BARRY, B.Sc.(C'dia), M.Sc.(McG.)  
**Program Coordinator**

### 1.3 Executive Committee

Peter Brown (Chair), Faculty of Science  
James Fyles, Faculty of Agricultural and Environmental Sciences  
Christopher Green, Faculty of Arts  
Catherine Potvin, Faculty of Science  
Joseph Rasmussen, Faculty of Science  
Nigel Roulet, Faculty of Science  
Colin Scott, Faculty of Arts  
Marilyn Scott, Faculty of Agricultural and Environmental Sciences

### 1.4 Creation of the School

In September 1998, McGill's Faculties of Agricultural and Environmental Sciences, Arts, and Science 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.

### 1.5 Goals of the School

The McGill School of Environment has the following goals:

- to impart to students an understanding of current environmental problems;
- to provide an exciting and rigorous program that allows for intellectual growth in the comprehension of environmental issues or components of the environment;
- to help students gain an understanding of the complexity and conflicts that underlie most environmental problems; and
- to give students an opportunity to apply their knowledge in the analysis of specific, contemporary problems.

## 2 Admission and Registration

Students may be admitted to B.A. or B.Sc. programs offered by the MSE on the University's two campuses: the Macdonald Campus and the Downtown Campus. They register as students within their faculty of admission and are governed by all rules and regulations of that faculty.

Please refer to "Admission Requirements" on [page 10](#) in the General University Information section. In addition, in the case of students entering the B.A. Faculty Program in Environment, the MSE requires, as either a pre or co-requisite for the core courses, 189-139 Calculus or 189-140 Calculus I and 189-141 Calculus II, or their equivalents (CEGEP courses 201-103 and 201-203 respectively).

To be eligible for a B.A. degree, students must fulfill all the Faculty and program requirements as indicated in Faculty of Arts [section 2 on page 42](#).

To be eligible for a B.Sc. degree, students must fulfill all the Faculty and program requirements as indicated in Faculty of Science [section 2 on page 338](#).

**Students enrolled in the Environmental Studies Program prior to September 1998 may continue in that program until they receive their degree. They should refer to the Calendar for the year they entered the program or contact their advisor.**

### 3 Programs

The McGill School of Environment has developed four programs which are offered on the downtown and Macdonald campuses. These programs strive to offer the flexibility necessary to deal with the environment through:

- a set of Core courses that provide the general knowledge base of the program combined with a progressive series of courses in a trans-disciplinary area of environmental specialization, referred to as a Domain; or
- in a more traditional discipline-based program that has an environmental emphasis.

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

The MSE offers four options for students interested in pursuing environmental studies.

1. **A Minor in Environment** is open to all undergraduate students.
2. **A Faculty Program in Environment** leading to a B.A. is open to Arts students only.
3. **A Major in Environment** leading to a B.Sc. is open to students meeting the entrance requirements of the Faculty of Science and who obtain 54 credits in approved Science, and Agricultural and Environmental Sciences courses.
4. **A Diploma in Environment** is available only to students who have already completed a Bachelor or an equivalent degree, and who wish to return to university for further undergraduate study.

#### 3.1 Minor in Environment

The Minor in Environment is intended to complement an expertise obtained through a Major, Major Concentration or a 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 advisor in their major program or concentration and the MSE Program Coordinator, can declare their intention to do a Minor in Environment. Students must submit their program of courses already taken and to be taken for the Minor in Environment to the MSE Program Coordinator for approval.

To obtain a Minor in Environment, students must:

- (a) register for the Minor on MARS using the program code listed below;
- (b) pass all courses counted towards the Minor with **a grade of C or higher**;
- (c) complete 18 credits from the courses listed below NOT otherwise counted towards the student's major program or concentration or a second Minor program; and
- (d) ensure that all the credits specified in (b) above are taken outside the discipline or field of the student's major program or concentration.

#### MINOR CONCENTRATION IN ENVIRONMENT (18 credits)

[MARS Program Code 7-412000]

This Minor is intended for Arts students in the multi-track system.

##### Complementary Courses (18 credits)

12 credits selected from the MSE core courses:

- |         |     |                                   |
|---------|-----|-----------------------------------|
| 170-200 | (3) | The Global Environment            |
| 170-201 | (3) | Society and Environment           |
| 170-202 | (3) | The Evolving Earth                |
| 170-203 | (3) | Knowledge, Ethics and Environment |
| 170-401 | (3) | Environmental Analysis            |

6 credits selected from Thematic Categories, at least 3 credits must be from the list of courses in the thematic area of Natural Sciences and Technology.

See "List of Approved Thematic Category Courses for the Minor and Diploma" [on page 464](#). Check the departmental course listings in this Calendar for course descriptions, prerequisites, and current scheduling.

#### MINOR PROGRAM IN ENVIRONMENT (18 credits)

[MARS Program Code 6-412000]

This Minor is intended for Science and Agricultural and Environmental Science students, but is open to students from other faculties as well, except Arts.

##### Complementary Courses (18 credits)

12 credits selected from the MSE core courses:

- |         |     |                                   |
|---------|-----|-----------------------------------|
| 170-200 | (3) | The Global Environment            |
| 170-201 | (3) | Society and Environment           |
| 170-202 | (3) | The Evolving Earth                |
| 170-203 | (3) | Knowledge, Ethics and Environment |
| 170-401 | (3) | Environmental Analysis            |

6 credits selected from Thematic Categories, at least 3 credits must be from the list of courses in the thematic area of Social Sciences and Policy.

See "List of Approved Thematic Category Courses for the Minor and Diploma" [on page 464](#). Check the departmental course listings in this Calendar for course descriptions, prerequisites, and current scheduling.

### 3.2 B.A. Faculty Program in Environment

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

1. **Introductory Core:** The Core consists of four introductory courses where students are exposed to the different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie most environmental problems. Through the Core program students go beyond the confines of their individual views of environment.
2. **Domain:** Domains provide a trans-disciplinary study of a particular theme or component of the environment. Additional Domains are being developed in several areas. More information on these is available on the MSE website (<http://www.mcgill.ca/mse>).
3. **Final Core:** 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:

- (a) register in a Domain using the MARS Program Codes listed below;
- (b) pass all courses counted towards the Faculty Program with **a grade of C or higher**;
- (c) 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

(d) fulfill all Faculty requirements as specified for the B.A. in the Faculty of Arts [section 2 on page 42](#), which includes meeting the minimum credit requirement as specified in their letter of admission.

### B.A. FACULTY PROGRAM IN ENVIRONMENT (54 credits)

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

170-200	(3)	The Global Environment
170-201	(3)	Society and Environment
170-202	(3)	The Evolving Earth
170-203	(3)	Knowledge, Ethics and Environment
170-400	(3)	Environmental Studies Project
170-401	(3)	Environmental Analysis

In addition, the B.A. Faculty Program requires, as either a pre- or co-requisite for the Core courses:

189-139 Calculus or 189-140 Calculus I and 189-141 Calculus II, or their equivalents (CEGEP courses 201-103 and 201-203, respectively).

#### Domain (36 credits)

one MSE Domain selected from those available to students in the B.A. Faculty program.

Currently available:

Environment and Development (36 credits)

Additional Domains TBA

Each Domain has different requirements which are listed below. Check the Departmental listings in this Calendar for course availability and prerequisites.

#### Environment and Development Domain

(36 credits) [MARS Program Code 4-412001]

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

Advisor: Professor Colin Scott,  
email: [scott@leacock.lan.mcgill.ca](mailto:scott@leacock.lan.mcgill.ca) Tel: (514) 398-4291 after September, 1999:  
Professor Oliver Coomes,  
email: [coomes@geog.mcgill.ca](mailto:coomes@geog.mcgill.ca) Tel: (514) 398-4943

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

Check the Departmental listings in this Calendar for course availability and prerequisites.

#### Domain – Required Courses (21 credits)

177-208	(3)	Introduction to Ecology
151-339	(3)	Ecological Anthropology
154-313	(6)	Economic Development
183-302	(3)	Environmental Analysis & Management
183-410	(3)	Geography of Underdevelopment: Current Problems
151-418	(3)	Environment and Development

#### Domain – Complementary Courses (15 credits)

3 credits in statistics to be chosen from:

189-203	(3)	Principles of Statistics
166-350	(3)	Statistics in Social Research
204-204	(3)	Introduction to Psychological Statistics (or equivalent)

12 credits to be chosen from the following:

101-292	(3)	History and the Environment
101-473	(3)	Environmental History Seminar
151-349	(3)	Transformation of Developing Countries
151-358	(3)	Process of Anthropological Research
151-439	(3)	Theories of Development

151-445	(3)	Property and Land Tenure
152-497	(3)	Research Seminar on International Development
154-208	(3)	Microeconomic Analysis and Applications
154-326	(3)	Ecological Economics
154-412	(3)	Selected Topics of Economic Development I
154-416	(3)	Selected Topics of Economic Development II
154-405	(3)	Natural Resource Economics
160-338	(3)	Developing Areas/Topics I
160-422	(3)	Developing Areas/ Topics II
160-445	(3)	International Politics of North-South
160-472	(3)	Developing Areas/ Social Movements
160-522	(3)	Seminar: Developing Areas
166-328	(3)	Environmental Sociology
166-354	(3)	Dynamics of Industrial Societies
166-550	(3)	The Sociology of Developing Societies
177-365	(3)	Conservation Biology
177-460	(3)	Aquatic Conservation
177-453B	(3)	Neotropical Environments (in Panama)
177-5xx		Political Ecology (proposed course)
183-300	(3)	Human Ecology in Geography
183-305	(3)	Soils and Environment
183-322	(3)	Environmental Hydrology
183-331	(3)	Urban Social Geography
183-404	(3)	Environmental Management for Developing Areas
183-408	(3)	Geography of Unequal Development: Historical Roots
183-415	(3)	Geography of Tourism
183-496	(3)	Regional Geographical Excursion
183-498B	(3)	Humans in Tropical Environments (in Panama)
183-500	(3)	Geography of Regional Identity
183-502	(3)	Geography of Northern Development
183-510	(3)	Humid Tropical Environments
183-551	(3)	Environmental Decisions
276-440	(3)	Strategies for Sustainable Development
276-567	(3)	Business in Society
330-210	(3)	Agro-Ecological History
330-411	(3)	International Agriculture
334-333	(3)	Resource Economics
334-430	(3)	Agriculture, Food and Resource Policy
334-442	(3)	Economics of International Development
350-380	(3)	Food Systems and the Environment
375-375	(3)	Issues in Environmental Sciences
375-380	(3)	Law and Land Use Policy
375-415	(2)	Conservation Law
382-406	(3)	Ecology of Human Nutrition
382-501	(3)	Nutrition in Developing Countries
407-532	(3)	International Social Welfare
409-505	(3)	GIS in Planning

### 3.3 B.Sc. Major Program in Environment

The B.Sc. Major has two components: Core and Domain. Students follow three steps in their degree program.

- 1. Introductory Core:** The Core consists of four introductory courses where students are exposed to the different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie most environmental problems. Through the Core program students go beyond the confines of their individual views of environment.
- 2. Domain:** Domains provide a trans-disciplinary study of a particular theme or component of the environment. Additional Domains are being developed in several areas. More information on these is available on the MSE website (<http://www.mcgill.ca/mse>).
- 3. Final Core:** 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.Sc. Major in Environment, students must:

- register in a Domain using the MARS Program Codes listed below;
- pass all courses counted towards the Major with a **grade of C or higher**;
- confirm that their course selection satisfies the required components of the MSE Core and their chosen Domain, and that the complementary courses are approved courses in their chosen Domain; and
- fulfill all Faculty requirements as specified for the B.Sc. in the Faculty of Science [section 2 on page 338](#), which includes meeting the minimum credit requirement as specified in their letter of admission.

**B.SC. MAJOR PROGRAM IN ENVIRONMENT** (54 to 60 credits – depending upon Domain selected)

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

170-200	(3)	The Global Environment
170-201	(3)	Society and Environment
170-202	(3)	The Evolving Earth
170-203	(3)	Knowledge, Ethics and Environment
170-400	(3)	Environmental Studies Project
170-401	(3)	Environmental Analysis

**Domain** (36 to 42 credits – depending upon Domain selected) one MSE Domain selected from those available to students in the B.Sc. Major.

Currently available:

Atmospheric Environment and Air Quality	(39 credits)
Biodiversity and Conservation	(42 credits)
Renewable Resource Management	(42 credits) (Awaiting University Approval)
Environmetrics	(42 credits)
Water Environments and Ecosystems – Physical Stream or Biological Stream	(36 credits)

Additional Domains TBA

Each Domain has different requirements which are listed below. Check the Departmental listings in this Calendar for course availability and prerequisites.

#### **Atmospheric Environment and Air Quality Domain** (39 credits) [MARS Program Code 1-412004]

This Domain is open only to students in the B.Sc. Major in Environment program.

Advisor: Professor Peter Yau,  
email: [yau@rainband.meteo.mcgill.ca](mailto:yau@rainband.meteo.mcgill.ca)  
Tel: (514) 398-3719

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

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

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

180-307	(3)	Environmental Analysis
180-367	(3)	Instrumental Analysis
195-214	(3)	Intro. to the Physics of the Atmosphere
195-215	(3)	Weather Systems and Climate

195-330	(3)	Physical Meteorology
195-512	(3)	Atmospheric and Oceanic Dynamics

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

189-222	(3)	Calculus III
or 360-202	(3)	Calculus
180-257D	(4)	Analytical Chemistry
or 333-213	(3)	Analytical Chemistry I

3 credits from:

189-203	(3)	Principles of Statistics
or 360-310	(3)	Statistical Methods I
or equivalent		

9 credits (at least 6 credits of which are at the 300 level or above) chosen from the following:

180-273	(1)	Chemical Kinetics
180-377	(3)	Instrumental Analysis II
189-223	(3)	Linear Algebra
189-315	(3)	Ordinary Differential Equations
or 360-205	(3)	Differential Equations
183-505	(3)	Global Biogeochemical Cycles
195-515	(3)	Turbulence in the Atmosphere and Oceans
195-540	(3)	Synoptic Meteorology I
308-208	(3)	Computers in Engineering
338-510	(3)	Agricultural Micrometeorology
375-333	(3)	Physical and Biological Aspects of Pollution
302-230	(3)	Environmental Aspects of Technology
303-225	(3)	Environmental Engineering

3 credits chosen from the following:

151-206	(3)	Environment and Culture
151-418	(3)	Environment and Development
154-225	(3)	Economics of the Environment
154-347	(3)	Economics of Climate Change
160-466	(3)	Public Policy Analysis
183-302	(3)	Environmental Analysis and Management: Problems and Policy
183-404	(3)	Environmental Management for Developing Areas
260-270	(3)	Religious Ethics and the Environment
389-580	(3)	Environment and the Law

#### **Biodiversity and Conservation Domain**

(42 credits) [MARS Program Code 1-412002]

This Domain is open only to students in the B.Sc. Major in Environment program.

Advisor: Professor David Green, email: [davidg@shared1.lan.mcgill.ca](mailto:davidg@shared1.lan.mcgill.ca) Tel: (514) 398-4086

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

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

9 credits, basic courses in the biological principles of diversity, systematics and conservation		
177-304	(3)	Evolution
177-305	(3)	Diversity of Life

- 177-365 (3) Conservation Biology  
 9 credits, interface between science, policy and management  
 183-302 (3) Environmental Analysis & Management  
 154-225 (3) Economics of the Environment  
 151-418 (3) Environment and Development

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

- 177-208 (3) Introduction to Ecology  
 or 344-205 (3) Principles of Ecology  
 177-373 (3) Biometry  
 or 360-310 (3) Statistical Methods I

3 credits chosen from:

- 177-358\* (3) Canadian Flora  
 367-358\* (3) Flowering Plant Diversity  
 349-312 (3) Zoological Systematics and Evolution

\* 367-358A and 177-358A are courses with substantially the same content, taught on different campuses. Only one may be taken. One of 367-358A/177-358A or 349-312A must be taken to satisfy Domain Core requirements, the other may be chosen as a complementary course from List III.

3 credits, one of the following field courses:

- 177-331 (3) Ecology and Behaviour Field Course  
 177-344 (3) Field Course in Applied Tropical Ecology  
 177-453 (3) Neotropical Environments  
 183-495 (3) Field Studies in Physical Geography  
 183-497 (3) Field Studies in Geography  
 183-499 (3) Subarctic Field Studies in Geography  
 375-475 (3) Desert Ecology

12 credits chosen from the following three course lists, of which 6 must be 300-level or above, noting that there must be at least 6 credits 400-level or above in the Domain as a whole. The distribution of the 12 credits is to be:

**6 credits from List I: courses dealing with general scientific principles.**

**Biology**

- 177-324 (3) Ecological Genetics  
 177-341 (3) History of Life  
 177-432 (3) Limnology  
 177-441 (3) Biological Oceanography  
 177-442 (3) Marine Biology  
 177-460 (3) Aquatic Conservation  
 177-473 (3) Ecology of Aquatic Invertebrates  
 177-505 (3) Advanced Seminar in Biodiversity & Systematics

**Geography**

- 183-201 (3) Geographical Information Systems  
 183-272 (3) Landforms in Environmental Systems  
 183-350 (3) Ecological Biogeography

**Agricultural and Biosystems Engineering**

- 336-330 (3) GIS for Biosystems Management

**Natural Resources Science**

- 349-313 (3) Zoogeography  
 373-331 (3) Microbial Ecology  
 373-421 (3) Topics in Wildlife Conservation  
 374-410 (3) The Forest Ecosystem  
 374-420 (3) Environmental Issues in Forestry  
 375-375 (3) Issues in Environmental Sciences  
 375-410 (3) Wildlife Ecology  
 375-437 (3) Assessing Environmental Impact

**Plant Science**

- 367-460 (3) Plant Ecology

A second field course from the Domain core curriculum may also be taken

**3 credits from List II: courses dealing with societal issues and principles.**

**Anthropology**

- 151-339 (3) Ecological Anthropology

**Economics**

- 154-326 (3) Ecological Economics

**Sociology**

- 166-328 (3) Environmental Sociology

**Geography**

- 183-321 (3) Climatic Environments  
 183-404 (3) Environmental Management for Developing Areas  
 183-510 (3) Humid Tropical Environments

**Agricultural Economics**

- 334-333 (3) Resource Economics

**Natural Resources Science**

- 375-415 (2) Conservation Law

If this course is taken, 1 additional credit of electives must be taken

**3 credits from List III: courses dealing with particular groups of organisms.**

**Biology**

- 177-327 (3) Herpetology  
 177-351 (3) The Biology of Invertebrates  
 177-353 (3) Lower Eukarya: Protista and Fungi  
 177-354 (3) Biology of Birds  
 177-437 (3) Advanced Invertebrate Zoology  
 177-358 (3) Canadian Flora  
 or 367-358 (3) Flowering Plant Diversity

**Plant Science**

- 367-304 (3) Biology of Fungi  
 367-458 (3) Flowering Plant Systematics

**Natural Resources Science**

- 349-307 (3) Natural History of the Vertebrates  
 349-312 (3) Zoological Systematics and Evolution  
 349-424 (3) Parasitology  
 350-440 (3) Systematic Entomology  
 375-420 (3) Topics in Ornithology

**Environmetrics Domain**

(42 credits) [MARS Program Code 1-412005]

This Domain is open only to students in the B.Sc. Major in Environment program.

Advisor: Professor Dutilleul, email: cydp@musica.mcgill.ca  
 Tel: (514) 398-7870

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 required courses for the Environmetrics Domain is composed primarily of six statistics courses and one mathematically-oriented course with biological and ecological applications. The list is completed by three 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 three courses should allow the students to understand their interlocutors and be understood by them in their future job. Students can further develop their background in applied or mathematical statistics and their expertise in environmental sciences, by taking two complementary courses along each of two axes: statistics & mathematics and environmental sciences. The possibility of an internship is also offered to students to provide them with preliminary professional experience.

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

360-414 (3) Temporal and Spatial Statistics

**Domain – Complementary Courses** (39 credits)

- 177-208 (3) Introduction to Ecology  
or 344-205 (3) Principles of Ecology  
306-308 (3) Social and Economic Impacts of Technology  
or 375-437 (3) Assessing Environmental Impact  
177-309 (3) Mathematical Models in Biology  
or 360-306 (3) Mathematical Methods in Ecology  
183-201 (3) Geographic Information Systems I  
or 336-330 (3) GIS for Biosystems Management  
183-351 (3) Quantitative Methods in Geography  
or 177-483 (3) Statistics in Population Biology  
303-555 (3) Environmental Data Analysis  
or 360-411 (3) Experimental Design

3 credits chosen from:

- 183-305 (3) Soils and Environment  
372-210 (3) Principles of Soil Science  
186-243 (3) Environmental Geology  
303-323 (3) Hydrology and Water Resources  
183-322 (3) Environmental Hydrology  
336-217 (3) Hydrology and Drainage

6 credits of statistics, one of the following three options:

Option 1:

- 189-203 (3) Principles of Statistics I  
and 189-204 (3) Principles of Statistics II

or Option 2:

- 189-323 (3) Probability Theory  
and 189-324 (3) Statistics

or Option 3:

- 177-373 (3) Biostatistical Analysis  
or 360-310 (3) Statistical Methods

and one 3-credit applied statistics course from the statistics and mathematics list given below

6 credits of statistics and mathematics chosen from:

- 166-461 (3) Quantitative Data Analysis  
166-504 (3) Quantitative Methods I  
166-505 (3) Quantitative Methods II  
166-580 (3) The Design and Practice of Social Research  
189-223 (3) Linear Algebra  
189-423 (3) Regression and Analysis of Variance  
189-425 (3) Sampling Theory and Applications  
189-447 (3) Stochastic Processes  
336-252 (3) Structured Computer Programming (or equivalent)  
336-319 (3) Applied Mathematics (or equivalent)  
360-403 (3) Environmetrics Stage (internship)

6 credits in environmental sciences chosen from:

- 177-526 (3) Plants and Extreme Environments  
367-460 (3) Plant Ecology  
183-300 (3) Human Ecology in Geography  
349-313 (3) Zoogeography  
183-302 (3) Environmental Analysis & Management: Problems & Policy  
375-401 (4) Fisheries and Wildlife Management  
306-451 (3) Environmental Controls  
375-333 (3) Physical and Biological Aspects of Pollution  
374-300 (3) Urban Forests and Trees  
374-420 (3) Environmental Issues in Forestry  
177-331 (3) Ecology/Behavior Field Course  
183-494 (3) Field Studies in Geography: Urban  
183-497 (3) Subarctic Field Studies in Geography: Schefferville

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**Renewable Resource Management Domain** (42 credits)

(Awaiting University Approval)

This Domain will be open only to students in the B.Sc. Major in Environment program.

Advisor: TBA

This Domain is awaiting final University approval. See the [MSE website](#) for details or contact the Program Coordinator.

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**Water Environments and Ecosystems Domain**

(36 credits) [MARS Program Code 1-412003]

This Domain is open only to students in the B.Sc. Major in Environment program.

Advisor: Professor Peter Yau,  
email: [yau@rainband.meteo.mcgill.ca](mailto:yau@rainband.meteo.mcgill.ca)  
Tel: (514) 398-3719

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

Those electing the **biological** stream will concentrate 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** stream. 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.

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**Water Environments and Ecosystems Domain  
Physical Stream** (36 credits)

This Domain is open only to students in the B.Sc. Major in Environment program.

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

- 195-220 (3) Introduction to Oceanic Sciences  
195-330 (3) Physical Meteorology  
183-372 (3) Running Water Environments

**Domain – Complementary Courses** (27 credits)

- 183-322 (3) Environmental Hydrology  
or 336-217 (3) Hydrology and Drainage  
177-208 (3) Introduction to Ecology  
or 344-205 (3) Principles of Ecology

3 credits chosen from the following:

- 189-203 (3) Principles of Statistics I  
360-310 (3) Statistical Methods I (or equivalent)  
189-222 (3) Calculus III  
360-202 (3) Calculus

12 credits chosen from the following:

- 183-201 (3) Geographic Information Systems I  
183-306 (3) Geographical Information Systems II  
or 336-330 (3) GIS for Biosystems Management  
183-522 (3) Advanced Environmental Hydrology  
or 336-506 (3) Advances in Drainage Management  
or 336-509 (3) Hydrologic Systems and Modelling  
183-537 (3) Advanced Fluvial Geomorphology  
186-549 (3) Hydrogeology  
189-315 (3) Ordinary Differential Equations  
or 360-205 (3) Differential Equations  
195-215 (3) Weather Systems and Climate  
195-310 (3) Physical Oceanography  
195-512 (3) Atmospheric and Oceanic Dynamics  
195-558 (3) Numerical Methods and Laboratory  
195-568 (3) Ocean Physics  
303-323 (3) Hydrology and Water Resources  
330-435 (3) Soil and Water Quality Management

- 336-416 (3) Engineering for Land Development  
 338-510 (3) Agricultural Micrometeorology  
 372-210 (3) Principles of Soil Science  
 or 183-305 (3) Soils and Environment
- 6 credits chosen from the following:  
 177-441 (3) Biological Oceanography  
 or 177-432 (3) Limnology  
 or 349-315 (3) Science of Inland Waters  
 177-442 (3) Marine Biology  
 177-473 (3) Ecology of Aquatic Invertebrates  
 183-350 (3) Ecological Biogeography  
 177-460 (3) Aquatic Conservation  
 183-505 (3) Global Biogeochemistry  
 375-401 (3) Fisheries and Wildlife Management

### Water Environments and Ecosystems Domain Biological Stream (36 credits)

This Domain is open only to students in the B.Sc. Major in Environment program.

#### Domain – Required Course (3 credits)

- 195-220 (3) Introduction to Oceanic Sciences

#### Domain – Complementary Courses (33 credits)

- 183-322 (3) Environmental Hydrology  
 or 336-217 (3) Hydrology and Drainage  
 177-208 (3) Introduction to Ecology  
 or 344-205 (3) Principles of Ecology
- 3 credits chosen from the following:  
 189-203 (3) Principles of Statistics I  
 360-310 (3) Statistical Methods I (or equivalent)  
 189-222 (3) Calculus III  
 360-202 (3) Calculus

3 credits chosen from the following:

- 177-441 (3) Biological Oceanography  
 or 177-432 (3) Limnology  
 or 349-315 (3) Science of Inland Waters

3 credits chosen from the following:

- 177-331 (3) Ecology field course  
 or 183-497 (3) Coastal marsh plant ecology  
 or one of the Huntsman Marine Science Centre field courses

9 credits chosen from the following:

- 177-441 (3) Biological Oceanography  
 or 177-432 (3) Limnology  
 177-442 (3) Marine Biology  
 177-460 (3) Aquatic Conservation  
 177-473 (3) Ecology of Aquatic Invertebrates  
 183-305 (3) Soils and Environment  
 or 372-210 (3) Principles of Soil Science  
 183-350 (3) Ecological Biogeography  
 330-435 (3) Soil and Water Quality Management  
 350-535 (3) Aquatic Entomology  
 373-331 (3) Microbial Ecology  
 375-333 (3) Physical and Biological Aspects of Pollution  
 375-401 (3) Fisheries and Wildlife Management

6 credits chosen from the following:

- 183-201 (3) Geographic Information Systems I  
 336-330 (3) GIS for Biosystems Management  
 183-372 (3) Running Water Environments  
 186-220 (3) Principles of Geochemistry  
 195-215 (3) Weather Systems and Climate  
 195-310 (3) Physical Oceanography  
 195-330 (3) Physical Meteorology  
 180-257 (4) Analytical Chemistry  
 183-522 (3) Advanced Hydrology  
 183-550 (3) Quaternary Paleocology  
 183-537 (3) Advanced Fluvial Geomorphology

3 credits chosen from the following list:

- 151-339 (3) Ecological Anthropology  
 151-418 (3) Environment and Development

- 334-333 (3) Natural Resource Economics  
 154-225 (3) Economics and the Environment  
 154-326 (3) Ecological Economics  
 160-466 (3) Public Policy Analysis  
 160-345 (3) International Organization

### 3.4 Panama Field Study Semester

This program is a joint venture between McGill University and the Smithsonian Tropical Research Institute (STRI) in Panama.

**Prerequisites:** Spanish Language Elementary 144-218A, or equivalent proficiency and Principles of Statistics 189-203, or equivalent. A GPA of 3.0 and higher is recommended. The program is aimed at 400-level students

#### Offered in the Winter Term

There is a one week transition and 12 weeks of course attendance in Panama. Field trips will be integrated into each of the courses offered.

The lecture courses will each consist of contact-hours organized over a four-week period, as follows:

- two weeks of lectures, 6 hours per day,
- one week of seminars; 3 hours per day, and
- one week in the field or laboratory, 8 hours per day.

#### Panama Field Study Semester – Required Courses (15 credits)

9 credits of formal training

- 177-453B (3) Neotropical Environments  
 183-498B (3) Humans in Tropical Environments  
 336-450B (3) Conserving the Neotropics

6 credits of research:

- 170-451B (6) Research in Panama

Hands-on experience is gained through an Independent Studies Project organized around multidisciplinary environmental issues. The nature of these projects will center on practical environmental problems/questions important for Panama. Students will form a team that will work with Panamanian institutions (NGO, governmental or research).

The independent study will have two requirements: attendance at STRI seminar series and at a weekly group discussion. The STRI's seminar series will expose the students to state of the art tropical ecology and involve them in current issues. The weekly discussions will enable student and professors to share experiences and will provide continuity during the term.

Enrolment of McGill students is limited to 26 students. In addition to the regular McGill fees, the cost is approximately \$5,000 (excluding food, tuition and insurance). Application forms are available from the MSE office. [See the MSE website](#) for more information.

### 3.5 Diploma In Environment

Advisor: Mr. Pete Barry, MSE Program Coordinator,  
 email: envstud@geog.mcgill.ca Tel: (514) 398-4306

The Diploma 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. The Diploma requires 30 credits of full-time or part-time studies at McGill; it may be started in either January or September (recommended). 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 either the Faculty of Science or the Faculty of Arts, provided they are otherwise acceptable for admission to the University. Students must have a **grade of C or higher** in all courses for the Diploma.

## DIPLOMA IN ENVIRONMENT (30 credits)

### Required Courses (18 credits)

- 170-200 (3) The Global Environment
- 170-201 (3) Society and Environment
- 170-202 (3) The Evolving Earth
- 170-203 (3) Knowledge, Ethics and Environment
- 170-400 (3) Environmental Studies Project
- 170-401 (3) Environmental Analysis

### Complementary Courses (12 credits)

12 credits selected from the Thematic Categories:

6 credits must be taken within the thematic area outside the area of the student's previous degree (e.g. those with a B.A. degree must take 6 credits from the Natural Sciences and Technology list; those with a B.Sc. degree must take 6 credits from the Social Sciences and Policy list.)

6 credits must be taken at the 400 level or higher in the thematic area of the student's previous degree (e.g., those with a B.A. degree must take 6 credits at the 400 level or higher in Social Sciences and Policy; those with a B.Sc. degree must take 6 credits at the 400 level or higher in Natural Sciences and Technology.)

## 3.6 List of Approved Thematic Category Courses for the Minor and Diploma

### Notes:

1. This list is not meant to be exclusive. Courses not on the list may be included in the Minor or Diploma with the permission of the MSE Program Coordinator.
2. Most courses listed at the 300 level and higher have prerequisites. Although instructors may waive prerequisites in some cases, **students are urged to prepare their program of study well before their final year.**
3. Not all courses are available in any given year. Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *infoMcGill* for current scheduling.

## SOCIAL SCIENCES AND POLICY

### Anthropology

- 151-206 (3) Environment and Culture
- 151-212 (3) Anthropology of Development
- 151-339 (3) Ecological Anthropology

### Economics

- 154-205 (3) An Introduction to Political Economy
- 154-225 (3) Economics of the Environment
- 154-326 (3) Ecological Economics
- 154-347 (3) Economics of Climate Change
- 154-405 (3) Natural Resource Economics

### Geography

- 183-200 (3) Geographical Perspectives on World Environmental Problems
- 183-216 (3) Geography of the World Economy
- 183-301 (3) Geography of the Circumpolar North
- 183-300 (3) Human Ecology in Geography
- 183-302 (3) Environmental Analysis and Management: Problems and Policy
- 183-410 (3) Geography of Underdevelopment: Current Problems

### Law

Students must complete the Special Student application form at the Faculty of Law, and must also provide the Law Faculty with a C.V., a transcript, and a letter stating why they want to take the course. Students should also speak with the professor of the course in question.

- 389-508 (2) Research Seminars (Several are available, check the Law calendar for details.)
- 389-580 (3) Environment and the Law

### Philosophy

- 107-230 (3) Introduction to Moral Philosophy I
- 107-237 (3) Contemporary Moral Issues

- 107-334 (3) Ethics I

### Political Science

- 160-211 (3) Comparative Government and Politics
- 160-212 (3) Government and Politics of the Developed World
- 160-227 (3) Political Change in the Third World
- 160-345 (3) International Organization
- 160-445 (3) The International Politics of North-South Economic Relations

### Psychology

- 204-215 (3) Social Psychology

### Religious Studies

- 260-270 (3) Religious Ethics and the Environment
- 260-370 (3) The Human Condition
- 260-376 (3) Religious Ethics

### Sociology

- 166-234 (3) Population and Society
- 166-235 (3) Technology and Society
- 166-254 (3) Development and Underdevelopment
- 166-328 (3) Environmental Sociology
- 166-366 (3) Social Change in the Caribbean

### Agricultural Economics (Macdonald Campus)

- 334-231 (3) Economic Systems of Agriculture
- 334-333 (3) Resource Economics
- 334-430 (3) Agriculture, Food and Resource Policy

### Religious Studies (Macdonald Campus)

- 260-270A (3) Religious Ethics and the Environment

### Renewable Resources (Macdonald Campus)

- 375-415 (2) Conservation Law

## NATURAL SCIENCES AND TECHNOLOGY

### Architecture

- 301-375 (2) Landscape
- 301-377 (2) Energy Conservation and Buildings
- 301-378 (3) Site Usage

### Atmospheric and Oceanic Sciences

- 195-210 (3) Introduction to Atmospheric Science
- 195-215 (3) Weather Systems and Climate
- 195-220 (3) Introduction to Oceanic Sciences
- 195-310 (3) Physical Oceanography
- 195-330 (3) Physical Meteorology

### Biology

- 177-208 (3) Introduction to Ecology
- 177-305 (3) Diversity of Life
- 177-365 (3) Conservation Biology
- 177-432 (3) Limnology
- 177-473 (3) Ecology of Aquatic Invertebrates

### Chemistry

- 180-201 (3) Modern Inorganic Chemistry I
- 180-212 (4) Introductory Organic Chemistry I
- 180-301 (3) Modern Inorganic Chemistry II
- 180-307 (3) Environmental Analysis
- 180-350 (3) Earth, Fire, Air and Water

### Chemical Engineering

- 302-230 (3) Environmental Aspects of Technology
- 302-471 (3) Industrial Water Pollution Control
- 302-472 (3) Industrial Air Pollution Control

### Civil Engineering

- 303-225 (4) Environmental Engineering
- 303-323 (3) Hydrology and Water Resources
- 303-526 (3) Solid Waste Management
- 303-550 (3) Water Resources Management
- 303-553 (3) Stream Pollution and Control
- 303-555 (3) Environmental Data Analysis



**Computer Science**

- 308-102 (3) Computers and Computing (Arts Students only)  
 308-202 (3) Introduction to Computer Science I  
 308-203 (3) Introduction to Computer Science II

**Earth and Planetary Sciences**

- 186-233 (3) Earth and Life History  
 186-243 (3) Environmental Geology  
 186-425 (3) Depositional Environments & Sequence Stratigraphy

**Geography**

- 183-201 (3) Geographic Information Systems I  
 183-205 (3) Global Change: Past, Present and Future  
 183-272 (3) Landforms and Environmental Systems  
 183-308 (3) Remote Sensing  
 183-322 (3) Environmental Hydrology

**Mechanical Engineering**

- 305-343 (3) Energy Conversion  
 305-534 (3) Air Pollution Engineering

**Microbiology and Immunology**

- 528-211 (3) Biology of Microorganisms  
 528-323 (3) Microbial Physiology  
 528-324 (3) Fundamental Virology  
 528-314 (3) Immunology

**Mining and Metallurgical Engineering**

- 306-308 (3) Social and Economic Impacts of Technology  
 306-320 (3) Extraction of Energy Resources  
 306-451 (3) Environmental Control in Metallurgical Plants  
 306-555 (3) Thermal Remediation of Wastes

**Physics**

- 198-217 (3) Physics and the Life Sciences  
 198-248 (3) Physics of Energy

**Psychology**

- 204-431 (3) Environment and the Developing Brain

**Agriculture and Biosystems Engineering (Macdonald Campus)**

- 330-435 (3) Soil and Water Quality Management  
 336-217 (3) Hydrology and Drainage  
 336-322 (3) Agro-Food Waste Management  
 336-518 (3) Pollution Control from Agriculture

**Biology (Macdonald Campus)**

- 344-205 (3) Principles of Ecology  
 344-495 (3) Environmental Biology Seminar

**Microbiology (Macdonald Campus)**

- 373-331 (3) Microbial Ecology

**Physics (Macdonald Campus)**

- 338-201 (3) Introductory Meteorology

**Plant Science (Macdonald Campus)**

- 367-305 (3) Plant Pathology  
 367-304 (3) Biology of Fungi  
 367-358 (4) Flowering Plant Diversity  
 367-460 (3) Plant Ecology

**Renewable Resources (Macdonald Campus)**

- 375-333 (3) Physical and Biological Aspects of Pollution  
 375-375 (3) Issues in Environmental Sciences  
 375-410 (3) Wildlife Ecology  
 375-437 (3) Assessing Environmental Impact

**Soil Science (Macdonald Campus)**

- 372-200 (3) Introduction to Earth Science

**Zoology (Macdonald Campus)**

- 349-315 (3) Science of Inland Waters

**4 Courses**

MSE courses are team-taught by faculty spanning a range of disciplines and perspectives.

**NOTE:** Section numbers given on the McGill Course Timetable indicate which campus the course is taught on. All Core courses are offered at both campuses. 170-451 is offered in Panama only.

Section 01: Downtown Campus

Section 51: Macdonald campus

□ Denotes limited enrolment.

The course credit weight is given in parentheses (#) after the course title.

**170-200 THE GLOBAL ENVIRONMENT.** (3) A systems approach to study the different components of the environment involved in global climate change: the atmosphere, biosphere, hydrosphere, and lithosphere. The interactions among these components. Their role in global climate change. The human dimension to global change.

**170-201 SOCIETY AND ENVIRONMENT.** (3) An introduction to human societies and their relations with the biophysical environment, focusing on how economy, technology, and institutions combine and interact to give rise to environmental problems. Analytical treatment of key concepts including “carrying capacity”, “renewable resources”, “environmental equity”, and “sustainability”, from distinct disciplinary perspectives in the social and life sciences.

**170-202 THE EVOLVING EARTH.** (3) Formation of the earth and the evolution of life. How geological and biological change are the consequence of history, chance, and necessity acting over different scales of space and time. General principles governing the formation of modern landscapes and biotas. Effects of human activities on natural systems.

**170-203 KNOWLEDGE, ETHICS, AND ENVIRONMENT.** (3) Introduction to cultural perspectives on the environment: the influence of culture and cognition on perceptions of the natural world; conflicts in orders of knowledge (models, taxonomies, paradigms, theories, cosmologies), ethics (moral values, frameworks, dilemmas), and law (formal and customary, rights and obligations) regarding political dimensions of critical environments, resource use, and technologies.

**170-400 ENVIRONMENTAL STUDIES PROJECT.** (3) (See MSE website for information on prerequisites.) Students work in an interdisciplinary team on a real-world research project involving problem definition, methodology development, social, ethical and environmental impact assessment, execution of the study, and dissemination of results to the research community and to the people affected. Teams begin defining their projects during the preceding year. (Awaiting University Approval)

**170-401 ENVIRONMENTAL ANALYSIS.** (3) (See MSE website for information on prerequisites.) Students work in interdisciplinary seminar groups on challenging philosophical, ethical, scientific and practical issues. They will explore cutting-edge ideas and grapple with the reconciliation of environmental imperatives and social, political and economic pragmatics. Activities include meeting practitioners, attending guest lectures, following directed readings, and organizing, leading and participating in seminars. (Awaiting University Approval)

□ **170-451B RESEARCH IN PANAMA** (6) (Restricted to students in the Panama Field Semester program.) Research projects will be developed by instructors in consultation with Panamanian Universities, Government Agencies and non-Governmental Organizations. Project groups will consist of four to six students working with a Panamanian Institution. Topics will be relevant to Panama: e.g. protection of the Canal watershed, economical alternatives to deforestation, etc. See “Panama Field Study Semester” on [page 463](#).