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## 1 The School

### 1.1 Location

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

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

Website: <http://www.mcgill.ca/mse>

For advising, contact:  
 Program Coordinator, Mr. Peter Barry  
 Telephone: (514) 398-4306  
 Fax: (514) 398-1643  
 Email: [info@mse.mcgill.ca](mailto:info@mse.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.(Haverford), M.A., Ph.D.(Col.)  
**Director**

MARILYN SCOTT, B.Sc. (U.N.B.), Ph.D.(McG.)  
**Associate Director**

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

### 1.3 Academic Staff

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

*Associate Professor*  
 Marilyn Scott; B.Sc.(U.N.B.), Ph.D.(McG.) *(joint appt. with  
 Institute of Parasitology)*

*Assistant Professors*  
 Colin Duncan; B.A.(Queen's), M.A., Ph.D.(York) *(joint appt.  
 with History)*  
 Jaye Ellis; B.A.(Calg.), LL.B., B.C.L.(McG.), LL.M.(U.B.C.)  
*(joint appt. with Law)*  
 Frédéric Fabry; B.Sc., M.Sc., Ph.D.(McG.) *(joint appt. with  
 Atmospheric and Oceanic Sciences)*  
 Renée Sieber; B.Sc.(Mich. St.), M.P.A.(W. Mich.),  
 Ph.D.(Rutgers) *(joint appt. with Geography)*  
 Joann Whalen; B.Sc.Agr.(Dal.), M.Sc.(McG.),  
 Ph.D.(Ohio St.) *(joint appt. with Natural Resource  
 Sciences)*

### 1.4 Creation of the School

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

### 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, Registration and Regulations

### 2.1 Admission

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.

Students who have already completed a Bachelor or an equivalent degree may be admitted to the Diploma in Environment through any of the three MSE Faculties: Agricultural and Environmental Sciences, Arts, and Science. They register as students within their Faculty of admission and are governed by all rules and regulations of that Faculty relative to the Diploma.

Please refer to "[Admission Requirements](#)" on [page 13](#).

### 2.2 Degree Requirements

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

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

To be eligible for a Diploma in Environment, students must fulfil all program requirements as specified in [section 7](#).

### 2.3 Important Information about Program Codes

The MSE uses MARS Program Codes to identify which students are in the School's major programs (and, by extension, which students are in the McGill Environmental Students' Society), and the Campus where they are studying. **It is important that students taking the B.A. or B.Sc. Environment programs register on MARS using the Program Codes provided with each Domain description.**

Students can change their Program Codes when and as often as necessary.

Students studying on the Macdonald Campus will only be able to use Macdonald Facilities (libraries, computers) if they use the **Macdonald Program Codes**. This is true even for students spending only one semester at Macdonald Campus.

#### Default Codes

Students in U1 who are unsure of the Domain they want to pursue may use the Default Codes given below. The Default Codes can be used for the first year (U1) only.

**Students must select a Domain Code in order to graduate, they cannot graduate with the Default Code.**

The Default Codes are:

B.A. Faculty Program in Environment:  
Downtown 4-412000 or  
Macdonald 4-412050

B.Sc. Major Program in Environment:  
Downtown 1-412000 or  
Macdonald 1-412050

Please contact the Program Coordinator for further information.

**Note:** None of the above applies to students in the Minor or Diploma Programs.

### 2.4 Course Numbering System at McGill

The first three numbers of a McGill course number refer to the department which offers the course. See the table on [page 31](#) of this Calendar for a key to department codes. The second three numbers refer to the course itself, with 200-level courses usually taken by U1 students, 300-level by U2 students, and 400-level by U3 students. Senior undergraduate students can also take some 500-level courses, but they should limit themselves to no more than one per semester.

### 2.5 Examination Regulations

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

### 2.6 Courses outside Arts and Science

Students in the School's B.A. and B.Sc. programs may take courses outside the Faculties of Arts and of Science according to the regulations of their Faculty of admission: Arts students, see Faculty of Arts [section 2.6.2](#); Science students, see Faculty of Science [section 2.6.3](#).

Science students in particular should be aware that some courses are restricted and cannot be taken for credit. See the Science Student Affairs website at <http://www.mcgill.ca/artscisao>. Check under Course Information, Course Restrictions.

Students in the Diploma in Environment follow the program as as specified in [section 7](#).

## 3 Programs Offered

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.

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 the necessary number of credits in approved Science, or 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. The Diploma is offered by all three MSE Faculties: Agricultural and Environmental Sciences, Arts, and Science.

## 4 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.

To obtain a Minor in Environment, students must:

- (a) register for the Minor on MARS using the Program Code listed below;

- (b) submit their program of courses already taken and to be taken for the Minor in Environment to the MSE Program Coordinator for approval;
- (c) pass all courses counted towards the Minor with a **grade of C or higher**;
- (d) 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
- (e) ensure that all the credits specified in (c) above are taken outside the discipline or field of the student's major program or concentration.

#### 4.1 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
170-400	(3)	Environmental Thought

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 the Diploma](#)" on page 485. Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling.

#### 4.2 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
170-400	(3)	Environmental Thought

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 the Diploma](#)" on page 485. Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling.

## 5 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.

- 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.
- 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>).

- 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:

- register in a Domain using the MARS Program Codes listed below;
- 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
- fulfill all Faculty requirements as specified for the B.A. in the Faculty of Arts [section 2](#) which includes meeting the minimum credit requirement as specified in their letter of admission.

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

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

3 credits of calculus  
189-139 Calculus  
or 189-140 Calculus I  
or equivalent (e.g., CEGEP objective 00UN)

3 credits of basic science chosen from:

177-111 Principles of Organismal Biology  
or 180-110 General Chemistry - Biological  
or 198-101 Introductory Physics - Mechanics  
or their equivalents (e.g., CEGEP objectives: Biology 00UK,  
Chemistry 00UL, Physics 00UR).

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

The Core courses are listed below in the Domain descriptions.

##### Domain (36 credits)

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

Currently available:

Ecological Determinants of Health in Society (36 credits)  
Economics and the Earth's Environment (36 credits)  
Environment and Development (36 credits)

Additional Domains TBA – refer to the MSE website.

Each Domain has different requirements which are listed below. Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling.

#### 5.1 Ecological Determinants of Health in Society Domain

(54 credits including Core) [MARS Program Codes:  
Downtown 4-412009; Macdonald 4-412059]  
(Program revisions awaiting University approval)

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

Advisor: Professor Tim Johns  
email: [johns@macdonald.mcgill.ca](mailto:johns@macdonald.mcgill.ca)  
telephone: (514) 398-7847

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.

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)**

**Prerequisite or Corequisite Course for Domain (3 credits)**

- 177-111 (3) Principles of Organismal Biology
- or 344-120 (3) General Biology (M)
- or equivalent (e.g., CEGEP objective 00UK or equivalent)

This course can also satisfy 3 credits of the pre/co-requisites for the B.A. Faculty Program in Environment listed above.

**NOTE: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes Core and Required courses, but does not include the Domain prerequisites or co-requisites listed above.**

**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 Thought
- 170-401 (3) Environmental Research

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

- 391-410 (3) Environment and Infection (M)

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

15 credits chosen from List A:

- 151-227 (3) Medical Anthropology
- or 375-333 (3) Physical and Biological Aspects of Pollution(M)
- 154-208 (3) Microeconomic Analysis and Applications
- or 334-200 (3) Principles of Microeconomics (M)
- 166-222 (3) Urban Sociology
- or 166-234 (3) Population and Society
- 382-200C (3) Contemporary Nutrition
- or 382-207 (3) Nutrition and Health (M)
- 189-203 (3) Principles of Statistics I
- or 166-350 (3) Statistics in Social Research
- or 360-310 (3) Statistical Methods I (M)
- or equivalent

9 credits chosen from List B:

- 166-254 (3) Development and Underdevelopment
- or 151-212 (3) Anthropology of Development
- or 151-339 (3) Ecological Anthropology
- or 183-300 (3) Human Ecology in Geography
- 336-217 (3) Hydrology and Drainage (M)
- or 183-321 (3) Climatic Environments
- or 183-322 (3) Environmental Hydrology
- or 338-510 (3) Agricultural Micrometeorology (M)
- 177-205 (3) Biology of Organisms
- or 177-200 (3) Molecular Biology
- or 177-208 (3) Ecology
- or 333-211 (3) Biochemistry I (M)
- or 344-200 (3) Biology of Organisms (M)
- or 344-205 (3) Principles of Ecology (M)
- or 367-201 (3) Comparative Plant Biology (M)
- or 552-202 (3) Human Physiology: Body Functions
- 330-250 (3) Principles of Ecological Agriculture (M)
- or 330-210 (3) Agro-Ecological History (M)
- or 330-411 (3) International Agriculture (M)
- 334-242 (3) Management Theories and Practices (M)
- or 107-343 (3) Biomedical Ethics
- or 154-440 (3) Health Economics

9 credits chosen from List C:

- 101-292 (3) History and the Environment
- or 166-328 (3) Environmental Sociology
- or 423-461 (3) Society and Change

- 166-520 (3) Migration and Immigrant Groups
- or 166-550 (3) Sociology of Developing Societies
- or 183-498 (3) Humans in Tropical Environments (in Panama)
- or 204-533 (3) International Health Psychology
- 177-465 (3) Conservation Biology
- or 177-350 (3) Insect Biology and Control
- or 367-361 (3) Pest Management and the Environment (M)
- or 350-452 (3) Biocontrol of Insect Pests (M)
- or 374-410 (3) The Forest Ecosystem (M)
- or 375-410 (3) Wildlife Ecology (M)
- 528-324 (3) Fundamental Virology
- or 391-438 (3) Immunology (M)
- or 528-314 (3) Immunology
- or 528-413 (3) Parasitology
- 183-201 (3) Geographic Information Systems I
- or 183-302 (3) Environmental Analysis and Management
- or 302-230 (3) Environmental Aspects of Technology
- or 336-330 (3) GIS for Biosystems Management (M)

**5.2 Economics and the Earth's Environment Domain**

(54 credits including Core) [MARS Program Codes: Downtown 4-412011; Macdonald 4-412061]

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

Advisor: Professor Don Baker  
 email: donb@eps.mcgill.ca  
 telephone: (514) 398-7485

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 towards 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 which define much of Earth's environment and how these materials interact with each other and with the atmosphere. Courses in specific subdisciplines of Earth sciences combined with courses presenting a global vision of how the Earth and its environment operate provide the student with the necessary knowledge of geologic processes. Examples of this knowledge include the effects of mineral and energy extraction on the environment and how industrial waste interacts with solids and liquids in the environment. The Earth science and economics studies merge in the final year when the students apply what they have learned in the Domain to current environmental issues.

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)**

**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 co-requisites listed above.**

**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 Thought
- 170-401 (3) Environmental Research

**Required Courses for Domain (19 credits)**

154-230D	(6)	Microeconomic Theory
154-405	(3)	Natural Resource Economics
186-210	(3)	Introduction to Mineralogy
186-212	(4)	Introduction to Petrology
186-243	(3)	Environmental Geology

**Complementary Courses for Domain (17 credits)**

3 credits of ecology selected from:

177-208	(3)	Ecology
344-205	(3)	Principles of Ecology ( <i>M</i> )

3 credits of impact assessment selected from:

302-430	(3)	Technology Impact Assessment
375-437	(3)	Assessing Environmental Impact ( <i>M</i> )

6 credits of economics from the following list of courses:

154-326	(3)	Ecological Economics
154-347	(3)	Economics of Climate Change
154-416	(3)	Topics in Economic Development II
154-525	(3)	Project Analysis
334-333	(3)	Resource Economics ( <i>M</i> )

5 credits minimum of advanced courses selected from:

151-339	(3)	Ecological Anthropology
154-305	(3)	Industrial Organization
154-313D	(6)	Economic Development
154-408D	(6)	Public Sector Economics
154-412	(3)	Topics in Economic Development I
166-328	(3)	Environmental Sociology
177-305	(3)	Diversity of Life
183-302	(3)	Environmental Analysis and Management
183-322	(3)	Environmental Hydrology
186-312	(3)	Spectroscopy of Minerals
186-334	(3)	Invertebrate Paleontology and Evolution
186-402C	(2)	Environmental Field School
189-203	(3)	Principles of Statistics I (or equivalent)
330-435	(3)	Soil and Water Quality Management ( <i>M</i> )
372-410	(3)	Soil Chemistry ( <i>M</i> )
375-415	(2)	Conservation Law ( <i>M</i> )

**5.3 Environment and Development Domain**

(54 credits including Core) [MARS Program Codes: Downtown 4-412001; Macdonald 4-412051]  
(Program revisions awaiting University approval)

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

Advisor: Professor Oliver Coomes  
email: coomes@geog.mcgill.ca  
telephone: (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 full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (*M*).** (Introductory Core Courses are offered on both campuses.)

**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.**

**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 Thought
170-401	(3)	Environmental Research

**Domain – Required Courses (15 credits)**

177-208	(3)	Ecology
151-339	(3)	Ecological Anthropology
154-313D	(6)	Economic Development
183-302	(3)	Environmental Analysis and Management

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

3 credits in statistics to be chosen from:

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

6 credits to be chosen: (awaiting University approval)

151-418	(3)	Environment and Development
183-408	(3)	Geography of Development
183-410	(3)	Geography of Underdevelopment: Current Problems

12 credits to be chosen from the following:

101-292	(3)	History and the Environment
101-473D	(6)	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
154-405	(3)	Natural Resource Economics
154-412	(3)	Topics in Economic Development I
154-416	(3)	Topics in Economic Development II
160-338	(3)	Developing Areas/Topics I
160-422	(3)	Developing Areas/ Topics II
160-445	(3)	IPE: North-South Relations
160-472	(3)	Developing Areas/ Social Movements
160-522	(3)	Developing Areas/Honours Seminar
166-328	(3)	Environmental Sociology
166-354	(3)	Dynamics of Industrial Societies
166-550	(3)	Sociology of Developing Societies
177-465	(3)	Conservation Biology
177-535	(3)	Political Ecology
177-553	(3)	Neotropical Environments (in Panama)
177-560	(3)	Aquatic Conservation
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 Development
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 ( <i>M</i> )
330-411	(3)	International Agriculture ( <i>M</i> )
334-333	(3)	Resource Economics ( <i>M</i> )
334-430	(3)	Agriculture, Food and Resource Policy ( <i>M</i> )

334-442	(3)	Economics of International Agricultural Development ( <i>M</i> )
375-375	(3)	Issues in Environmental Sciences ( <i>M</i> )
375-380	(3)	Law and Land Use Policy ( <i>M</i> )
375-415	(2)	Conservation Law ( <i>M</i> )
382-406	(3)	Ecology of Human Nutrition ( <i>M</i> )
382-501	(3)	Nutrition in Developing Countries ( <i>M</i> )
391-410	(3)	Environment and Infection ( <i>M</i> ) (AUA)
407-532	(3)	International Social Work
409-505	(3)	Geographic Information Systems

## 6 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** which includes meeting the minimum credit requirement as specified in their letter of admission.

**B.SC. MAJOR PROGRAM IN ENVIRONMENT** (54 to 64 credits – depending upon Domain selected)

### Core – Required Courses (18 credits)

The Core courses are listed in the Domain descriptions.

**Domain** (36 to 46 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)
- Earth Sciences and Economics (minimum 45 credits)
- Ecological Determinants of Health –
  - Population Stream (minimum 39 credits)
  - or Cellular Stream (minimum 39 credits)
- Environmetrics (42 credits)
- Food Production and the Environment (minimum 45 credits)
- Renewable Resource Management (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 full course descriptions and prerequisites, and *info*McGill for current scheduling.

## 6.1 Atmospheric Environment and Air Quality Domain

(57 credits including Core) [MARS Program Codes: Downtown 1-412004; Macdonald 1-412054]

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)  
 telephone: (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.

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)**

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

### 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 Thought
170-401	(3)	Environmental Research

### Domain – Required Courses (18 credits)

180-307	(3)	Environmental Analysis
195-214	(3)	Intro. to the Physics of the Atmosphere
195-219	(3)	Intro to Atmospheric Chem.
		or 180-219
195-308	(3)	Principles of Remote Sensing
		or 183-308
195-315	(3)	Water in the Atmosphere
195-402	(3)	Atmosphere-Ocean Transports

### Domain – Complementary Courses (21 credits)

6 credits, minimum, from:

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

3 credits from:

189-203	(3)	Principles of Statistics I
		or 360-310 (3) Statistical Methods I ( <i>M</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
183-505	(3)	Global Biogeochemistry
189-223	(3)	Linear Algebra
189-315	(3)	Ordinary Differential Equations
		or 360-205 (4) Differential Equations ( <i>M</i> )
195-215	(3)	Weather Systems and Climate

- 195-419 (3) Adv. in Chem. of Atmosphere  
or 180-419  
195-515 (3) Turbulence in the Atmosphere and Oceans  
195-540 (3) Synoptic Meteorology I  
302-230 (3) Environmental Aspects of Technology  
303-225 (3) Environmental Engineering  
308-208 (3) Computers in Engineering  
338-510 (3) Agricultural Micrometeorology (*M*)  
375-333 (3) Physical and Biological Aspects of Pollution (*M*)

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  
183-404 (3) Environmental Management for Developing Areas  
260-270 (3) Religious Ethics and the Environment  
389-580 (3) Environment and the Law

## 6.2 Biodiversity and Conservation Domain

(60 credits including Core) [MARS Program Codes: Downtown 1-412002; Macdonald 1-412052]

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

Advisors: Professor Graham Bell  
email: gbell2@macdonald.mcgill.ca  
telephone: (514) 398-4086 local 4087  
Professor David Green  
email: david.m.green@mcgill.ca  
telephone: (514) 398-4086 local 4088

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.

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (*M*). (Introductory Core Courses are offered on both campuses.)**

**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.**

- 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 Thought  
170-401 (3) Environmental Research

### Domain – Required Courses (15 credits)

- 9 credits, basic courses in the biological principles of diversity, systematics and conservation  
177-304 (3) Evolution  
177-305 (3) Diversity of Life  
177-465 (3) Conservation Biology  
6 credits, interface between science, policy and management  
154-225 (3) Economics of the Environment  
183-302 (3) Environmental Analysis and Management

### Domain – Complementary Courses (27 credits)

- 6 credits of ecology and statistics:  
177-208 (3) Ecology  
or 344-205 (3) Principles of Ecology (*M*)  
177-373 (3) Biostatistical Analysis  
or 360-310 (3) Statistical Methods I (*M*)  
3 credits to be chosen: (awaiting University approval)  
151-418 (3) Environment and Development  
183-408 (3) Geography of Development  
183-410 (3) Geography of Underdevelopment: Current Problems

3 credits chosen from:

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

\* 367-358A and 177-358A are courses with substantially the same content, taught on different campuses. Only one may be taken. See the Calendar listing for these courses for information on the required field component in summer prior to first classes.

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/Behaviour Field Course  
177-334 (3) Field Course in Applied Tropical Ecology  
177-553 (3) Neotropical Environments (in Panama)  
183-495 (3) Field Studies – Physical Geography  
183-497 (3) Ecology of Coastal Waters  
183-499 (3) Subarctic Field Studies in Geography  
375-475 (3) Desert Ecology (*M*)

12 credits chosen from the following three course lists, of which 6 must be 300-level or above:

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

- 177-324 (3) Ecological Genetics  
177-341 (3) History of Life  
177-432 (3) Limnology  
177-441 (3) Biological Oceanography  
177-473 (3) Ecology of Aquatic Invertebrates  
177-505 (3) Advanced Seminar in Biodiversity & Systematics  
177-542 (3) Marine Biology  
177-560 (3) Aquatic Conservation  
183-201 (3) Geographical Information Systems I  
183-272 (3) Landforms and Environmental Systems  
183-350 (3) Ecological Biogeography  
336-330 (3) GIS for Biosystems Management (*M*)  
349-313 (3) Zoogeography (*M*)  
367-460 (3) Plant Ecology (*M*)  
373-331 (3) Microbial Ecology (*M*)  
373-421 (3) Topics in Wildlife Conservation (*M*)  
374-410 (3) The Forest Ecosystem (*M*)  
374-420 (3) Environmental Issues in Forestry (*M*)  
375-375 (3) Issues in Environmental Sciences (*M*)  
375-410 (3) Wildlife Ecology (*M*)  
375-437 (3) Assessing Environmental Impact (*M*)

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

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

- 151-339 (3) Ecological Anthropology
- 154-326 (3) Ecological Economics
- 166-328 (3) Environmental Sociology
- 183-321 (3) Climatic Environments
- 183-404 (3) Environmental Management for Developing Areas
- 183-510 (3) Humid Tropical Environments
- 334-333 (3) Resource Economics (*M*)
- 375-415 (2) Conservation Law (*M*) (If this course is taken, one additional credit of electives must be taken.)

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

- 177-327 (3) Herpetology
- 177-351 (3) The Biology of Invertebrates
- 177-354 (3) Biology of Birds
- 177-437 (3) Advanced Invertebrate Zoology
- 177-358 (3) Canadian Flora
- or 367-358 (3) Flowering Plant Diversity (*M*)
- 349-307 (3) Natural History of the Vertebrates (*M*)
- 349-312 (3) Zoological Systematics and Evolution (*M*)
- 349-424 (3) Parasitology (*M*)
- 350-440 (3) Systematic Entomology (*M*)
- 367-304 (3) Biology of Fungi (*M*)
- 367-458 (3) Flowering Plant Systematics (*M*)
- 375-420 (3) Topics in Ornithology (*M*)

### 6.3 Earth Sciences and Economics Domain

(63 credits, minimum, including Core) [MARS Program Codes: Downtown 1-412007; Macdonald 1-412057]

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

Advisor: Professor Don Baker  
 email: donb@eps.mcgill.ca  
 telephone: (514) 398-7485

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

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

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (*M*).** (Introductory Core Courses are offered on both campuses.)

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

### 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 Thought
- 170-401 (3) Environmental Research

### Required Courses for Domain (25 credits)

- 154-230D (6) Microeconomic Theory
- 154-405 (3) Natural Resource Economics
- 186-210 (3) Introduction to Mineralogy
- 186-212 (4) Introduction to Petrology
- 186-220 (3) Principles of Geochemistry
- 186-243 (3) Environmental Geology
- 186-425 (3) Depositional Environments & Sequence Stratigraphy

### Complementary Courses (20 credits, minimum)

12 credits from List A

- 177-208 (3) Ecology
- or 344-205 (3) Principles of Ecology (*M*)
- 302-430 (3) Technology Impact Assessment
- or 375-437 (3) Assessing Environmental Impact (*M*)
- 154-326 (3) Ecological Economics
- 154-347 (3) Economics of Climate Change
- 154-416 (3) Topics in Economic Development II
- 154-525 (3) Project Analysis
- 334-333 (3) Resource Economics (*M*)

8 credits, minimum, from List B

- 151-339 (3) Ecological Anthropology
- 154-305 (3) Industrial Organization
- 154-313D (6) Economic Development
- 154-408D (6) Public Sector Economics
- 154-412 (3) Topics in Economic Development I
- 166-328 (3) Environmental Sociology
- 177-305 (3) Diversity of Life
- 183-302 (3) Environmental Analysis and Management
- 183-322 (3) Environmental Hydrology
- 186-312 (3) Spectroscopy of Minerals
- 186-334 (3) Invertebrate Paleontology and Evolution
- 186-401 (3) Advanced Environmental Geology
- 186-402C (2) Environmental Field School
- 186-483D (6) Independent Study in Environmental Geology
- 186-519 (3) Isotope Geology
- 186-542 (3) Chemical Oceanography
- 186-549 (3) Hydrogeology
- 186-580 (3) Aqueous Geochemistry
- 186-590 (3) Applied Geochemistry Seminar
- 195-210 (3) Introduction to Atmospheric Science
- 195-220 (3) Introduction to Oceanic Sciences
- 330-435 (3) Soil and Water Quality Management (*M*)
- 372-410 (3) Soil Chemistry (*M*)

### 6.4 Ecological Determinants of Health Domain

(57 credits, minimum, including Core) [MARS Program Codes: Downtown 1-412008; Macdonald 1-412058]

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

Advisor: Professor Tim Johns  
 email: johns@macdonald.mcgill.ca  
 telephone: (514) 398-7847

This Domain considers the interface between the environment and human well-being, with particular focus on the triad that ties human health to the environment through the elements of food and infectious agents. Each of these elements is influenced by planned and unplanned environmental disturbances.

For example, agricultural practices shift the balance between beneficial and harmful ingredients of food. Use of insecticides presents dilemmas with regard to the environment, economics and



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

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

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

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M).** (Introductory Core Courses are offered on both campuses.)

### Ecological Determinants of Health Domain – Population Stream (57 credits, minimum)

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

#### 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 Thought
170-401	(3)	Environmental Research

#### Required Courses for Domain - Population Stream (6 credits)

382-361	(3)	Environmental Toxicology (M)
391-410	(3)	Environment and Infection (M)

#### Complementary Courses for Domain (33 credits, minimum)

18 credits, minimum, from the following List A:

166-234	(3)	Population and Society
or 166-222	(3)	Urban Sociology
333-211	(3)	Biochemistry I (M)
or 177-200	(3)	Molecular Biology
or 177-201	(3)	Cell Biology and Metabolism
356-204	(4)	Genetics (M)
or 177-202	(3)	Basic Genetics
382-207	(3)	Nutrition and Health (M)
or 382-307	(3)	Human Nutrition ( <i>Video Conference: Downtown and Macdonald</i> )
or 342-330	(3)	Fundamentals of Nutrition (M)
374-410	(3)	The Forest Ecosystem (M)
or 177-465	(3)	Conservation Biology
or 177-483	(3)	Stats in Population Biology
or 360-306	(3)	Mathematical Methods in Ecology (M)
or 367-460	(3)	Plant Ecology (M)
or 373-331	(3)	Microbial Ecology (M)
or 375-410	(3)	Wildlife Ecology (M)
189-203	(3)	Principles of Statistics I
or 360-310	(3)	Statistical Methods I (M)
or equivalent		

6 credits from the following List B:

166-254	(3)	Development and Underdevelopment
or 101-292	(3)	History and the Environment
or 151-212	(3)	Anthropology of Development
or 330-210	(3)	Agro-Ecological History (M)
336-217	(3)	Hydrology and Drainage (M)
or 183-321	(3)	Climatic Environments
or 183-322	(3)	Environmental Hydrology
or 330-250	(3)	Principles of Ecological Agriculture (M)
or 338-510	(3)	Agricultural Micrometeorology (M)

334-242	(3)	Management Theories and Practices (M)
or 107-343	(3)	Biomedical Ethics
or 154-208	(3)	Microeconomic Analysis and Applications
or 177-535	(3)	Political Ecology
or 423-461	(3)	Society and Change

9 credits from the following list C:

166-328	(3)	Environmental Sociology
or 183-300	(3)	Human Ecology in Geography
or 183-498	(3)	Humans in Tropical Environments (in Panama)
or 204-533	(3)	International Health Psychology
528-324	(3)	Fundamental Virology
or 391-400	(3)	Eukaryotic Cells and Viruses (M)
or 391-438	(3)	Immunology (M)
or 513-637L	(3)	Infectious and Parasitic Disease Epidemiology
or 528-314	(3)	Immunology
or 528-413	(3)	Parasitology
382-406	(3)	Ecology of Human Nutrition (M)
or 330-411	(3)	International Agriculture (M)
or 382-420	(3)	Food Toxicants and Health Risks (M)
or 382-501	(3)	Nutrition in Developing Countries (M)
or 382-512	(3)	Herbs, Foods and Phytochemicals ( <i>Video Conference: Downtown and Macdonald</i> )
302-230	(3)	Environmental Aspects of Technology
or 183-201	(3)	Geographic Information Systems I
or 183-302	(3)	Environmental Analysis and Management
or 336-330	(3)	GIS for Biosystems Management (M)
or 375-437	(3)	Assessing Environmental Impact (M)
375-333	(3)	Physical and Biological Aspects of Pollution (M)
or 177-350	(3)	Insect Biology and Control
or 336-322	(3)	Agro-Food Waste Management (M)
or 350-452	(3)	Biocontrol of Insect Pests (M)
or 367-361	(3)	Pest Management and the Environment (M)

### Ecological Determinants of Health Domain – Cellular Stream (57 credits, minimum)

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

#### 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 Thought
170-401	(3)	Environmental Research

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

382-361	(3)	Environmental Toxicology (M)
391-410	(3)	Environment and Infection (M)

#### Complementary Courses for Domain (33 credits, minimum)

18 credits, minimum, chosen from List A:

166-234	(3)	Population and Society
or 166-222	(3)	Urban Sociology
333-211	(3)	Biochemistry I (M)
or 177-200	(3)	Molecular Biology
356-204	(4)	Genetics (M)
or 177-202	(3)	Basic Genetics
344-202	(3)	Cellular Biology (M)
or 177-201	(3)	Cell Biology and Metabolism
or 342-234	(3)	Biochemistry II (M)
382-307	(3)	Human Nutrition ( <i>Video Conference: Downtown and Macdonald</i> )
or 342-330	(3)	Fundamentals of Nutrition (M)
189-203	(3)	Principles of Statistics I
or 360-310	(3)	Statistical Methods I (M)
or equivalent		

6 credits, minimum, chosen from List B:

- 552-209 (3) Mammalian Physiology I
- or 342-323 (4) Mammalian Physiology (*M*)
- 549-300 (3) Drug Action
- or 342-424 (3) Metabolic Endocrinology (*M*)
- 362-341 (3) Mechanisms of Pathogenicity (*M*)
- or 391-438 (3) Immunology (*M*)
- or 528-314 (3) Immunology

9 credits chosen from List C:

- 336-217 (3) Hydrology and Drainage (*M*)
- or 183-321 (3) Climatic Environments
- or 183-322 (3) Environmental Hydrology
- or 338-510 (3) Agricultural Micrometeorology (*M*)
- 374-410 (3) The Forest Ecosystem (*M*)
- or 177-432 (3) Limnology
- or 177-465 (3) Conservation Biology
- or 367-304 (3) Biology of Fungi (*M*)
- or 367-460 (3) Plant Ecology (*M*)
- or 373-331 (3) Microbial Ecology (*M*)
- or 375-410 (3) Wildlife Ecology (*M*)
- 546-300 (3) Human Disease
- or 177-350 (3) Insect Biology and Control
- or 350-452 (3) Biocontrol of Insect Pests (*M*)
- or 367-361 (3) Pest Management and the Environment (*M*)
- or 382-406 (3) Ecology of Human Nutrition (*M*)
- or 382-420 (3) Food Toxicants and Health Risks (*M*)
- or 382-512 (3) Herbs, Foods and Phytochemicals (*Video Conference: Downtown and Macdonald*)
- or 391-400 (3) Eukaryotic Cells and Viruses (*M*)
- or 528-324 (3) Fundamental Virology
- or 528-413 (3) Parasitology
- 302-230 (3) Environmental Aspects of Technology
- or 183-302 (3) Environmental Analysis and Management
- or 336-322 (3) Agro-Food Waste Management (*M*)
- or 375-437 (3) Assessing Environmental Impact (*M*)
- 375-333 (3) Physical and Biological Aspects of Pollution (*M*)
- or 180-307 (3) Environmental Analysis
- or 336-518 (3) Pollution Control for Agriculture (*M*)

## 6.5 Environmetrics Domain

(60 credits including Core) [MARS Program Codes: Downtown 1-412005; Macdonald 1-412055]

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

Advisor: Professor Dutilleul  
 email: cydp@musica.mcgill.ca  
 telephone: (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 and mathematics and environ-

mental sciences. The possibility of an internship is also offered to students to provide them with preliminary professional experience.

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)**

**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.**

### 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 Thought
- 170-401 (3) Environmental Research

### Domain – Required Course (3 credits)

- 360-414 (3) Temporal and Spatial Statistics (*M*)

### Domain – Complementary Courses (39 credits, minimum)

18 credits:

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

3 credits chosen from:

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

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 1 (*M*)
- and one 3-credit applied statistics course from the statistics and mathematics list given below

6 credits, minimum, 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
- 189-447 (3) Stochastic Processes
- 189-525 (4) Sampling Theory and Applications
- 336-252 (3) Structured Computer Programming (or equivalent) (*M*)
- 336-319 (3) Applied Mathematics (or equivalent) (*M*)
- 360-403 (3) Environmetrics Stage (internship) (*M*)

6 credits, minimum, in environmental sciences chosen from:

- |         |     |  |
|---------|-----|--|
| 177-331 | (3) | Ecology/Behavior Field Course                                |
| 177-526 | (3) | Plants and Extreme Environments                              |
| 183-300 | (3) | Human Ecology in Geography                                   |
| 183-302 | (3) | Environmental Analysis and Management                        |
| 183-494 | (3) | Urban Field Studies  |
| 183-499 | (3) | Subarctic Field Studies in Geography:<br>Schefferville       |
| 306-451 | (3) | Environmental Controls                                       |
| 349-313 | (3) | Zoogeography ( <i>M</i> )                                    |
| 367-460 | (3) | Plant Ecology ( <i>M</i> )                                   |
| 374-300 | (3) | Urban Forests and Trees ( <i>M</i> )                         |
| 374-420 | (3) | Environmental Issues in Forestry ( <i>M</i> )                |
| 375-333 | (3) | Physical and Biological Aspects of Pollution<br>( <i>M</i> ) |
| 375-401 | (4) | Fisheries and Wildlife Management ( <i>M</i> )               |

## 6.6 Food Production and Environment Domain

(63 credits, minimum, including Core) [MARS Program Codes: Downtown 1-412010; Macdonald 1-412060]  
(Revisions awaiting University approval)

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

Advisor: TBA. Contact Mr. Pete Barry, MSE Program Coordinator  
email: [info@mse.mcgill.ca](mailto:info@mse.mcgill.ca)  
telephone: (514) 398-4306  
or refer to the Website, <http://www.mcgill.ca/mse>

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 while 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.

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)**

### Prerequisite or Corequisite Courses for Domain

(6 credits, minimum)

- |         |     |   |
|---------|-----|---|
| 333-211 | (3) | Biochemistry I ( <i>M</i> )                   |
|         | or  | 177-112 (3) Cell and Molecular Biology        |
|         | or  | CEGEP equivalent (e.g., CEGEP objective 00XU) |
| 333-230 | (4) | Organic Chemistry ( <i>M</i> )                |
|         | or  | 180-212 (4) Introductory Organic Chemistry I  |
|         | or  | CEGEP equivalent (e.g., CEGEP objective 00XV) |

**NOTE: Students are required to take a maximum of 34 credits at the 200 level and a minimum of 15 credits at the 400 level or higher in this program. This includes Core and Required courses, but does not include the Domain prerequisites or co-requisites listed above.**

### 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 Thought             |
| 170-401 | (3) | Environmental Research            |

### Required Courses for Domain (12 credits)

- |         |     |   |
|---------|-----|---|
| 330-210 | (3) | Agro-ecological History ( <i>M</i> )          |
| 367-211 | (3) | Principles of Plant Science ( <i>M</i> )      |
| 367-300 | (3) | Cropping Systems ( <i>M</i> )                 |
| 375-375 | (3) | Issues in Environmental Sciences ( <i>M</i> ) |

### Complementary Courses (33 credits, minimum)

15 or 16 credits of Basic Sciences

- |         |     |   |
|---------|-----|---|
| 330-250 | (3) | Principles of Ecological Agriculture ( <i>M</i> )     |
|         | or  | 342-250 (3) Principles of Animal Science ( <i>M</i> ) |
| 344-205 | (3) | Principles of Ecology ( <i>M</i> )                    |
|         | or  | 177-208 (3) Ecology                                   |
| 356-204 | (4) | Genetics ( <i>M</i> )                                 |
|         | or  | 177-202 (3) Basic Genetics                            |
| 360-310 | (3) | Statistical Methods I ( <i>M</i> )                    |
|         | or  | equivalent  |
| 372-210 | (3) | Principles of Soil Science ( <i>M</i> )               |
|         | or  | 183-305 (3) Soils and Environment                     |

12 credits of Applied Sciences

- |         |     |  |
|---------|-----|--|
| 177-465 | (3) | Conservation Biology   |
| 177-553 | (3) | Neotropical Environments (in Panama)                         |
| 183-302 | (3) | Environmental Analysis and Management                        |
| 183-322 | (3) | Environmental Hydrology                                      |
|         | or  | 336-217 (3) Hydrology and Drainage ( <i>M</i> )              |
| 330-411 | (3) | International Agriculture ( <i>M</i> )                       |
| 330-430 | (3) | Ecological Agricultural Systems ( <i>M</i> )                 |
| 330-435 | (3) | Soil and Water Quality Management ( <i>M</i> )               |
| 330-550 | (3) | Sustained Tropical Agriculture (in Panama)<br>(AUA)          |
| 333-200 | (3) | Introduction to Food Science ( <i>M</i> )                    |
|         | or  | 382-207 (3) Nutrition and Health ( <i>M</i> )                |
| 333-535 | (3) | Food Biotechnology ( <i>M</i> )                              |
| 336-322 | (3) | Agro-Food Waste Management ( <i>M</i> )                      |
| 336-518 | (3) | Pollution Control for Agriculture ( <i>M</i> )               |
| 342-501 | (3) | Advanced Animal Production Systems ( <i>M</i> )              |
| 367-361 | (3) | Pest Management and the Environment ( <i>M</i> )             |
| 367-434 | (3) | Weed Biology and Control ( <i>M</i> )                        |
| 372-315 | (3) | Soil Fertility and Fertilizers ( <i>M</i> )                  |
| 372-410 | (3) | Soil Chemistry ( <i>M</i> )                                  |
| 373-331 | (3) | Microbial Ecology ( <i>M</i> )                               |
| 373-521 | (3) | Soil Microbiology and Biochemistry ( <i>M</i> )              |
| 375-401 | (4) | Fisheries and Wildlife Management ( <i>M</i> )               |
| 375-333 | (3) | Physical and Biological Aspects of Pollution<br>( <i>M</i> ) |
| 375-437 | (3) | Assessing Environmental Impact ( <i>M</i> )                  |
| 382-361 | (3) | Environmental Toxicology ( <i>M</i> )                        |
| 382-406 | (3) | Ecology of Human Nutrition ( <i>M</i> )                      |
| 391-410 | (3) | Environment and Infection ( <i>M</i> )                       |

6 credits in Social Sciences / Humanities

- |         |     |   |
|---------|-----|---|
| 151-418 | (3) | Environment and Development   |
| 154-225 | (3) | Economics of the Environment  |
| 166-254 | (3) | Development and Underdevelopment                                    |
| 183-404 | (3) | Environmental Management of Developing<br>Areas                     |
| 183-410 | (3) | Geography of Underdevelopment: Current<br>Problems                  |
| 183-498 | (3) | Humans in Tropical Environments (in Panama)                         |
| 183-510 | (3) | Humid Tropical Environments   |
| 334-200 | (3) | Principles of Microeconomics ( <i>M</i> )                           |
| 334-320 | (3) | Economics of Agricultural Production ( <i>M</i> )                   |
| 334-333 | (3) | Resource Economics ( <i>M</i> )                                     |
|         | or  | 154-405 (3) Natural Resource Economics                              |
| 334-430 | (3) | Agriculture, Food and Resource Policy ( <i>M</i> )                  |
| 334-442 | (3) | Economics of International Agricultural<br>Development ( <i>M</i> ) |
| 375-415 | (2) | Conservation Law ( <i>M</i> )                                       |

## 6.7 Renewable Resource Management Domain

(60 credits including Core) [MARS Program Codes: Downtown 1-412006; Macdonald 1-412056]

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

Advisor: Professor Benoît Côté,  
email: coteb@nrs.mcgill.ca  
telephone: (514) 398-7952

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

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

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)**

### Prerequisite or Corequisite Courses for Domain

(6 credits, minimum)

- 333-211 (3) Biochemistry I (M)  
or 177-112 (3) Cell and Molecular Biology  
or CEGEP equivalent (e.g., CEGEP objective 00XU)
- 333-230 (4) Organic Chemistry (M)  
or 180-212 (4) Introductory Organic Chemistry I  
or CEGEP equivalent (e.g., CEGEP objective 00XV)

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

### 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 Thought
- 170-401 (3) Environmental Research

### Domain – Complementary Courses (42 credits)

9 credits of basic principles of ecosystem processes and diversity chosen from:

- 344-200 (3) Biology of Organisms I (M)  
or 367-201 (3) Comparative Plant Biology (M)  
or 177-305 (3) Diversity of Life
- 344-205 (3) Principles of Ecology (M)  
or 177-208 (3) Ecology
- 372-210 (3) Principles of Soil Science (M)  
or 183-305 (3) Soils and Environment

6 credits of statistics and GIS methods:

- 360-310 (3) Statistical Methods I (M)  
or 177-373 (3) Biostatistical Analysis
- 336-330 (3) GIS for Biosystems Management (M)  
or 183-201 (3) Geographical Information Systems I

6 credits of advanced ecosystem components chosen from:

- 367-358\* (3) Flowering Plant Diversity (M)  
or 177-358\* (3) Canadian Flora

\* 367-358A and 177-358A are courses with substantially the same content, taught on different campuses. Only one may be taken. See the Calendar listing for these courses for information on the required field component in summer prior to first classes.

- 349-307 (3) Natural History of the Vertebrates (M)
- 372-326 (3) Soil Genesis and Classification (M)

6 credits of advanced courses on ecological processes:

- 177-465 (3) Conservation Biology
- 183-322 (3) Environmental Hydrology  
or 336-217 (3) Hydrology and Drainage (M)
- 349-315 (3) Science of Inland Waters (M)  
or 177-432 (3) Limnology
- 367-460 (3) Plant Ecology (M)
- 373-331 (3) Microbial Ecology (M)
- 374-410 (3) The Forest Ecosystem (M)
- 375-410 (3) Wildlife Ecology (M)
- 183-470C (3) Wetlands
- 183-372 (3) Running Water Environments

6 credits of social processes:

- 151-339 (3) Ecological Anthropology
- 166-328 (3) Environmental Sociology
- 260-270 (3) Religious Ethics and the Environment
- 334-242 (3) Management Theories and Practices (M)
- 334-333 (3) Resource Economics (M)  
or 154-405 (3) Natural Resource Economics
- 375-415 (2) Conservation law (M)

9 credits in the management of ecosystems or ecosystem components:

- 177-470 (3) Lake Management
- 183-302 (3) Environmental Analysis and Management
- 183-404 (3) Environmental Management for Developing Areas
- 330-435 (3) Soil and Water Quality Management (M)
- 367-300 (3) Cropping Systems (M)
- 374-441 (3) Integrated Forest Management (M)
- 375-401 (4) Fisheries and Wildlife Management (M)
- 375-437 (3) Assessing Environmental Impact (M)

## 6.8 Water Environments and Ecosystems Domain

(54 credits including Core) [MARS Program Codes: Downtown 1-412003; Macdonald 1-412053]

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

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.

**Water Environments and Ecosystems Domain –****Physical Stream** (54 credits minimum)

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)  
telephone: (514) 398-3719

Check the departmental listings in this Calendar for full course descriptions and prerequisites, and *info*McGill for current scheduling. **Courses offered at Macdonald Campus are marked with an (M).** (Introductory Core Courses are offered on both campuses.)

**Recommended Corequisite Course for Domain** (3 credits)

189-222 (3) Calculus III  
or CEGEP Mathematics 201-301 or equivalent

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

**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 Thought  
170-401 (3) Environmental Research

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

183-372 (3) Running Water Environments  
195-220 (3) Introduction to Oceanic Sciences  
195-315 (3) Water in the Atmosphere

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

6 credits chosen from:

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

3 credits chosen from the following:

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

12 credits chosen from the following:

183-201 (3) Geographic Information Systems I  
183-306 (3) Geographic Information Systems II  
or 336-330 (3) GIS for Biosystems Management (M)  
183-522 (3) Advanced Environmental Hydrology  
or 336-506 (3) Advances in Drainage Management (M)  
or 336-509 (3) Hydrologic Systems and Modelling (M)  
183-537 (3) Advanced Fluvial Geomorphology  
186-549 (3) Hydrogeology  
189-315 (3) Ordinary Differential Equations  
or 360-205 (4) Differential Equations (M)  
195-215 (3) Weather Systems and Climate  
195-308 (3) Principles of Remote Sensing  
or 183-308  
195-402 (3) Atmosphere-Ocean Transports  
195-414 (3) Applications of Remote Sensing  
195-568 (3) Ocean Physics  
303-323 (3) Hydrology and Water Resources  
330-435 (3) Soil and Water Quality Management (M)  
336-416 (3) Engineering for Land Development (M)  
338-510 (3) Agricultural Micrometeorology (M)  
372-210 (3) Principles of Soil Science (M)  
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 (M)  
177-473 (3) Ecology of Aquatic Invertebrates  
177-542 (3) Marine Biology  
177-560 (3) Aquatic Conservation  
183-350 (3) Ecological Biogeography  
183-505 (3) Global Biogeochemistry  
375-401 (4) Fisheries and Wildlife Management (M)

**Water Environments and Ecosystems Domain –**  
**Biological Stream** (54 credits minimum)

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

Advisor: TBA. Contact Mr. Pete Barry, MSE Program Coordinator  
email: [info@mse.mcgill.ca](mailto:info@mse.mcgill.ca)  
telephone: (514) 398-4306  
or refer to the Website, <http://www.mcgill.ca/mse>

**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.**

**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 Thought  
170-401 (3) Environmental Research

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

195-220 (3) Introduction to Oceanic Sciences

**Domain – Complementary Courses** (33 credits, minimum)

6 credits chosen from:

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

3 credits chosen from the following:

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

3 credits chosen from the following:

177-331 (3) Ecology/Behaviour Field Course  
or 183-497 (3) Ecology of Coastal Waters  
or equivalent aquatic field course (AUA)

18 credits, minimum, from Lists A and B below –

List A, 9 to 12 credits chosen from:

177-441 (3) Biological Oceanography  
177-432 (3) Limnology  
177-542 (3) Marine Biology  
177-560 (3) Aquatic Conservation  
177-570 (3) Advanced Seminar in Evolution (AUA)  
183-305 (3) Soils and Environment  
or 372-210 (3) Principles of Soil Science (M)  
183-350 (3) Ecological Biogeography  
330-435 (3) Soil and Water Quality Management (M)  
349-315 (3) Science of Inland Waters (M)  
350-535 (3) Aquatic Entomology (M)  
373-331 (3) Microbial Ecology (M)  
375-333 (3) Physical and Biological Aspects of Pollution (M)  
375-401 (4) Fisheries and Wildlife Management (M)  
391-410 (3) Environment and Infection (M) (AUA)

List B, 6 to 10 credits chosen from:

- 180-257D (4) Analytical Chemistry
- 180-219 (3) Intro to Atmospheric Chem. (AUA)
- or 195-219
- 180-419 (3) Adv. in Chem. of Atmosphere (AUA)
- or 195-419
- 183-201 (3) Geographic Information Systems I
- 183-372 (3) Running Water Environments
- 183-522 (3) Advanced Environmental Hydrology
- 183-537 (3) Advanced Fluvial Geomorphology
- 183-550 (3) Quaternary Paleoecology
- 186-220 (3) Principles of Geochemistry
- 195-215 (3) Weather Systems and Climate
- 195-308 (3) Principles of Remote Sensing
- or 183-308
- 195-310 (3) Physical Oceanography
- 195-330 (3) Physical Meteorology
- 336-330 (3) GIS for Biosystems Management (M)

3 credits chosen from the following list:

- 151-339 (3) Ecological Anthropology
- 151-418 (3) Environment and Development
- 154-225 (3) Economics of the Environment
- 154-326 (3) Ecological Economics
- 160-345 (3) International Organization
- 160-466 (3) Public Policy Analysis
- 334-333 (3) Resource Economics (M)

## 7 Diploma In Environment

Advisor: Mr. Pete Barry, MSE Program Coordinator  
 email: info@mse.mcgill.ca  
 telephone: (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. 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.

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 Thought
- 170-401 (3) Environmental Research

#### 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. or equivalent degree must take 6 credits from the Natural Sciences and Technology list; those with a B.Sc. or equivalent 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. or equivalent degree must take 6 credits at the 400 level or higher in Social Sciences and Policy; those with a B.Sc. or equivalent degree must take 6 credits at the 400 level or higher in Natural Sciences and Technology.)

## 8 Field Studies

### 8.1 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 I 189-203, or equivalent. A GPA of 3.00 and higher is recommended. The program is aimed at 400-level students in their final year.

#### 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 (15 credits)**  
 (Program Revision awaiting University approval)

#### Required Courses (9 credits)

- 177-553B (3) Neotropical Environments
- 170-451B (6) Research in Panama

#### Complementary Courses (6 credits)

One of the following sets:

Offered in Winter 2002 –

- 183-498B (3) Humans in Tropical Environments
- 330-550B (3) Sustained Tropical Agriculture

Offered in Winter 2003 –

- 166-565B (3) Social Change in Panama
- 183-404B (3) Environmental Management for Developing Areas

Hands-on experience is gained through a research 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 \$5500CDN (excluding food, tuition and insurance).

For the year 2002, students are to submit, by April 1, 2001, a letter of intent, CV, and copy of their transcript to Susan Gabe, Biology Undergraduate Office (W4/8, Stewart Biology Building, Downtown Campus, telephone (514) 398-7045.

See the MSE website for more information.

### 8.2 Macdonald Campus Summer Field Study Human Impacts on the Environment

Courses are available during Summer Session that provide students the opportunity to participate in supervised field research concerning flora and fauna not easily studied at other times of the year, and to apply knowledge from the classroom to environmental issues in the field. Common thematic elements include: the linkages between physical, biological and human systems, field research, and human impacts on the environment. Students learn and apply research techniques and analytical skills within a multi-disciplinary, holistic approach.

For more information, see the Faculty of Agricultural and Environmental Sciences section, [page 449](#), or Website <http://www.mcgill.ca/macdonald/programs/applied/> or the *2001 Summer Studies Calendar* or website <http://www.mcgill.ca/Summer/>

### 8.3 Bay of Fundy Field Study Semester (Awaiting University approval)

Contingent upon University approval, a new field study program for McGill students will be offered during fall semester 2001.

Students in the program could earn 15 credits through field courses and research while living at the Huntsman Marine Science Centre on the Bay of Fundy. The program will be aimed at final-year students with a GPA of at least 3.00.

In addition to the regular McGill fees, the field semester fee is estimated at \$4,300, which would include food and lodging at the Huntsman Marine Science Centre as well as field trips. Travel to St. Andrews, New Brunswick, **would not be** included.

See the MSE website or the Geography Department website at <http://www.geog.mcgill.ca/fieldsemester.html> for more information on this program.

## 9 List of Approved Thematic Category Courses for the Minor and the 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 *info*McGill 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

#### Environment

- 170-201 (3) Society and Environment  
170-203 (3) Knowledge, Ethics and Environment  
170-400 (3) Environmental Thought

#### Geography

- 183-200 (3) Geographical Perspectives on World Environmental Problems  
183-216 (3) Geography of the World Economy  
183-300 (3) Human Ecology in Geography  
183-301 (3) Geography of Nunavut  
183-302 (3) Environmental Analysis and Management  
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) Introduction to Comparative Politics  
160-212 (3) Government and Politics of the Developed World  
160-227 (3) Developing Areas/Introduction  
160-345 (3) International Organization  
160-445 (3) IPE: North-South Relations

#### Psychology

- 204-215 (3) Social Psychology

#### Religious Studies

- 260-270 (3) Religious Ethics and the Environment  
260-370 (3) Justice, Human Rights and Religion  
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, Environment 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

#### Biology

- 177-208 (3) 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 Computing I  
 308-203 (3) Introduction to Computing II

**Earth and Planetary Sciences**

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

**Environment**

- 170-200 (3) The Global Environment  
 170-202 (3) The Evolving Earth

**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) Principles of 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  
 528-314 (3) Immunology  
 528-323 (3) Microbial Physiology and Genetics  
 528-324 (3) Fundamental Virology

**Mining and Metallurgical Engineering**

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

**Physics**

- 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 for 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)**

- 367-304 (3) Biology of Fungi  
 367-305 (3) Plant Pathology  
 367-358 (3) 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

**10 Courses**

MSE courses are team-taught by faculty spanning a range of disciplines and perspectives. The names of course instructors are listed on the Course Timetable available on *infoMcGill* via the Web <http://www.mcgill.ca/students/courses/>.

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

**All courses have limited enrolment.**

**170-200A 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.  
*Section 01: Downtown Campus*  
*Section 51: Macdonald Campus*

**170-201A SOCIETY AND ENVIRONMENT.** (3) An introduction to human societies and their relations with the biophysical environment, focusing on how economy, technology, and institutions interact to give rise to environmental problems. Analytical treatment of key concepts from distinct disciplinary perspectives in the social and life sciences, including "carrying capacity", "renewable resources", "environmental equity", and "sustainability".  
*Section 01: Downtown Campus*  
*Section 51: Macdonald campus*

**170-202B 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.  
*Section 01: Downtown Campus*  
*Section 51: Macdonald Campus*

**170-203A,B 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.  
*Section 01: Downtown Campus*  
*Section 51: Macdonald Campus*

**170-380A,B TOPICS IN ENVIRONMENT 1.** (3) (Normally open only to students who have completed MSE U1 core courses.) Lectures and discussion of interdisciplinary aspects of current problems in environment led by staff and/or special guests. This course is offered on an irregular basis.

**170-400A ENVIRONMENTAL THOUGHT.** (3) 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.  
*Downtown Campus only.*

**170-401A ENVIRONMENTAL RESEARCH.** (3) (Restricted to students in the B.A., B.Sc. and Diploma in Environment programs. Corequisite: 170-400) 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 spring.  
*Downtown Campus only.*

**170-451B RESEARCH IN PANAMA** (6) (Restricted to students in the Panama Field Semester program.) (Offered in Panama only.) 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 484.

**170-480A,B TOPICS IN ENVIRONMENT 2.** (3) (Normally open only to U3 MSE students) Intermediate-level seminars and discussion of interdisciplinary aspects of current problems in environment led by staff and/or special guests. This course is offered on an irregular basis.

**170-485A,B READINGS IN ENVIRONMENT 1.** (3) (Normally open only to U3 MSE students) Interdisciplinary literature project / essays related to environment, enabling independent study under guidance of qualified MSE staff in areas outside the scope of individual departments. Proposed topic and method of evaluation must be approved by the Associate Director one month before the beginning of term. Contact the Program Coordinator for information.

**170-580A,B TOPICS IN ENVIRONMENT 3.** (3) (Prerequisite: Permission of instructor) Advanced-level seminars and discussion of interdisciplinary aspects of current problems in environment led by staff and/or special guests. This course is offered on an irregular basis.

**170-585A,B READINGS IN ENVIRONMENT 2.** (3) (Prerequisites: 170-400 and 170-401, or permission of instructor) Interdisciplinary literature project/essays related to environment, enabling advanced-level study under guidance of qualified MSE staff in areas outside the scope of individual departments. Proposed topic and method of evaluation must be approved by the Associate Director one month before the beginning of term. Contact the Program Coordinator for information.