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1 The School

1.1 Location

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 Fax: (514) 398-1643
 E-mail: info.mse@mcgill.ca

Website: www.mcgill.ca/mse

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

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**
 James W. Fyles; B.Sc., M.Sc.(Vict.), Ph.D.(Alta.) **Director (Interim)**
 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 appoint. with Geography and Natural Resource Sciences)*

Associate Professor

Arun Agrawal; B.A. (Hindu College, Delhi U., M.B.A. (I.I.M.), M.A., Ph.D. (Duke) *(joint appoint. with Political Science)*

Assistant Professors

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

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

Colin Duncan; B.A.(Queen's), M.A., Ph.D.(York)

Jaye Ellis; B.A.(Calg.), LL.B., B.C.L.(McG.), LL.M.(U.B.C.) *(joint appoint. with Law)*

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

Rebecca Hardin; B.A. (Brown), M.Phil., Ph.D.(Yale) *(joint appt. with Anthropology)*

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

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

Lisa Sideris; B.A., M.A., Ph.D.(Indiana) *(joint appt. with Religious Studies)*

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

Joann Whalen; B.Sc.Agr.(Dal.), M.Sc.(McG.), Ph.D.(Ohio St.) *(joint appoint. with Natural Resource Sciences)*

Associate Members

Agricultural and Biosystems Engineering: Suzelle Barrington, Robert Bonnell

Agricultural Economics: John Henning

Anthropology: John Galaty, Colin H. Scott

Architecture: Avi Freidman

Atmospheric and Oceanic Sciences: Charles Lin

Avian Science and Conservation Centre: David Bird

Biology: Catherine Potvin

Chemistry: Bill Chan

Civil Engineering and Applied Mechanics:

Van-Thanh-Van Nguyen, Jim Nicell

Developing Area Studies: Rosalind Boyd

Dietetics and Human Nutrition, School of: Laurie Chan, Tim Johns, Harriet Kuhnlein

Earth and Planetary Sciences: Don Baker, Alfonso Mucci, Jeanne Paquette

Economics: Robert Cairns, Myron Frankman, Chris Green, Franque Grimard, Tom Naylor

Epidemiology and Biostatistics: Mark Goldberg

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

History: Myron Echenberg

Law, Faculty of: Jane Glenn

Management, Faculty of: Frances Westley

Medicine, Ethics, Law: Margaret Somerville

Mining and Metallurgical Engineering: Jim Finch
 Natural Resource Sciences: Benoit Côté, Mark Curtis,
 Brian Driscoll, Jim W. Fyles, William Hendershot,
 Roger Titman, Terry Wheeler
 Parasitology, Institute of: James Smith
 Pathology, Autopsy Service: Bruce Case
 Philosophy: Philip Buckley
 Plant Science: Pierre Dutilleul, Don Smith, Marcia Waterway
 Political Science: Hudson Meadwell, Philip Oxhorn
 Redpath Museum: David M. Green
 Sociology: Uli Locher
 Urban Planning, School of: Jeanne Wolfe
Adjunct Professor
 Economics (Concordia): Frank Müller

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 a B.A., B.Sc.(Ag.Env.Sc.), or a B.Sc. program, 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 see "Admission Requirements" on page 13.

2.2 Degree Requirements

To be eligible for a B.A. degree, students must fulfill all the Faculty and program requirements as indicated under Arts "Faculty Degree Requirements" on page 48.

To be eligible for a B.Sc.(Ag.Env.Sc.) degree, students must fulfill all the Faculty and program requirements as indicated under Agricultural and Environmental Sciences "Faculty Information and Regulations" on page 304.

To be eligible for a B.Sc. degree, students must fulfill all the Faculty and program requirements as indicated under Science "Faculty Degree Requirements" on page 246.

To be eligible for the Diploma in Environment, students must fulfill all program requirements as specified in section 8 "Diploma in Environment".

2.3 Important Information about Program Selection

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

Students in U1 who are unsure of the Domain they want to pursue may register in the Major or Faculty program in Environment without picking a Domain. However, they must pick a Domain in their U2 year.

Note: Students must select a Domain in order to graduate; they cannot graduate without choosing a Domain.

(None of the above applies to students in the Minor or Diploma Programs.)

2.4 Course Numbering System at McGill

The first four characters of a McGill course number refer to the unit offering the course. For example, MSE courses begin with the Subject Code ENVR (formerly 170-)

The three numbers following the Subject Code refer to the course itself, with 200-level courses usually taken by U1 students, 300-level by U2 students, and 400-level by U3 students. 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.**

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

2.6 Courses outside the Student's Faculty

Students in the School's B.A., B.Sc., and B.Sc.(Ag.Env.Sc.) programs may take courses outside their Faculty according to the regulations of their Faculty of admission. These regulations are **not identical:**

- Arts students, see Faculty of Arts "Courses outside the Faculties of Arts and of Science" on page 50.
- Science students, see Faculty of Science "Courses outside the Faculties of Arts and Science" on page 248.
- Regulations for students in the Faculty of Agricultural and Environmental Sciences are being developed for September 2003. Contact Pete Barry, MSE Program Coordinator, for details.

Faculty of 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 www.mcgill.ca/artscisao. Check under Course Information, Course Restrictions.

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

3 Programs Offered

The McGill School of Environment has developed five 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 five 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 students meeting the entrance requirements of the Faculty of Arts.
3. **A Major in Environment leading to a B.Sc.(Ag.Env.Sc.)** is open to students meeting the entrance requirements of the Faculty of Agricultural and Environmental Sciences.
4. **A Major in Environment leading to a B.Sc.** is open to students meeting the entrance requirements of the Faculty of Science.
5. **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 adviser 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-line, using Minerva;
- (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

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

Adviser: Mr. Pete Barry, MSE Program Coordinator
E-mail: info.mse@mcgill.ca
Telephone: (514) 398-4306

Complementary Courses (18 credits)

12 credits selected from the MSE core courses:

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society and Environment
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 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 [section 10 "List of approved Thematic Category Courses for the Minor and the Diploma"](#). Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

4.2 Minor Program in Environment

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

Adviser: Mr. Pete Barry, MSE Program Coordinator
E-mail: info.mse@mcgill.ca
Telephone: (514) 398-4306

Complementary Courses (18 credits)

12 credits selected from the MSE core courses:

ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society and Environment
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 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 [section 10 "List of approved Thematic Category Courses for the Minor and the Diploma"](#). Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

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.

1. **Core:** The Core consists of four introductory courses and one intermediate-level course where students are exposed to the different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie most environmental problems. Through the Core program students go beyond the confines of their individual views of environment.
2. **Domain:** Domains provide a trans-disciplinary study of a particular theme or component of the environment.
3. **Senior Core and Research:** In the two senior courses of the Core, students will apply the general and specialized knowledge that they have gained in the program to the analysis of some specific, contemporary environmental problems.

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

- register in a Domain on-line, using Minerva;
- satisfy the co- / pre-requisites for the program (calculus and a basic science course);
- pass all courses counted towards the Faculty Program with a **grade of C or higher**;
- confirm that their course selection satisfies the required components of the MSE Core and their chosen Domain, and that the complementary courses are approved courses in their chosen Domain; and
- fulfill all Faculty requirements as specified for the B.A. in the Arts "**Faculty Degree Requirements**" on page 48, which include 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 first year of the program:

3 credits of calculus:

MATH 139 Calculus

or MATH 140 Calculus 1

or equivalent (e.g., CEGEP objective 00UN)

3 credits of basic science chosen from:

BIOL 111 Principles: Organismal Biology (required for the Ecological Determinants of Health in Society Domain)

or CHEM 110 General Chemistry 1

or PHYS 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.

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

The research courses are listed in the Domain descriptions.

Domain (33 credits)

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

Currently available:

Ecological Determinants of Health in Society

Economics and the Earth's Environment

Environment and Development

Each Domain has different requirements which are listed below.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

5.1 Ecological Determinants of Health in Society Domain

This Domain (54 credits including Core) is open only to students in the B.A. Faculty Program in Environment.

Adviser: Professor Tim Johns

E-mail: 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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

Courses offered at Macdonald Campus are marked with an (M). (Introductory Core courses are offered on both campuses.)

Prerequisite or Corequisite Courses for Program

MATH 139 (4) Calculus

or MATH 140 (3) Calculus 1

or equivalent (e.g., CEGEP objective 00UN)

BIOL 111 (3) Principles: Organismal Biology

or AEBI 120 (3) General Biology (M)

or equivalent (e.g., CEGEP objective 00UK 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 Program prerequisites or co-requisites listed above.

Core: Required Courses (18 credits)

ENVR 200 (3) The Global Environment

ENVR 201 (3) Society and Environment

ENVR 202 (3) The Evolving Earth

ENVR 203 (3) Knowledge, Ethics and Environment

ENVR 301 (3) Environmental Research Design

ENVR 400 (3) Environmental Thought

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

ENVR 401 (3) Environmental Research

ENVR 451 (6) Research in Panama (in Panama)

ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (6 credits)

PARA 410 (3) Environment and Infection (M)

SOCI 234 (3) Population and Society

Domain: Complementary Courses (27 credits)

12 credits of Fundamentals (maximum 3 credits from any one category):

Health and Pollution

ANTH 227 (3) Medical Anthropology

WILD 333 (3) Physical and Biological Aspects of Pollution (M)

Economics

AGEC 200 (3) Principles of Microeconomics (M)

ECON 208 (3) Microeconomic Analysis and Applications

Nutrition

NUTR 200 (3) Contemporary Nutrition

NUTR 207 (3) Nutrition and Health (M)

Statistics

AEMA 310 (3) Statistical Methods 1 (M)

MATH 203 (3) Principles of Statistics 1

SOCI 350 (3) Statistics in Social Research

or equivalent

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

Hydrology and Climate

ABEN 217 (3) Hydrology and Drainage (M)

AEPH 510 (3) Agricultural Micrometeorology (M)

GEOG 321 (3) Climatic Environments

GEOG 322 (3) Environmental Hydrology

Agriculture

AGRI 210 (3) Agro-Ecological History (M)

AGRI 340 (3) Principles of Ecological Agriculture (M)

AGRI 411 (3) International Agriculture (M)

Decision Making

- AGEC 242 (3) Management Theories and Practices (M)
 ECON 440 (3) Health Economics
 PHIL 343 (3) Biomedical Ethics

Biology Fundamentals

- AEBI 200 (3) Biology of Organisms (M)
 AEBI 205 (3) Principles of Ecology (M)
 BIOL 200 (3) Molecular Biology
 BIOL 205 (3) Biology of Organisms
 BIOL 208 (3) Introduction to Ecology
 FDSC 211 (3) Biochemistry 1(M)
 PHGY 202 (3) Human Physiology: Body Functions
 PLNT 201 (3) Comparative Plant Biology (M)

Development and Ecology

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

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

Advanced Ecology

- BIOL 465 (3) Conservation Biology
 BIOL 553 (3) Neotropical Environments (in Panama)
 WILD 410 (3) Wildlife Ecology (M)
 WOOD 410 (3) The Forest Ecosystem (M)

Pest Management

- BIOL 350 (3) Insect Biology and Control
 ENTO 352 (3) Control of Insect Pests (M)
 PLNT 361 (3) Pest Management and the Environment (M)

Techniques and Management

- ABEN 330 (3) GIS for Biosystems Engineering (M)
 CHEE 230 (3) Environmental Aspects of Technology
 GEOG 201 (3) Introductory Geo-Information Science
 GEOG 302 (3) Environmental Management 1

Social Change

- EDER 461 (3) Society and Change
 ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
 HIST 292 (3) History and the Environment
 SOCI 328 (3) Environmental Sociology

Immunology and Infectious Disease

- MIMM 314 (3) Immunology
 MIMM 324 (3) Fundamental Virology
 MIMM 413 (3) Parasitology
 PARA 438 (3) Immunology (M)

Populations and Place

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

5.2 Economics and the Earth's Environment Domain

This Domain (54 credits including Core) is open only to students in the B.A. Faculty Program in Environment.

Adviser: Professor Don Baker
 E-mail: 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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

Courses offered at Macdonald Campus are marked with an (M). (Introductory Core courses are offered on both campuses.)

Prerequisite or Corequisite Courses for Program

3 credits of calculus:

- MATH 139 Calculus
 or MATH 140 Calculus 1
 or equivalent (e.g., CEGEP objective 00UN)

3 credits of basic science chosen from:

- BIOL 111 Principles: Organismal Biology
 or CHEM 110 General Chemistry 1
 or PHYS 101 Introductory Physics - Mechanics
 or their equivalents (e.g., CEGEP objectives: Biology 00UK, Chemistry 00UL, Physics 00UR).

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)

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

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

- ENVR 401 (3) Environmental Research
 ENVR 451 (6) Research in Panama (in Panama)
 ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (16 credits)

- ECON 230D1 (3) Microeconomic Theory
 ECON 230D2 (3) Microeconomic Theory
 ECON 405 (3) Natural Resource Economics
 EPSC 210 (3) Introductory Mineralogy
 EPSC 212 (4) Introductory Petrology

Domain: Complementary Courses (17 credits)

3 credits of ecology:

- AEBI 205 (3) Principles of Ecology (M)
 BIOL 208 (3) Introduction to Ecology

3 credits of statistics:

- AEMA 310A (3) Statistical Methods 1 (M)
 GEOG 202 (3) Statistics and Spatial Analysis
 MATH 203 (3) Principles of Statistics 1
 or equivalent

6 credits of economics:

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

5 credits minimum of advanced courses:

- AGRI 435 (3) Soil and Water Quality Management
- AGRI 550 (3) Sustained Tropical Agriculture (in Panama)
- ANTH 339 (3) Ecological Anthropology
- BIOL 305 (3) Diversity of Life
- CHEE 430 (3) Technology Impact Assessment
- ECON 305 (3) Industrial Organization
- ECON 313 (3) Economic Development 1
- ECON 314 (3) Economic Development 2
- ECON 408D1 (3) Public Sector Economics
- ECON 408D2 (3) Public Sector Economics
- ECON 412 (3) Topics in Economic Development 1
- EPSC 312 (3) Spectroscopy of Minerals
- EPSC 334 (3) Invertebrate Paleontology
- EPSC 402 (2) Environmental Field School
- ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
- GEOG 302 (3) Environmental Management 1
- GEOG 322 (3) Environmental Hydrology
- GEOG 404 (3) Environmental Management 2 (in Panama)
- GEOG 498 (3) Humans in Tropical Environments (in Panama)
- SOCI 328 (3) Environmental Sociology
- SOIL 410 (3) Soil Chemistry
- WILD 415 (2) Conservation Law
- WILD 437 (3) Assessing Environmental Impact (*M*)

5.3 Environment and Development Domain

This Domain (54 credits including Core) is open only to students in the B.A. Faculty Program in Environment.

Adviser: Mr. Pete Barry, MSE Program Coordinator
 E-mail: info.mse@mcgill.ca
 Telephone: (514) 398-4306

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.).

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

Courses offered at Macdonald Campus are marked with an (M). (Introductory Core courses are offered on both campuses.)

Prerequisite or Corequisite Courses for Program

3 credits of calculus:

- MATH 139 Calculus
- or MATH 140 Calculus 1
- or equivalent (e.g., CEGEP objective 00UN)

3 credits of basic science chosen from:

- BIOL 111 Principles: Organismal Biology
- or CHEM 110 General Chemistry 1
- or PHYS 101 Introductory Physics - Mechanics
- or their equivalents (e.g., CEGEP objectives: Biology 00UK, Chemistry 00UL, Physics 00UR).

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)

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

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

- ENVR 401 (3) Environmental Research
- ENVR 451 (6) Research in Panama (in Panama)
- ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (12 credits)

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

Domain: Complementary Courses (21 credits)

3 credits of microeconomics:

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

3 credits of statistics:

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

3 credits of ecology

- AEBI 205 (3) Principles of Ecology (*M*)
- BIOL 208 (3) Introduction to Ecology

6 credits of advanced development courses:

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

3 credits of natural sciences

- AGRI 550 (3) Sustained Tropical Agriculture (in Panama)
- BIOL 465 (3) Conservation Biology
- BIOL 553 (3) Neotropical Environments (in Panama)
- BIOL 560 (3) Aquatic Conservation
- GEOG 305 (3) Soils and Environment
- GEOG 322 (3) Environmental Hydrology
- NUTR 403 (3) Nutrition in Society (*M*)
- NUTR 501 (3) Nutrition in Developing Countries (*M*)
- PARA 410 (3) Environment and Infection (*M*)

3 credits of social sciences

- AGEC 333 (3) Resource Economics (*M*)
- AGEC 442 (3) Economics of International Development (*M*)
- AGRI 210 (3) Agro-Ecological History (*M*)
- ANTH 439 (3) Theories of Development
- ANTH 445 (3) Property and Land Tenure
- BIOL 535 (3) Political Ecology
- CANS 407 (3) Understanding Atlantic Canada (at Bay of Fundy)
- ECON 326 (3) Ecological Economics
- ECON 405 (3) Natural Resource Economics
- ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
- GEOG 201 (3) Introductory Geo-Information Science
- GEOG 300 (3) Human Ecology in Geography
- GEOG 331 (3) Urban Social Geography
- GEOG 404 (3) Environmental Management 2 (in Panama or Africa)

GEOG 408	(3)	Geography of Development
GEOG 496	(3)	Regional Geographical Excursion (in Barbados)
GEOG 498	(3)	Humans in Tropical Environments (in Panama)
GEOG 510	(3)	Humid Tropical Environments
GEOG 551	(3)	Environmental Decisions
INTD 497	(3)	Research Seminar on International Development
MGPO 440	(3)	Strategies for Sustainability
POLI 445	(3)	IPE: NorthSouth Relations
POLI 472	(3)	Developing Areas/ Social Movements
SOCI 328	(3)	Environmental Sociology
SOCI 565	(3)	Social Change in Panama (in Panama)
WILD 380	(3)	Law and Land Use Policy (M)

Land Surface Processes and Environmental Change (42 credits)
Environmetrics (42 credits)
Food Production and the Environment (45 credits)
Renewable Resource Management (42 credits)
Water Environments and Ecosystems – Physical Stream or Biological Stream (36 - 39 credits)

Currently available for B.Sc. only (see section 7 "Major Program in Environment – B.Sc."):

Atmospheric Environment and Air Quality (39 credits)
Earth Sciences and Economics (45 credits)

Each Domain has different requirements which are listed below. Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

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

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

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

- Core:** The Core consists of four introductory courses and one intermediate-level course where students are exposed to the different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie most environmental problems. Through the Core program students go beyond the confines of their individual views of environment.
- Domain:** Domains provide a trans-disciplinary study of a particular theme or component of the environment.
- Senior Core and Research:** In the two senior courses of the Core, students will apply the general and specialized knowledge that they have gained in the program to the analysis of some specific, contemporary environmental problems.

To obtain a Major in Environment, students must:

- register in a Domain, on-line using Minerva;
- 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 by the faculty in which they are registered: for the B.Sc. (Ag.Env.Sc.) refer to Agricultural and Environmental Sciences "[Faculty Information and Regulations](#)" on page 304; for the B.Sc. refer to Science "[Faculty Degree Requirements](#)" on page 246. This includes meeting the minimum credit requirement as specified in their letter of admission.

MAJOR PROGRAM IN ENVIRONMENT (57 to 66 credits – depending upon Domain selected)

Core: Required Courses (18 credits)

The Core courses are listed below in the Domain descriptions.

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

The research courses are listed in the Domain descriptions.

Domain (36 to 45 credits – depending upon Domain selected) one MSE Domain selected from those available to students in the Major.

Currently available for B.Sc.(Ag.Env.Sc.) or B.Sc.:

Biodiversity and Conservation (42 credits)

Ecological Determinants of Health –

Population Stream or Cellular Stream (39 credits)

6.1 Biodiversity and Conservation Domain

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

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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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

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)

ENVR 200 (3) The Global Environment

ENVR 201 (3) Society and Environment

ENVR 202 (3) The Evolving Earth

ENVR 203 (3) Knowledge, Ethics and Environment

ENVR 301 (3) Environmental Research Design

ENVR 400 (3) Environmental Thought

Core: Complementary Course – Senior Research Project

(3 credits*)

- ENVR 401 (3) Environmental Research
- ENVR 451 (6) Research in Panama (in Panama)
- ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (9 credits)

9 credits, basic courses in the biological principles of diversity, systematics and conservation:

- BIOL 304 (3) Evolution
- BIOL 305 (3) Diversity of Life
- BIOL 465 (3) Conservation Biology

Domain: Complementary Courses (33 credits)

6 credits of ecology and statistics:

- BIOL 208 (3) Introduction to Ecology
- or AEBI 205 (3) Principles of Ecology (M)
- BIOL 373 (3) Biometry
- or AEMA 310 (3) Statistical Methods 1 (M)

9 credits, interface between science, policy and management:

- ANTH 418 (3) Environment and Development
- ECON 225 (3) Economics of the Environment
- GEOG 302 (3) Environmental Management 1
- GEOG 408 (3) Geography of Development
- GEOG 410 (3) Geography of Underdevelopment: Current Problems

3 credits of field courses:

- BIOL 331 (3) Ecology/Behaviour Field Course (at Mont St. Hilaire)
- BIOL 334 (3) Applied Tropical Ecology (in Barbados)
- BIOL 553 (3) Neotropical Environments (in Panama)
- GEOG 495 (3) Field Studies - Physical Geography (at Mont St. Hilaire)
- GEOG 497 (3) Ecology of Coastal Waters (at Bay of Fundy)
- GEOG 499 (3) Subarctic Field Studies (in Schefferville)
- WILD 475 (3) Desert Ecology (in Arizona)

6 credits of general scientific principles:

- ABEN 330 (3) GIS for Biosystems Engineering (M)
- or GEOG 306 (3) Raster Geo-Information Science
- BIOL 324 (3) Ecological Genetics
- BIOL 341 (3) History of Life
- BIOL 432 (3) Limnology
- BIOL 441 (3) Biological Oceanography
- BIOL 442 (3) Marine Biology
- BIOL 473 (3) Ecology of Aquatic Invertebrates
- BIOL 505 (3) Diversity and Systematics Seminar
- BIOL 560 (3) Aquatic Conservation
- GEOG 272 (3) Earth's Changing Surface
- GEOG 321 (3) Climatic Environments
- GEOG 350 (3) Ecological Biogeography
- NRSC 331 (3) Microbial Ecology (M)
- PLNT 460 (3) Plant Ecology (M)
- WILD 375 (3) Issues: Environmental Sciences (M)
- WILD 410 (3) Wildlife Ecology (M)
- WILD 437 (3) Assessing Environmental Impact (M)
- WOOD 410 (3) The Forest Ecosystem (M)
- WOOD 420 (3) Environmental Issues: Forestry (M)
- ZOOL 313 (3) Zoogeography (M)

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

3 credits of social science:

- AGEC 333 (3) Resource Economics (M)
- ANTH 339 (3) Ecological Anthropology
- ANTH 416 (3) Environment/Development: Africa (in Africa)
- ECON 326 (3) Ecological Economics
- ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
- GEOG 404 (3) Environmental Management 2 (in Panama)

- GEOG 498 (3) Humans in Tropical Environments (in Panama)
 - GEOG 510 (3) Humid Tropical Environments
 - SOCI 328 (3) Environmental Sociology
 - WILD 415 (2) Conservation Law (M)
(If this course is taken, 1 additional credit of complementary courses must be taken.)
 - WILD 421 (3) Wildlife Conservation (M)
- 6 credits, organisms and diversity:
- BIOL 327 (3) Herpetology
 - BIOL 335 (3) Marine Mammals (at Bay of Fundy)
 - BIOL 350 (3) Insect Biology and Control
 - BIOL 351 (3) The Biology of Invertebrates
 - BIOL 358 (3) Canadian Flora
 - or PLNT 358 (3) Flowering Plant Diversity (M)
 - BIOL 437 (3) Advanced Invertebrate Zoology
 - ENTO 352 (3) Control of Insect Pests (M)
 - ENTO 440 (3) Systematic Entomology (M)
 - PLNT 304 (3) Biology of Fungi (M)
 - PLNT 458 (3) Flowering Plant Systematics (M)
 - WILD 350 (3) Mammalogy (M)
 - WILD 420 (3) Ornithology (M)
 - ZOOL 307 (3) Natural History of Vertebrates (M)
 - ZOOL 312 (3) Zoological Systematics and Evolution (M)
 - ZOOL 424 (3) Parasitology (M)

6.2 Ecological Determinants of Health Domain

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

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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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

Courses offered at Macdonald Campus are marked with an (M). (Introductory Core courses are offered on both campuses.)

Ecological Determinants of Health Domain – Cellular Stream

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

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)

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

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

- ENVR 401 (3) Environmental Research
 ENVR 451 (6) Research in Panama (in Panama)
 ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (6 credits)

- PARA 410 (3) Environment and Infection (M)
 SOCI 234 (3) Population and Society

Domain - Cellular Stream: Complementary Courses (36 credits)

18 credits of Fundamentals:

Toxicology

- NUTR 420 (3) Toxicology and Health Risks (M)
 or PHAR 303 (3) Principles of Toxicology

Cellular Biology

- AEBI 202 (3) Cellular Biology (M)
 or ANSC 234 (3) Biochemistry 2 (M)
 or BIOL 201 (3) Cell Biology and Metabolism

Genetics

- BIOL 202 (3) Basic Genetics
 or CELL 204 (4) Genetics (M)

Molecular Biology

- BIOL 200 (3) Molecular Biology
 or FDSC 211 (3) Biochemistry 1(M)

Statistics

- AEMA 310 (3) Statistical Methods 1(M)
 or MATH 203 (3) Principles of Statistics 1
 or equivalent

Nutrition

- ANSC 330 (3) Fundamentals of Nutrition (M)
 or NUTR 307 (3) Human Nutrition (Video conference
 Downtown and Macdonald)

12 credits chosen from Human Health:

Immunology and Pathogenicity

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

Infectious Disease

- MIMM 324 (3) Fundamental Virology
 or MIMM 413 (3) Parasitology
 or PARA 400 (3) Eucaryotic Cells and Viruses (M)
 or ZOOL 424 (3) Parasitology (M)

Nutrition

- NUTR 403 (3) Nutrition in Society (M)
 or NUTR 512 (3) Herbs, Foods and Phytochemicals (Video
 conference Downtown and Macdonald)

Drugs and Hormones

- ANSC 424 (3) Metabolic Endocrinology (M)
 or PHAR 300 (3) Drug Action

Physiology

- ANSC 323 (4) Mammalian Physiology (M)
 or PHGY 209 (3) Mammalian Physiology 1

6 credits chosen from the Natural Environment:

Hydrology and Climate

- ABEN 217 (3) Hydrology and Drainage (M)
 or AEPH 510 (3) Agricultural Micrometeorology (M)
 or GEOG 321 (3) Climatic Environments
 or GEOG 322 (3) Environmental Hydrology

Techniques and Management

- ABEN 322 (3) Food Production/Processing Waste
 Management (M)
 or CHEE 230 (3) Environmental Aspects of Technology
 or GEOG 302 (3) Environmental Management 1
 or WILD 437 (3) Assessing Environmental Impact (M)

Pest Management

- BIOL 350 (3) Insect Biology and Control
 or ENTO 352 (3) Control of Insect Pests (M)
 or PLNT 361 (3) Pest Management and the Environment (M)

Pollution Control and Management

- ABEN 518 (3) Pollution Control for Agriculture (M)
 or CHEM 307 (3) Analytical Chemistry of Pollutants
 or WILD 333 (3) Physical and Biological Aspects of Pollution
 (M)

Ecology

- BIOL 432 (3) Limnology
 or BIOL 465 (3) Conservation Biology
 or BIOL 553 (3) Neotropical Environments (in Panama)
 or GEOG 497 (3) Ecology of Coastal Waters (at Bay of Fundy)
 or MICR 331 (3) Microbial Ecology (M)
 or PLNT 304 (3) Biology of Fungi (M)
 or PLNT 460 (3) Plant Ecology (M)
 or WILD 410 (3) Wildlife Ecology (M)
 or WOOD 410 (3) The Forest Ecosystem (M)

Ecological Determinants of Health Domain – Population Stream

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

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)

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

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

- ENVR 401 (3) Environmental Research
 ENVR 451 (6) Research in Panama (in Panama)
 ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (6 credits)

- PARA 410 (3) Environment and Infection (M)
 SOCI 234 (3) Population and Society

Domain - Population Stream: Complementary Courses

(36 credits)

18 credits of fundamentals:

Toxicology

- NUTR 420 (3) Toxicology and Health Risks (M)
- or PHAR 303 (3) Principles of Toxicology

Genetics

- BIOL 202 (3) Basic Genetics
- or CELL 204 (4) Genetics (M)

Biology

- BIOL 200 (3) Molecular Biology
- or BIOL 201 (3) Cell Biology and Metabolism
- or FDSC 211 (3) Biochemistry 1(M)

Statistics

- AEMA 310 (3) Statistical Methods 1 (M)
- or MATH 203 (3) Principles of Statistics 1
- or equivalent

Nutrition

- ANSC 330 (3) Fundamentals of Nutrition (M)
- or NUTR 207 (3) Nutrition and Health (M)
- or NUTR 307 (3) Human Nutrition (Video conference Downtown and Macdonald)

Advanced Ecology

- AEMA 306 (3) Mathematical Methods in Ecology (M)
- or BIOL 465 (3) Conservation Biology
- or BIOL 553 (3) Neotropical Environments (in Panama)
- or GEOG 497 (3) Ecology of Coastal Waters (at Bay of Fundy)
- or MICR 331 (3) Microbial Ecology (M)
- or PLNT 460 (3) Plant Ecology (M)
- or WILD 410 (3) Wildlife Ecology (M)
- or WOOD 410 (3) The Forest Ecosystem (M)

6 credits from the following List A:

Hydrology, Climate, and Agriculture

- ABEN 217 (3) Hydrology and Drainage (M)
- or AEPH 510 (3) Agricultural Micrometeorology (M)
- or AGRI 340 (3) Principles of Ecological Agriculture (M)
- or AGRI 550 (3) Sustained Tropical Agriculture (in Panama)
- or GEOG 321 (3) Climatic Environments
- or GEOG 322 (3) Environmental Hydrology

Decision Making and Social Change

- AGEC 242 (3) Management Theories and Practices (M)
- or BIOL 535 (3) Political Ecology
- or ECON 208 (3) Microeconomic Analysis and Applications
- or EDER 461 (3) Society and Change
- or ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
- or GEOG 302 (3) Environmental Management 1
- or GEOG 404 (3) Environmental Management 2 (in Panama)
- or PHIL 343 (3) Biomedical Ethics

Development and History

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

12 credits from the following list B:

Techniques and Management

- ABEN 330 (3) GIS for Biosystems Engineering (M)
- or CHEE 230 (3) Environmental Aspects of Technology
- or GEOG 201 (3) Introductory Geo-Information Science
- or WILD 437 (3) Assessing Environmental Impact (M)

Immunology and Infectious Disease

- EPIB 637 (3) Infectious and Parasitic Disease Epidemiology
- or MIMM 314 (3) Immunology
- or MIMM 324 (3) Fundamental Virology
- or MIMM 413 (3) Parasitology
- or PARA 400 (3) Eucaryotic Cells and Viruses (M)
- or PARA 438 (3) Immunology (M)
- or ZOOL 424 (3) Parasitology (M)

Nutrition and Agriculture

- NUTR 403 (3) Nutrition in Society (M)
- or AGRI 411 (3) International Agriculture (M)
- or NUTR 501 (3) Nutrition in Developing Countries (M)
- or NUTR 512 (3) Herbs, Foods and Phytochemicals (Video conference Downtown and Macdonald)

Populations and Place

- CANS 407 (3) Understanding Atlantic Canada (at Bay of Fundy)
- or GEOG 300 (3) Human Ecology in Geography
- or GEOG 498 (3) Humans in Tropical Environments (in Panama)
- or PSYC 533 (3) International Health Psychology
- or SOCI 328 (3) Environmental Sociology

Pollution and Pest Management

- ABEN 322 (3) Food Production/Processing Waste Management (M)
- or BIOL 350 (3) Insect Biology and Control
- or ENTO 352 (3) Control of Insect Pests (M)
- or PLNT 361 (3) Pest Management and the Environment (M)
- WILD 333 (3) Physical and Biological Aspects of Pollution (M)

6.3 Environmetrics Domain

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

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

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

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

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)

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

- ENVR 301 (3) Environmental Research Design
 ENVR 400 (3) Environmental Thought
Core: Complementary Course – Senior Research Project
 (3 credits*)
 ENVR 401 (3) Environmental Research
 ENVR 451 (6) Research in Panama (in Panama)
 ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Course (6 credits)

- AEMA 403 (3) Environmetrics Stage (internship) (M)
 AEMA 414 (3) Temporal and Spatial Statistics (M)

Domain - Complementary Courses (36 credits, minimum)
 15 credits from:

- AEBI 205 (3) Principles of Ecology (M)
 or BIOL 208 (3) Introduction to Ecology
 MIME 308 (3) Social and Economic Impacts of Technology
 or WILD 437 (3) Assessing Environmental Impact (M)
 AEMA 306 (3) Mathematical Methods in Ecology (M)
 or BIOL 309 (3) Mathematical Models in Biology
 ABEN 330 (3) GIS for Biosystems Engineering (M)
 or GEOG 201 (3) Introductory Geo-Information Science
 AEMA 411 (3) Experimental Designs (M)
 or CIVE 555 (3) Environmental Data Analysis

3 credits of basic environmental science:

- ABEN 217 (3) Hydrology and Drainage (M)
 CIVE 323 (3) Hydrology and Water Resources
 GEOG 305 (3) Soils and Environment
 GEOG 322 (3) Environmental Hydrology
 GEOG 350 (3) Ecological Biogeography
 SOIL 210 (3) Principles of Soil Science (M)

6 credits of Statistics, one of the following two options:

Option 1:

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

Option 2:

- AEMA 310 (3) Statistical Methods 1 (M)
 or BIOL 373 (3) Biometry

plus one 3-credit complementary applied statistics course of the statistics and mathematics section.

6 credits of statistics and mathematics chosen from:

- ABEN 252 (3) Structured Computer Programming (or equivalent) (M)
 ABEN 319 (3) Applied Mathematics (or equivalent) (M)
 GEOG 351 (3) Quantitative Methods
 GEOG 501 (3) Modelling Environmental Systems
 MATH 223 (3) Linear Algebra
 MATH 423 (3) Regression and Analysis of Variance
 MATH 447 (3) Stochastic Processes
 MATH 525 (4) Sampling Theory and Applications
 SOCI 461 (3) Quantitative Data Analysis
 SOCI 504 (3) Quantitative Methods 1
 SOCI 505 (3) Quantitative Methods 2
 SOCI 580 (3) Social Research Design and Practice.

6 credits, minimum, of environmental sciences chosen from:

- AGRI 550 (3) Sustained Tropical Agriculture (in Panama)
 BIOL 331 (3) Ecology/Behavior Field Course (at Mont St. Hilaire)
 BIOL 553 (3) Neotropical Environments (in Panama)
 GEOG 300 (3) Human Ecology in Geography
 GEOG 302 (3) Environmental Management 1
 GEOG 404 (3) Environmental Management 2 (in Panama)
 GEOG 494 (3) Urban Field Studies
 GEOG 497 (3) Ecology of Coastal Waters (at Bay of Fundy)
 GEOG 499 (3) Subarctic Field Studies (in Schefferville)
 MIME 451 (3) Environmental Controls: Met'l Plants
 PLNT 460 (3) Plant Ecology (M)

- WILD 333 (3) Physical and Biological Aspects of Pollution (M)
 WILD 401 (4) Fisheries and Wildlife Management (M)
 WOOD 300 (3) Urban Forests and Trees (M)
 WOOD 420 (3) Environmental Issues: Forestry (M)
 ZOO 313 (3) Zoogeography (M)

6.4 Food Production and Environment Domain

This Domain (66 credits including Core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc in Environment program.

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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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

Courses offered at Macdonald Campus are marked with an (M). (Introductory Core courses are offered on both campuses.)

Recommended Prerequisite or Corequisite Courses for Domain

- FDSC 211 (3) Biochemistry 1 (M)
 or BIOL 112 (3) Cell and Molecular Biology
 or CEGEP equivalent (e.g., CEGEP objective 00XU)
 FDSC 230 (4) Organic Chemistry (M)
 or CHEM 212 (4) Introductory Organic Chemistry 1
 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)

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

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

- ENVR 401 (3) Environmental Research
 ENVR 451 (6) Research in Panama (in Panama)
 ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (12 credits)

- AGRI 210 (3) Agro-Ecological History (M)
 PLNT 211 (3) Principles of Plant Science (M)
 PLNT 300 (3) Cropping Systems (M)
 WILD 375 (3) Issues: Environmental Sciences (M)

Domain: Complementary Courses (33 credits)

15 or 16 credits of Basic Sciences:

- AEBI 205 (3) Principles of Ecology (M)
- or BIOL 208 (3) Introduction to Ecology
- AEMA 310 (3) Statistical Methods 1 (M)
- or MATH 203 (3) Principles of Statistics 1
- or equivalent
- AGRI 340 (3) Principles of Ecological Agriculture (M)
- or ANSC 250 (3) Principles of Animal Science (M)
- BIOL 202 (3) Basic Genetics
- or CELL 204 (4) Genetics (M)
- GEOG 305 (3) Soils and Environment
- or SOIL 210 (3) Principles of Soil Science (M)

12 credits of Applied Sciences:

- ABEN 217 (3) Hydrology and Drainage (M)
- or GEOG 322 (3) Environmental Hydrology
- ABEN 322 (3) Food Production/Processing Waste Management (M)
- ABEN 518 (3) Pollution Control for Agriculture (M)
- AGRI 341 (3) Ecological Agricultural Systems (M)
- AGRI 411 (3) International Agriculture (M)
- AGRI 435 (3) Soil and Water Quality Management (M)
- AGRI 550 (3) Sustained Tropical Agriculture (in Panama)
- ANSC 501 (3) Advanced Animal Production Systems (M)
- BIOL 465 (3) Conservation Biology
- BIOL 553 (3) Neotropical Environments (in Panama)
- FDSC 200 (3) Introduction to Food Science (M)
- or NUTR 207 (3) Nutrition and Health (M)
- FDSC 535 (3) Food Biotechnology (M)
- GEOG 302 (3) Environmental Management 1
- MICR 331 (3) Microbial Ecology (M)
- NRSC 521 (3) Soil Microbiology and Biochemistry (M)
- NUTR 403 (3) Nutrition in Society (M)
- NUTR 420 (3) Toxicology and Health Risks (M)
- PARA 410 (3) Environment and Infection (M)
- PHAR 303 (3) Principles of Toxicology
- PLNT 361 (3) Pest Management and the Environment (M)
- PLNT 434 (3) Weed Biology and Control (M)
- SOIL 315 (3) Soil Fertility and Fertilizer Use (M)
- SOIL 410 (3) Soil Chemistry (M)
- WILD 401 (4) Fisheries and Wildlife Management (M)
- WILD 333 (3) Physical and Biological Aspects of Pollution (M)
- WILD 437 (3) Assessing Environmental Impact (M)

6 credits in Social Sciences / Humanities:

- AGEC 200 (3) Principles of Microeconomics (M)
- AGEC 320 (3) Economics of Agricultural Production (M)
- AGEC 333 (3) Resource Economics (M)
- or ECON 405 (3) Natural Resource Economics
- AGEC 430 (3) Agriculture, Food and Resource Policy (M)
- AGEC 442 (3) Economics of International Agricultural Development (M)
- ANTH 418 (3) Environment and Development
- ECON 225 (3) Economics of the Environment
- ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
- GEOG 404 (3) Environmental Management 2 (in Panama)
- GEOG 410 (3) Geography of Underdevelopment: Current Problems
- GEOG 498 (3) Humans in Tropical Environments (in Panama)
- GEOG 510 (3) Humid Tropical Environments
- SOCI 254 (3) Development and Underdevelopment
- SOCI 565 (3) Social Change in Panama (in Panama)
- WILD 415 (2) Conservation Law (M)

6.5 Land Surface Processes and Environmental Change Domain

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

Adviser: Mr. Pete Barry, MSE Program Coordinator
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 Telephone: (514) 398-4306

The thin soil layer on the planet's land surfaces controls the vital inputs of water, nutrients and energy to terrestrial and freshwater aquatic ecosystems. Widespread occurrences around the globe of desertification, soil erosion, deforestation and land submergence over water reservoirs indicate that this dynamic system is under increasing pressure from population growth and changes in climate and land uses. Production of key green-house gases (water vapor, CO₂ and methane) is controlled by complex processes operating at the land surface, involving climate change feedbacks that need to be fully understood, given current global warming trends.

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

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

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)

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

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

- ENVR 401 (3) Environmental Research
- ENVR 451 (6) Research in Panama (in Panama)
- ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Course (3 credits)

- GEOG 203 (3) Environmental Systems

Domain: Complementary Courses (39 credits)

3 credits of statistics chosen from:

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

3 credits of ecology chosen from:

- BIOL 208 (3) Introduction to Ecology
- or AEBI 205 (3) Principles of Ecology (M)

3 credits of weather and climate chosen from:

- ATOC 215 (3) Weather Systems and Climate
- or AEPH 201 (3) Introductory Meteorology (M)

9 credits of fundamental land surface processes chosen from:

- GEOG 272 (3) Earth's Changing Surface
 or SOIL 200 (3) Introduction to Earth Science (M)
 GEOG 305 (3) Soils and Environment
 or SOIL 326 (3) Soil Genesis and Classification (M)
 GEOG 321 (3) Climatic Environments
 GEOG 322 (3) Environmental Hydrology
 or ABEN 217 (3) Hydrology and Drainage (M)

3 credits of environment and resource management chosen from:

- AGRI 435 (3) Soil and Water Quality Management (M)
 AGRI 550 (3) Sustained Tropical Agriculture (in Panama)
 BIOL 465 (3) Conservation Biology
 BIOL 535 (3) Political Ecology
 BIOL 560 (3) Aquatic Conservation
 CHEE 230 (3) Environmental Aspects of Technology
 CIVE 225 (4) Environmental Engineering
 GEOG 302 (3) Environmental Management 1
 GEOG 404 (3) Environmental Management 2 (in Panama)
 WILD 437 (3) Assessing Environmental Impact (M)
 WOOD 420 (3) Environmental Issues: Forestry (M)
 WOOD 441 (3) Integrated Forest Management (M)

3 credits of a field course chosen from:

- BIOL 553 (3) Neotropical Environments (in Panama)
 GEOG 495 (3) Field Studies - Physical Geography
 (at Mont St. Hilaire)
 GEOG 496 (3) Geographical Excursion (in Barbados)
 GEOG 497 (3) Ecology of Coastal Waters
 (at Bay of Fundy)
 GEOG 499 (3) Subarctic Field Studies (in Schefferville)
 NRSC 382 (3) Ecological Monitoring and Analysis (M)
 WILD 475 (3) Desert Ecology (in Arizona)

3 credits of social science issues chosen from:

- ANTH 339 (3) Ecological Anthropology
 ECON 225 (3) Economics of the Environment
 ECON 326 (3) Ecological Economics
 ECON 405 (3) Natural Resource Economics
 or AGECE 333 (3) Resource Economics (M)
 ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
 GEOG 408 (3) Geography of Development
 GEOG 498 (3) Humans in Tropical Environments (in Panama)
 GEOG 508 (3) Resources, People and Power
 SOCI 328 (3) Environmental Sociology
 SOCI 565 (3) Social Change in Panama (in Panama)

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

3 credits minimum of advanced study of particular environments:

- BIOL 358 (3) Canadian Flora
 or PLNT 358 (3) Flowering Plant Diversity (M)
 BIOL 432 (3) Limnology
 or ZOOL 315 (3) Science of Inland Waters (M)
 GEOG 350 (3) Ecological Biogeography
 GEOG 372 (3) Running Water Environments
 GEOG 470 (3) Wetlands
 GEOG 536 (3) Geocryology
 GEOG 550 (3) Quaternary Paleoecology
 PLNT 460 (3) Plant Ecology (M)
 WOOD 410 (3) The Forest Ecosystem (M)

6 credits minimum of advanced study of surface processes:

- ABEN 509 (2) Hydrologic Systems and Modelling (M)
 ATOC 315 (3) Water in the Atmosphere
 EPSC 401 (3) Advanced Environmental Geology
 EPSC 549 (3) Hydrogeology
 EPSC 580 (3) Aqueous Geochemistry
 GEOG 501 (3) Modelling Environmental Systems
 GEOG 505 (3) Global Biogeochemistry
 GEOG 522 (3) Advanced Environmental Hydrology

- GEOG 537 (3) Advanced Fluvial Geomorphology
 SOIL 331 (3) Soil Physics (M)
 SOIL 410 (3) Soil Chemistry (M)
 WILD 333 (3) Physical and Biological Aspects of Pollution (M)

6.6 Renewable Resource Management Domain

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

Adviser: Professor Joann Whalen
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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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)

Recommended Prerequisite or Corequisite Courses for Domain

- FDSC 211 (3) Biochemistry 1 (M)
 or BIOL 112 (3) Cell and Molecular Biology
 or CEGEP equivalent (e.g., CEGEP objective 00XU)
 FDSC 230 (4) Organic Chemistry (M)
 or CHEM 212 (4) Introductory Organic Chemistry 1
 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)

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

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

- ENVR 401 (3) Environmental Research
 ENVR 451 (6) Research in Panama (in Panama)
 ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Complementary Courses (42 credits)

9 credits basic principles of ecosystem processes and diversity

- AEBI 200 (3) Biology of Organisms (*M*)
- or BIOL 305 (3) Diversity of Life
- or PLNT 201 (3) Comparative Plant Biology (*M*)
- AEBI 205 (3) Principles of Ecology (*M*)
- or BIOL 208 (3) Introduction to Ecology
- GEOG 305 (3) Soils and Environment
- or SOIL 210 (3) Principles of Soil Science (*M*)

6 credits statistics and GIS methods

- ABEN 330 (3) GIS for Biosystems Engineering (*M*)
- or GEOG 201 (3) Introductory Geo-Information Science
- AEMA 310 (3) Statistical Methods 1 (*M*)
- or BIOL 373 (3) Biometry

6 credits advanced ecosystem components

- PLNT 358 (3) Flowering Plant Diversity (*M*)
- or BIOL 358 (3) Canadian Flora
- BIOL 553 (3) Neotropical Environments (in Panama)
- SOIL 326 (3) Soil Genesis and Classification (*M*)
- ZOOL 307 (3) Natural History of Vertebrates (*M*)

6 credits advanced ecological processes

- ABEN 217 (3) Hydrology and Drainage (*M*)
- or GEOG 322 (3) Environmental Hydrology
- BIOL 432 (3) Limnology
- or ZOOL 315 (3) Science of Inland Waters (*M*)
- BIOL 465 (3) Conservation Biology
- GEOG 372 (3) Running Water Environments
- GEOG 470 (3) Wetlands
- GEOG 497 (3) Ecology of Coastal Waters (at Bay of Fundy)
- MICR 331 (3) Microbial Ecology (*M*)
- PLNT 460 (3) Plant Ecology (*M*)
- WILD 410 (3) Wildlife Ecology (*M*)
- WOOD 410 (3) The Forest Ecosystem (*M*)

6 credits social processes:

- AGEC 242 (3) Management Theories and Practices (*M*)
- AGEC 333 (3) Resource Economics (*M*)
- or ECON 405 (3) Natural Resource Economics
- ANTH 339 (3) Ecological Anthropology
- CANS 407 (3) Understanding Atlantic Canada (at Bay of Fundy)
- ENVR 465 (3) Environment and Social Change (at Bay of Fundy)
- GEOG 498 (3) Humans in Tropical Environments (in Panama)
- RELG 270 (3) Religious Ethics and the Environment
- SOCI 328 (3) Environmental Sociology
- SOCI 565 (3) Social Change in Panama (in Panama)
- WILD 415 (2) Conservation Law (*M*)

9 credits ecosystem components or management of ecosystems:

- AGRI 435 (3) Soil and Water Quality Management (*M*)
- AGRI 550 (3) Sustained Tropical Agriculture (in Panama)
- BIOL 470 (3) Lake Management
- GEOG 302 (3) Environmental Management 1
- GEOG 404 (3) Environmental Management 2 (in Panama)
- PLNT 300 (3) Cropping Systems (*M*)
- SOIL 335 (3) Soil Ecology and Management (*M*)
- WILD 401 (4) Fisheries and Wildlife Management (*M*)
- WILD 437 (3) Assessing Environmental Impact (*M*)
- WOOD 441 (3) Integrated Forest Management (*M*)

6.7 Water Environments and Ecosystems Domain

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

To educate students in both the ecological and physical facets of the water environment, this Domain offers two 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 – Biological Stream

This Domain (57 credits including Core) is open only to students in the B.Sc.(Ag.Env.Sc.) Major in Environment or B.Sc. Major in Environment program.

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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)

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

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

- ENVR 401 (3) Environmental Research
- ENVR 451 (6) Research in Panama (in Panama)
- ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Course (3 credits)

- ATOC 310 (3) Physical Oceanography

Domain: Complementary Courses (33 credits)

6 credits chosen from:

- AEBI 205 (3) Principles of Ecology (*M*)
- or BIOL 208 (3) Introduction to Ecology
- ABEN 217 (3) Hydrology and Drainage (*M*)
- or GEOG 322 (3) Environmental Hydrology

3 credits of math and statistics from:

- AEMA 202 (3) Calculus (*M*)
- AEMA 310 (3) Statistical Methods 1 (or equivalent) (*M*)
- MATH 203 (3) Principles of Statistics 1
- MATH 222 (3) Calculus 3

3 credits chosen from:

- BIOL 331 (3) Ecology/Behaviour Field Course (at Mont St. Hilaire)
- GEOG 495 (3) Field Studies - Physical Geography (at Mont St. Hilaire)
- GEOG 497 (3) Ecology of Coastal Waters (at Bay of Fundy) or an equivalent aquatic field course

3 credits chosen from:

- AGEC 333 (3) Resource Economics (*M*)
- ANTH 339 (3) Ecological Anthropology
- ANTH 418 (3) Environment and Development
- ECON 225 (3) Economics of the Environment
- ECON 326 (3) Ecological Economics
- ENVR 465 (3) Environment and Social Change (at Bay of Fundy)

GEOG 404	(3)	Environmental Management 1 (in Panama)
GEOG 498	(3)	Humans in Tropical Environments (in Panama)
POLI 345	(3)	International Organization
POLI 466	(3)	Public Policy Analysis
SOCI 565	(3)	Social Change in Panama (in Panama)

18 credits, minimum, from lists A and B below

List A, 9 to 12 credits chosen from:

AGRI 435	(3)	Soil and Water Quality Management (M)
BIOL 432	(3)	Limnology
BIOL 441	(3)	Biological Oceanography
BIOL 442	(3)	Marine Biology
BIOL 553	(3)	Neotropical Environments (in Panama)
BIOL 560	(3)	Aquatic Conservation
BIOL 570	(3)	Advanced Seminar in Evolution
ENTO 535	(3)	Aquatic Entomology (M)
GEOG 305	(3)	Soils and Environment
or SOIL 210	(3)	Principles of Soil Science (M)
GEOG 350	(3)	Ecological Biogeography
MICR 331	(3)	Microbial Ecology (M)
PARA 410	(3)	Environment and Infection (M)
WILD 333	(3)	Physical and Biological Aspects of Pollution (M)
WILD 401	(4)	Fisheries and Wildlife Management (M)
ZOOL 315	(3)	Science of Inland Waters (M)

List B, 6 to 10 credits chosen from:

ABEN 330	(3)	GIS for Biosystems Engineering (M)
ATOC 215	(3)	Weather Systems and Climate
ATOC 308	(3)	Principles of Remote Sensing
or GEOG 308	(3)	Principles of Remote Sensing
ATOC 310	(3)	Physical Oceanography
ATOC 330	(3)	Physical Meteorology
ATOC 219	(3)	Introduction to Atmospheric Chemistry
or CHEM 219	(3)	Introduction to Atmospheric Chemistry
ATOC 419	(3)	Advances in Chemistry of Atmosphere
or CHEM 419	(3)	Advances in Chemistry of Atmosphere
CHEM 257D1	(2)	Introductory Analytical Chemistry
CHEM 257D2	(2)	Introductory Analytical Chemistry
EPSC 220	(3)	Principles of Geochemistry
GEOG 201	(3)	Introductory Geo-Information Science
GEOG 372	(3)	Running Water Environments
GEOG 522	(3)	Advanced Environmental Hydrology
GEOG 537	(3)	Advanced Fluvial Geomorphology
GEOG 550	(3)	Quaternary Paleocology

Water Environments and Ecosystems Domain – Physical Stream

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

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Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

Courses offered at Macdonald Campus are marked with an (M). (Introductory Core Courses are offered on both campuses.)

Recommended Corequisite Course for Domain

MATH 222 (3) Calculus 3
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)

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

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

ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama (in Panama)
ENVR 466	(6)	Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (9 credits)

ATOC 310	(3)	Physical Oceanography
ATOC 315	(3)	Water in the Atmosphere
GEOG 372	(3)	Running Water Environments

Domain – Complementary Courses (30 credits)

6 credits chosen from:

AEBI 205	(3)	Principles of Ecology (M)
or BIOL 208	(3)	Introduction to Ecology
ABEN 217	(3)	Hydrology and Drainage (M)
or GEOG 322	(3)	Environmental Hydrology

3 credits of statistics or calculus:

AEMA 310	(3)	Statistical Methods 1 (or equivalent) (M)
AEMA 202	(3)	Calculus (M)
MATH 203	(3)	Principles of Statistics 1
MATH 222	(3)	Calculus 3

12 credits chosen from:

ABEN 330	(3)	GIS for Biosystems Engineering (M)
or GEOG 306	(3)	Raster Geo-Information Science
ABEN 416	(3)	Engineering for Land Development (M)
ABEN 506	(3)	Advances in Drainage Management (M)
or ABEN 509	(3)	Hydrologic Systems and Modelling (M)
or GEOG 522	(3)	Advanced Environmental Hydrology
AEMA 205	(3)	Differential Equations (M)
or MATH 315	(3)	Ordinary Differential Equations
AEPH 510	(3)	Agricultural Micrometeorology (M)
AGRI 435	(3)	Soil and Water Quality Management (M)
ATOC 215	(3)	Weather Systems and Climate
ATOC 308	(3)	Principles of Remote Sensing
or GEOG 308	(3)	Principles of Remote Sensing
ATOC 402	(3)	Atmosphere-Ocean Transports
ATOC 414	(3)	Applications of Remote Sensing
ATOC 568	(3)	Ocean Physics
CIVE 323	(3)	Hydrology and Water Resources
EPSC 549	(3)	Hydrogeology
GEOG 201	(3)	Introductory Geo-Information Science
GEOG 537	(3)	Advanced Fluvial Geomorphology
GEOG 305	(3)	Soils and Environment
or SOIL 210	(3)	Principles of Soil Science (M)

6 credits chosen from:

BIOL 432	(3)	Limnology
or BIOL 441	(3)	Biological Oceanography
or ZOOL 315	(3)	Science of Inland Waters (M)
BIOL 442	(3)	Marine Biology
BIOL 473	(3)	Ecology of Aquatic Invertebrates
BIOL 553	(3)	Neotropical Environments (in Panama)
BIOL 560	(3)	Aquatic Conservation
GEOG 350	(3)	Ecological Biogeography
GEOG 505	(3)	Global Biogeochemistry
WILD 401	(4)	Fisheries and Wildlife Management (M)

3 credits of field courses

GEOG 495 (3) Field Studies - Physical Geography (at Mont St. Hilaire)

GEOG 497 (3) Ecology of Coastal Waters (at Bay of Fundy) or an equivalent aquatic field course

7 Major Program in Environment – B.Sc.

In addition to the selection of Domains available to students in the Major program in either the Faculty of Science or the Faculty of Agricultural and Environmental Sciences, [see section 6 “Major Program in Environment – B.Sc.\(Ag.Env.Sc.\) and B.Sc.”](#), students in the Faculty of Science program can choose from one of the two Domains limited to Science students only:

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

Refer to [section 6 “Major Program in Environment – B.Sc.\(Ag.Env.Sc.\) and B.Sc.”](#), for the general guidelines and regulations which apply to all Domains in the Major in Environment program.

7.1 Atmospheric Environment and Air Quality Domain

This Domain (60 credits including Core) is open only to students in the B.Sc. Major in Environment program in the Faculty of Science.

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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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

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)

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

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

ENVR 401 (3) Environmental Research
ENVR 451 (6) Research in Panama (in Panama)
ENVR 466 (6) Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (18 credits)

ATOC 214 (3) Introduction: Physics of the Atmosphere
ATOC 219 (3) Introduction to Atmospheric Chemistry
or CHEM 219 (3) Introduction to Atmospheric Chemistry
ATOC 308 (3) Principles of Remote Sensing
or GEOG 308 (3) Principles of Remote Sensing
ATOC 315 (3) Water in the Atmosphere
ATOC 402 (3) Atmosphere-Ocean Transports
CHEM 307 (3) Analytical Chemistry of Pollutants

Domain: Complementary Courses (21 credits)

6 credits from:

CHEM 257D1 (2) Introductory Analytical Chemistry
CHEM 257D2 (2) Introductory Analytical Chemistry
or FDSC 213 (3) Analytical Chemistry 1 (M)

MATH 222 (3) Calculus 3
or AEMA 202 (3) Calculus (M)

3 credits from:

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

9 credits of math or physical science (at least 6 credits of which are at the 300 level or above):

AEPH 510 (3) Agricultural Micrometeorology (M)
ATOC 215 (3) Weather Systems and Climate
ATOC 419 (3) Advances in Chemistry of Atmosphere
or CHEM 419 (3) Advances in Chemistry of Atmosphere
ATOC 515 (3) Turbulence in Atmosphere and Oceans
ATOC 540 (3) Synoptic Meteorology 1
CHEE 230 (3) Environmental Aspects of Technology
CHEM 273 (1) Chemical Kinetics
CHEM 377 (3) Instrumental Analysis 2
CIVE 225 (4) Environmental Engineering
COMP 208 (3) Computers in Engineering
GEOG 505 (3) Global Biogeochemistry
MATH 223 (3) Linear Algebra
MATH 315 (3) Ordinary Differential Equations
or AEMA 205 (4) Differential Equations (M)
WILD 333 (3) Physical and Biological Aspects of Pollution(M)

3 credits of social science:

ANTH 206 (3) Environment and Culture
ANTH 418 (3) Environment and Development
CMPL 580 (3) Environment and the Law
ECON 225 (3) Economics of the Environment
ECON 347 (3) Economics of Climate Change
ENVR 465 (3) Environment and Social Change (in Bay of Fundy)
GEOG 302 (3) Environmental Management 1
GEOG 404 (3) Environmental Management 2 (in Panama or in Africa)
GEOG 498 (3) Humans in Tropical Environments (in Panama)
POLI 466 (3) Public Policy Analysis
RELG 270 (3) Religious Ethics and the Environment

7.2 Earth Sciences and Economics Domain

This Domain (66 credits including Core) is open only to students in the B.Sc. Major in Environment program in the Faculty of Science.

Adviser: Professor Don Baker
E-mail: 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.

Course descriptions and prerequisites can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

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)

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

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

ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama (in Panama)
ENVR 466	(6)	Research in Atlantic Canada (at Bay of Fundy)

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

Domain: Required Courses (22 credits)

ECON 230D1	(3)	Microeconomic Theory
ECON 230D2	(3)	Microeconomic Theory
ECON 405	(3)	Natural Resource Economics
EPSC 210	(3)	Introductory Mineralogy
EPSC 212	(4)	Introductory Petrology
EPSC 220	(3)	Principles of Geochemistry
EPSC 425	(3)	Sediments to Sequences

Domain: Complementary Courses (23 credits)
3 credits of statistics from:

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

12 credits from List A

AGEC 333	(3)	Resource Economics (M)
BIOL 208	(3)	Introduction to Ecology
or AEBI 205	(3)	Principles of Ecology (M)
CHEE 430	(3)	Technology Impact Assessment
or WILD 437	(3)	Assessing Environmental Impact (M)
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 416	(3)	Topics in Economic Development 2
ECON 525	(3)	Project Analysis

8 credits, minimum, from List B

AGRI 435	(3)	Soil and Water Quality Management (M)
ANTH 339	(3)	Ecological Anthropology
BIOL 305	(3)	Diversity of Life
BIOL 553	(3)	Neotropical Environments (in Panama)
ECON 305	(3)	Industrial Organization

ECON 313	(3)	Economic Development 1
ECON 314	(3)	Economic Development 2
ECON 408D1	(3)	Public Sector Economics
ECON 408D2	(3)	Public Sector Economics
ECON 412	(3)	Topics in Economic Development 1
EPSC 312	(3)	Spectroscopy of Minerals
EPSC 334	(3)	Invertebrate Paleontology
EPSC 401	(3)	Advanced Environmental Geology
EPSC 402	(2)	Environmental Field School
EPSC 483D1	(1.5)	Independent Studies 2
EPSC 483D2	(1.5)	Independent Studies 2
EPSC 519	(3)	Isotope Geology
EPSC 542	(3)	Chemical Oceanography
EPSC 549	(3)	Hydrogeology
EPSC 580	(3)	Aqueous Geochemistry
EPSC 590	(3)	Applied Geochemistry Seminar
GEOG 302	(3)	Environmental Management 1
GEOG 322	(3)	Environmental Hydrology
GEOG 497	(3)	Ecology of Coastal Waters (at Bay of Fundy)
SOCI 328	(3)	Environmental Sociology
SOIL 410	(3)	Soil Chemistry (M)

8 Diploma in Environment

Adviser: Mr. Pete Barry, MSE Program Coordinator
E-mail: 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 (15 credits)

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

Complementary Courses (15 credits)

6 credits from:

ENVR 301	(3)	Environmental Research Design
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama (in Panama)
ENVR 466	(6)	Research in Atlantic Canada (at Bay of Fundy)

9 credits from Thematic Categories*:

3 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.)

* See section 10 "List of approved Thematic Category Courses for the Minor and the Diploma". Course descriptions and prerequisites

can be found in the Courses section. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva.

9 Field Studies

9.1 African Field Study Semester

The Department of Geography, Faculty of Science, coordinates the 15-credit interdisciplinary **African Field Study Semester**, see page 276. **Note: The AFSS will only be offered in 2003-04 pending approval by the Dean of Science.**

9.2 Panama Field Study Semester

Website: www.mcgill.ca/mse/field_study/panama

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

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).

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

Offered: Winter Term.

Location: Offered at Smithsonian Tropical Research Institute (STRI) in Panama.

Enrolment Limit: 25 students.

Fees: Approximately \$4000CDN – excludes regular McGill fees, airfare, food, and insurance; includes lodging.

Quebec residents may be eligible for a financial subsidy from the Ministry of Education, see “Quebec Government Awards for Quebec Residents” on page 37.

Application Deadline: March 15, 2003 for January 2004 (Winter Term of the academic year 2003-04).

Application Details: Students must submit a letter of intent, CV, and copy of their transcript to: Susan Gabe, Biology Undergraduate Office, Stewart Biology Building room W4/8, Downtown Campus. E-mail: susan.gabe@mcgill.ca. Telephone: (514) 398-7045.

Prerequisites: HISP 218 Spanish Language Elementary or equivalent proficiency, and MATH 203 Principles of Statistics 1 or equivalent. A GPA of 3.00 and higher is recommended. The program is aimed at undergraduate students in their final year.

PANAMA FIELD STUDY SEMESTER – offered Winter Term (15 credits)

Required Courses (9 credits)

BIOL 553 (3) Neotropical Environments
ENVR 451 (6) Research in Panama

Complementary Courses (6 credits)

One of the following sets:

Offered in Winter 2004 –

AGRI 550 (3) Sustained Tropical Agriculture
GEOG 498 (3) Humans in Tropical Environments

Offered in Winter 2005 –

GEOG 404 (3) Environmental Management 2
SOC 565 (3) Social Change in Panama

9.3 Bay of Fundy Field Study Semester

Website: www.geog.mcgill.ca/fieldsemester.html

The focus of this program is environmental and social change on the Bay of Fundy, situated between southern New Brunswick and western Nova Scotia. The program is based at the Huntsman Marine Science Centre in Saint Andrews, New Brunswick.

Students will take three intensive courses followed by a research project related to regional environmental issues. Courses will cover the ecology of the coastal environments which provide important resources; the historical context of current social, political, economic and environmental issues in Atlantic Canada; and how development of new technologies for resource exploitation and globalization of local economies are having dramatic impacts on small coastal communities. Courses rely heavily on field work and interaction with local experts and stakeholders. Student research projects will be arranged with Federal, Provincial and non-governmental agencies.

Offered: Fall Term in alternate years, i.e., 2003, 2005, etc.

Location: Offered at Huntsman Marine Science Centre in St. Andrews, New Brunswick.

Fees: Approximately \$4700CDN – excludes regular McGill fees, transportation to Huntsman; includes lodging, food and field trip related expenses.

Quebec residents may be eligible for a financial subsidy from the Ministry of Education, see “Quebec Government Awards for Quebec Residents” on page 37.

Application Deadline: March 1, 2003 for September 2003 (Fall Term of the academic year 2003-04).

Application Details: Students must submit an application (available for download from the program Website) and a copy of their transcript to: Professor Gail Chmura, Department of Geography, Burnside Hall room 705, Downtown Campus.

E-mail: chmura@geog.mcgill.ca. Telephone: (514) 398-7437.

Prerequisites: The program is for upper-level students with a GPA of at least 3.00.

BAY OF FUNDY FIELD STUDY SEMESTER – offered Fall Term Required Courses (15 credits)

CANS 407 (3) Understanding Atlantic Canada
ENVR 465 (3) Environment and Social Change
ENVR 466 (6) Research in Atlantic Canada
GEOG 497 (3) Ecology of Coastal Waters

9.4 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 “Macdonald Summer Field Semester: Human Impacts on the Environment” on page 318 under the Faculty of Agricultural and Environmental Sciences, the Faculty Website at www.mcgill.ca/macdonald/programs, the 2003 Summer Studies Calendar or their Website at www.mcgill.ca/summer.

10 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. The most up-to-date information on courses being offered this academic year is available on Class Schedule at www.mcgill.ca/minerva. Course descriptions and prerequisites can be found in the Courses section.

SOCIAL SCIENCES AND POLICY

Anthropology

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

Economics

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

Environment

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

Geography

- GEOG 200 (3) Geographical Perspectives: World Environmental Problems
 GEOG 216 (3) Geography of the World Economy
 GEOG 300 (3) Human Ecology in Geography
 GEOG 301 (3) Geography of Nunavut
 GEOG 302 (3) Environmental Management 1
 GEOG 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.

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

Philosophy

- PHIL 230 (3) Introduction to Moral Philosophy 1
 PHIL 237 (3) Contemporary Moral Issues
 PHIL 334 (3) Ethics 1

Political Science

- POLI 211 (3) Comparative Government and Politics
 POLI 212 (3) Government and Politics - Developed World
 POLI 227 (3) Developing Areas/Introduction
 POLI 345 (3) International Organization
 POLI 445 (3) IPE: North-South Relations

Psychology

- PSYC 215 (3) Social Psychology

Religious Studies

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

Sociology

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

Agricultural Economics (Macdonald Campus)

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

Religious Studies (Macdonald Campus)

- RELG 270 (3) Religious Ethics and the Environment

Renewable Resources (Macdonald Campus)

- WILD 415 (2) Conservation Law

NATURAL SCIENCES AND TECHNOLOGY

Architecture

- ARCH 375 (2) Landscape
 ARCH 377 (2) Energy, Environment and Buildings
 ARCH 378 (3) Site Usage

Atmospheric and Oceanic Sciences

- ATOC 210 (3) Introduction to Atmospheric Science
 ATOC 215 (3) Weather Systems and Climate
 ATOC 220 (3) Introduction to Oceanic Sciences

Biology

- BIOL 208 (3) Introduction to Ecology
 BIOL 305 (3) Diversity of Life
 BIOL 432 (3) Limnology
 BIOL 465 (3) Conservation Biology
 BIOL 473 (3) Ecology of Aquatic Invertebrates

Chemistry

- CHEM 201 (3) Modern Inorganic Chemistry 1
 CHEM 212 (4) Introductory Organic Chemistry 1
 CHEM 301 (3) Modern Inorganic Chemistry 2
 CHEM 307 (3) Analytical Chemistry of Pollutants

Chemical Engineering

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

Civil Engineering

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

Computer Science

- COMP 102 (3) Computers and Computing (Arts students only)
 COMP 202 (3) Introduction to Computing 1
 COMP 203 (3) Introduction to Computing 2

Earth and Planetary Sciences

- EPSC 233 (3) Earth and Life History
 EPSC 243 (3) Environmental Geology
 EPSC 425 (3) Sediments to Sequences

Environment

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

Geography

- GEOG 201 (3) Introductory Geo-Information Science
 GEOG 205 (3) Global Change: Past, Present and Future
 GEOG 272 (3) Earth's Changing Surface
 GEOG 308 (3) Principles of Remote Sensing
 GEOG 322 (3) Environmental Hydrology

Mechanical Engineering

MECH 343 (3) Energy Conversion
MECH 534 (3) Air Pollution Engineering

Microbiology and Immunology

MIMM 211 (3) Introductory Microbiology
MIMM 314 (3) Immunology
MIMM 323 (3) Microbial Physiology
MIMM 324 (3) Fundamental Virology

Mining, Metals and Materials Engineering

MIME 308 (3) Social Impact of Technology
MIME 320 (3) Extraction of Energy Resources
MIME 451 (3) Environmental Controls: Met'l Plants
MIME 555 (3) Thermal Remediation of Wastes

Physics

PHYS 248 (3) Physics of Energy

Psychology

PSYC 431 (3) Environment and Developing Brain

Agricultural and Biosystems Engineering

(Macdonald Campus)

AGRI 435 (3) Soil and Water Quality Management
ABEN 217 (3) Hydrology and Drainage
ABEN 322 (3) Food Production/Processing Waste Management
ABEN 518 (3) Pollution Control for Agriculture

Biology (Macdonald Campus)

AEBI 205 (3) Principles of Ecology
AEBI 495D1 (1) Environmental Biology Seminar
AEBI 495D2 (1) Environmental Biology Seminar

Microbiology (Macdonald Campus)

MICR 331 (3) Microbial Ecology

Physics (Macdonald Campus)

AEPH 201 (3) Introductory Meteorology

Plant Science (Macdonald Campus)

PLNT 304 (3) Biology of Fungi
PLNT 305 (3) Plant Pathology
PLNT 358 (3) Flowering Plant Diversity
PLNT 460 (3) Plant Ecology

Renewable Resources (Macdonald Campus)

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

Soil Science (Macdonald Campus)

SOIL 200 (3) Introduction to Earth Science

Zoology (Macdonald Campus)

ZOOL 315 (3) Science of Inland Waters