Bieler School of Environment

Programs, Courses and University Regulations

2024-2025

This publication provides guidance to prospects, applicants, students, faculty and staff.

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Publication Information

Published by

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

1 About the Bieler School of Environment

McGill's faculties of Arts, of Science, and of Agricultural and Environmental Sciences, have forged a unique approach to the study of environment through the interfaculty, trans-disciplinary Bieler School of Environment. The rapid growth of technology, global economies, and global population have dramatic and significant environmental impacts that are felt locally and in the short-term as well as perturbations affecting large-scale global ecosystems felt over hundreds if not thousands of years. Solutions to the environmental challenges we face will come from an understanding of global ecosystems and the conflicting and complex ways in which human activities are intertwined with them. Studying environmental problems at the intersection of the natural environment and human-built world requires a depth and breadth of knowledge in both the social and natural sciences. The approach of the Bieler School of Environment programs is to introduce 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. The Bieler School attracts exceptional students able to comprehend and navigate the complex dynamics of environmental challenges and who are catalysts of change in their communities.

The mission of the Bieler School of Environment is:

- to provide a program that will develop a broad-based environmental literacy in the undergraduate population;
- to develop opportunities for graduate students to pursue studies of the environment at an advanced level to create future leaders and researchers; and
- to generate new ideas, new insights, new technologies, and new approaches to understanding and redressing environmental problems through academic research and outreach that draws on the University's existing strength in research and spans disciplinary boundaries.

1.1 Location

For advising, contact:

Environment Program Advisor
Telephone: 514-398-4306
Fax: 514-398-1643
Email: *advisor.environment@mcgill.ca*
Website: *mcgill.ca/environment*

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

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

2 Admission, Registration, and Regulations

Information concerning admission to the Bieler School of Environment and the regulations concerning the Environment programs is provided in these sections:

Admission, Registration, and Regulations

section 2.1: Admission

section 2.2: Degree Requirements

section 2.3: Important Information about Program Selection

section 2.4: Examination Regulations

section 2.5: Courses Outside the Student's Faculty

2.1 Admission

You may be admitted to a B.A., B.A. & Sc., B.Sc.(Ag.Env.Sc.), or B.Sc. program offered by the Bieler School of Environment on one of the University's two campuses: the Macdonald Campus (B.Sc.(Ag.Env.Sc.) program) and the Downtown Campus (B.A., B.A. & Sc., and B.Sc. programs). You register as a student within your faculty of admission and are governed by all rules and regulations of your faculty.

If you have already completed a bachelor or an equivalent degree, you may be admitted to the Diploma in Environment through the Faculty of Agricultural and Environmental Sciences, the Faculty of Arts, or the Faculty of Science. You register as a student within your faculty of admission and are governed by all rules and regulations of your faculty relative to the Diploma.

Please see the Undergraduate Admissions Guide, found at *mcgill.ca/applying*.

2.2 Degree Requirements

To be eligible for a **B.A.** degree, you must fulfil all the faculty and program requirements as indicated in the *Degree Requirements for the Faculty of Arts*.

To be eligible for a **B.A. & Sc.** degree, you must fulfil all the faculty and program requirements as indicated in the *Degree Requirements for the Bachelor of Arts & Science*.

To be eligible for a **B.Sc.(Ag.Env.Sc.)** degree, you must fulfil all the faculty and program requirements as indicated in the *Degree Requirements for the Faculty of Agricultural and Environmental Sciences*.

To be eligible for a **B.Sc.** degree, you must fulfil all the faculty and program requirements as indicated in the *Degree Requirements for the Faculty of Science*.

To be eligible for the **Diploma in Environment**, you must fulfil all program requirements as specified for the *Diploma in Environment*.

To be eligible for an **Honours** degree, you must fulfil all the faculty and program requirements as indicated in the *Honours and First Class Honours* section under your home faculty. In addition, you must fulfil the honours program requirements outlined in the *Honours Program in Environment* section.

To be eligible for a **Joint Honours** degree, you must fulfil all the faculty and program requirements as detailed in the section on

- Faculty of Science students in particular should be aware that some courses are restricted and cannot be taken for credit. Refer to *Restrictions on courses outside the Faculty of Science* in the Faculty of Science's Undergraduate Handbook, or contact *SOUSA*
- Students in the Diploma of Environment follow the program as specified; see *section 5.8: Diploma Environment*.

3 Overview of Programs Offered

The Bieler School of Environment offers nine programs on the Downtown and Macdonald Campuses:

1. A **Minor (or Minor Concentration) in Environment** is open to all undergraduate students. For more information, see *section 5.1: Minor in Environment*.
2. A **Faculty Program in Environment** leading to a B.A. is open to students meeting the entrance requirements of the Faculty of Arts. For more information, see *section 5.2: B.A. Faculty Program in Environment*.
3. An **Interfaculty Program in Environment** leading to a B.A. & Sc. is open to students meeting the entrance requirements for the Bachelor of Arts and Science. For more information, see *section 5.3: Bachelor of Arts and Science (B.A. & Sc.) – Interfaculty Programs*.
4. An **Interfaculty Program in Sustainability, Science and Society** leading to a B.A. and Sc. is offered by the Bieler School of Environment in partnership with the Department of Geography. It is open to students meeting the entrance requirements for the Bachelor of Arts and Science. For more information, see *Bachelor of Arts and Science* > *Undergraduate* > *: Bachelor of Arts and Science (B.A. & Sc.) - Interfaculty Program in Sustainability, Science and Society (54 credits)*.
5. A **Major 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. For more information, see *section 5.4: Major in Environment - B.Sc.(Ag.Env.Sc.) and B.Sc.* .
6. A **Major Environment** leading to a B.Sc. is open to students meeting the entrance requirements of the Faculty of Science. For more information, see *section 5.4: Major in Environment - B.Sc.(Ag.Env.Sc.) and B.Sc.*.
7. An **Honours Program in Environment** is open to senior Environment students in the B.A., B.A. & Sc., B.Sc.(Ag.Env.Sc.) and B.Sc. degrees. For more information, see *section 5.6: Honours Environment*.
8. A **Joint Honours Program in Environment** is open to senior Environment students in the B.A. degree. For more information, see *section 5.7.1: Bachelor of Arts (B.A.) - Joint Honours Component Environment (36 credits)*.
9. A **Diploma in Environment** is available only to students who have already completed a Bachelor or an equivalent degree, and who want to return to university for further undergraduate study. The Diploma is offered by the Faculty of Agricultural and Environmental Sciences, the Faculty of Arts, and the Faculty of Science. For more information, see *section 5.8: Diploma Environment*.

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 transdisciplinary Concentration of environmental specialization.

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.

4 Suggested Courses for Freshman/U0 Year Students

In general, the Downtown Campus offerings (section -001) of ENVR courses are restricted to students in U1 and above. Where course capacity allows, Students in their Freshman/U0 year are allowed to take the Macdonald Campus offerings (section -051) of the 200-level ENVR courses. Students in their U1 to U3 years are welcome to take selected ENVR courses as electives where space permits. For courses to take in their Freshman/U0 year, students should refer to the website of their respective faculty.

- Students in the **B.Sc.** degree, see *www.mcgill.ca/science/undergraduate/handbook#bsc-program-specific-advice*.
- Students in the **B.Sc.(Ag.Env.Sc.)** degree, see *mcgill.ca/macdonald/prospective/freshmanyear/academics*.
- Students in the **B.A. & Sc.** degree, see *www.mcgill.ca/science/undergraduate/handbook#basc-program-specific-advice*.
- Students in the **B.A.** degree, see *www.mcgill.ca/oasis/students/new*.

5 Browse Academic Programs

The programs and courses in the following sections have been approved for the 2024–2025 academic year as listed.

5.1 Minor in Environment

The Minor in Environment is intended to complement an expertise obtained through a Major, Major Concentration, Faculty program, or Interfaculty program offered by an academic unit **other than** the Bieler School of Environment*****. Students taking the Minor (or Minor Concentration) in Environment are exposed to different approaches, perspectives, and world views that will help them gain an understanding of the complexity and conflicts that underlie environmental problems.

Students, after consulting with their advisor in their Major program or Major Concentration, and the Environment Program Advisor, can declare their intention to do a Minor (or Minor Concentration) in Environment.

> *** Note:** Students in Arts, Law, and Management complete the **Minor Concentration Environment**. Students in Agricultural and Environmental Sciences, Engineering, and Science complete the

Social Sciences and Policy

AGEC 231	(3)	Economic Systems of Agriculture
AGEC 333	(3)	Resource Economics
AGEC 430	(3)	Agriculture, Food and Resource Policy
AGEC 442	(3)	Economics of International Agricultural Development
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
ANTH 206	(3)	Environment and Culture
ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
ANTH 418	(3)	Environment and Development
ANTH 512	(3)	Political Ecology
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

PHIL 334	(3)	Ethical Theory
PHIL 341	(3)	Philosophy of Science 1
PHIL 343	(3)	Biomedical Ethics
PHIL 348	(3)	Philosophy of Law 1
POLI 212	(3)	Introduction to Comparative Politics – Europe/North America
POLI 227	(3)	Introduction to Comparative Politics - Global South
POLI 345	(3)	International Organizations
POLI 350	(3)	Global Environmental Politics
		Canadian Voting/Public Opinion

BIOL 418	(3)	Freshwater Invertebrate Ecology
BIOL 432	(3)	Limnology
BIOL 436	(3)	Evolution and Society
BIOL 465**	(3)	Conservation Biology
BREE 217**	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 327	(3)	Bio-Environmental Engineering
BREE 518	(3)	Ecological Engineering
CHEM 212	(4)	Introductory Organic Chemistry 1
CHEM 281	(3)	Inorganic Chemistry 1
CIVE 225	(4)	Environmental Engineering
CIVE 323**	(3)	Hydrology and Water Resources
CIVE 550	(3)	Water Resources Management
COMP 202**	(3)	Foundations of Programming
COMP 204**	(3)	Computer Programming for Life Sciences
ENVB 210	(3)	The Biophysical Environment
ENVB 301	(3)	Meteorology
ENVB 305**	(3)	Population and Community Ecology
ENVB 410	(3)	Ecosystem Ecology
ENVB 415	(3)	Ecosystem Management
ENVB 529**	(3)	GIS for Natural Resource Management
ENVR 200	(3)	The Global Environment
ENVR 202	(3)	The Evolving Earth
ENVR 422	(3)	Montreal Urban Sustainability Analysis
EPSC 201**	(3)	Understanding Planet Earth
EPSC 233**	(3)	Earth and Life History
EPSC 549	(3)	Hydrogeology
ESYS 301	(3)	Earth System Modelling
FDSC 230	(4)	Organic Chemistry
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 201**	(3)	Introductory Geo-Information Science
GEOG 205	(3)	Global Change: Past, Present and Future
GEOG 272	(3)	Earth's Changing Surface
		Remote Sensing for Earth OI2xb206.8 Tm(Remote Sensing f0 0 1 165.864th's Ch06.8 Tm(Remote otSu((3))Tj1 0 0 1 7(

MIMM 214	(3)	Introductory Immunology: Elements of Immunity
MIMM 323	(3)	Microbial Physiology
NRSC 333	(3)	Pollution and Bioremediation
PARA 410	(3)	Environment and Infection
PARA 515	(3)	Water, Health and Sanitation
PHYS 228	(3)	Energy and the Environment
PLNT 304	(3)	Biology of Fungi
PLNT 305	(3)	Plant Pathology
	(3)	Flowering Plant Diversity

This list is not exhaustive. You are encouraged to examine the course lists of the various domains in the Environment program for other courses that might interest you. Courses not on the Suggested Course List may be included with the permission of the Bieler School of Environment Program Adviser.

Some courses (vironment Program)Tj1 0 0 1 517.849 71Tj1 0 0 1 5 Tw1 00A.

HIST 292	(3)	History and the Environment
NRSC 221	(3)	Environment and Health
PHIL 221	(3)	Introduction to History and Philosophy of Science 2
PHIL 230	(3)	Introduction to Moral Philosophy 1
PHIL 237	(3)	Contemporary Moral Issues
PHIL 334	(3)	Ethical Theory
PHIL 341	(3)	Philosophy of Science 1
PHIL 343	(3)	Biomedical Ethics
PHIL 348	(3)	Philosophy of Law 1
POLI 212	(3)	Introduction to Comparative Politics – Europe/North America
POLI 227	(3)	Introduction to Comparative Politics - Global South
POLI 345	(3)	International Organizations
POLI 350	(3)	Global Environmental Politics
POLI 412	(3)	Canadian Voting/Public Opinion

BIOL 240	(3)	Monteregian Flora
BIOL 305	(3)	Animal Diversity
BIOL 308**	(3)	Ecological Dynamics
BIOL 310	(3)	Biodiversity and Ecosystems
BIOL 342	(3)	Global Change Biology of Aquatic Ecosystems
BIOL 418	(3)	Freshwater Invertebrate Ecology
BIOL 432	(3)	Limnology
BIOL 436	(3)	Evolution and Society
BIOL 465**	(3)	Conservation Biology
BREE 217**	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 327	(3)	Bio-Environmental Engineering
BREE 518	(3)	Ecological Engineering
CHEM 212	(4)	Introductory Organic Chemistry 1
CHEM 281	(3)	Inorganic Chemistry 1
CIVE 225	(4)	Environmental Engineering
CIVE 323**	(3)	Hydrology and Water Resources
CIVE 550	(3)	Water Resources Management
COMP 202**	(3)	Foundations of Programming
COMP 204**	(3)	Computer Programming for Life Sciences
ENVB 210	(3)	The Biophysical Environment
ENVB 301	(3)	Meteorology
ENVB 305**	(3)	Population and Community Ecology
ENVB 410	(3)	Ecosystem Ecology
ENVB 415	(3)	Ecosystem Management
ENVB 529**	(3)	GIS for Natural Resource Management
ENVR 200	(3)	The Global Environment
ENVR 202	(3)	The Evolving Earth
ENVR 422	(3)	Montreal Urban Sustainability Analysis
EPSC 201**	(3)	Understanding Planet Earth
EPSC 233**	(3)	Earth and Life History
EPSC 549	(3)	Hydrogeology
ESYS 301	(3)	Earth System Modelling
FDSC 230	(4)	Organic Chemistry
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 201**	(3)	Introductory Geo-Information Science
GEOG 205	(3)	Global Change: Past, Present and Future
GEOG 272	(3)	Earth's Changing Surface
GEOG 308	(3)	Remote Sensing for Earth Observation
GEOG 321	(3)	Climatic Environments
GEOG 322**	(3)	Environmental Hydrology
GEOG 372	(3)	Running Water Environments
GEOG 470	(3)	Wetlands

GEOG 550	(3)	Historical Ecology Techniques
LSCI 230**	(3)	Introductory Microbiology
MICR 331	(3)	Microbial Ecology
MIME 320	(3)	Extraction of Energy Resources
MIMM 211**	(3)	Introductory Microbiology
MIMM 214	(3)	Introductory Immunology: Elements of Immunity
MIMM 323	(3)	Microbial Physiology
NRSC 333	(3)	Pollution and Bioremediation
PARA 410	(3)	Environment and Infection
PARA 515	(3)	Water, Health and Sanitation
PHYS 228	(3)	Energy and the Environment
PLNT 304	(3)	Biology of Fungi
PLNT 305	(3)	Plant Pathology
PLNT 358	(3)	Flowering Plant Diversity
PLNT 460	(3)	Plant Ecology
SOIL 300	(3)	Geosystems
WILD 302	(3)	Fish Ecology
WILD 421**	(3)	Wildlife Conservation

5.2 B.A. Faculty Program in Environment

The B.A. Faculty Program comprises two course components: core and concentration.

Core: In the core component, the four introductory courses and an intermediate-level course expose students to different interdisciplinary perspectives, approaches, and world views to help them understand the complexity and conflicts that underlie most environmental problems. In the two senior-level courses of the core component, students will apply the general and specialized knowledge acquired through the rest of their program, to the analysis of a selection of contemporary environmental problems. Students will be challenged by the core program to look beyond the confines of their individual views of environment.

Concentration: In addition to the core program, students choose a concentration, a transdisciplinary study of a particular theme or component of the environment. The requirements and complementary course sets vary between Concentrations. You can choose to follow one of three concentrations within the B.A. Faculty Program in Environment:

- Ecological Determinants of Health in Society
- Economics and the Earth's Environment
- Environment and Development

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

- register in a Concentration online, using Minerva;
- satisfy the co- and/or prerequisites for the program (Numeracy [e.g., 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 core and their chosen concentration, and that the Complementary courses are approved courses in their chosen Concentration; and
- fulfil all Faculty requirements as specified for the B.A. in *Faculty of Arts* > *Undergraduate* > *: Degree Requirements for the Faculty of Arts*, which include meeting the minimum credit requirement as specified in their letter of admission.

5.2.1 Ecological Determinants of Health in Society Concentration

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

we are to be successful in our efforts to assure health of individuals and societies in the future. Recognizing the key role that nutritional status plays in maintaining a healthy body, and the increasing importance of infection as a health risk linked intimately with the environment, this domain prepares students to contribute to the solution of problems of nutrition and infection by tying the relevant natural sciences to the social sciences.

Program Prerequisites or Corequisites

To graduate from the Faculty Program in Environment, students are required to complete these courses by the end of their U1 year. These courses can be taken using the Satisfactory/Unsatisfactory option. See: http://www.mcgill.ca/study/university_regulations_and_resources/undergraduate/gi_courses_taken_under_the_satisfactory_unsatisfactory_option for details.

Numeracy

3 credits from the following, or equivalent (e.g., CEGEP objective 00UN):

MATH 139	(4)	Calculus 1 with Precalculus
MATH 140	(3)	Calculus 1

Basic Science

3 credits of basic science from the following, or equivalent (e.g., CEGEP objective 00UK):

AEBI 120	(3)	General Biology
BIOL 111	(3)	Principles: Organismal Biology

Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "Bieler School of Environment Student Handbook" available on the website (http://www.mcgill.ca/environment), or contact Kathy Roulet, the Program Adviser (kathy.roulet@mcgill.ca).

Program Requirements

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

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

Core: Required Courses (18 credits)

Location Note: Core required courses are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

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

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

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

AEBI 427	(6)	Barbados Interdisciplinary Project
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama
FSCI 444	(6)	Barbados Research Project

Complementary Courses (33 credits)

33 credits of complementary courses are chosen as follows:

6 credits of Health and Environment

SOCI 225	(3)	Medicine and Health in Modern Society
SOCI 234	(3)	Population and Society
SOCI 309	(3)	Health and Illness
SOCI 331	(3)	Population and Environment
SOCI 515	(3)	Medicine and Society

Hydrology and Climate

* Note: You may take BREE 217 or GEOG 322, but not both.

AGRI 452	(3)	Water Resources in Barbados
BREE 217*	(3)	Hydrology and Water Resources
GEOG 321	(3)	Climatic Environments
GEOG 322*	(3)	Environmental Hydrology

Agriculture

AEBI 425	(3)	Tropical Energy and Food
AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
AGRI 550	(3)	Sustained Tropical Agriculture
NUTR 341	(3)	Global Food Security

Decision Making

AGEC 333	(3)	Resource Economics
ECON 440	(3)	Health Economics
PHIL 343	(3)	Biomedical Ethics
RELG 270	(3)	Religious Ethics and the Environment

Biology Fundamentals:

* Note: You may take BIOL 308 or ENVB 305, but not both.

AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
BIOL 200	(3)	Molecular Biology
BIOL 308*	(3)	Ecological Dynamics
ENVB 305*	(3)	Population and Community Ecology
LSCI 211	(3)	Biochemistry 1

Development and Ecology

ANTH 212	(3)	Anthropology of Development
ANTH 339	(3)	Ecological Anthropology
ANTH 512	(3)	Political Ecology
ENVR 421	(3)	Montreal: Environmental History and Sustainability
GEOG 300	(3)	Human Ecology in Geography
GEOG 310	(3)	Development and Livelihoods

* Note: You may take MIMM 413 or WILD 424, but not both.

MIMM 214	(3)	Introductory Immunology: Elements of Immunity
MIMM 314	(3)	Intermediate Immunology
MIMM 324	(3)	Fundamental Virology
MIMM 413*	(3)	Parasitology
PARA 424*	(3)	Fundamental Parasitology
PARA 438	(3)	Immunology
PPHS 501	(3)	Population Health and Epidemiology

P

AECH 110	(4)	General Chemistry 1
CHEM 110	(4)	General Chemistry 1

Other Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "Bieler School of Environment Student Handbook" available on the website (http://www.mcgill.ca/environment), or contact Ms. Kathy Roulet, the Program Adviser (kathy.roulet@mcgill.ca).

Program Requirements

Note: Students are required to take a maximum of 34 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses, but does not include the program pre-requisites or co-requisites listed above.

Location Note: When planning your schedule and re

GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1

Economics

6 credits from:

AGEC 333	(3)	Resource Economics
ECON 209	(3)	Macroeconomic Analysis and Applications
ECON 326	(3)	Ecological Economics
ECON 347	(3)	Economics of Climate Change
ECON 416	(3)	Topics in Economic Development 2
ECON 511	(3)	Energy, Economy and Environment

Advanced Courses (9 credits)

9 credits chosen from two areas:

Area 1: Development/Environmental Management

* Note: You can take ENVB 529 or GEOG 201 but not both; you can take BIOL 451 or NRSC 451 but not both; you can take ANTH 451 or GEOG 451 but not both.

AEBI 423	(3)	Sustainable Land Use
AGRI 550	(3)	Sustained Tropical Agriculture
ANTH 451*	(3)	Research in Society and Development in Africa
BIOL 451*	(3)	Research in Ecology and Development in Africa
ECON 305	(3)	Industrial Organization
ECON 313	(3)	Economic Development 1
ECON 314	(3)	Economic Development 2
ECON 408	(3)	Public Sector Economics 1
ECON 409	(3)	Public Sector Economics 2
ENVB 437	(3)	Assessing Environmental Impact
ENVB 529*	(3)	GIS for Natural Resource Management
		Montreal: Environmental Histor.864 36.263 Tm(ENVB 529*)Tj1 0 0 1s0 1,Mlty1 l0 0 1 22129*

ATOC 341	(3)	Caribbean Climate and Weather
BIOL 308*	(3)	Ecological Dynamics
BIOL 343	(3)	Biodiversity in the Caribean
BREE 217*	(3)	Hydrology and Water Resources
ENVB 305*	(3)	Population and Community Ecology
EPSC 355	(3)	Sedimentary Geology
EPSC 549	(3)	Hydrogeology
GEOG 305	(3)	Soils and Environment
GEOG 322*	(3)	Environmental Hydrology
SOIL 300	(3)	Geosystems

5.2.3 Environment and Development Concentration

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

5.2.3.1 Bachelor of Arts (B.A.) - Faculty Program Environment - Environment and Development (54 credits)

The B.A.; Faculty Program in Environment; Environment and Development is an introduction to theories, concepts and approaches associated with the complexities between environment and development. The problems and solutions to the development/environmental crisis, which include: the natural world, theories behind economic development and growth, and of the cultural constructs of nature and environment; knowledge of global economic and environmental organizations; and sustainability and the climate crisis.

Program Prerequisites or Corequisites

To graduate from the Faculty Program in Environment, students are required to complete these courses by the end of their U1 year. These courses can be taken using the Satisfactory/Unsatisfactory option. See: http://www.mcgill.ca/study/university_regulations_and_resources/undergraduate/gi_courses_taken_under_the_satisfactory_unsatisfactory_option for details.

Calculus

3 credits of calculus from the following, or equivalent (e.g., CEGEP objective OOUN):

MATH 139	(4)	Calculus 1 with Precalculus
MATH 140	(3)	Calculus 1

Basic Science

3 credits of basic science from the following, or equivalent (e.g., CEGEP objectives: Biology OOUK, Chemistry OOUL, Physics OOUR):

BIOL 111	(3)	Principles: Organismal Biology
CHEM 110	(4)	General Chemistry 1
PHYS 101	(4)	Introductory Physics - Mechanics

Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "Bieler School of Environment Student Handbook" available on the website (http://www.mcgill.ca/environment), or contact Ms. Kathy Roulet, the Program Adviser (kathy.roulet@mcgill.ca).

Program Requirements

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

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and Macdonald campus in Sainte-Anne-de-Bellevue.

Required Courses (30 credits)

Location Note: ENVR courses are taught at both McGill's Downtown campus and Macdonald campus. You should register in Section 001 of an ENVR course on the Downtown campus, and in Section 051 of an ENVR on the Macdonald campus.

ANTH 339	(3)	Ecological Anthropology
ECON 313	(3)	Economic Development 1
ECON 314	(3)	Economic Development 2
ENVR 200	(3)	The Global Environment
ENVR 201	(3)	Society, Environment and Sustainability
ENVR 202	(3)	The Evolving Earth
ENVR 203	(3)	Knowledge, Ethics and Environment
ENVR 301	(3)	Environmental Research Design
ENVR 400	(3)	Environmental Thought
GEOG 302	(3)	Environmental Management 1

Complementary Courses (24 credits)

Senior Research Project

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

3 credits from:

GEOG 514	(3)	Climate Change Vulnerability and Adaptation
GEOG 525	(3)	Asian Cities in the 21st Century

Natural Sciences

3 credits from:

* Note: If chosen, you may take BIOL 308 or ENVB 305 ; you may take BIOL 465 or WILD 421; you may take ENVB 210 or GEOG 305; you may take BREE 217 or GEOG 322.

AEBI 421	(3)	Tropical Horticultural Ecology
AGRI 550	(3)	Sustained Tropical Agriculture

GEOG 340	(3)	Sustainability in the Caribbean
GEOG 404	(3)	Environmental Management 2
GEOG 496	(3)	Geographical Excursion
GEOG 498	(3)	Humans in Tropical Environments
GEOG 510	(3)	Humid Tropical Environments
GEOG 514	(3)	Climate Change Vulnerability and Adaptation
GEOG 530	(3)	Global Land and Water Resources
HIST 292	(3)	History and the Environment
HIST 510	(3)	Environmental History of Latin America (Field)
INTD 360	(3)	Environmental Challenges in Development
POLI 345	(3)	International Organizations
POLI 350	(3)	Global Environmental Politics
POLI 445	(3)	International Political Economy: Monetary Relations
SOCI 254	(3)	Development and Underdevelopment
SOCI 331	(3)	Population and Environment
WCOM 314	(3)	Communicating Science

5.3 Bachelor of Arts and Science (B.A. & Sc.) – Interfaculty Programs

These interfaculty programs are open only to students in the B.A. & Sc. degree.

To obtain a **B.A. & Sc. Interfaculty Program in Environment** or a **B.A. & Sc. Interfaculty Program in Sustainability, Science and Society**, students must:

- register in the interfaculty program online, using Minerva;
- pass all courses counted toward the interfaculty program with a grade of C or higher;
- confirm that their course selection satisfies the required and complementary course components of the program;
- fulfil all requirements specified for the B.A. & Sc. in *Bachelor of Arts & Science* > *Undergraduate* > *: Degree Requirements*, which include meeting the minimum credit requirement as specified in their letter of admission.

section 5.3.1: Bachelor of

1. Students are required to take a maximum of 21 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes required courses.

2. Students must complete at least 21 credits in the Faculty of Arts and at least 21 in the Faculty of Science as part of their interfaculty program and their minor or minor concentration. ENVR courses are considered courses in both Arts and Science, and so the credits are split between the two faculties for the purpose of this regulation.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught on both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

Required Courses (18 credits)

Location Note: courses are taught at both McGill's Downtown campus and Macdonald campus. You should register in section 001 of an ENVR course on the Downtown campus, and in section 051 of ENVR course on the Macdonald campus.

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

Complementary Courses (36 credits)

Senior Research Project

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

AEBI 427	(6)	Barbados Interdisciplinary Project
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama
FSCI 444	(6)	Barbados Research Project
GEOG 451	(3)	Research in Society and Development in Africa

Statistics:

One of:

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

Areas:

30 credits from at least three of the following Areas. At least 6 credits must be at the 400 level or higher, selected either from these lists or in consultation with the Program Adviser.

Area 1: Population, Community, and Ecosystem Ecology

* Note: You may take BIOL 308 or ENVR 305.

BIOL 308	(3)	Ecological Dynamics
BIOL 432	(3)	Limnology
BIOL 441	(3)	Biological Oceanography
BIOL 540	(3)	Ecology of Species Invasions
ENVB 305	(3)	Population and Community Ecology
ENVB 410	(3)	Ecosystem Ecology

ENVB 500	(3)	Advanced Topics in Ecotoxicology
ENVR 540	(3)	Ecology of Species Invasions
PLNT 460	(3)	Plant Ecology

Area 2: Biodiversity and Conservation

BIOL 305	(3)	Animal Diversity
BIOL 310	(3)	Biodiversity and Ecosystems
BIOL 343	(3)	Biodiversity in the Caribean
BIOL 427	(3)	Herpetology
BIOL 465	(3)	Conservation Biology
MICR 331	(3)	Microbial Ecology
PLNT 358	(3)	Flowering Plant Diversity
WILD 307	(3)	Natural History of Vertebrates
WILD 350	(3)	Mammalogy
WILD 420	(3)	Ornithology

Area 3: Field Studies in Ecology and Conservation

BIOL 240	(3)	Monteregian Flora
BIOL 331	(3)	Ecology/Behaviour Field Course
BIOL 334D1	(1.5)	Applied Tropical Ecology
BIOL 334D2	(1.5)	Applied Tropical Ecology
BIOL 335	(3)	Marine Mammals
BIOL 553	(3)	Neotropical Environments
GEOG 495	(3)	Field Studies - Physical Geography
WILD 475	(3)	Desert Ecology

Area 4: Hydrology and Water Resources

* Note: If chosen, you may take only one of: GEOG 322, BREE 217, or CIVE 323.

** Note: If chosen, you may take EPSC 522 or GEOG 522.

BREE 217	(3)	Hydrology and Water Resources
CIVE 323	(3)	Hydrology and Water Resources
EPSC 522	(3)	Advanced Environmental Hydrology
EPSC 549	(3)	Hydrogeology
GEOG 322	(3)	Environmental Hydrology
GEOG 470	(3)	Wetlands
GEOG 522	(3)	Advanced Environmental Hydrology
GEOG 530	(3)	Global Land and Water Resources

Area 5: Human Health

NUTR 307	(3)	Metabolism and Human Nutrition
PARA 410	(3)	Environment and Infection
PATH 300	(3)	Human Disease

PHAR 303	(3)	Principles of Toxicology

Area 6: Earth and Soil Sciences

Oceans, Weather and Climate

Area 10: Human Ecology and Health

ANTH 227	(3)	Medical Anthropology
GEOG 303	(3)	Health Geography
PHIL 343	(3)	Biomedical Ethics
SOCI 225	(3)	Medicine and Health in Modern Society
SOCI 309	(3)	Health and Illness

Area 11: Spirituality, Philosophy, and Thought

ANTH 318	(3)	Globalization and Religion
EDER 461	(3)	Society and Change
PHIL 221	(3)	Introduction to History and Philosophy of Science 2
PHIL 237	(3)	Contemporary Moral Issues
PHIL 341	(3)	Philosophy of Science 1
PHIL 348	(3)	Philosophy of Law 1
RELG 270	(3)	Religious Ethics and the Environment
RELG 370	(3)	Religion and Human Rights

Area 12: Environmental Management

AGRI 550	(3)	Sustained Tropical Agriculture
COMS 360	(3)	Environmental Communication
ENVB 437	(3)	Assessing Environmental Impact
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 302	(3)	Environmental Management 1
GEOG 340	(3)	Sustainability in the Caribbean
GEOG 404	(3)	Environmental Management 2
NRSC 333	(3)	Pollution and Bioremediation
POLI 350	(3)	Global Environmental Politics
WCOM 314	(3)	Communicating Science
		Fisheries and Wildlife Management

the Core, students will apply the general and specialized knowledge acquired through the rest of their program to the analysis of a selection of contemporary environmental problems. Students will be challenged by the Core program to look beyond the confines of their individual views of environment.

2. **Concentration:** In addition to the Core, students choose a Concentration, a transdisciplinary study of a particular theme or component of the environment. The requirements and complementary course sets vary between Concentrations. B.Sc.(Ag.Env.Sc.) and B.Sc. students can choose one of the following concentrations:

   - Biodiversity and Conservation
   - Ecological Determinants of Health (Population and Cellular stream options)
   - Environmetrics
   - Food Production and Environment
   - Land Surface Processes and Environmental Change
   - Renewable Resource Management
   - Water Environments and Ecosystems (Biological and Physical stream options)

   B.Sc. students in the Faculty of Science may also choose one of the following concentrations:

   - Atmospheric Environment and Air Quality
   - Earth Sciences and Economics

3. **Senior Core and Research:** In the two senior courses of the Core, students will apply the general and specialized knowledge that they have gained in the program to the analysis of some specific, contemporary environmental problems.

To obtain a Major in Environment, students must:

- register in a concentration online using Minerva;
- pass all courses counted toward the Major with a grade of **C** or higher;
- confirm that their course selection satisfies the required components of the Core and their chosen Concentration, and that the complementary courses are approved courses in their chosen Concentration; and
- fulfil all faculty requirements as specified by the faculty in which they are registered: for the B.Sc.(Ag.Env.Sc.), refer to *Faculty of Agricultural & Environmental Sciences > Undergraduate > About the Faculty of Agricultural and Environmental Sciences, including School of Human Nutrition (Undergraduate) > : Faculty Information and Regulations*; for the B.Sc., see *Faculty of Science > Undergraduate > : Faculty Degree Requirements*. This includes meeting the minimum credit requirement as specified in their letter of admission.

5.4.1 Biodiversity and Conservation Concentration

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

5.4.1.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Biodiversity and Conservation (63 credits)

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

This domain links the academic study of biological diversity with the applied field of 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.

Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "Bieler School of Environment Student Handbook" available on the website (http://www.mcgill.ca/environment), or contact Kathy Roulet, the Program Adviser (kathy.roulet@mcgill.ca).

Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and Macdonald campus in Sainte-Anne-de-Bellevue.

Required Courses (18 credits)

Location Note: ENVR courses are taught at both McGill's Downtown campus and Macdonald campus. You should register in Section 001 of an ENVR course on the Downtown campus, and in Section 051 of an ENVR course on the Macdonald campus.

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

Complementary Courses (45 credits)

Senior Research Project

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

3 credits from:

AEBI 427	(6)	Barbados Interdisciplinary Project
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama
FSCI 444	(6)	Barbados Research Project
GEOG 451	(3)	Research in Society and Development in Africa

Biological Principles of Diversity/ Systematics/ Conservation

3 credits from:

AEBI 212	(3)	Evolution and Phylogeny
BIOL 304	(3)	Evolution

3 credits from:

AEBI 211	(3)	Organisms 2
BIOL 305	(3)	Animal Diversity

3 credits from:

BIOL 465	(3)	Conservation Biology
WILD 421	(3)	Wildlife Conservation

Ecology:

3 credits from:

BIOL 308	(3)	Ecological Dynamics
ENVB 305	(3)	Population and Community Ecology

Statistics:

3 credits from the following Statistics courses or equivalent:

Note: Other appropriate statistics courses may be approved as substitutions by the Program Adviser. Credit given for Statistics courses is subject to certain restrictions. Students in the Faculty of Arts or the Faculty of Science should consult the “Course Overlap” information in the “Course Requirements” section of the e-Calendar for the Faculty of Science.

AEMA 310	(3)	Statistical Methods 1

GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1

Science, Policy, and Management:

9 credits from the following:

*You may take AGEC 200 or ECON 208, but not both.

AEBI 423	(3)	Sustainable Land Use
AGEC 200*	(3)	Principles of Microeconomics
AGEC 430	(3)	Agriculture, Food and Resource Policy
BIOL 451	(3)	Research in Ecology and Development in Africa
ECON 208*	(3)	Microeconomic Analysis and Applications
ECON 225	(3)	Economics of the Environment
ENVB 437	(3)	Assessing Environmental Impact
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 302	(3)	Environmental Management 1
GEOG 340	(3)	Sustainability in the Caribbean
GEOG 360	(3)	Analyzing Sustainability
GEOG 408	(3)	Geography of Development
NRSC 451	(3)	Research in Ecology and Development in Africa
PLNT 312	(3)	Urban Horticulture
POLI 345	(3)	International Organizations
POLI 350	(3)	Global Environmental Politics
WCOM 314	(3)	Communicating Science

Field Courses

3 credits from the following:

BIOL 240	(3)	Monteregian Flora
BIOL 331	(3)	Ecology/Behaviour Field Course
BIOL 334D1	(1.5)	Applied Tropical Ecology
BIOL 334D2	(1.5)	Applied Tropical Ecology
BIOL 335	(3)	Marine Mammals
BIOL 553	(3)	Neotropical Environments
ENTO 340	(3)	Field Entomology
ENVB 410	(3)	Ecosystem Ecology
GEOG 495	(3)	Field Studies - Physical Geography
PLNT 358	(3)	Flowering Plant Diversity
PLNT 460	(3)	Plant Ecology
WILD 401	(3)	Fisheries and Wildlife Management
WILD 475	(3)	Desert Ecology
WOOD 441	(3)	Integrated Forest Management

General Scientific Principles

6 credits from the following:

AGRI 340	(3)	Principles of Ecological Agriculture
BIOL 310	(3)	Biodiversity and Ecosystems
BIOL 343	(3)	Biodiversity in the Caribean
BIOL 350*	(3)	Insect Biology and Control
BIOL 352	(3)	Dinosaur Biology
BIOL 427	(3)	Herpetology
BIOL 510	(3)	Advances in Community Ecology
BIOL 540	(3)	Ecology of Species Invasions
ENTO 330*	(3)	Insect Biology
ENTO 350*	(3)	Insect Biology and Control
ENVR 540	(3)	Ecology of Species Invasions
PARA 424	(3)	Fundamental Parasitology
PLNT 304	(3)	Biology of Fungi
PLNT 434	(3)	Weed Biology and Control
REDM 400	(3)	Science and Museums
WILD 307	(3)	Natural History of Vertebrates
WILD 350	(3)	Mammalogy
WILD 420	(3)	Ornithology

5.4.2 Ecological Determinants of Health Concentration

This concentration is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment. Within this concentration, there are two program options: the Cellular stream, and the Population stream.

5.4.2.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Ecological Determinants of Health - Cellular (63 credits)

The Cellular concentration in this domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

This domain considers the interface between the environment and human well-being, with particular focus on the triad that ties human health to the environment through the elements of food and infectious agents. Each of these elements is influenced by planned and unplanned environmental disturbances. For example, agricultural practices shift the balance between beneficial and harmful ingredients of food. Use of insecticides presents dilemmas with regard to the environment, economics, and human health. The distribution of infectious diseases is influenced by the climatic conditions that permit vectors to coexist with humans, by deforestation, by urbanization, and by human interventions ranging from the building of dams to provision of potable water.

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

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

Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "Bieler School of Environment Student Handbook" available on the website (http://www.mcgill.ca/environment), or contact Kathy Roulet, the Program Adviser (kathy.roulet@mcgill.ca).

Program Requirements

Note: You are required to take a maximum of 33 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

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

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

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

AEBI 427	(6)	Barbados Interdisciplinary Project
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama
FSCI 444	(6)	Barbados Research Project

Domain: Required Course (6 credits)

GEOG 403	(3)	Global Health and Environmental Change
PARA 410	(3)	Environment and Infection

Domain: Complementary Courses (36 credits)

36 credits of the complementary courses are selected as follows:

18 credits - Fundamentals, 3 credits from each category

12 credits - Human Health, maximum of 3 credits from any one category

6 credits - Natural Environment, maximum of 3 credits from any one category

Fundamentals:

18 credits of Fundamentals, 3 credits from each category.

Health, Society, and Environment

* Note: You may take GEOG 221 or NRSC 221, but not both.

GEOG 221*	(3)	Environment and Health
GEOG 303	(3)	Health Geography
GEOG 503	(3)	Advanced Topics in Health Geography
NRSC 221*	(3)	Environment and Health
PPHS 529	(3)	Global Environmental Health and Burden of Disease
SOCI 234	(3)	Population and Society
SOCI 309	(3)	Health and Illness
SOCI 331	(3)	Population and Environment

Cellular Biology

* Note: You will not receive credit for either LSCI 211 or LSCI 202 if you have already received credit for both BIOL 200 and BIOL 201; you will not receive credit for either BIOL 200 or BIOL 201 if you have already received credit for both LSCI 202 and LSCI 211.

ANSC 234	(3)	Biochemistry 2
BIOL 201	(3)	Cell Biology and Metabolism
LSCI 202	(3)	Molecular Cell Biology

ENVB 500	(3)	Advanced Topics in Ecotoxicology
NUTR 512	(3)	Herbs, Foods and Phytochemicals
PHAR 300	(3)	Drug Action
PHAR 303	(3)	Principles of Toxicology

Hormones

* Note: You will not receive credit for ANSC 424 if you have already received credit for both PHGY 209 and PHGY 210; you will not receive credit for PHGY 210 if you have already received credit for both ANSC 323 and ANSC 424.

ANSC 424*	(3)	Metabolic Endocrinology
PHGY 210*	(3)	Mammalian Physiology 2
PSYC 342	(3)	Hormones and Behaviour

Physiology

* Note: You will not receive credit ANSC 323 if you have already received credit for both PHGY 209 and PHGY 210; you will not receive credit for PHGY 209 if you have already received credit for both ANSC 323 and ANSC 424.

ANSC 323*	(3)	Mammalian Physiology
PHGY 209*	(3)	Mammalian Physiology 1

Natural Environment:

6 credits chosen from the Natural Environment, maximum of 3 credits from any one category:

Hydrology and Climate

* Note: You may take BREE 217 or GEOG 322, but not both.

ATOC 341	(3)	Caribbean Climate and Weather
BREE 217*	(3)	Hydrology and Water Resources
GEOG 321	(3)	Climatic Environments
GEOG 322*	(3)	Environmental Hydrology

Techniques and Management

AEBI 423	(3)	Sustainable Land Use
ENVB 437	(3)	Assessing Environmental Impact
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 302	(3)	Environmental Management 1
GEOG 340	(3)	Sustainability in the Caribbean
NUTR 450	(3)	Research Methods: Human Nutrition

or, advanced quantitative methods course (with approval of Adviser).

Pest Management

* Note: You may take BIOL 350 or ENTO 350, but not both.

BIOL 350*	(3)	Insect Biology and Control
ENTO 350*	(3)	Insect Biology and Control
ENTO 352	(3)	Biocontrol of Pest Insects

Pollution Control and Management

BREE 322	(3)	Organic Waste Management
BREE 518	(3)	Ecological Engineering
NRSC 333	(3)	Pollution and Bioremediation
PARA 515	(3)	Water, Health and Sanitation

Ecology

* Note: You may take ENVR 540 or BIOL 540, but not both; you many take BIOL 451 or NRSC 451, but not both.

AEBI 421	(3)	Tropical Horticultural Ecology
BIOL 343	(3)	Biodiversity in the Caribean
BIOL 432	(3)	Limnology
BIOL 451*	(3)	Research in Ecology and Development in Africa
BIOL 465	(3)	Conservation Biology
BIOL 540*	(3)	Ecology of Species Invasions
BIOL 553	(3)	Neotropical Environments
ENVB 410	(3)	Ecosystem Ecology
ENVR 540*	(3)	Ecology of Species Invasions
MICR 331	(3)	Microbial Ecology
NRSC 451*	(3)	Research in Ecology and Development in Africa
PLNT 304	(3)	Biology of Fungi
PLNT 460	(3)	Plant Ecology

5.4.2.2 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Ecological Determinants of Health- Population (63 credits)

The Population concentration in this domain is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment program.

This domain considers the interface between the environment and human well-being, with particular focus on the triad that ties human health to the environment through the elements of food and infectious agents. Each of these elements is influenced by planned and unplanned environmental disturbances. For example, agricultural practices shift the balance between beneficial and harmful ingredients of food. Use of insecticides presents dilemmas with regard to the environment, economics, and human health. The distribution of infectious diseases is influenced by the climatic conditions that permit vectors to coexist with humans, by deforestation, by urbanization, and by human interventions ranging from the building of dams to provision of potable water.

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

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

Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "Bieler School of Environment Student Handbook" available on the website (http://www.mcgill.ca/environment), or contact Kathy Roulet, the Program Adviser (kathy.roulet@mcgill.ca).

Program Requirements

Note: You are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning your schedule and registering for courses, you should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

ENVR 200	(3)	The Global Environment

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

Core: Complementary Cour

Cellular Biology

AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 550	(3)	Sustained Tropical Agriculture
ATOC 341	(3)	Caribbean Climate and Weather
BREE 217*	(3)	Hydrology and Water Resources
		Climatic En

Populations and Place

* Note: You may take ANTH 451 or GEOG 451, but not both.

AGRI 411	(3)	Global Issues on Development, Food and Agriculture
ANTH 451*	(3)	Research in Society and Development in Africa
ENVR 421	(3)	Montreal: Environmental History and Sustainability
GEOG 300	(3)	Human Ecology in Geography
GEOG 451*	(3)	Research in Society and Development in Africa
GEOG 498	(3)	Humans in Tropical Environments
NUTR 341	(3)	Global Food Security

Pollution Control and Pest Management

* Note: You may take BIOL 350 or ENTO 350, but not both.

BIOL 350*	(3)	Insect Biology and Control
BREE 322	(3)	Organic Waste Management
ENTO 350*	(3)	Insect Biology and Control
ENTO 352	(3)	Biocontrol of Pest Insects
NRSC 333	(3)	Pollution and Bioremediation
PARA 515	(3)	Water, Health and Sanitation

Genetics

BIOL 202	(3)	Basic Genetics
LSCI 204	(3)	Genetics

5.4.3 Environmetrics Concentration

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

5.4.3.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Environmetrics (63 credits)

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

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

Graduates will be capable of effectively participating in the design of environmental studies and adequately analyzing data for use by the environmental community. Accordingly, the list of courses for the Environmetrics Domain is composed primarily of 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 Bieler School of Environment 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

Statistics courses BIOL 373 OR AEMA 310 can be taken in U1, but do not take them if you want to follow Option 1 (below), as they overlap with MATH 324.

Program Requirements

Note: Students are required to take a maximum of 30 credits at the 200 level and a minimum of 12 credits at the 400 level or higher in this program. This includes core and required courses.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course if you want to take it on the Downtown campus, and in Section 051 of an ENVR course if you want to take it on the Macdonald campus.

The Global Environment

MIME 308	(3)	Social Impact of Technology

Modelling

BIOL 309	(3)	Mathematical Models in Biology
ENVB 506	(3)	Quantitative Methods: Ecology

GIS Techniques

9.161 po	(3)	GIS for Natural Resource Management

List 1

3 credits minimum of statistics and mathematics chosen from:

* Note: or equivalent courses to BREE 252 or BREE 319.

BIOL 434	(3)	Theoretical Ecology
BREE 252*	(3)	Computing for Engineers
BREE 319*	(3)	Engineering Mathematics
GEOG 401	(3)	Socio-Environmental Systems: Theory and Simulation
MATH 223	(3)	Linear Algebra
MATH 326	(3)	Nonlinear Dynamics and Chaos
MATH 423	(3)	Applied Regression
MATH 447	(3)	Introduction to Stochastic Processes
MATH 525	(4)	Sampling Theory and Applications
SOCI 504	(3)	Quantitative Methods 1
SOCI 580	(3)	Social Research Design and Practice

List 2

3 credits minimum of environmental sciences chosen from:

AGRI 550	(3)	Sustained Tropical Agriculture
ATOC 341	(3)	Caribbean Climate and Weather
BIOL 331	(3)	Ecology/Behaviour Field Course
BIOL 343	(3)	Biodiversity in the Caribean
BIOL 553	(3)	Neotropical Environments
ENVB 313	(3)	Phylogeny and Biogeography
ENVB 500	(3)	Advanced Topics in Ecotoxicology
ENVR 421	(3)	Montreal: Environmental History and Sustainability
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 300	(3)	Human Ecology in Geography
GEOG 302	(3)	Environmental Management 1
GEOG 404	(3)	Environmental Management 2
GEOG 494	(3)	Urban Field Studies
GEOG 499	(3)	Subarctic Field Studies
NRSC 333	(3)	Pollution and Bioremediation
PLNT 460	(3)	Plant Ecology
WILD 401	(3)	Fisheries and Wildlife Management

which can be significant and which can be difficult to assess and contain, as the effects range from loss of biodiversity due to increasing farm size, production of biofuels versus food, non-point source pollution of rivers and lakes, and a loss of arable land to urbanization. Secondly, a growing population needs support from a number of different land uses (e.g., urban growth, transportation, water resource use, timber resources, etc.), many of which conflict, and all of which compete with food production land requirements. As the available land resource decreases, land-use competition for what remains will grow more fierce, making the need for smart and informed decision-making related to food production increasingly critical.

Program Prerequisites or Corequisites

All students in this program MUST take these pre- or corequisite courses, or their equivalents. These courses are taken as follows:

One of the following courses or CEGEP equivalent (e.g., CEGEP objective 00XU):

BIOL 112	(3)	Cell and Molecular Biology
LSCI 211	(3)	Biochemistry 1

One of the following courses or CEGEP equivalent (e.g., CEGEP objective 00XV):

CHEM 212	(4)	Introductory Organic Chemistry 1
FDSC 230	(4)	Organic Chemistry

Suggested First Year (U1) Courses

For suggestions on courses to take in your first year (U1), you can consult the "Bieler School of Environment Student Handbook" available on the website (http://www.mcgill.ca/environment), or contact Kathy Roulet, the Program Adviser (kathy.roulet@mcgill.ca).

Program Requirements

Note: Students are required to take a maximum of 34 credits at the 200 level and a minimum of 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 corequisites listed above.

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downto

36 credits of complementary courses selected as follows:

18 credits - Fundamentals

12 credits - Applied Sciences

6 credits - Social Sciences/Humanities

The Applied and Social Sciences courses are grouped according to subtopics. Students can choose their courses from one subtopic, or a combination of subtopics.

Fundamentals (18 credits)

One of the following Statistics courses or equivalent:

Note: Credit given for Statistics courses is subject to certain restrictions. Students in Science should consult the "Course Overlap" information in the "Course Requirements" section for the Faculty of Science.

NUTR 501	(3)	Nutrition in the Majority World
NUTR 505	(3)	Public Health Nutrition
PARA 410	(3)	Environment and Infection
PHAR 303	(3)	Principles of Toxicology

Food Production

AEBI 421	(3)	Tropical Horticultural Ecology
AEBI 425	(3)	Tropical Energy and Food
AGRI 215	(3)	Agro-Ecosystems Field Course
AGRI 325	(3)	Sustainable Agriculture and Food Security
AGRI 550	(3)	Sustained Tropical Agriculture
BIOL 385	(3)	Plant Growth and Development
ENTO 352	(3)	Biocontrol of Pest Insects
PLNT 302	(3)	Forage Crops and Pastures
PLNT 307	(3)	Agroecology of Vegetables and Fruits
PLNT 353	(3)	Plant Structure and Function
PLNT 430	(3)	Pesticides in Agriculture
PLNT 434	(3)	Weed Biology and Control
SOIL 315	(3)	Soil Nutrient Management

Natural Resources and Natural Resource Impacts

* Note: Students take BIOL 465 or WILD 421, but not both.

** Note: Students take BREE 217 or GEOG 322, but not both.

AGRI 435	(3)	Soil and Water Quality Management
BIOL 343	(3)	Biodiversity in the Caribean
BIOL 465*	(3)	Conservation Biology
BIOL 553	(3)	Neotropical Environments
BREE 217**	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 518	(3)	Ecological Engineering
ENVB 500	(3)	Advanced Topics in Ecotoxicology
GEOG 322**	(3)	Environmental Hydrology
NRSC 333	(3)	Pollution and Bioremediation
SOIL 510	(3)	Environmental Soil Chemistry
WILD 401	(3)	Fisheries and Wildlife Management
WILD 421*	(3)	Wildlife Conservation

Social Science (6 credits)

Economic and Resource Policy

* Note: Students take AGEC 333 or ECON 405, but not both.

AGEC 320	(3)	Intermediate Microeconomic Theory
AGEC 333*	(3)	Resource Economics

AGEC 430	(3)	Agriculture, Food and Resource Policy
AGEC 442	(3)	Economics of International Agricultural Development
ECON 225	(3)	Economics of the Environment
ECON 405*	(3)	Natural Resource Economics

Social Change and Human Impacts

ENVR 421	(3)	Montreal: Environmental History and Sustainability
GEOG 340	(3)	Sustainability in the Caribbean
GEOG 406	(3)	Human Dimensions of Climate Change
GEOG 410	(3)	Geography of Underdevelopment: Current Problems
GEOG 498	(3)	Humans in Tropical Environments
GEOG 510	(3)	Humid Tropical Environments
HIST 510	(3)	Environmental History of Latin America (Field)
SOCI 254	(3)	Development and Underdevelopment

Environment Management

* Note: Students may take only one of BREE 529, ENVB 529, or GEOG 201.

AEBI 423	(3)	Sustainable Land Use
ANTH 418	(3)	Environment and Development
BREE 529*	(3)	GIS for Natural Resource Management
ENVB 437	(3)	Assessing Environmental Impact
ENVB 529*	(3)	GIS for Natural Resource Management
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 201*	(3)	Introductory Geo-Information Science
GEOG 302	(3)	Environmental Management 1
GEOG 404	(3)	Environmental Management 2
GEOG 530	(3)	Global Land and Water Resources
MGPO 440	(3)	Strategies for Sustainability

5.4.5 Land Surface Processes and Environmental Change Concentration

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

GEOG 340	(3)	Sustainability in the Caribbean
GEOG 404	(3)	Environmental Management 2
GEOG 506	(3)	Advanced Geographic Information Science
GEOG 530	(3)	Global Land and Water Resources
SOIL 315	(3)	Soil Nutrient Management
WILD 421	(3)	Wildlife Conservation
WOOD 441	(3)	Integrated Forest Management

Field Course

3 credits from:

ATOC 555	(3)	Field Course 1
BIOL 343	(3)	Biodiversity in the Caribean
BIOL 55343Field CoursStudies	(3)	Neotropical Ecology (Fieldtrip)

GEOG 550	(3)	Historical Ecology Techniques
		Flowering Plant Div

Program Requirements

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

Location Note: When planning their schedule and registering for courses, students should verify where each course is offered because courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue.

Core: Required Courses (18 credits)

Location Note: Core required courses for this program are taught at both McGill's Downtown campus and at the Macdonald campus in Sainte-Anne-de-Bellevue. You should register in Section 001 of an ENVR course that you plan to take on the Downtown campus, and in Section 051 of an ENVR course that you plan to take on the Macdonald campus.

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

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

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

ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama
FSCI 444	(6)	Barbados Research Project

Domain: Complementary Courses (42 credits)

42 credits of complementary courses are selected as follows:

9 credits - Basic Principles of Ecosystem Processes and Diversity

6 credits - 3 credits from each category of Statistics and GIS

6 credits - Advanced Ecosystem Components

6 credits - Advanced Ecological Processes

6 credits - Social Processes

9 credits - Ecosystem Components or Management of Ecosystems

Basic Principles of Ecosystem Processes:

9 credits of basic principles of ecosystem processes and diversity are selected as follows:

One of:

	Or	Organisms 1

ENVB 210	(3)	The Biophysical Environment
GEOG 305	(3)	Soils and Environment

Statistics

One of:

AEMA 310	(3)	Statistical Methods 1
BIOL 373	(3)	Biometry

GIS Methods

One of:

	(3)	GIS for Natural Resource Management

ENVR 421	(3)	Montreal: Environmental History and Sustainability
GEOG 340	(3)	Sustainability in the Caribbean
GEOG 382	(3)	Principles Earth Citizenship
GEOG 498	(3)	Humans in Tropical Environments
RELG 270	(3)	Religious Ethics and the Environment

Ecosystem Components or Management of Ecosystems:

9 credits of ecosystem components or management of ecosystems selected from:

AGRI 435	(3)	Soil and Water Quality Management
AGRI 452	(3)	Water Resources in Barbados
AGRI 550	(3)	Sustained Tropical Agriculture
ENVB 437	(3)	Assessing Environmental Impact
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 302	(3)	Environmental Management 1
GEOG 404	(3)	Environmental Management 2
PLNT 300	(3)	Cropping Systems
WILD 401	(3)	Fisheries and Wildlife Management
WOOD 441	(3)	Integrated Forest Management

5.4.7 Water Environments and Ecosystems Concentration

This concentration is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment or B.Sc. Major Environment. Within this concentration, there are two program options: the Biological stream, and the Physical stream.

5.4.7.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Water Environments & Ecosystems - Biological (60 credits)

The Water Environments and Ecosystems - Biological (60 credits including core) is a concentration open only to students in the B.Sc.(Ag.Env.Sc.); Major in Environment or B.Sc.; Major in Environment program.

The program focuses on the ecological facet of the water environment and the mechanisms regulating the different forms of life in water bodies; and to a lesser extent on the physical mechanisms controlling water properties.

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.

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

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

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

AEBI 427	(6)	Barbados Interdisciplinary Project
ENVR 401	(3)	Environmental Research
ENVR 451	(6)	Research in Panama
FSCI 444	(6)	Barbados Research Project
GEOG 451	(3)	Research in Society and Development in Africa

Domain: Required Courses (3 credits)

ATOC 214	(3)	Introduction: Physics of the Atmosphere

Domain: Complementary Courses (36 credits)

36 credits of complementary courses are selected as follows:

3 credits - Meteorology

6 credits - Hydrology and Ecology

3 credits - Statistics

3 credits - Field Course

3 credits - Social Sciences and Policy

18 credits chosen in total from List A: Water Environments and Habitats, and List B: Surface and Atmospheric Processes

Meteorology:

3 credits from:

ATOC 215	(3)	Oceans, Weather and Climate
ENVB 301	(3)	Meteorology

Hydrology and Ecology:

* Note: Other appropriate statistics courses may be approved as substitutes by the Program Adviser. Credit for Statistics courses is subject to certain restrictions. Students in the Faculty of Arts or the Faculty of Science should consult "Course Overlap" information in the "Course Requirements" section of the eCalendar for the Faculty of Science.

AEMA 310*	(3)	Statistical Methods 1
BIOL 373	(3)	Biometry
GEOG 202	(3)	Statistics and Spatial Analysis
MATH 203	(3)	Principles of Statistics 1

Field Course:

3 credits selected from the following courses or an equivalent Aquatic Field course:

BIOL 331	(3)	Ecology/Behaviour Field Course
BIOL 334D1	(1.5)	Applied Tropical Ecology
BIOL 334D2	(1.5)	Applied Tropical Ecology
BIOL 335	(3)	Marine Mammals
BIOL 343	(3)	Biodiversity in the Caribean
GEOG 495	(3)	Field Studies - Physical Geography
WILD 401	(3)	Fisheries and Wildlife Management

Social Sciences and Policy:

3 credits from:

AGEC 333	(3)	Resource Economics
ANSC 555	(3)	The Use and Welfare of Animals
ANTH 339	(3)	Ecological Anthropology
ANTH 418	(3)	Environment and Development
ECON 225	(3)	Economics of the Environment
ECON 326	(3)	Ecological Economics
ENVB 437	(3)	Assessing Environmental Impact
ENVR 421	(3)	Montreal: Environmental History and Sustainability
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 302	(3)	Environmental Management 1
GEOG 340	(3)	Sustainability in the Caribbean
GEOG 404	(3)	Environmental Management 2
GEOG 498	(3)	Humans in Tropical Environments
GEOG 530	(3)	Global Land and Water Resources
HIST 510	(3)	Environmental History of Latin America (Field)
POLI 345	(3)	International Organizations
POLI 350	(3)	Global Environmental Politics
WCOM 314	(3)	Communicating Science
WILD 421	(3)	Wildlife Conservation

18 credits chosen in total from List A and List B as follows:

List A (Water Environments and Habitats)

9-12 credits chosen from:

5.4.7.2 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Major Environment - Water Environments and Ecosystems - Physical (63 credits)

The Water Environments and Ecosystems - Physical (63 credits, including the core) is a a concentration open only to students in the B.Sc.(Ag.Env.Sc.); Major in Environment or B.Sc.; Major in Environment program.

The program focuses on the physical facet of the water environment, and the transport and transformation mechanisms of water on the planet, from rivers to the oceans and atmosphere; and to a lesser extent on 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 oceanograph

3 credits - Intermediate Calculus

3 credits - Field course

9 credits chosen from List A: Engineering/Math/Hydrology

6 credits chosen from List B: Marine and Freshwater Biology

Meteorology

3 credits from:

ATOC 215	(3)	Oceans, Weather and Climate
ATOC 341	(3)	Caribbean Climate and Weather
ENVB 301	(3)	Meteorology

Hydrology and Ecology

6 credits selected as follows:

3 credits from:

BREE 217	(3)	Hydrology and Water Resources
GEOG 322	(3)	Environmental Hydrology

3 credits from:

BIOL 343	(3)	Biodiversity in the Caribean
GEOG 495	(3)	Field Studies - Physical Geography
WILD 401	(3)	Fisheries and Wildlife Management

List A: (Engineering/Math/Hydrology)

6-9 credits chosen from:

* Note: You can taken ENVB 529 or GEOG 201, but not both; you can take ENVB 530 or GEOG 506, but not both; you can take ENVB 210 or GEOG 305, but not both.

ATOC 309	(3)	Weather Radars and Satellites
BREE 416	(3)	Engineering for Land Development
BREE 420	(3)	Engineering for Sustainability
BREE 506	(3)	Advances in Drainage Management
BREE 509	(3)	Hydrologic Systems and Modelling.
BREE 533	(3)	Water Quality Management
CIVE 323	(3)	Hydrology and Water Resources
ENVB 210*	(3)	The Biophysical Environment
ENVB 529*	(3)	GIS for Natural Resource Management
ENVB 530	(3)	Advanced GIS for Natural Resource Management
EPSC 549	(3)	Hydrogeology
GEOG 201*	(3)	Introductory Geo-Information Science
GEOG 305*	(3)	Soils and Environment
GEOG 308	(3)	Remote Sensing for Earth Observation
GEOG 314	(3)	Geospatial Analysis
GEOG 506	(3)	Advanced Geographic Information Science
GEOG 537	(3)	Advanced Fluvial Geomorphology
	(3)	Soil Nutrient Management

GEOG 530	(3)	Global Land and Water Resources
WILD 302	(3)	Fish Ecology
WILD 421	(3)	Wildlife Conservation

5.5 Major in Environment – B.Sc.

In addition to the concentrations available to students in the Major program in either the Faculty of Science or the Faculty of Agricultural and Environmental Sciences, "Major in Environment - B.Sc." students in the Faculty of Science can choose from one of the following two concentrations:

- Atmospheric Environment and Air Quality
- Earth Sciences and Economics

Refer to *section 5.4: Major in Environment - B.Sc.(Ag.Env.Sc.) and B.Sc.* for the general guidelines and regulations, which apply to all concentrations in the Major in Environment program.

5.5.1 W60 Bachelor of Science (B.Sc.) - Major Environment - Atmospheric Environment and Air Quality (60 credits)

15 credits are selected from:

* Note: You may take ATOC 219 or CHEM 219, but not both.

ATOC 214	(3)	Introduction: Physics of the Atmosphere
ATOC 215	(3)	Oceans, Weather and Climate
ATOC 219*	(3)	Introduction to Atmospheric Chemistry
ATOC 315	(3)	Thermodynamics and Convection
CHEM 219*	(3)	Introduction to Atmospheric Chemistry
GEOG 308	(3)	Remote Sensing for Earth Observation

Domain: Complementary Courses (24 credits)

24 credits of complementary courses are selected as follows:

6 credits - Analytical Chemistry/Calculus courses

3 credits - Statistics

9 credits - Math or Physical Science

6 credits - Social Science

Analytical Chemistry/Calculus:

One of (students will not receive credit for both):

AEMA 202	(3)	Intermediate Calculus
MATH 222	(3)	Calculus 3

Note: Students take either CHEM 267 or FDSC 213.

CHEM 267	(3)	Introductory Chemical Analysis
FDSC 213	(3)	Analytical Chemistry 1

Statistics:

3 credits of Statistics courses or equivalent from:

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

Math or Physical Science:

9 credits of Math or Physical Science (at least 6 credits of which are at the 300 level or above):

* Note: You may take ATOC 519 or CHEM 519, but not both; you may take AEMA 305 or MATH 315, but not both.

AEMA 305*	(3)	Differential Equations
ATOC 309	(3)	Weather Radars and Satellites
ATOC 519*	(3)	Advances in Chemistry of Atmosphere
ATOC 540	(3)	Synoptic Meteorology 1
CHEM 273	(3)	Introductory Physical Chemistry 2: Kinetics and Methods
CHEM 377	(3)	Instrumental Analysis 2
CHEM 519*	(3)	Advances in Chemistry of Atmosphere
CIVE 225	(4)	Environmental Engineering
CIVE 561	(3)	Greenhouse Gas Emissions
COMP 208	(3)	Computer Programming for Physical Sciences and Engineering

GEOG 505	(3)	Global Biogeochemistry
MATH 223	(3)	Linear Algebra
MATH 315*	(3)	Ordinary Differential Equations
NRSC 333	(3)	Pollution and Bioremediation
NRSC 510	(3)	Agricultural Micrometeorology

Social Science:

6 credits from:

ANTH 206	(3)	Environment and Culture
ANTH 418	(3)	Environment and Development
ECON 225	(3)	Economics of the Environment
ECON 347	(3)	Economics of Climate Change
ENVR 422	(3)	Montreal Urban Sustainability Analysis
GEOG 221	(3)	Environment and Health
GEOG 302	(3)	Environmental Management 1
GEOG 303	(3)	Health Geography
GEOG 340	(3)	Sustainability in the Caribbean
GEOG 403	(3)	Global Health and Environmental Change
GEOG 404	(3)	Environmental Management 2
GEOG 498	(3)	Humans in Tropical Environments
RELG 270	(3)	Religious Ethics and the Environment

5.6 Honours Environment

Environment Program Advisor

Telephone: 514-398-4306
Email: *advisor.environmment@mcgill.ca*

This program is open only to students in the B.Sc. Major Environment, B.Sc.(Ag.Env.Sc.) Major Environment, B.A. Faculty Program Environment, and the B.A. & Sc. Interfaculty Program Environment.

The Honours Environment program offers students the opportunity to undertake a year-long independent research project under the close supervision of a professor. Honours research provides excellent preparation for graduate studies, but is not required for such studies. The Honours program (6 credits) is undertaken in a student's final year of their regular degree and does not add to the length (duration) of the degree. If, for some reason, a student cannot complete the Honours requirements, they may still graduate within the regular Environment program.

5.6.1 Bachelor of Arts (B.A.) - Honours Environment (60 credits)

This program is open only to students in the B.A. Faculty Program Environment. To be eligible for Honours, students must satisfy the requirements set by their B.A. degree.

InertaCiionudents must satisfy the reqrnment.

5. Arts (B.A.) students in the Honours Environment program must also complete a minor concentration in an academic unit other than the Bieler School of Environment. Please refer to the Faculty of Arts regulations on Honours programs found under "Faculty Degree Requirements", "About Program Requirements" and "Departmental Programs".

Students in the B.A. Honours programs complete the core and domain courses (54 credits) according to their chosen domain as well as the 6 credits of Honours required courses.

At the completion of your Honours research, you are expected to present your results at an Honours Symposium, and are required to submit a copy of your final report to the Bieler School of Environment Program Adviser.

Honours Required Courses (6 credits)

Note: you take either ENVR 495D1 and ENVR 495D2 (6 credits over consecutive terms) or ENVR 495N1 and ENVR 495N2 (6 credits over non-consecutive terms).

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

5.6.2 Bachelor of Science (B.Sc.) - Honours Environment (72 credits)

This program is open only to students in the B.Sc. Major Environment. To be eligible for Honours, students must satisfy the requirements set by their B.Sc. degree.

In addition, students must satisfy the following:

1. Students apply for the Honours program in March of their U2 year. See the Program Adviser for details.

2. Applicants must have a minimum Program GPA (GPA of all required and complementary courses for the program in Environment taken at McGill) of 3.3 to enter the Honours program.

3. Students must earn a B grade (3.0) or higher for the Honours Research course (ENVR 495).

4. Students are required to achieve a minimum overall CGPA of 3.0 at graduation, and a minimum Program GPA of 3.3 to obtain Honours.

Students in the B.Sc. Honours programs complete the core and domain courses (60 to 66 credits) according to their chosen domain as well as the 6 credits of Honours required courses.

At the completion of your Honours research, you are expected to present your results at an Honours Symposium, and are required to submit a copy of your final report to the Bieler School of Environment Program Adviser.

Honours Required Courses (6 credits)

Note: you take either ENVR 495D1 and ENVR 495D2 (6 credits over consecutive terms) or ENVR 495N1 and ENVR 495N2 (6 credits over non-consecutive terms).

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

5.6.3 Bachelor of Arts and Science (B.A. & Sc.) - Honours Environment (60 credits)

This program is open only to students in the B.A. & Sc. Interfaculty Program Environment.

To be eligible for Honours, students must satisfy the requirements set by their B.A. & Sc. degree.

In addition, students must satisfy the following:

1. Students apply for the Honours program in March of their U2 year. See the Program Adviser for details.

2. Applicants must have a minimum Program GPA (GPA of all required and complementary courses for the program in Environment taken at McGill) of 3.3 to enter the Honours program.

3. Students must earn a B grade (3.0) or higher for the Honours Research course (ENVR 495).

4. Students are required to achieve a minimum overall CGPA of 3.0 at graduation, and a minimum Program GPA of 3.3 to obtain Honours.

5. B.A. & Sc. students must complete at least 21 credits in the Faculty of Arts and at least 21 in the Faculty of Science as part of their Honours program and their Minor concentration or Minor program. For a list of available Minor concentrations or Minor programs, see "Overview of Programs Offered" and "Minor Concentrations or Minors."

Students in the B.A. & Sc. Honours programs complete the coursework (54 credits) for the Interfaculty Program in Environment as well as the Honours required courses (6 credits).

At the completion of your Honours research, you are expected to present your results at an Honours Symposium, and are required to submit a copy of your final report to the Bieler School of Environment Program Adviser.

Honours Required Courses (6 credits)

Note: You take either ENVR 495D1 and ENVR 495D2 (6 credits over consecutive terms) or ENVR 495N1 and ENVR 495N2 (6 credits over non-consecutive terms).

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

5.6.4 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Environment (69 credits)

This program is open only to students in the B.Sc.(Ag.Env.Sc.) Major Environment. To be eligible for Honours, students must satisfy the requirements set by their B.Sc.(Ag.Env.Sc.) degree.

In addition, students must satisfy the following:

1. Students apply for the Honours program in March of their U2 year. See the Program Adviser for details.

2. Applicants must have a minimum Program GPA (GPA of all required and complementary courses for the program in Environment taken at McGill) of 3.3 to enter the Honours program.

3. Students must earn a B grade (3.0) or higher for the Honours Research course (ENVR 495).

4. Students are required to achieve a minimum overall CGPA of 3.0 at graduation, and a minimum Program GPA of 3.3 to obtain Honours.

Students in the B.Sc.(Ag.Env.Sc.) Honours program complete the core and domain courses (60 to 63 credits) according to their chosen domain as well as the 6 credits of required Honours courses.

The Joint Honours Component Environment offers students the opportunity to undertake a year-long, interdisciplinary research project in their final year under the close supervision of a professor. Honours research provides excellent preparation for graduate studies, but is not required for such studies. If, for some reason, students cannot complete the Joint Honours requirements, they may still graduate with a Minor Concentration Environment.

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

Students wishing to study at the honours level in two disciplines can combine joint honours program components in any two Arts disciplines. For a list of available joint honours programs, see "Overview of Programs Offered" and "Joint Honours Programs".

Joint Honours students should consult an adviser in each department for approval of their course selection and their interdisciplinary honours research project.

Students will enter the Joint Honours at the end of their U1 year, and will be required to maintain a PGPA of 3.30 and an overall CGPA of 3.0. Whereas the Faculty Program Environment Honours requires the student to undertake a Minor as well, the Joint Honours Environment component does not.

This program comprises 36 credits, including: Honours research (6 credits); Environment core (21 credits); statistics (3 credits); and complementary courses (6 credits).

Program Prerequisites or Corequisites

The program corequisites (6-8 credits), which are common to the stand-alone Environment Honours program, are in addition to the overall credit account. Students are required to complete these courses by the end of their U1 year.

3 credits of Basic Science, one of the following, or their equivalents (e.g., CEGEP objectives Biology 00UK, Chemistry 00UL, Physics 00UR):

BIOL 111	(3)	Principles: Organismal Biology
CHEM 110	(4)	General Chemistry 1
PHYS 101	(4)	Introductory Physics - Mechanics

And one of the following:

3 credits of Calculus or equivalent (e.g., CEGEP objective 00UN):

MA	(4)	Calculus 1 with Precalculus

ENVR 495D1	(3)	Honours Research
ENVR 495D2	(3)	Honours Research
ENVR 495N1	(3)	Honours Research
ENVR 495N2	(3)	Honours Research

Note: Students must complete 6 credits of honours research between the two components of the program. If the second component requires 0 credits of

GEOG 530	(3)	Global Land and Water Resources
HIST 249	(3)	Health and the Healer in Western History
HIST 292	(3)	History and the Environment
NRSC 221	(3)	Environment and Health
PHIL 221	(3)	Introduction to History and Philosophy of Science 2
PHIL 230	(3)	Introduction to Moral Philosophy 1
PHIL 237	(3)	Contemporary Moral Issues
PHIL 334	(3)	Ethical Theory
PHIL 341	(3)	Philosophy of Science 1
PHIL 343	(3)	Biomedical Ethics
PHIL 348	(3)	Philosophy of Law 1
POLI 212	(3)	Introduction to Comparative Politics – Europe/North America
POLI 227	(3)	Introduction to Comparative Politics - Global South
POLI 345	(3)	International Organizations
POLI 350	(3)	Global Environmental Politics
POLI 412	(3)	Canadian Voting/Public Opinion
POLI 445	(3)	International Political Economy: Monetary Relations
POLI 474	(3)	Inequality and Development
PSYC 215	(3)	Social Psychology
RELG 270	(3)	Religious Ethics and the Environment
RELG 370	(3)	Religion and Human Rights
SOCI 222	(3)	Urban Sociology
SOCI 234	(3)	Population and Society
SOCI 235	(3)	Technology and Society
SOCI 254v	(3)	Development and Underdevelopment

ATOC 214	(3)	Introduction: Physics of the Atmosphere
ATOC 215	(3)	Oceans, Weather and Climate
BIOL 240	(3)	Monteregian Flora
BIOL 305	(3)	Animal Diversity
BIOL 308**	(3)	Ecological Dynamics
BIOL 310	(3)	Biodiversity and Ecosystems
BIOL 342	(3)	Global Change Biology of Aquatic Ecosystems
BIOL 418	(3)	Freshwater Invertebrate Ecology
BIOL 432	(3)	Limnology
BIOL 436	(3)	Evolution and Society
BIOL 465**	(3)	Conservation Biology
BREE 217**	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 327	(3)	Bio-Environmental Engineering
BREE 518	(3)	Ecological Engineering
CHEM 212	(4)	Introductory Organic Chemistry 1
CHEM 281	(3)	Inorganic Chemistry 1
CIVE 225	(4)	Environmental Engineering
CIVE 323**	(3)	Hydrology and Water Resources
CIVE 550	(3)	Water Resources Management
COMP 202**	(3)	Foundations of Programming
COMP 204**	(3)	Computer Programming for Life Sciences
ENVB 210	(3)	The Biophysical Environment
ENVB 301	(3)	Meteorology
ENVB 305**	(3)	Population and Community Ecology
ENVB 410	(3)	Ecosystem Ecology
ENVB 415	(3)	Ecosystem Management
ENVB 529**	(3)	GIS for Natural Resource Management
ENVR 200	(3)	The Global Environment
ENVR 202	(3)	The Evolving Earth
ENVR 422	(3)	Montreal Urban Sustainability Analysis
EPSC 201**	(3)	Understanding Planet Earth
EPSC 233**	(3)	Earth and Life History
EPSC 549	(3)	Hydrogeology
ESYS 301	(3)	Earth System Modelling
GEOG 200	(3)	Geographical Perspectives: World Environmental Problems
GEOG 201**	(3)	Introductory Geo-Information Science
GEOG 205	(3)	Global Change: Past, Present and Future
GEOG 272	(3)	Earth's Changing Surface

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GEOG 470	(3)	Wetlands
GEOG 550	(3)	Historical Ecology Techniques
LSCI 230**	(3)	Introductory Microbiology
MICR 331	(3)	Microbial Ecology
MIME 320	(3)	Extraction of Energy Resources
MIMM 211**	(3)	Introductory Microbiology
MIMM 214	(3)	Introductory Immunology: Elements of Immunity
MIMM 323	(3)	Microbial Physiology
NRSC 333	(3)	Pollution and Bioremediation
PARA 410	(3)	Environment and Infection
PARA 515	(3)	Water, Health and Sanitation
PHYS 228	(3)	Energy and the Environment
PLNT 304	(3)	Biology of Fungi
PLNT 305	(3)	Plant Pathology
PLNT 358	(3)	Flowering Plant Diversity
PLNT 460PLNT 358	(3)	Plant Ecology