ENVIRONMENT MAJOR - LAND SURFACE PROCESSES AND ENVIRONMENTAL CHANGE (B.SC.(AG.ENV.SC.)) OR (B.SC.) (63 CREDITS)

Offered by: Bieler School of Environment
Degree: Bachelor of Science (Agricultural and Environmental Sciences)
Program credit weight: 63

Program Description

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 programs.

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

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

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

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 at the Macdonald campus in Sainte-Anne-de-Bellevue.

Core: Required Courses (18 credits)

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Course	Title	Credits
ENVR 200	The Global Environment.	3
ENVR 201	Society, Environment and Sustainability.	3
ENVR 202	The Evolving Earth.	3
ENVR 203	Knowledge, Ethics and Environment.	3
ENVR 301	Environmental Research Design.	3
ENVR 400	Environmental Thought.	3

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

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

Expand allContract all

Course	Title	Credits
AEBI 427	Barbados Interdisciplinary Project.	6
ENVR 401	Environmental Research.	3
ENVR 451	Research in Panama.	6
FSCI 444	Barbados Research Project.	6
GEOG 451	Research in Society and Development in Africa.	3

Domain Required Course (3 credits)

Expand allContract all

Course	Title	Credits
GEOG 203	Environmental Systems.	3

Domain: Complementary Courses (39 credits)

39 credits of complementary courses are selected as follows:

9 credits - 3 credits from each category of Statistics, Geographic Information Systems, Weather and Climate

9 credits of fundamental land surface processes

3 credits of environment and resource management

3 credits of field course

3 credits of social science

12 credits total of advanced studies chosen from List A: Particular Environments and List B: Surface Processes

Statistics

3 credits from one of 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 Course Catalogue for the Faculty of Science.

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Course	Title	Credits
AEMA 310	Statistical Methods 1.	3
GEOG 202	Statistics and Spatial Analysis.	3
MATH 203	Principles of Statistics 1.	3

Geographic Information Systems

3 credits from:

Expand allContract all

Course	Title	Credits
ENVB 529	GIS for Natural Resource Management.	3
GEOG 201	Introductory Geo-Information Science.	3

Weather and Climate

3 credits from:

Expand allContract all

Course	Title	Credits
ATOC 215	Oceans, Weather and Climate.	3
ATOC 341	Caribbean Climate and Weather.	3
ENVB 301	Meteorology.	3

Fundamental Land Surface Processes

9 credits total of fundamental land surface processes chosen as follows:

0-3 credits chosen from:

Expand allContract all

Course	Title	Credits
GEOG 321	Climatic Environments.	3

0-3 credits from:

Expand allContract all

Course	Title	Credits
GEOG 272	Earth's Changing Surface.	3
SOIL 300	Geosystems.	3

0-3 credits from:

Expand allContract all

Course	Title	Credits
ENVB 210	The Biophysical Environment.	3
GEOG 305	Soils and Environment.	3

0-3 credits from:

Expand allContract all

Course	Title	Credits
BREE 217	Hydrology and Water Resources.	3
GEOG 322	Environmental Hydrology.	3

Environment and Resource Management

3 credits from:

Expand allContract all

Course	Title	Credits
AGRI 550	Sustained Tropical Agriculture.	3
BIOL 308	Ecological Dynamics.[1]	3
BIOL 465	Conservation Biology.	3
CIVE 225	Environmental Engineering.	4
ENVB 305	Population and Community Ecology.[1]	3
ENVB 437	Assessing Environmental Impact.	3
ENVB 530	Advanced GIS for Natural Resource Management.	3
ENVR 422	Montreal Urban Sustainability Analysis.	3
ESYS 301	Earth System Modelling.	3
GEOG 302	Environmental Management 1.	3
GEOG 308	Remote Sensing for Earth Observation.	3
GEOG 340	Sustainability in the Caribbean.	3
GEOG 404	Environmental Management 2.	3
GEOG 506	Advanced Geographic Information Science.	3
GEOG 530	Global Land and Water Resources.	3
SOIL 315	Soil Nutrient Management.	3
WILD 421	Wildlife Conservation.	3
WOOD 441	Integrated Forest Management.	3

[1] Note: You may take BIOL 308 Ecological Dynamics. or ENVB 305 Population and Community Ecology., but not both.

Field Course

3 credits from:

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Course	Title	Credits
ATOC 555	Field Course 1.	3
BIOL 343	Biodiversity in the Caribean.	3
BIOL 553	Neotropical Environments.	3
GEOG 495	Field Studies - Physical Geography.	3
GEOG 496	Geographical Excursion.	3
GEOG 499	Subarctic Field Studies.	3
WILD 475	Desert Ecology.	3

Social Science

3 credits from:

Expand allContract all

Course	Title	Credits
AGEC 333	Resource Economics.	3
ANTH 339	Ecological Anthropology.	3
ECON 225	Economics of the Environment.	3
ECON 326	Ecological Economics.	3
ECON 405	Natural Resource Economics.	3
ENVR 421	Montreal: Environmental History and Sustainability.	3
GEOG 221	Environment and Health.	3
GEOG 408	Geography of Development.	3
GEOG 498	Humans in Tropical Environments.	3
HIST 510	Environmental History of Latin America (Field).	3
NRSC 221	Environment and Health.	3
POLI 350	Global Environmental Politics.	3
WCOM 314	Communicating Science.	3

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

List A - Particular Environments

3-9 credits of advanced study of Particular Environments:

Expand allContract all

Course	Title	Credits
BIOL 432	Limnology.	3
ENVB 410	Ecosystem Ecology.	3
GEOG 372	Running Water Environments.	3
GEOG 470	Wetlands.	3
GEOG 550	Historical Ecology Techniques.	3
PLNT 358	Flowering Plant Diversity.	3
PLNT 460	Plant Ecology.	3

List B - Surface Processes

3-9 credits of advanced study of Surface Processes:

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Course	Title	Credits
ATOC 315	Thermodynamics and Convection.	3
BREE 509	Hydrologic Systems and Modelling.	3
EPSC 325	Environmental Geochemistry.	3
EPSC 549	Hydrogeology.	3
GEOG 401	Socio-Environmental Systems: Theory and Simulation.	3
GEOG 505	Global Biogeochemistry.	3
GEOG 537	Advanced Fluvial Geomorphology.	3
MICR 331	Microbial Ecology.	3
NRSC 333	Pollution and Bioremediation.	3
SOIL 535	Soil Ecology.	3