

# ENVIRONMENT MAJOR - WATER ENVIRONMENTS AND ECOSYSTEMS - PHYSICAL (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

The Water Environments and Ecosystems - Physical (63 credits, including the 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 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 oceanography, and atmospheric science.

**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](mailto: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 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.

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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)

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

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| 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 Courses (9 credits)

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| Course   | Title                                    | Credits |
|----------|------------------------------------------|---------|
| ATOC 214 | Introduction: Physics of the Atmosphere. | 3       |
| ATOC 315 | Thermodynamics and Convection.           | 3       |
| GEOG 372 | Running Water Environments.              | 3       |

## Domain: Complementary Courses (33 credits)

33 credits of complementary courses are selected as follows:

3 credits - Meteorology

6 credits - Hydrology and Ecology

3 credits - Statistics

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:

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

Hydrology and Ecology

6 credits selected as follows:

3 credits from:

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

3 credits from:

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| Course   | Title                             | Credits |
|----------|-----------------------------------|---------|
| BIOL 308 | Ecological Dynamics.              | 3       |
| ENVB 305 | Population and Community Ecology. | 3       |

Statistics

3 credits from:

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| Course   | Title                               | Credits |
|----------|-------------------------------------|---------|
| AEMA 310 | Statistical Methods 1. <sup>1</sup> | 3       |
| BIOL 373 | Biometry.                           | 3       |
| GEOG 202 | Statistics and Spatial Analysis.    | 3       |
| MATH 203 | Principles of Statistics 1.         | 3       |

<sup>1</sup> Note: Other appropriate statistics courses may be approved as substitutes 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.

Intermediate Calculus

3 credits from:

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| Course   | Title                  | Credits |
|----------|------------------------|---------|
| AEMA 202 | Intermediate Calculus. | 3       |
| MATH 222 | Calculus 3.            | 3       |

Field Course

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

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

List A: (Engineering/Math/Hydrology)

6-9 credits chosen from:

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| Course   | Title                                                      | Credits |
|----------|------------------------------------------------------------|---------|
| ATOC 309 | Weather Radars and Satellites.                             | 3       |
| BREE 416 | Engineering for Land Development.                          | 3       |
| BREE 420 | Engineering for Sustainability.                            | 3       |
| BREE 506 | Advances in Drainage Management.                           | 3       |
| BREE 509 | Hydrologic Systems and Modelling.                          | 3       |
| BREE 533 | Water Quality Management.                                  | 3       |
| CIVE 323 | Hydrology and Water Resources.                             | 3       |
| ENVB 210 | The Biophysical Environment. <sup>1</sup>                  | 3       |
| ENVB 529 | GIS for Natural Resource Management. <sup>1</sup>          | 3       |
| ENVB 530 | Advanced GIS <sub>i</sub> for Natural Resource Management. | 3       |
| EPSC 549 | Hydrogeology.                                              | 3       |
| GEOG 201 | Introductory Geo-Information Science. <sup>1</sup>         | 3       |
| GEOG 305 | Soils and Environment. <sup>1</sup>                        | 3       |
| GEOG 308 | Remote Sensing for Earth Observation.                      | 3       |
| GEOG 314 | Geospatial Analysis.                                       | 3       |
| GEOG 506 | Advanced Geographic Information Science. <sup>1</sup>      | 3       |
| GEOG 537 | Advanced Fluvial Geomorphology.                            | 3       |
| SOIL 315 | Soil Nutrient Management.                                  | 3       |

<sup>1</sup> Note: You can taken ENVB 529 GIS for Natural Resource Management. or GEOG 201 Introductory Geo-Information Science., but not both; you can take ENVB 530 Advanced GIS for Natural Resource Management. or GEOG 506 Advanced Geographic Information Science., but not both; you can take ENVB 210 The Biophysical Environment. or GEOG 305 Soils and Environment., but not both.

0-3 credits from:

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| Course   | Title                            | Credits |
|----------|----------------------------------|---------|
| AEMA 305 | Differential Equations.          | 3       |
| MATH 315 | Ordinary Differential Equations. | 3       |

List B: (Marine and Freshwater Biology)

6 credits chosen from:

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| Course   | Title                                        | Credits |
|----------|----------------------------------------------|---------|
| BIOL 310 | Biodiversity and Ecosystems.                 | 3       |
| BIOL 342 | Global Change Biology of Aquatic Ecosystems. | 3       |
| BIOL 432 | Limnology.                                   | 3       |
| BIOL 441 | Biological Oceanography.                     | 3       |
| BIOL 465 | Conservation Biology.                        | 3       |
| BIOL 553 | Neotropical Environments.                    | 3       |
| ENVB 410 | Ecosystem Ecology.                           | 3       |
| EPSC 325 | Environmental Geochemistry.                  | 3       |
| GEOG 470 | Wetlands.                                    | 3       |
| GEOG 505 | Global Biogeochemistry.                      | 3       |
| GEOG 530 | Global Land and Water Resources.             | 3       |
| WILD 302 | Fish Ecology.                                | 3       |
| WILD 421 | Wildlife Conservation.                       | 3       |