

ENVIRONMENTAL BIOLOGY

B.Sc. (Ag. Env. Sc.)
Faculty of Agricultural and
Environmental Sciences
McGill University,
Macdonald Campus

PROGRAM HANDBOOK

For students entering the program in the
2015-2016 Academic Year



Congratulations!

You have selected an exciting academic program at McGill University's Macdonald Campus.

The Major in Environmental Biology offers a vibrant learning experience by using the unique setting of the Macdonald Campus, one of the largest green spaces on the Island of Montreal. In this environment, you will receive extensive field training in the diversity, biology, conservation and ecology of a broad range of organisms, from plants, birds and mammals, to insects, fungi and microbes. This major is about ecosystems, the species in these ecosystems, how plants and animals adapt to changing environments and how humans fit into the picture. In essence, this Major combines outdoor learning and faculty expertise in a first-rate suburban/rural environment, preparing graduating students well for careers as ecologists, wildlife biologists, zoologists, botanists, field biologists, ecosystem scientists, or as environmental consultants.

This handbook will provide you with the 'essentials' as you move through your degree, and will hopefully save you a lot of time and frustration! Please read this handbook carefully and keep it for future reference, since most answers to your questions will likely be here, or found in the Resources section. The latter section will link you to many important websites and/or people. The FAQ section will also prove helpful to you as you move through your degree in Environmental Biology. Since course offerings change, make sure you have all of the most current information by checking Minerva and meeting with your advisor regularly.

I wish you the best of luck as you embark on a successful academic career at McGill University.

Julie Major, agr., Ph.D.

Academic Advisor – B.Sc. (Ag.Env.Sc.)

TABLE OF CONTENTS

Program overview and structure	...page 4
Important rules pertaining to your degree	...page 5
Course Selection	...page 6
Specializations	
Applied Ecology	...page 8
Plant Biology	...page 10
Wildlife Biology	...page 12
Frequently Asked Questions	...page 14
Resources	...page 15

PROGRAM OVERVIEW AND PROGRAM STRUCTURE

The Major in Environmental Biology consists of 30 **required** credits (i.e., 10 courses since most courses at McGill are 3 credits each). Required courses form the scientific foundations of your program along with 12 credits (about 4 courses) from a list of **complementary** courses.

Complementary courses can be taken any time, and the list of courses represents different facets of Environmental Biology. If you are not sure about when to take which course, as a general rule of thumb, 200-level courses (beginning with '2') are typically done in U1, 300-level courses are typically for U2 students, and 400-level courses are typically designed for your final year of study.

Specializations: These are sets of courses in one particular discipline that form a total of 24-credits, and allow you to become a specialist in that topic. For example, you may be interested in disciplines such as **Applied Ecology, Plant Biology, or Wildlife Biology**. You do not need to declare your Specialization until the end of your first year (U1).

NOTE: When you graduate, your Major and Specialization(s) **MUST** have appeared on your University transcript for at least the last two consecutive semesters (a Québec Ministry of Education rule). **THEREFORE**, by the end of your penultimate year your **MUST** have declared and fixed upon your Major and Specialization(s). To select a Specialization, fill out the appropriate form found at <http://www.mcgill.ca/macdonald/studentinfo/undergrads/forms> or in Dr. Major's office. You will need Dr. Major's signature.

Most students take five courses per term, but some choose to take four for a variety of reasons including language difficulties or other complications associated with carrying a full course load. The overall program can be completed in three years if a full course load (i.e., 15 credits) is taken each term. You must take a minimum of 27 credits/year to be eligible for scholarships, and you are considered to be a full-time student when you take at least 12 credits during a semester.

Advisor, Program Director and Specialization Coordinators: during the course of your degree, your academic advisor, Dr. Julie Major, will help you with course selection and provide you with general guidance and advice. It is recommended that you meet with Dr. Major regularly throughout your time at McGill, to ensure that you are on the right track to achieving your goals in the timeframe that you expect. When special needs arise such as obtaining equivalences for courses taken elsewhere, or transferring credits, you must meet with Dr. Major to update your records in a timely manner and avoid unpleasant surprises at your expected time of graduation. For mentoring and questions relating to course and program content, you should contact the program director for Environmental Biology and/or your 'Specialization Coordinator' (see the Resources section).

IMPORTANT RULES PERTAINING TO YOUR DEGREE

Here are some important points about your degree and its requirements, and **it is entirely your responsibility to fulfill these requirements:**

- To obtain a B.Sc. (Ag. Env. Sc.) you must complete 120 credits. You need to determine how many credits **you** need to complete all your degree requirements; this differs depending on your background, but most students coming from the Québec education system require 90 credits. If you are required to complete a Freshman Year (U0), you typically need 120 credits. Regardless, this number will be on the letter of acceptance that was sent to you from McGill. Any advanced standing will be on your transcript at the beginning of your first term in your program.
- To get a McGill degree you need **at least 60 credits being awarded from McGill courses**
- A rule specific to our Faculty states that 2/3 of the credits required when you begin your B.Sc. (Ag. Env. Sc.) **must be taken on the Macdonald Campus**. This means 60 credits if you enter from a science DEC in CEGEP, or 2/3 of the credits remaining for your degree if you are given credit for other previous studies.
- **McGill has a 'C' minimum policy:** you must get higher than D in your pre-requisite, required and complementary courses. If you get a D grade in such courses, you will need to take the course again and obtain a higher grade in order to make the course count towards your degree requirements. In the case of a complementary course, if you get a D grade you can either take the course again or chose another from the list. Courses with a grade of D which are not re-taken count as electives.
- You require at least 12 credits **at or above the 400-level**. You can tell the level of a course by the first digit of the course number.
- If you **retake a course** in which you obtained an F in initially, the F grade will continue to affect your GPA. If you retake a course in which you obtained a D or higher initially, the same as the above applies, BUT NOTE THAT YOU CAN RECEIVE CREDIT FOR THE COURSE ONLY ONCE. You must be especially mindful of this if you retake the course under a different code (e.g., get a D in FDSC 230 and get C or better in CHEM 212, these two being equivalent courses). Minerva will give credit for both courses until someone manually alters the student's record. Students have been prevented from graduating because they banked on receiving credit twice for a course they re-took.
- To get your degree in the Environmental Biology Program you must take the requirements for your Major (**42 credits**) and the requirements for at least one Specialization (**24 credits**). If you take the number of credits you need for your degree, and subtract these 66 credits, the remaining credits are called 'electives': these are any other courses at McGill University or elsewhere, which qualify and for which you obtain a grade of C or higher. You can take more courses from your program as your electives. Consult with your advisor BEFORE taking courses outside McGill, and also before taking Continuing Education courses at McGill.

ENVIRONMENTAL BIOLOGY MAJOR (42 CREDITS)

*****NOTE***** Information about courses was accurate at the time this handbook was updated (i.e. for the 2015-2016 academic year). Changes to course offerings may occur in later years. Consult with Dr. Major and/or Minerva for the most up-to-date information.

The tables below include some suggestions about when you should take courses which are required for the Major in Environmental Biology, and Specializations (for students entering in Fall 15). You are strongly advised to follow these sequences of courses to ensure you do not run into problems! If you do not follow suggestions of when to take required courses, you may run into serious scheduling issues. You may have additional requirements (e.g., missing Freshman courses) – you are urged to complete these as early as possible in your program – avoid leaving them to the end.

Required (30 credits, 10 courses)

Course code	Course name	Credits	Semester offered	Pre-requisites	Suggested timing
AEBI 210	Organisms 1	3	Fall		U1 Fall
AEBI 211	Organisms 2	3	Winter		U1 Winter
AEBI 212	Evolution and Phylogeny	3	Winter		U1 Winter
AEHM 205	Science Literacy	3	Fall and Winter		U1 Winter
AEMA 310	Statistical Methods 1	3	Fall and Winter		U2 Winter
ENVB 210	The Biophysical Environment	3	Fall		U1 Fall
ENVB 222	St. Lawrence Ecosystems	3	Fall		U1 Fall
ENVB 410	Ecosystem Ecology	3	Fall	ENVB 222, AEMA 310 or permission of instructor	U3 Fall
LSCI 204	Genetics	3	Fall		U1 Fall
LSCI 211	Biochemistry 1	3	Fall and Winter	FDSC 230 (pre- or co-req)	U1 Winter

If you have not already taken **Organic Chemistry**, you will need to take it (FDSC 230) in your first semester at Macdonald. It is a pre- or co-requisite to Biochemistry 1.

Complementary Courses (choose at least 12 credits):

Course code	Course name	Credits	Semester offered	Pre-requisites	Suggested timing
ENTO 330	Insect Biology	3	Fall		
ENVB 301	Meteorology	3	Fall		U1 Fall
ENVB 305	Population & Community Ecology	3	Winter		U1 or U2 Winter
ENVB 313	Phylogeny and Biogeography	3	Even-numbered Falls	AEBI 212	U2 or U3 Fall
ENVB 430	GIS for Natural Resource Management	3	Fall	At least one environmental science course and one ecology course or permission of instructor, U2 and above	U3 Fall
ENVB 437	Assessing Environmental Impact	3	Winter	U2 and above	U3 Winter
ENVB 497	Research Project 1	3	Fall, Winter	U2 and above	
ENVB 498	Research Project 2	3	Fall, Winter	U2 and above	
FAES 300	Internship 2	3	Summer		
MICR 331	Microbial Ecology	3	Winter	LSCI 230	
PLNT 304	Biology of Fungi	3	Winter		
PLNT 358	Flowering Plant Diversity	3	Fall	AEBI 210 or ENVR 202 or permission of instructor	
PLNT 460	Plant Ecology	3	Fall	AEMA 310 or permission of instructor	
SOIL 300	Geosystems	3	Winter	U2 and above	
WILD 302	Fish Ecology	3	Even-numbered Falls	AEBI 211 or permission of instructor	
WILD 307	Natural History of Vertebrates	3	Fall		U2 Fall

SPECIALIZATIONS

There are many potential Specializations to take at the Macdonald Campus, and below are listed some details for a few of these, notably ones that fit well with the Major in Environmental Biology; you are not restricted to these Specializations, but these tend to be the most popular, and the ones that are designed to work effectively with the program. You should refer to the McGill University official course calendar for all the specifics (see the Resources section for the link). The scheduling suggestions below only include required classes for each specialization, it is your responsibility to plan and build schedules to fulfill all program requirements in your desired time frame. Your advisor can help if you have questions or run into problems. It is a good idea to check your progress regularly with your advisor.

Applied Ecology (24 credits)

Food, water, air, the materials we use, and much of the diversity of life and recreation we enjoy are products of ecological systems. We manage ecosystems to provide these services and our use and misuse often degrades the ability of ecosystems to provide the benefits and services we value. In the Applied Ecology Specialization you will develop your ability to understand how ecosystems function. You will apply systems thinking to the challenge of managing ecosystems for agriculture, forestry, fisheries, protected areas and urban development. You will learn concepts and tools that help you to deal with the complexity that an ecosystem perspective brings. The goal of this Specialization is to provide students with an opportunity to further develop their understanding of the ecosystem processes, ecology, and systems thinking necessary to understand, design and manage our interaction with the environment.

Course code	Course name	Credits	Semester offered	Pre-requisites	Suggested timing
REQUIRED (12 credits)					
ENVB 305	Population & Community Ecology	3	Winter		U1 Winter
ENVB 415	Ecosystem Management	3	Fall	BREE 327 and ENVB 305	U3 Fall
ENVB 430	GIS for Natural Resource Management	3	Fall	At least one environmental science course and one ecology course or permission of instructor, U2 and above	U2 or U3 Fall

ENVB 437	Assessing Environmental Impact	3	Winter	U2 and above	U3 Winter
COMPLEMENTARY (at least 12 credits)					
AGRI 340	Principles of Ecological Agriculture	3	Winter		U3 Winer
AGRI 435	Soil and Water Quality Management	3	Fall		
BREE 327	Bio-Environmental Engineering	3	Fall	U2 and above	
ENTO 440	Insect Diversity	3	Fall	ENTO 330 or permission of instructor	
ENVB 301	Meteorology	3	Fall		
ENVB 506	Quantitative Methods: Ecology	3	Winter	AEMA 310 and ENVB 305 or permission of instructor	U3 Winter
MICR 331	Microbial Ecology	3	Winter	LSCI 230	
MICR 450	Environmental Microbiology	3	Odd-numbered Winters	LSCI 230	
PLNT 304	Biology of Fungi	3	Winter		
PLNT 426	Plant Ecophysiology	3	Winter	LSCI 204 and PLNT 353 or permission of instructor	
PLNT 460	Plant Ecology	3	Fall	AEMA 310 or permission of instructor	
SOIL 300	Geosystems	3	Winter	U2 and above	U2 Winter
SOIL 326	Soils in a Changing Environment	3	Odd-numbered Falls	A previous course in soil science, geography, geology or permission of instructor.	
WILD 302	Fish Ecology	3	Even-numbered Falls	AEBI 211 or permission of instructor	
WILD 307	Natural History of Vertebrates	3	Fall		U2 Fall
WILD 350	Mammalogy	3	Winter	AEBI 211 and WILD 307	U2 Winter
WILD 420	Ornithology	3	Fall	WILD 307 or permission of instructor	

Plant Biology (24 credits)

We live in a world powered by plants! The Plant Biology Specialization emphasizes the study of plants from their cellular structure to their roles in the ecosystem. You will examine the structure and development of plants in the context of their function as the primary producers on earth. You will learn about the physiology and biochemistry of plants from the basics of photosynthesis to the production of chemical compounds used for defense against herbivores, pests and pathogens.

You will also develop skills in plant identification, plant propagation, and molecular methods for studying plants and fungi. You will learn how natural selection has shaped the diversity of plants, explore the dynamics of plant communities in the ecosystem, and appreciate the role of plants in society as the source of food, fiber, fuel, medicinal compounds, poisons, and recreation. Most courses offer laboratory classes that expand on the lecture material and introduce students to the latest techniques in plant biology. Many laboratory exercises use the excellent research and field facilities on the Macdonald campus and at the McGill field stations. Students may undertake a research project under the guidance of a member of the Plant Science Department as part of their studies.

Course code	Course name	Credits	Semester offered	Pre-requisites	Suggested timing
REQUIRED (9 credits)					
PLNT 353	Plant Structure and Function	3	Winter	AEBI 210 and LSCI 204 and LSCI 211 or permission of instructor	U2 Winter
PLNT 358	Flowering Plant Diversity	3	Fall	AEBI 210 or ENVR 202 or permission of instructor	U2 Fall
PLNT 426	Plant Ecophysiology	3	Winter	LSCI 204 and PLNT 353 or permission of instructor	U3 Winter
COMPLEMENTARY (at least 15 credits)					
At least 15 credits from:					
ANSC 326	Fundamentals of Population Genetics	3	Fall	AEMA 310 or equivalent or permission of instructor and LSCI 204 or equivalent or permission of instructor	U3 Fall
BINF 511	Bioinformatics for Genomics	3	Winter	Understanding of cell and molecular biology (equivalent to	U3 Winter

				a cell or molecular biology course) or permission from instructor.	
ENVB 313	Phylogeny and Biogeography	3	Even-numbered Falls	AEBI 212	U2 Fall
PLNT 304	Biology of Fungi	3	Winter		U2 Winter
PLNT 305	Plant Pathology	3	Fall		U2 Fall
PLNT 310	Plant Propagation	3	Winter		U2 Winter
PLNT 435	Plant Breeding	3	Winter	AEBI 210 and LSCI 204	U3 Winter
PLNT 460	Plant Ecology	3	Fall	AEMA 310 or permission of instructor	U3 Fall

Wildlife Biology (24 credits)

Wildlife biology is about the biology, ecology, and behavior of vertebrate animals, especially mammals, birds and fish. This Specialization focuses on the management and conservation of wildlife species and their habitats, recognizing that wildlife species are important in ecosystems and are important to society. Many of the courses in the Specialization are ‘hands on’, and will take students into a field setting to study wildlife in their natural environments. The Specialization focuses on the most recent techniques and findings in wildlife research, and how they have and can be applied to real world problems in conserving wildlife and minimizing human-wildlife conflicts.

Course code	Course name	Credits	Semester offered	Pre-requisites	Suggested timing
REQUIRED (10 credits)					
PLNT 358	Flowering Plant Diversity	3	Fall	AEBI 210 or ENVR 202 or permission of instructor	U2 Fall §
WILD 307	Natural History of Vertebrates	3	Fall		U2 Fall
WILD 401	Fisheries and Wildlife Management	4	Fall	PLNT 358	U3 Fall §
COMPLEMENTARY (at least 14 credits)					
At least 6 credits from:					
BIOL 427	Herpetology (taught Downtown)	3	Odd-numbered Falls	BIOL 205 and BIOL 305 or permission of instructor	
WILD 302	Fish Ecology	3	Even-numbered Falls	AEBI 211 or permission of instructor	U2 Fall
WILD 350	Mammalogy	3	Winter	AEBI 211 and WILD 307	U2 or U3 Winter
WILD 420	Ornithology	3	Fall	WILD 307 or permission of instructor	U2 or U3 Fall
At least 5 credits from:					
BIOL 307	Behavioural Ecology (taught Downtown)	3	Winter	BIOL 205 and BIOL 215 or permission	
BIOL 465	Conservation Biology (taught Downtown)	3	Fall	BIOL 215 OR both ENVR 200 and ENVR 202	
ENVB 430	GIS for Natural Resource Management	3	Fall	At least one environmental science course and one ecology course or	U3 Fall

				permission of instructor, U2 and above	
WILD 421	Wildlife Conservation	3	Winter		U3 Winter
WILD 424	Parasitology	3	Winter		U2 or U3 Winter
WILD 475	Desert Ecology (limit 20 students, extra costs)	3	Odd-numbered Winters	PLNT 460, WILD 307, WILD 420	

§ PLNT 358 and WILD 401 both have concurrent August field trips; PLNT 358 is also a pre-requisite to WILD 401. For these reason, PLNT 358 **MUST** be taken in U2 Fall and WILD 401 in U3 Fall.

FREQUENTLY ASKED QUESTIONS:

Consult the FAQ section here: <http://www.mcgill.ca/macdonald/studentinfo/advising/advising-bsc-agenvsc/envbiolmajor>

RESOURCES

Advisor: Julie Major 514-398-8380 julie.major@mcgill.ca
MS2-082

Program Director: Christopher Solomon 514-398-7732 chris.solomon@mcgill.ca

Specialization Coordinators:

Applied Ecology: Christopher Solomon 514-398-7732 chris.solomon@mcgill.ca
Plant Biology: Jacqueline Bede 514-398-7860 jacqueline.bede@mcgill.ca
Wildlife Biology: Murray Humphries 514-398-7885 murray.humphries@mcgill.ca

Student Affairs Office (Laird Hall):

For general questions, call 514-398-7925, or visit SAO in Laird Hall

Website: <http://www.mcgill.ca/macdonald/studentinfo/sao/>

McGill's course calendar:

<http://www.mcgill.ca/students/courses/calendars/>

Environmental Biology program website:

<http://www.mcgill.ca/macdonald/prospective/degrees/bscagenvsc/envbiol>

Specializations:

Applied Ecology:

<http://www.mcgill.ca/macdonald/prospective/degrees/bscagenvsc/specializations/applecosys>

Plant Biology:

<http://www.mcgill.ca/macdonald/prospective/degrees/bscagenvsc/Specializations/plantbiol>

Wildlife Biology:

<http://www.mcgill.ca/macdonald/prospective/degrees/bscagenvsc/Specializations/wildlife>

Bieler Family Internship Office: <http://www.mcgill.ca/macdonald/programs/internships>

Careers: Visit the Career and Placement Services Website at: www.mcgill.ca/caps or call 514-398-7582

Studying abroad:

For information about student exchanges and studying abroad, see <http://www.mcgill.ca/students/international/exchange>

For information about McGill field study semesters (e.g., Africa, Barbados, Panama) and courses: <http://www.mcgill.ca/macdonald/programs/fieldstudies>