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## *Publication Information*

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## 1 About Agricultural & Environmental Sciences (Undergraduate)

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### 1.1 Location

McGill University, Macdonald Campus  
21, 111 Lakeshore Road  
Sainte-Anne-de-Bellevue QC H9X 3V9  
Canada  
Telephone: 514-398-7925  
Website: [www.mcgill.ca/macdonald](http://www.mcgill.ca/macdonald)

The Faculty of Agricultural and Environmental Sciences and the School of Human Nutrition are located on the Macdonald Campus of McGill University, at the western end of the island of Montreal. Served by public transport (STM [[www.stm.info](http://www.stm.info)], bus, and train), it is easily reached from the McGill Downtown Campus and from the Pierre Elliott Trudeau International Airport. Special arrangements can be made for prospective students to use the McGill inter-campus [shuttle bus service](#). The shuttle service is available to all registered students who attend classes on both campuses.

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### 1.2 The Faculty of Agricultural and Environmental Sciences, including School of Human Nutrition (Undergraduate)

The Faculty of Agricultural and Environmental Sciences and the School of Human Nutrition are located on McGill University's Macdonald Campus, which occupies 650 hectares in a beautiful waterfront setting on the western tip of the island of Montreal.

Students can earn internationally recognized degrees in the fields of agricultural sciences and applied biosciences; food and nutritional sciences; environmental sciences; and bioresource engineering. Students have the opportunity, in all programs, to study abroad in places such as Panama, Barbados, or Africa. Students may also have the opportunity to participate in internships.

Macdonald is a very diverse and international campus. Students are taught by outstanding professors who are among the top in their fields. The campus has excellent facilities for teaching and research, including well-equipped laboratories, experimental farm and field facilities, and the Morgan Arboretum. The campus is surrounded by the Ottawa and St. Lawrence rivers.

The Faculty is at the forefront of advances in the basic sciences and engineering associated with food supply; human health and nutrition; and the environment, and it is a world leader in plant and animal biotechnology, bioproducts and bioprocessing, bioinformatics, food safety and food quality, environmental engineering, water management, soils, parasitology, microbiology, and ecosystem science and management.

The Macdonald Campus is an exciting place to live, work, study, learn, and discover. Its very intimate collegial and residential setting allows for strong interaction between staff and students, and for enriched student activity and participation in extracurricular activities. A hallmark of our undergraduate programs is the ability to provide hands-on learning experiences in the field and labs, and the smaller class sizes.

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### 1.3 Administrative Officers

#### Dean, Faculty of Agricultural and Environmental Sciences, and Associate Vice-Principal (Macdonald Campus)

Anja Geitmann; Diplom(Konstanz), Ph.D.(Siena)

#### Associate Deans

Valérie Orsat; B.Sc., M.Sc., Ph.D.(McG) (*Student Affairs*)

Salwa Karboune; B.Sc., M.Sc.,(Hassan II, Rabat), Ph.D.(Univ. de la Méditerranée) (*Research*)

Marilyn E. Scott; B.Sc.(New Br.), Ph.D.(McG.) (*Academic*)

Ian Strachan; B.Sc.(Tor.), M.Sc., Ph.D.(Qu.) (*Graduate Studies*)

#### Manager, Student Affairs

Silvana Pellecchia

#### Director, Academic and Administrative Services

Christine Butler; B.Com.(C'dia)

#### **Assistant Director, Athletics and Recreation**

Jill Barker; B.A.(C'dia)

#### **General Manager, Macdonald Campus Farm**

Paul Meldrum; B.J.(Hons.)(Car.)

#### **Supervisor, Buildings and Grounds**

Franco Nardi

#### **Manager, Residence Life and Accommodations**

Lindsay O'Connell; B.A.(McG.)

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## **1.4 Faculty Admission Requirements**

For information about admission requirements and application deadlines for this Faculty, please refer to the *Undergraduate Admissions Guide* found at [www.mcgill.ca/applying](http://www.mcgill.ca/applying).

Applications are submitted directly online at [www.mcgill.ca/applying](http://www.mcgill.ca/applying). Please note that the same application is used for all undergraduate programs at McGill and two program choices can be entered. For further information, contact:

Student Affairs Office  
Macdonald Campus of McGill University  
21,111 Lakeshore Road  
Sainte-Anne-de-Bellevue QC H9X 3V9  
Telephone: 514-398-7925/7927  
Email: [studentinfo.macdonald@mcgill.ca](mailto:studentinfo.macdonald@mcgill.ca)  
Website: [www.mcgill.ca/macdonald/prospective](http://www.mcgill.ca/macdonald/prospective)

For information about interfaculty transfers, see [University Regulations and Resources > Undergraduate > Registration > Interfaculty Transfer](#).

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## **1.5 Student Information**

Friendly staff are on hand to answer your questions about academics, residence, athletics, student life, health concerns, and much more.

### **1.5.1 Student Rights and Responsibilities**

The regulations and policies governing student rights and responsibilities at McGill University are published jointly by the Dean of Students' Office and the Secretariat and can be found at [www.mcgill.ca/secretariat/policies-and-regulations](http://www.mcgill.ca/secretariat/policies-and-regulations).

### **1.5.2 The Student Affairs Office**

The Student Affairs Office, located in Laird Hall, Room 106, provides a wide variety of academic services. These include information about admission (prerequisites and program requirements), transfer credits, Academic Standing, examinations (deferrals, conflicts, rereads), exchange programs, interfaculty transfers, program changes, registration (course change, withdrawals), scholarships (entrance and in-course), second degrees, second majors, minors, study away, and graduation (convocation).

Website: [www.mcgill.ca/macdonald/studentinfo/sao](http://www.mcgill.ca/macdonald/studentinfo/sao)

### **1.5.3 Student Services**

Please see [University Regulations and Resources > Undergraduate > Student Services > Student Services – Macdonald Campus](#). Further information is also available on our website: [www.mcgill.ca/macdonald-studentservices](http://www.mcgill.ca/macdonald-studentservices).

All *eligible* McGill students are entitled to use the Student Services located on both campuses, regardless of the faculty they are enrolled in.

### **1.5.4 Macdonald Campus Residences**

Please see [University Regulations and Resources > Undergraduate > Residential FaisF/F2 1Resided in](#).

## 1.5.5 Student Life

All undergraduate and Farm Management and Technology students are members of the [Macdonald Campus Students' Society](#). The MCSS, through the Students' Council, is involved in numerous campus activities such as social events, academic affairs, and the coordination of clubs and organizations.

The [Macdonald Campus Graduate Students' Society](#) (MCGSS) represents graduate students on the Macdonald Campus. MCGSS is part of McGill's [Post-Graduate Students' Society](#) (PGSS) which represents all graduate students at McGill.

## 1.5.6 Fees

Please refer to the [Student Accounts](#) website for information and step-by-step instructions regarding fees.

### 1.5.6.1 Tuition Fees

General information on tuition and other fees is found in [University Regulations & Resources](#) > *Undergraduate* > : [Fees](#).

### 1.5.6.2 Other Expenses

In addition to tuition fees and the cost of accommodation and meals, you should be prepared to spend a minimum of \$1,000 (depending on your program) on prescribed textbooks and classroom supplies. These may be purchased at the [MCSS Bookstore](#)

If you are a student in the B.Sc.(Ag.Env.Sc.) and in the Diploma in Environment (AES), you must take a minimum of two-thirds of your course credits within the Faculty of Agricultural and Environmental Sciences.

### **1.6.2 Minimum Grade Requirement**

You must obtain grades of C or better in any required, complementary, or Freshman courses used to fulfil program requirements. You may not register in a course for which you have not passed all the prerequisite courses with a grade of C or better, except by written permission of the Departmental Chair concerned.

### **1.6.3 Academic Advisers**

Upon entering the Faculty and before registering, you must consult with the academic adviser of your program for selection and scheduling of required, complementary, and elective courses. The academic adviser will normally continue to act in this capacity for the duration of your studies in the Faculty.

A faculty adviser is also available in the Student Affairs Office to assist you with student record related matters.

### **1.6.4 Categories of Students**

#### **1.6.4.1 Full-time Students**

Full-time students in Satisfactory Standing take a minimum of 12 credits per term. A normal course load is considered to be 15 credits per term. Students who wish to be considered for Faculty in-course scholarships must be registered for 27 graded credits during the fall/winter academic year.

Students in Probationary Standing are not permitted to take more than 14 credits per term. In exceptional circumstances, the Committee on Academic Standing may give permission to attempt more.

#### **1.6.4.2 Part-time Students**

Part-time students carry fewer than 12 credits per term.

### **1.6.5 Academic Standing**

You must prove that you can master the material of lectures and laboratories. Examinations are normally held at the end of each course, but other methods of evaluation may also be used. The grade assigned for a course represents your Standing in all the coursework.

The following rules apply to your Academic Standing:

- 1.** When your CGP



#### **1.6.6.1 School of Continuing Studies Courses**

Not all School of Continuing Studies credit courses are recognized for credit within Faculty degree programs. Please contact the Student Affairs Office before registering for such courses.

#### **1.6.7 Academic Credit Transfer**

Transfer credits based on courses taken at other institutions (completed with a grade that is equal to or higher than the grade/CGPA required to graduate from the host university) before entrance to this Faculty are calculated and assigned after you are accepted, and have accepted the offer of admission.

Transfer credits may also be granted for courses taken at other institutions (completed with a grade that is equal to or higher than the grade/CGPA required to graduate from the host university ) while you are attending McGill University. You must secure permission to apply such credits to your program in this Faculty before you begin the work. Grades obtained in such courses do not enter into calculations of grade point averages (GPA).

Exemption from a required or complementary course on the basis of work completed at another institution must be approved by both the instructor of the appropriate McGill course and the Academic Adviser.

As a full-time degree student, you may register, with appro

### 1.6.11 Attendance and Conduct in Class

Matters of discipline connected with, or arising from, the general arrangement for teaching are under the jurisdiction of the Dean of the Faculty.

Students may be admonished by a professor or instructor for dishonest or improper conduct. If disciplinary action is required, it must be reported to the Associate Dean (Student Affairs).

Punctual attendance at all classes, laboratory periods, tests, etc., is expected of all students.

### 1.6.12 Incomplete Grades

Please refer to [University Regulations and Resources > Undergraduate > Student Records > : Incomplete Courses](#).

### 1.6.13 Examinations

You should refer to [University Regulations and Resources > Undergraduate > : Examinations: General Information](#) for information about final examinations and deferred examinations. Examination schedules are posted on the McGill [website](#); normally 4 weeks after the start of classes for the **Tentative** Exam Schedule, and 6 weeks after the start of classes for the **Final** Exam Schedule.

Every student has a right to write essays, examinations, and theses in English or in French except in courses where knowledge of a language is one of the objectives of the course.

Oral presentations made as part of course requirements are in English.

#### 1.6.13.1 Reassessments and Rereads

Please refer to [University Regulations and Resources > Undergraduate > Examinations: General Information > Final Examinations > : Reassessments and Rereads: Faculty of Agricultural and Environmental Sciences](#).

#### 1.6.13.2 Deferred Examinations

Please refer to [University Regulations and Resources > Undergraduate > Examinations: General Information > Final Examinations > : Final Examinations: Deferred Examinations](#).

### 1.6.14 Degree Requirements

To be eligible for a B.Eng.(Bioresource), B.Sc.(Ag.Env.Sc.), B.Sc.(F.Sc.), or Concurrent B.Sc.(F.Sc.) and B.Sc.(Nutr.Sc.) degree, you must have passed, or achieved exemption, with a minimum grade of C in all required and complementary courses of the program. You must also have a CGPA of at least 2.00.

In addition, if you are a student in the Dietetics program, you must have completed the Stages of professional formation requiring a CGPA of 3.00.

You must have completed all Faculty and program requirements; see [section 1.6.1: Minimum Credit Requirement](#) in this publication.

In order to qualify for a McGill degree, you must complete a minimum residency requirement of 60 credits at McGill. If you are in the B.Sc.(Ag.Env.Sc.), you must take a minimum of two-thirds of your course credits within the Faculty of Agricultural and Environmental Sciences.



**Note for B.Eng.(Bioresource) students:** If you are completing a B.Eng.(Bioresource) degree, you must complete a minimum residency requirement of 72 credits at McGill. Note that the total credits for your program (143 credits) includes those associated with the year 0 (Freshman) courses.

### 1.6.15 Graduation Honours

For information on the designation of graduation honours and awards, see [University Regulations and Resources > Undergraduate > Graduation > : Graduation Honours](#).

### 1.6.16 Scholarships, Bursaries, Prizes, and Medals

Various scholarships, bursaries, prizes, and medals are open to entering, in-course, and graduating students. No application is required. Full details of these are set out in the [Undergraduate Scholarships and Awards Calendar](#), available at [www.mcgill.ca/studentaid](http://www.mcgill.ca/studentaid).

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## 2 Overview of Programs Offered

The Faculty of Agricultural and Environmental Sciences and the School of Human Nutrition offer degrees, certificates, and diplomas in:

- Bachelor of Engineering (Bioresource Engineering)
- Bachelor of Science (Agricultural and Environmental Sciences)

- Bachelor of Science (Food Science)
- Bachelor of Science (Nutritional Sciences)
- Concurrent degree in Food Science and Nutritional Sciences
- Certificate in Ecological Agriculture
- Certificate in Food Science
- Diploma in Environment
- Diploma of Collegial Studies in Farm Management and Technology

The Faculty of Agricultural and Environmental Sciences is one of the four faculties in partnership with the McGill School of Environment.

Several programs offered by the Faculty and School lead to professional accreditation. These include:

- the Agricultural Economics Major and the Agro-Environmental Sciences Major – membership in the *Ordre des agronomes du Québec* and other provincial Institutes of Agriculture;
- Bioresource Engineering – membership as a professional engineer in any province of Canada and the *Ordre des agronomes du Québec*;
- the Dietetics Major – membership in the Dietitians of Canada and the *Ordre professionnel des diététistes du Québec*;
- Food Science – accreditation by the Institute of Food Technologists and professional accreditation by the *Ordre des chimistes du Québec*.

Professional Practice experiences to complete the Dietetics practicum are provided in the McGill teaching hospitals and in a wide variety of health, education, business, government, and community agencies.

The Faculty also offers M.Sc. and Ph.D. programs in a variety of areas. Further information about these programs is available in the Faculty of Agricultural and Environmental Studies [Graduate and Postdoctoral Studies](#) section.

#### **Programs Offered by the Faculty of Agricultural and Environmental Sciences**

[section 3.2: Bachelor of Science \(Agricultural and Environmental Sciences\) – B.Sc.\(Ag.Env.Sc.\)](#)

[section 3.3: Bachelor of Engineering \(Bioresource\) – B.Eng.\(Bioresource\)](#)

[section 3.4: Bachelor of Science \(F](#)

### **2.1.3 AGRI 410D1 and AGRI 410D2 Agrology Internship**

As a qualified student in the B.Sc.(Ag.Env.Sc.), you have the opportunity to participate in a 420-hour-minimum internship related to your field of study.

**AGRI 410** is part of the Professional Agrology Specialization and constitutes practical training as required by the *Ordre des agronomes du Québec*. Each internship placement must be approved by the instructor.

### **2.1.4 AGRI 499 Agricultural Development Internship**

**AGRI 499** is a supervised internship which provides practical experience working on agricultural issues related to international development. The internship can take many forms, including work in a developing country, for an agency that focuses on international development, or on a research project that aims at solving problems faced by developing populations. Each internship placement must be approved by the instructor.

The following are specializations for the major programs listed above in Agricultural Economics, Agro-Environmental Sciences, Environmental Biology, Global Food Security, and Life Sciences (Biological and Agricultural).

Full program descriptions are also listed at [section 3.2.2: Specializations](#).

- Agribusiness, [section 3.2.2.1: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Agribusiness \(24 credits\)](#)
- Animal Biology, [section 3.2.2.2: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Animal Biology \(24 credits\)](#)
- Animal Health and Disease, [section 3.2.2.3: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Animal Health and Disease \(24 credits\)](#)
- Animal Production, [section 3.2.2.4: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Animal Production \(24 credits\)](#)
- Applied Ecology, [section 3.2.2.5: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Applied Ecology \(24 credits\)](#)
- Ecological Agriculture, [section 3.2.2.6: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Ecological Agriculture \(24 credits\)](#)
- Environmental Economics, [section 3.2.2.7: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Environmental Economics \(24 credits\)](#)
- International Agriculture, [section 3.2.2.8: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - International Agriculture \(24 credits\)](#)
- Life Sciences (Multidisciplinary), [section 3.2.2.9: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Life Sciences \(Multidisciplinary\) \(24 credits\)](#)
- Microbiology and Molecular Biotechnology, [section 3.2.2.10: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Microbiology and Molecular Biotechnology \(24 credits\)](#)
- Plant Biology, [section 3.2.2.11: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Plant Biology \(24 credits\)](#)
- Plant Production, [section 3.2.2.12: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Plant Production \(24 credits\)](#)
- Professional Agrology, [section 3.2.2.13: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Professional Agrology \(24 credits\)](#)
- Professional Agrology for Agribusiness, [section 3.2.2.14: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Professional Agrology for Agribusiness \(24 credits\)](#)
- Soil and Water Resources, [section 3.2.2.15: Bachelor of Science \(Agricultural and Environmental Sciences\) \(B.Sc.\(Ag.Env.Sc.\)\) - Soil and Water Resources \(24 credits\)](#)
- W

The **Professional Agrology** option offers a course selection guided to qualify graduates for registration as professional agrologists with the *Ordre des agronomes du Québec*.

All required and complementary courses must be passed with a minimum grade of C. One term is spent taking courses from the Faculty of Engineering on the McGill downtown campus.

Students also have the opportunity to pursue a minor. Several possibilities are: Agricultural Production, Environment, Ecological Agriculture, Biotechnology, Computer Science, Construction Engineering and Management, Entrepreneurship, and Environmental Engineering. Details of some of these minors can be found under [Faculty of Engineering > Undergraduate > Browse Academic Units & Programs > : Minor Programs](#). To complete a minor, it is necessary to spend at least one extra term beyond the normal requirements of the B.Eng.(Bioresource) program.



**Note:** If you are completing a B.Eng.(Bioresource) degree, you must complete a minimum residency requirement of 72 credits at McGill. The total credits for your program (143 credits) include those associated with the year 0 (Freshman) courses.

See [section 3.3: Bachelor of Engineering \(Bioresource\) – B.Eng.\(Bioresource\)](#) for a list of B.Eng.(Bioresource) programs offered.

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## 2.5 Bachelor of Science in Food Science – B.Sc.(F.Sc.) (Overview)

Refer to [section 3.4: Bachelor of Science \(Food Science\) - B.Sc.\(F.Sc.\)](#) for a full list of B.Sc.(F.Sc.) programs offered.

### Food Science

- Food Chemistry Option
- Food Science Option

The Food Science program has been designed to combine the basic sciences—particularly chemistry—with specialty courses that are directly related to the discipline.

For academic advising, please consult [www.mcgill.ca/macdonald/studentinU15fered.mg15c52\(fered..4371569.48572.937142.525724j07lhBT/F09.1Tf100184j07l](http://www.mcgill.ca/macdonald/studentinU15fered.mg15c52(fered..4371569.48572.937142.525724j07lhBT/F09.1Tf100184j07l)



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## 2.11 Diploma Program (Undergraduate) (Overview)

### Diploma Program (Undergraduate)

- Diploma in Environment – see [McGill School of Environment](#) > Undergraduate > Diploma in Environment > : [Diploma \(Dip.\) En](#)



in both Food Science and Nutritional Sciences. The Faculty also offers post-baccalaureate undergraduate Certificate programs in Food Science and Ecological Agriculture as well as a Diploma in Environment.

The McGill School of Environment also offers several B.Sc.(Ag.Env.Sc.) programs; for more information, please visit the [McGill School of Environment](#) section.

### 3.1 Freshman Major

#### Program Director

Dr. Alice Cherestes  
Macdonald-Stewart Building, Room 1-020  
Telephone: 514-398-7980

The Freshman Program is designed to provide a basic science foundation to students entering university for the first time from a high school system (outside of the Quebec CEGEP system). The Freshman year consists of at least 30 credits in Fundamental Math and Science courses as preparation for one of the following degree programs:

- B.Sc. (Agricultural & Environmental Sciences)
- B.Eng. (Bioresource)
- B.Sc. (Nutritional Sciences)
- B.Sc. (Food Science)
- Concurrent B.Sc. (Food Science) and B.Sc. (Nutritional Sciences)

Students who have completed the Diploma of Collegial Studies, Advanced Placement Exams, Advanced Levels, the International Baccalaureate, the French Baccalaureate, or McGill Placement examinations may receive exemption and/or credit for all or part of the Basic Science courses in biology, chemistry, physics, and mathematics. Similarly, students who have completed courses at other universities or colleges may receive exemptions and/or credits. Students should consult with the Faculty's Student Affairs Office.

#### 3.1.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Freshman Program (30 credits)

(All majors except Agricultural Economics - see Advising Notes below\*)

If you are entering university for the first time from a high school system, outside of the Quebec CEGEP system, you will be required to complete a Freshman year of at least 30 credits as listed below.

Normally, students registered in the Faculty of Agricultural and Environmental Sciences Freshman program may take a maximum of 8 credits outside the Faculty offerings to meet the requirements of the program. Permission to exceed this limit must be received from the Associate Dean (Student Affairs) prior to registration.

Note: If you are not certain that you have adequate math and/or physics skills to commence the freshman year you may wish to take preparatory courses prior to the normal Fall semester. You are encouraged to discuss your potential need with your academic adviser. Mathematical skill level will be determined during the first week of classes. Your freshman adviser may recommend that you register for an additional weekly Pre-Calculus Lab, of one credit, which may be applied towards the required credits of the degree program.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### Required Courses - Fall (14.5 credits)

AEBI 120	(3)	General Biology
AECH 110	(4)	General Chemistry 1
AEMA 101	(3)	Calculus 1
AEPH 112	(4)	Introductory Physics 1
AGRI 195	(.5)	Freshman Seminar 1

#### Required Courses - Winter (12.5 credits)

AECH 111	(4)	General Chemistry 2
AEMA 102	(4)	Calculus 2
AEPH 114	(4)	Introductory Physics 2

AGRI 196                      (.5)                      Freshman Seminar 2

**Elective - Winter (3 credits)**

**B.Sc. (Ag. & Env. Sci.) - Agricultural Economics Major - Freshman Program (30 credits)**

If you are entering university for the first time from a high school system, outside of the Quebec CEGEP system, you will be required to complete a Freshman year of at least 30 credits as listed below.

Note: If you are not certain that you have adequate math and/or physics skills to commence the Freshman year you may wish to take preparatory courses prior to the normal Fall semester. You are encouraged to discuss your potential need with your academic adviser. Mathematical skill level will be determined during the first week of classes. Your freshman adviser may recommend that you register for an additional weekly Pre-calculus Lab, of one credit, which may be applied towards the required credits of the degree program.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>.

**Required Courses - Fall (14 credits)**

AECH 110	(4)	General Chemistry 1
AEMA 101	(3)	Calculus 1
AEPH 112	(4)	Introductory Physics 1
AGEC 200**	(3)	Principles of Microeconomics

**Required Courses - Winter (10 credits)**

AEBI 122	(3)	Cell Biology
AEHM 205	(3)	Science Literacy
AEMA 102	(4)	Calculus 2

**Complementary Courses - Winter (6 credits)**

One of the following:

BREE 103	(3)	Linear Algebra
NUTR 301	(3)	Psychology

One of the following:

AGEC 201**	(3)	Principles of Macroeconomics
AGEC 231**	(3)	Economic Systems of Agriculture

Advising Notes:

\* Freshman students intending to major in Agricultural Economics in the B.Sc. (Ag. & Env. Sci.) degree program should note that the courses AEBI 120 (General Biology), AECH 111 (General Chemistry 2), and AEPH 114 (Introductory Physics 2) are required for all other majors in the B.Sc. (Ag. & Env. Sci.) degree. Students who are uncertain about their choice of major should be completing the "regular" Agricultural & Environmental Sciences Freshman program; the AGECE 200/201 courses would then be taken as part of the "regular" U1 curriculum should they ultimately decide on the Agricultural Economics Major.

\*\* Freshman students planning to choose the Agricultural Economics Major will still be required to complete 90 credits in the Major. Since AGECE 200 and AGECE 201/AGECE 231 are normally required in the U1 year of the program, students who take these courses in their freshman year will be required to substitute 6 other credits. Students should discuss suitable replacement courses with their adviser.

**3.1.2 Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Freshman Program (30 credits)**

If you are entering university for the first time from a high school system (outside of the Quebec CEGEP system) you will be required to complete a Freshman year of at least 30 credits as listed below.

Normally, students registered in the Faculty of Agricultural and Environmental Sciences Freshman program may take a maximum of 8 credits outside the Faculty offerings to meet the requirements of the program. Permission to exceed this limit must be received from the Associate Dean (Student Affairs) prior to registration.

Note: If you are not certain that you have adequate math and/or physics skills to commence the freshman year you may wish to take preparatory courses prior to the normal Fall semester. You are encouraged to discuss your potential need with your academic adviser. Mathematical skill level will be determined during the first week of classes. Your Freshman adviser may recommend that you register for an additional weekly Pre-calculus Lab, of one credit, which may be applied towards the required credits of the degree program.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### Required Courses - Fall (14.5 credits)

AEBI 120	(3)	General Biology
AECH 110	(4)	General Chemistry 1
AEMA 101	(3)	Calculus 1
AEPH 113	(4)	Physics 1
BREE 187	(.5)	Freshman Seminar 1

#### Required Courses - Winter (15.5 credits)

AECH 111	(4)	General Chemistry 2
AEMA 102	(4)	Calculus 2
AEPH 115	(4)	Physics 2
BREE 103	(3)	Linear Algebra
BREE 188	(.5)	Freshman Seminar 2

### 3.1.3 Bachelor of Science (Food Science) (B.Sc.(F.Sc.)) - Freshman Program (30 credits)

If you are entering university for the first time from a high school system (outside of the Quebec CEGEP system), you will be required to complete a freshman year of at least 30 credits as listed below.

Normally, students registered in the Faculty of Agricultural and Environmental Sciences Freshman program may take a maximum of 8 credits outside the Faculty offerings to meet the requirements of the program. Permission to exceed this limit must be received from the Associate Dean (Student Affairs) prior to registration.

Note: If you are not certain that you have adequate math and/or physics skills to commence the Freshman year, you may wish to take preparatory courses prior to the normal Fall semester. You are encouraged to discuss your potential need with your academic adviser. Mathematical skill level will be determined during the first week of classes. Your Freshman adviser may recommend that you register for an additional weekly Pre-calculus Lab, of one credit, which may be applied towards the required credits of the degree program.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### Required Courses - Fall (14.5 credits)

AEBI 120	(3)	General Biology
AECH 110	(4)	General Chemistry 1
AEMA 101	(3)	Calculus 1
AEPH 112	(4)	Introductory Physics 1
AGRI 195	(.5)	Freshman Seminar 1

#### Required Courses - Winter (12.5 credits)

AECH 111	(4)	General Chemistry 2
AEMA 102	(4)	Calculus 2
AEPH 114	(4)	Introductory Physics 2
AGRI 196	(.5)	Freshman Seminar 2

## **Elective - Winter (3 credits)**

### **3.1.4 Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Freshman Program (30 credits)**

If you are entering university for the first time from a high school system (outside of the Quebec CEGEP system) you will be required to complete a Freshman year of at least 30 credits as listed below.

Normally, students registered in the Faculty of Agricultural and Environmental Sciences Freshman program may take a maximum of 8 credits outside the Faculty offerings to meet the requirements of the program. Permission to exceed this limit must be received from the Associate Dean (Student Affairs) prior to registration.

Students require a minimum 3.00 CGPA in order to progress into Year 1 of the Dietetics program.

Note: If you are not certain that you have adequate math and/or physics skills to commence the Freshman year, you may wish to take preparatory courses prior to the normal Fall semester. You are encouraged to discuss your potential need with your academic adviser. Mathematical skill level will be determined during the first week of classes. Your Freshman Adviser may recommend that you register for an additional weekly Pre-calculus Lab, of 1 credit, which may be applied toward the required credits of the degree program.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### **Required Courses - Fall (14.5 credits)**

AEBI 120	(3)	General Biology
AECH 110	(4)	General Chemistry 1
AEMA 101	(3)	Calculus 1
AEPH 112	(4)	Introductory Physics 1
AGRI 195	(.5)	Freshman Seminar 1

#### **Required Courses - Winter (15.5 credits)**

AEBI 122	(3)	Cell Biology
AEMA 102	(4)	Calculus 2

AGRI 195                    (.5)                    Freshman Seminar 1

**Required Courses - Winter (15.5 credits)**

AEBI 122	(3)	Cell Biology
AEMA 102	(4)	Calculus 2
AEPH 114	(4)	Introductory Physics 2
AGRI 196	(.5)	Freshman Seminar 2
FDSC 230	(4)	Organic Chemistry

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**3.2 Bachelor of Science (Agricultural and Environmental Sciences) – B.Sc.(Ag.Env.Sc.)**

Please refer to [section 2.3: Bachelor of Science in Agricultural and Environmental Sciences – B.Sc.\(Ag.Env.Sc.\) \(Overview\)](#)

Specializations designed to be taken with the Agricultural Economics Major:

- \*Agribusiness (24 credits)
- Environmental Economics (24 credits)
- \*Professional Agrology (21 credits)

\*Membership to the OAQ requires successful completion of these two specializations.

Note: For a complete list of specializations offered for students in the Bachelor of Science in Agricultural and Environmental Sciences, please refer to "Browse Academic Units & Programs > Bachelor of Science (Agricultural and Environmental Sciences) - B.Sc.(Ag.Env.Sc.) > Specializations", in this eCalendar.

### **Electives**

To meet the minimum credit requirement for the degree.

**Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Agricultural Economics (42**



AGRI 215	(3)	Agro-Ecosystems Field Course
ANSC 250	(3)	Principles of Animal Science
ENVB 210	(3)	The Biophysical Environment



This Major is focused on the idea that agricultural landscapes are managed ecosystems, and that humans engaged in agriculture must maintain the highest possible environmental standards while providing food and other bioproducts to the marketplace. The Major core focuses on the basic and applied biology of cultivated plants, domestic animals, arable soils, and the economics of agriculture. Students then choose one or two specializations in these or connected disciplines that reflect their interests and career goals.

The program has a strong field component that includes hands-on laboratories, visits to agricultural enterprises, and opportunities for internships. Classes and laboratories exploit the unique setting and facilities of the Macdonald Campus and Farm, which is a fully functioning farm in an urban setting that exemplifies many of the issues at the forefront of modern agricultural production. Graduates of this program are eligible to become members of the Ordre

A minimum of two 3-credit Honours project courses and 6 credits in 400- or 500-level courses, from the Faculty of Agricultural and Environmental Sciences, selected in consultation with the Program Director of the student's Major. The topic of the Honours project must be related to their Major and selected in consultation with the Program Director of the student's Major and the professor who has agreed to supervise the project.

FAES 405	(3)	Honours Project 1
FAES 406	(3)	Honours Project 2

### Specialization

Choose at least one specialization of 18-24 credits.

Specializations designed to be taken with the Agro-Environmental Sciences Major:

- Animal Production
- Ecological Agriculture
- Plant Production
- Professional Agrology\*
- Soil and Water Resources

\* Membership to the OAQ requires students successfully complete one of the above specializations in addition to the Professional Agrology Specialization.

### Electives

To meet the minimum credit requirement for the degree.

#### 3.2.1.5 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Major Environmental Biology (42 credits)

The Environmental Biology Major is about the biology, diversity, and ecology of a broad range of organisms, from plant and vertebrate animals to insects, fungi, and microbes. This Major places a strong emphasis on the ecosystems that species inhabit and the constraints imposed by the physical environment and by environmental change. Environmental Biology has significant field components worked into the course sets, and through this experiential learning, biological diversity, and the ways that species interact with their physical environment in a variety of ecosystems will be studied. The Major makes full use of the unique physical setting and faculty expertise of McGill's Macdonald campus to train students to become ecologists, taxonomists, field biologists, and ecosystem scientists.

Program Director: Professor Joann Whalen

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

### Program Prerequisites

Please refer to "Faculty Information and Regulations" > "Minimum Credit Requirements", in this eCalendar for information on prerequisites and minimum credit requirements.

### Required Courses (36 credits)

AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
AEBI 212	(3)	Evolution and Phylogeny
AEHM 205	(3)	Science Literacy
AEMA 310	(3)	Statistical Methods 1
ENVB 210	(3)	The Biophysical Environment
ENVB 222	(3)	St. Lawrence Ecosystems
ENVB 305	(3)	Population & Community Ecology
ENVB 410	(3)	Ecosystem Ecology
LSCI 204	(3)	Genetics
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology

### Complementary Courses (6 credits)

6 credits of complementary courses selected from:

ENTO 330	(3)	Insect Biology
ENVB 301	(3)	Meteorology
ENVB 313	(3)	Phylogeny and Biogeography
ENVB 437	(3)	Assessing Environmental Impact
ENVB 497	(3)	Research Project 1
ENVB 498	(3)	Research Project 2
FAES 300	(3)	Internship 2
MICR 331	(3)	Microbial Ecology
PLNT 304	(3)	Biology of Fungi
PLNT 358	(3)	Flowering Plant Diversity
PLNT 460	(3)	Plant Ecology
SOIL 300	(3)	Geosystems
WILD 302	(3)	Fish Ecology
WILD 307	(3)	Natural History of Vertebrates
WOOD 441	(3)	Integrated Forest Management

### Specialization

At least one specialization of 18-24 credits.

Specializations designed to be taken with the Environmental Biology Major:

- Applied Ecology
- Plant Biology
- Wildlife Biology

Note: For a complete list of specializations offered for students in the Bachelor of Science in Agricultural and Environmental Sciences, refer to "Browse Academic Units & Programs" > "Bachelor of Science (Agricultural and Environmental Sciences) - B.Sc.(Ag.Env.Sc.)" > "Specializations", in this eCalendar. Consult the Academic Adviser for approval of specializations other than those listed above.

### Electives

To meet the minimum credit requirement for the degree.

#### 3.2.1.6 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Environmental Biology (54 credits)

Program Director: Professor Joann Whalen

Students can use their electives to complete the Honours program. The courses credited to the Honours program must be in addition to any required or complementary courses taken to satisfy the requirements of the student's Major and Specialization.

In addition to satisfying the Honours requirements, students must apply for the Honours program in March or April of their U2 year. It is the responsibility of the student to find a professor who is willing to support and supervise the research project. No student will be accepted into the program until a supervisor has agreed to supervise the student. Applicants must have a minimum CGPA of 3.3 to enter the Honours program and they must earn a B grade (3.0) or higher in the courses making up the Honours program. Students are required to achieve a minimum overall CGPA of 3.3 at graduation to obtain honours.

Please refer to "Faculty Information and Regulations" > "Minimum Credit Requirements" in this eCalendar for information on prerequisites and minimum credit requirements.

### Required Courses (36 credits)

AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
AEBI 212	(3)	Evolution and Phylogeny
AEHM 205	(3)	Science Literacy
AEMA 310	(3)	Statistical Methods 1
ENVB 210	(3)	The Biophysical Environment
ENVB 222	(3)	St. Lawrence Ecosystems
ENVB 305	(3)	Population & Community Ecology
ENVB 410	(3)	Ecosystem Ecology
LSCI 204	(3)	Genetics
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology

### Complementary Courses (18 credits)

6 credits from the following:

ENTO 330	(3)	Insect Biology
ENVB 301	(3)	Meteorology
ENVB 313	(3)	Phylogeny and Biogeography
ENVB 437	(3)	Assessing Environmental Impact
ENVB 497	(3)	Research Project 1
ENVB 498	(3)	Research Project 2
ENVB 529	(3)	GIS for Natural Resource Management
FAES 300	(3)	Internship 2
MICR 331	(3)	Microbial Ecology
PLNT 304	(3)	Biology of Fungi
PLNT 358	(3)	Flowering Plant Diversity
PLNT 460	(3)	Plant Ecology
SOIL 300	(3)	Geosystems
		Fish Ecology

OR

**Honours Plan B**

A minimum of two 3-credit Honours project courses and 6 credits in 400- or 500-level courses, from the Faculty of Agricultural and Environmental Sciences, selected in consultation with the Program Director of the student's Major. The topic of the Honours project must be related to their Major and selected in consultation with the Program Director of the student's Major and the professor who has agreed to supervise the project.

FAES 405	(3)	Honours Project 1
FAES 406	(3)	Honours Project 2

**Specialization**

At least one specialization of 18-24 credits.

Specializations designed to be taken with the Environmental Biology Major:

- Applied Ecology
- Plant Biology
- Wildlife Biology

Note: For a complete list of specializations offered for students in the Bachelor of Science in Agricultural and Environmental Sciences, refer to "Browse Academic Units & Programs" > "Bachelor of Science (Agricultural and Environmental Sciences) - B.Sc.(Ag.Env.Sc.)" > "Specializations" in this eCalendar. Consult the Academic Adviser for approval of specializations other than those listed above.

**Electives**

To meet the minimum credit requirement for the degree.

**3.2.1.7 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Major Global Food Security (42 credits)**

The program provides a global perspective on agriculture and food security, and addresses issues related to rural development, malnutrition, poverty and food safety with special emphasis on the developing world. Using a multidimensional and multidisciplinary approach, the program provides students with a comprehensive set of courses at McGill in combination with hands-on experience through structured internships and study abroad opportunities. The field experience (short courses, internships or full semester) includes project development in local communities, observing subsistence agriculture in situ and participating in various activities which sensitize students to the challenges that countries face to feed their people. Students will have the opportunity to develop the knowledge base needed for successful careers in government, non-government and international institutions in the areas of international and sustainable development, international research and project management, agri-business, and food and agriculture policy analysis.

Program Director: Professor Sergio Burgos

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

**Program Prerequisites**

Refer to "Faculty Information and Regulations" > "Minimum Credit Requirements", in this publication for prerequisites and minimum credit requirements.

**Required Courses (33 credits)**

AEBI 210	(3)	Organisms 1
AEMA 310	(3)	Statistical Methods 1
AGEC 200	(3)	Principles of Microeconomics
AGEC 442	(3)	Economics of International Agricultural Development
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
AGRI 493	(3)	International Project Management
ANSC 250	(3)	Principles of Animal Science
ENVB 210	(3)	The Biophysical Environment
INTD 200	(3)	Introduction to International Development
NUTR 207	(3)	Nutrition and Health
NUTR 341	(3)	Global Food Security

### **Complementary Courses (9 credits)**

AGRI 215	(3)	Agro-Ecosystems Field Course
AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 499	(3)	Agricultural Development Internship
ANSC 420	(3)	Animal Biotechnology
BREE 217	(3)	Hydrology and Water Resources
FDSC 310	(3)	Post Harvest Fruit and Vegetable Technology
NRSC 221	(3)	Environment and Health
NUTR 501	(3)	Nutrition in Developing Countries
PLNT 300	(3)	Cropping Systems
PLNT 435	(3)	Plant Breeding
SOIL 315	(3)	Soil Nutrient Management
SOIL 326	(3)	Soils in a Changing Environment

### **Specialization (24 credits)**

Students must also complete at least one Specialization of 24 credits.

#### **3.2.1.8 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Global Food Security (54 credits)**

Program Director: Professor Sergio Burgos

Students can use their electives to complete the Honours program. The courses credited to the Honours program must be in addition to any required or complementary courses taken to satisfy the requirements of the student's Major and Specialization.

In addition to satisfying the Honours requirements, students must apply for the Honours program in March or April of their U2 year. It is the responsibility of the student to find a professor who is willing to support and supervise the research project. No student will be accepted into the program until a supervisor has agreed to supervise the student. Applicants must have a minimum CGPA of 3.3 to enter the Honours program and they must earn a B grade (3.0) or higher in the courses making up the Honours program. Students are required to achieve a minimum overall CGPA of 3.3 at graduation to obtain honours. Students can use their electives to complete the Honours program. The courses credited to the Honours program must be in addition to any required or complementary courses taken to satisfy the requirements of the student's major and specialization.

The Honours program consists of 12 credits of courses that follow one of two plans listed below.

Students who meet all the requirements will have the name of their program changed to include the word "Honours."

A brief description of the Honours project activities involved will be documented and signed by the Program Director of the student's Major, the supervisor of the Honours project, and the student.

The program provides a global perspective on agriculture and food security, and addresses issues related to rural developmentA

AGRI 493	(3)	International Project Management
ANSC 250	(3)	Principles of Animal Science
ENVB 210	(3)	The Biophysical Environment
INTD 200	(3)	Introduction to International Development
NUTR 207	(3)	Nutrition and Health
NUTR 341	(3)	Global Food Security

### Complementary Courses (21 credits)

9 credits from the following:

AGRI 215	(3)	Agro-Ecosystems Field Course
AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 499	(3)	Agricultural Development Internship
ANSC 420	(3)	Animal Biotechnology
BREE 217	(3)	Hydrology and Water Resources
FDSC 310	(3)	Post Harvest Fruit and Vegetable Technology
NRSC 221	(3)	Environment and Health
NUTR 501	(3)	Nutrition in Developing Countries
PLNT 300	(3)	Cropping Systems
PLNT 435	(3)	Plant Breeding
SOIL 315	(3)	Soil Nutrient Management
SOIL 326	(3)	Soils in a Changing Environment

### Honours Courses

12 credits of Honours Plan A or Plan B:

#### Honours Plan A

Two 6-credit Honours research courses in the subject area of the student's major, chosen in consultation with the Program Director of the student's major and the professor who has agreed to supervise the research project.

FAES 401	(6)	Honours Research Project 1
FAES 402	(6)	Honours Research Project 2

OR

#### Honours Plan B

A minimum of two 3-credit Honours courses and 6 credits in 400- or 500-level courses, from the Faculty of Agricultural and Environmental Sciences, selected in consultation with the Program Director of the student's major. The topic of the Honours research project must be on a topic related to their major and selected in consultation with the Program Director of the student's major and the professor who has agreed to supervise the research project.

FAES 405	(3)	Honours Project 1
FAES 406	(3)	Honours Project 2

### Specialization (24 credits)

Students must also complete at least one Specialization of 24 credits.

**3.2.1.9 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Major Life Sciences (Biological and Agricultural) (42 credits)**

The Life Sciences (Biological and Agricultural) Major provides a strong foundation in the basic biological sciences. It will prepare graduates for careers in the agricultural, environmental, health, and biotechnological fields. Graduates with high academic achievement may go on to postgraduate studies in research, or professional programs in the biological, veterinary, medical, and health sciences fields.

Program Director: Professor Jacqueline Bede

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

**Program Prerequisites**

Please refer to "Faculty Information and Regulations" > "Minimum Credit Requirements", in this eCalendar for prerequisites and minimum credit requirements.

Default Specialization: Students who do not select a Specialization will automatically be assigned to the Life Sciences (Multidisciplinary) Specialization upon entering U2.

**Required Courses (33 credits)**

\* Other appropriate Statistics courses may be approved as substitutes by the Program Director.

AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
AEBI 212	(3)	Evolution and Phylogeny
AEHM 205	(3)	Science Literacy
AEMA 310*	(3)	Statistical Methods 1
ANSC 400	(3)	Eukaryotic Cells and Viruses
LSCI 202	(3)	Molecular Cell Biology
LSCI 204	(3)	Genetics
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
PARA 438	(3)	Immunology

**Complementary Courses (9 credits)**

9 credits of the complementary courses selected from:

ANSC 234	(3)	Biochemistry 2
ANSC 250	(3)	Principles of Animal Science
ANSC 312	(3)	Animal Health and Disease
ANSC 323	(3)	Mammalian Physiology
ANSC 324	(3)	Developmental Biology and Reproduction
ANSC 326	(3)	Fundamentals of Population Genetics
ANSC 420	(3)	Animal Biotechnology
BINF 511	(3)	Bioinformatics for Genomics
BTEC 306	(3)	Experiments in Biotechnology
ENVB 210	(3)	The Biophysical Environment
ENVB 222	(3)	St. Lawrence Ecosystems
FAES 300	(3)	Internship 2
LSCI 451	(3)	Research Project 1
LSCI 452	(3)	Research Project 2
MICR 331	(3)	Microbial Ecology



MICR 338	(3)	Bacterial Molecular Genetics
MICR 341	(3)	Mechanisms of Pathogenicity
MICR 450	(3)	Environmental Microbiology
NRSC 333	(3)	Pollution and Bioremediation
PARA 410	(3)	Environment and Infection
PARA 424	(3)	Fundamental Parasitology
PLNT 304	(3)	Biology of Fungi
PLNT 353	(3)	Plant Structure and Function
	(3)	Plant Ecophysiology

ANSC 400	(3)	Eukaryotic Cells and Viruses
FAES 401	(6)	Honours Research Project 1
FAES 402	(6)	Honours Research Project 2
LSCI 202	(3)	Molecular Cell Biology
LSCI 204	(3)	Genetics
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
PARA 438	(3)	Immunology

### **Complementary Courses (9 credits)**

9 credits of the complementary courses selected from:

ANSC 234	(3)	Biochemistry 2
ANSC 250	(3)	Principles of Animal Science
ANSC 312	(3)	Animal Health and Disease
ANSC 323	(3)	Mammalian Physiology
ANSC 324	(3)	Developmental Biology and Reproduction
ANSC 326	(3)	Fundamentals of Population Genetics
ANSC 420	(3)	Animal Biotechnology
BINF 511	(3)	Bioinformatics for Genomics
BTEC 306	(3)	Experiments in Biotechnology
ENVB 210	(3)	The Biophysical Environment
ENVB 222	(3)	St. Lawrence Ecosystems
LSCI 451	(3)	Research Project 1
LSCI 452	(3)	Research Project 2
MICR 331	(3)	Microbial Ecology
MICR 338	(3)	Bacterial Molecular Genetics
MICR 341	(3)	Mechanisms of Pathogenicity
MICR 450	(3)	Environmental Microbiology
NRSC 333	(3)	Pollution and Bioremediation
PARA 410	(3)	Environment and Infection
PARA 424	(3)	Fundamental Parasitology
PLNT 304	(3)	Biology of Fungi
PLNT 353	(3)	Plant Structure and Function
PLNT 426	(3)	Plant Ecophysiology
PLNT 435	(3)	Plant Breeding

### **Specialization**

At least one specialization of 18-24 credits from:

Specializations designed to be taken with the Life Sciences (Biological and Agricultural) Major:

- Animal Biology
- Animal Health and Disease
- Life Sciences (Multidisciplinary)
- Microbiology and Molecular Biotechnology

Note: For a complete list of specializations offered for students in the Bachelor of Science in Agricultural and Environmental Sciences, please refer to "Browse Academic Units & Programs" > "Bachelor of Science (Agricultural and Environmental Sciences) - B.Sc.(Ag.Env.Sc.)" > "Specializations" in this eCalendar.

### **Electives**

To meet the minimum credit requirement for the degree.



### Required Courses (24 credits)

ANSC 234	(3)	Biochemistry 2
ANSC 301	(3)	Principles of Animal Breeding
ANSC 312	(3)	Animal Health and Disease
ANSC 323	(3)	Mammalian Physiology
ANSC 324	(3)	Developmental Biology and Reproduction
ANSC 433	(3)	Animal Nutrition and Metabolism
ANSC 451	(3)	Dairy and Beef Production Management
ANSC 458	(3)	Swine and Poultry Production

### 3.2.2.5 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - 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 ecosystems to provide the benefits and services we value. In the Applied Ecology minor 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. Concepts and tools will be presented that help you to deal with the complexity that an ecosystem perspective brings. The goal of this minor 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.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

### Required Courses (12 credits)

ENVB 305	(3)	Population & Community Ecology
ENVB 415	(3)	Ecosystem Management
ENVB 437	(3)	Assessing Environmental Impact
ENVB 529	(3)	GIS for Natural Resource Management

### Complementary Courses (12 credits)

12 credits selected from the following:

AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 435	(3)	Soil and Water Quality Management
BREE 327	(3)	Bio-Environmental Engineering
ENTO 440	(3)	Insect Diversity
ENVB 301	(3)	Meteorology
ENVB 500	(3)	Advanced Topics in Ecotoxicology
ENVB 506	(3)	Quantitative Methods: Ecology
MICR 331	(3)	Microbial Ecology
MICR 450	(3)	Environmental Microbiology
PLNT 304	(3)	Biology of Fungi
PLNT 426	(3)	Plant Ecophysiology
PLNT 460	(3)	Plant Ecology
SOIL 300	(3)	Geosystems
SOIL 326	(3)	Soils in a Changing Environment
SOIL 535	(3)	Ecological Soil Management
WILD 302	(3)	Fish Ecology
WILD 307	(3)	Natural History of Vertebrates

## Mammalogy

**Complementary Courses (15 credits)**

At least 15 credits chosen from the following list:

AGRI 310	(3)	Internship in Agriculture/Environment
BREE 217	(3)	Hydrology and Water Resources
ECON 225	(3)	Economics of the Environment
ECON 326	(3)	Ecological Economics
ECON 405	(3)	Natural Resource Economics
ENVB 301	(3)	Meteorology
ENVR 203	(3)	Knowledge, Ethics and Environment
MICR 331	(3)	Microbial Ecology
NRSC 333	(3)	Pollution and Bioremediation
WILD 415	(2)	Conservation Law
WILD 421	(3)	Wildlife Conservation

**3.2.2.8 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - International Agriculture (24 credits)**

Students enter this specialization to acquire a global and applied understanding of agriculture as a fundamental tool to help rural development, alleviate poverty and reach food security, especially in the developing world. This program provides students with a combination of coursework at McGill together with a hands-on experience in a developing country, meeting locals and attending courses with McGill professors and/or local instructors. The costs of these field experiences may vary. The field experience (semester, short course or internship) includes developing projects in local communities, observing subsistence agriculture in situ and participating in various activities which contribute to sensitizing the students to the challenges that developing countries face. Students study water resources, sustainable development, nutrition, planning and development, and a host of other fascinating topics, allowing them to sharpen their skills for future career opportunities.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

**Required Courses (6 credits)**

AGEC 442	(3)	Economics of International Agricultural Development
AGRI 411	(3)	Global Issues on Development, Food and Agriculture

**Complementary Courses (18 credits)**

Students select either Option A or Option B.

**Option A**

18 credits from the following:

AGEC 333	(3)	Resource Economics
AGEC 430	(3)	Agriculture, Food and Resource Policy
AGRI 215	(3)	Agro-Ecosystems Field Course
AGRI 325	(3)	Sustainable Agriculture and Food Security
AGRI 499	(3)	Agricultural Development Internship
BREE 510	(3)	Watershed Systems Management
ENVB 437	(3)	Assessing Environmental Impact
FDSC 525	(3)	Food Quality Assurance
NUTR 501	(3)	Nutrition in Developing Countries
PARA 410	(3)	Environment and Infection
PARA 515	(3)	Water, Health and Sanitation
PLNT 300	(3)	Cropping Systems

## **Option B**

15 credits from any of the McGill Field Study Semesters

African Field Study Semester

Barbados Field Study Semester

Barbados Interdisciplinary Tropical Studies Field Semester

Panama Field Study Semester

3 credits from the list in Option A

### **3.2.2.9 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Life Sciences (Multidisciplinary) (24 credits)**

Students taking this specialization have a wide variety of Life Sciences course offerings to choose from, which allow them to target their program to their own interests in the field. Course choices are balanced between "fundamentals" and "applications." Depending upon the courses chosen, the resulting program may be relatively specialized or very broad, spanning several disciplines. Such a broad background in Life Sciences will open up employment opportunities in a variety of diverse bioscience industries; students with an appropriate CGPA may proceed to a wide variety of postgraduate programs or professional schools.

For 6 Tm(yment elr5AaSuate programs or professional)TjEl1r5ate vis(v.62ee:



MICR 338	(3)	Bacterial Molecular Genetics
MICR 341	(3)	Mechanisms of Pathogenicity
MICR 450	(3)	Environmental Microbiology
NUTR 337	(3)	Nutrition Through Life
NUTR 512	(3)	Herbs, Foods and Phytochemicals
PARA 410	(3)	Environment and Infection
PARA 424	(3)	Fundamental Parasitology
PARA 515	(3)	Water, Health and Sanitation
PLNT 304	(3)	Biology of Fungi
PLNT 305	(3)	Plant Pathology
PLNT 310	(3)	Plant Propagation
PLNT 353	(3)	Plant Structure and Function
PLNT 358	(3)	Flowering Plant Diversity
PLNT 426	(3)	Plant Ecophysiology
PLNT 434	(3)	Weed Biology and Control
PLNT 435	(3)	Plant Breeding
PLNT 460	(3)	Plant Ecology

### 3.2.2.10 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Microbiology and Molecular Biotechnology (24 credits)

Students following this specialization receive education and training in fundamental principles and applied aspects of microbiology. Complementary courses allow students to focus on basic microbial sciences or applied areas such as biotechnology. Successful graduates may work in university, government and industrial research laboratories, in the pharmaceutical, fermentation and food industries, and with an appropriate CGPA proceed to post-graduate studies or professional biomedical schools.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### Required Courses (18 credits)

BTEC 306	(3)	Experiments in Biotechnology
MICR 331	(3)	Microbial Ecology
MICR 338	(3)	Bacterial Molecular Genetics
MICR 341	(3)	Mechanisms of Pathogenicity
MICR 450	(3)	Environmental Microbiology
PARA 424	(3)	Fundamental Parasitology

#### Complementary Courses and Suggested Electives (6 credits)

ANSC 350	(3)	Food-Borne Pathogens
ANSC 420	(3)	Animal Biotechnology
BINF 511	(3)	Bioinformatics for Genomics
BTEC 501	(3)	Bioinformatics
BTEC 535	(3)	Functional Genomics in Model Organisms
BTEC 555	(3)	Structural Bioinformatics

### **3.2.2.11 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Plant Biology (24 credits)**

This specialization emphasizes the study of plants from the cellular to the organismal level. The structure, physiology, development, evolution, and ecology of plants will be studied. Most courses offer laboratory classes that expand on the lecture material and introduce students to the latest techniques in plant biology. Man

PLNT 307	(3)	Agroecology of Vegetables and Fruits
PLNT 312	(3)	Urban Horticulture
PLNT 322	(3)	Greenhouse Management
SOIL 535	(3)	Ecological Soil Management

**3.2.2.13 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Professional Agrology (24 credits)**

3 credits from:

ANSC 451	(3)	Dairy and Beef Production Management
ANSC 458	(3)	Swine and Poultry Production

3 credits from:

PLNT 300	(3)	Cropping Systems
PLNT 302	(3)	Forage Crops and Pastures
PLNT 434	(3)	Weed Biology and Control

### **3.2.2.15 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Soil and Water Resources (24 credits)**

\*\* This program is currently not offered. \*\*

This specialization will interest students who want to understand how soils and water interact within managed ecosystems such as urban or agricultural landscapes. The conservation and management of agricultural soils, issues affecting watershed management and decision making, and the remediation of contaminated soils will be examined. When taken with the Agro-Environmental Sciences Major and the specialization in Professional Agrology, this specialization conforms with the eligibility requirements for the Ordre des agronomes du Québec.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### **Required Courses (15 credits)**

AGRI 435	(3)	Soil and Water Quality Management
BREE 217	(3)	Hydrology and Water Resources
SOIL 326	(3)	Soils in a Changing Environment
SOIL 331	(3)	Environmental Soil Physics
SOIL 535	(3)	Ecological Soil Management

#### **Complementary Courses (9 credits)**

\* Note: Students may take BREE 529 or ENVB 529, but not both.

BREE 322	(3)	Organic Waste Management
BREE 327	(3)	Bio-Environmental Engineering
BREE 510*	(3)	Watershed Systems Management
BREE 529*	(3)	GIS for Natural Resource Management
ENVB 529*	(3)	GIS for Natural Resource Management
NRSC 333	(3)	Pollution and Bioremediation
SOIL 300	(3)	Geosystems
SOIL 510	(3)	Environmental Soil Chemistry

### **3.2.2.16 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Wildlife Biology (24 credits)**

This specialization focuses on the ecology of vertebrate animals, their biological and physical environment, and the interactions that are important in the management of ecological communities and wildlife species. Students have access to local wildlife resources including the Avian Science and Conservation Centre, the McGill Arboretum, the Stonycroft Wildlife Area, the Molson Reserve, and the Ecomuseum.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### **Required Courses (16 credits)**

ENVB 529	(3)	GIS for Natural Resource Management
WILD 307	(3)	Natural History of Vertebrates

WILD 350	(3)	Mammalogy
WILD 401	(4)	Fisheries and Wildlife Management
WILD 420	(3)	Ornithology

### Complementary Courses (8 credits)

Note: A 2-credit course may replace one of the complementary courses with permission of the advisor.

BIOL 307	(3)	Behavioural Ecology
BIOL 427	(3)	Herpetology
ENVB 437	(3)	Assessing Environmental Impact
ENVB 506	(3)	Quantitative Methods: Ecology
PARA 424	(3)	Fundamental Parasitology
PLNT 358	(3)	Flowering Plant Diversity
WILD 302	(3)	Fish Ecology
WILD 421	(3)	Wildlife Conservation
WILD 475	(3)	Desert Ecology

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### 3.3 Bachelor of Engineering (Bioresource) – B.Eng.(Bioresource)

For more information on this major, please see [section 2.4: Bachelor of Engineering in Bioresource Engineering – B.Eng.\(Bioresource\) \(Overview\)](#).

#### 3.3.1 Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Major Bioresource Engineering (113 credits)

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### Required Courses (59 credits)

AEMA 202	(3)	Intermediate Calculus
AEMA 305	(3)	Differential Equations
BREE 205	(3)	Engineering Design 1
BREE 210	(3)	Mechanical Analysis & Design
BREE 216	(3)	Bioresource Engineering Materials
BREE 252	(3)	Computing for Engineers
BREE 301	(3)	Biothermodynamics
BREE 305	(3)	Fluid Mechanics
BREE 319	(3)	Engineering Mathematics
BREE 327	(3)	Bio-Environmental Engineering
BREE 341	(3)	Mechanics of Materials
BREE 415	(3)	Design of Machines and Structural Elements
BREE 420	(3)	Engineering for Sustainability
BREE 451	(1)	Undergraduate Seminar 1 - Oral Presentation
BREE 452	(1)	Undergraduate Seminar 2 Poster Presentation
BREE 453	(1)	Undergraduate Seminar 3 - Scientific Writing
BREE 485	(1)	Senior Undergraduate Seminar 1
BREE 490	(3)	Engineering Design 2
BREE 495	(3)	Engineering Design 3

ECSE 461	(3)	Electric Machinery
FACC 250	(0)	Responsibilities of the Professional Engineer
FACC 300	(3)	Engineering Economy
FACC 400	(1)	Engineering Professional Practice
MECH 289	(3)	Design Graphics

**Complementary Courses (54 credits)**

54 credits of the complementary courses selected as follo

30 credits from the following list where 12 credits must be taken from 200-400 level courses, with the option (and approval of the Academic Adviser) of taking a maximum of 6 credits from other courses offered in the Faculty of Engineering:

BREE 214	(3)	Geomatics
BREE 217	(3)	Hydrology and Water Resources
BREE 314	(3)	Agri-Food Buildings
BREE 322	(3)	Organic Waste Management
BREE 325	(3)	Food Process Engineering
BREE 329	(3)	Precision Agriculture
BREE 412	(3)	Machinery Systems Engineering
BREE 416	(3)	Engineering for Land Development
BREE 418	(3)	Soil Mechanics and Foundations
BREE 423	(3)	Biological Material Properties
BREE 497	(3)	Bioresource Engineering Project
BREE 501	(3)	Simulation and Modelling
BREE 504	(3)	Instrumentation and Control
BREE 509	(3)	Hydrologic Systems and Modelling
BREE 510	(3)	Watershed Systems Management
BREE 515	(3)	Soil Hydrologic Modelling
BREE 518	(3)	Ecological Engineering
BREE 519	(3)	Advanced Food Engineering
BREE 520	(3)	Food, Fibre and Fuel Elements
BREE 522	(3)	Bio-Based Polymers
BREE 529	(3)	GIS for Natural Resource Management
BREE 530	(3)	Fermentation Engineering
BREE 531	(3)	Post-Harvest Drying
BREE 532	(3)	Post-Harvest Storage
BREE 533	(3)	Water Quality Management
BREE 535	(3)	Food Safety Engineering

### **3.3.2 Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Honours Bioresource Engineering (113 credits)**

Students can use their electives to complete the Honours program. The courses credited to the Honours program must be in addition to any required or complementary courses taken to satisfy the requirements of the student's major and specialization.

In addition to satisfying the research requirements, students must apply for the Honours program in March or April of their U2 year. It is the responsibility of the student to find a professor who is willing to support and supervise the research project. No student will be accepted into the program until a supervisor has agreed to supervise the student. Applicants must have a minimum CGPA of 3.3 to enter the Honours program and they must earn a B grade (3.0) or higher in the courses making up the Honours program. Students are required to achieve a minimum o

BREE 205	(3)	Engineering Design 1
BREE 210	(3)	Mechanical Analysis & Design
BREE 216	(3)	Bioresource Engineering Materials
BREE 252	(3)	Computing for Engineers
BREE 301	(3)	Biothermodynamics
BREE 305	(3)	Fluid Mechanics
BREE 319	(3)	Engineering Mathematics
BREE 327	(3)	Bio-Environmental Engineering
BREE 341	(3)	Mechanics of Materials
BREE 415	(3)	Design of Machines and Structural Elements
BREE 420	(3)	Engineering for Sustainability
BREE 451	(1)	Undergraduate Seminar 1 - Oral Presentation
BREE 452	(1)	Undergraduate Seminar 2 Poster Presentation
BREE 453	(1)	Undergraduate Seminar 3 - Scientific Writing
BREE 485	(1)	Senior Undergraduate Seminar 1
BREE 490	(3)	Engineering Design 2
BREE 495	(3)	Engineering Design 3
ECSE 461	(3)	Electric Machinery
FACC 250	(0)	Responsibilities of the Professional Engineer
FACC 300	(3)	Engineering Economy
FACC 400	(1)	Engineering Professional Practice
MECH 289	(3)	Design Graphics

### Complementary Courses (54 credits)

54 credits of the complementary courses selected as follows:

#### Honours Courses

Students choose either Plan A or Plan B

#### Honours Plan A

12 credits of Honours research courses in the subject area of the student's major in consultation with the Program Director of the student's major and the professor who has agreed to supervise the research project.

12 credits from:

FAES 401	(6)	Honours Research Project 1
FAES 402	(6)	Honours Research Project 2

OR

#### Honours Plan B

A minimum of 6 credits of Honours courses and 6 credits in 500-level BREE courses, selected in consultation with the Program Director of the student's major. The topic of the Honours research project must be on a topic related to their major and selected in consultation with the program Director of the student's major and the professor who has agreed to supervise the research project.

6 credits from:

FAES 405	(3)	Honours Project 1
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FAES 406 (3) Honours Project 2

Plus 6 credits of BREE courses at the 500 level.

6 credits - Set A

**Set A**

3 credits from the following:

AEMA 310	(3)	Statistical Methods 1
CIVE 302	(3)	Probabilistic Systems

3 credits from the following:

CHEE 315	(3)	Heat and Mass Transfer
MECH 346	(3)	Heat Transfer

9 credits - Set B (Natural Sciences and Mathematics)

**Set B - Natural Sciences and Mathematics**

9 credits with a minimum of 3 credits chosen from the list below:

AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
ENVB 305	(3)	Population & Community Ecology
ENVB 315	(3)	Science of Inland Waters
LSCI 202	(3)	Molecular Cell Biology
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
MICR 331	(3)	Microbial Ecology

Plus 6 credits chosen in consultation with the Academic Adviser.

9 credits - Set C (Social Sciences)

**Set C - Social Sciences**

Minimum of 3 credits from the following list:

ENVR 201	(3)	Society, Environment and Sustainability
SOCI 235	(3)	Technology and Society

Plus 6 credits of social sciences, management studies, humanities, or law courses at the U1 undergraduate level or higher with approval of the Academic Adviser. Note: these 6 credits may include one 3-credit language course other than the student's normal spoken languages.

18 credits - Set D (Engineering)

**Set D - Engineering**

18 credits from the following list where 12 credits must be taken from 200-400 level courses, with the option (and approval of the Academic

BREE 314	(3)	Agri-Food Buildings
BREE 322	(3)	Organic Waste Management
BREE 325	(3)	Food Process Engineering
BREE 329	(3)	Precision Agriculture
BREE 412	(3)	Machinery Systems Engineering
BREE 416	(3)	Engineering for Land Development
BREE 418	(3)	Soil Mechanics and Foundations
BREE 423	(3)	Biological Material Properties
BREE 497	(3)	Bioresource Engineering Project
BREE 501	(3)	Simulation and Modelling
BREE 504	(3)	Instrumentation and Control
BREE 509	(3)	Hydrologic Systems and Modelling
BREE 510	(3)	Watershed Systems Management
BREE 515	(3)	Soil Hydrologic Modelling
BREE 518	(3)	Ecological Engineering
BREE 519	(3)	Advanced Food Engineering
BREE 520	(3)	Food, Fibre and Fuel Elements
BREE 522	(3)	Bio-Based Polymers
BREE 529	(3)	GIS for Natural Resource Management
BREE 530	(3)	Fermentation Engineering
BREE 531	(3)	Post-Harvest Drying
BREE 532	(3)	Post-Harvest Storage
BREE 533	(3)	Water Quality Management
BREE 535	(3)	Food Safety Engineering

### 3.3.3 Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Major Bioresource Engineering - Professional Agrology (113 credits)

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### Required Courses (62 credits)

AEMA 202	(3)	Intermediate Calculus
AEMA 305	(3)	Differential Equations
AGRI 330	(1)	Agricultural Legislation
AGRI 430	(2)	Professional Practice in Agrology
BREE 205	(3)	Engineering Design 1
BREE 210	(3)	Mechanical Analysis & Design
BREE 216	(3)	Bioresource Engineering Materials
BREE 252	(3)	Computing for Engineers
BREE 301	(3)	Biothermodynamics
BREE 305	(3)	Fluid Mechanics
BREE 319	(3)	Engineering Mathematics
BREE 327	(3)	Bio-Environmental Engineering
BREE 341	(3)	Mechanics of Materials

BREE 415	(3)	Design of Machines and Structural Elements
BREE 420	(3)	Engineering for Sustainability
BREE 451	(1)	Undergraduate Seminar 1 - Oral Presentation
BREE 452	(1)	Undergraduate Seminar 2 Poster Presentation
BREE 453	(1)	Undergraduate Seminar 3 - Scientific Writing
BREE 485	(1)	Senior Undergraduate Seminar 1
BREE 490	(3)	Engineering Design 2
BREE 495	(3)	Engineering Design 3
ECSE 461	(3)	Electric Machinery
FACC 250	(0)	Responsibilities of the Professional Engineer
FACC 300	(3)	Engineering Economy
FACC 400	(1)	Engineering Professional Practice
MECH 289	(3)	Design Graphics

### Complementary Courses (51 credits)

51 credits of the complementary courses selected as follows:

6 credits - Set A

12 credits - Set B (Natural Sciences)

3 credits - Set C (Social Sciences)

30 credits - Set D (Engineering)

#### Set A

6 credits

3 credits from the following:

AEMA 310	(3)	Statistical Methods 1
CIVE 302	(3)	Probabilistic Systems

3 credits from the following:

CHEE 315	(3)	Heat and Mass Transfer
MECH 346	(3)	Heat Transfer

#### Set B - Natural Sciences

6 credits from each of the following two groups:

##### Group 1 - Biology

AEBI 210	(3)	Organisms 1
AEBI 211	(3)	Organisms 2
LSCI 202	(3)	Molecular Cell Biology
LSCI 204	(3)	Genetics
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology

##### Group 2 - Agricultural Sciences

ANSC 250	(3)	Principles of Animal Science
ANSC 433	(3)	Animal Nutrition and Metabolism
ANSC 451	(3)	Dairy and Beef Production Management
ANSC 458	(3)	Swine and Poultry Production
PLNT 300	(3)	Cropping Systems
PLNT 302	(3)	Forage Crops and Pastures
PLNT 307	(3)	Agroecology of Vegetables and Fruits
PLNT 312	(3)	Urban Horticulture
PLNT 322	(3)	Greenhouse Management
PLNT 430	(3)	Pesticides in Agriculture

### Set C - Social Sciences

3 credits from the following list:

ENVR 201	(3)	Society, Environment and Sustainability
SOCI 235	(3)	Technology and Society

### Set D - Engineering

30 credits from Group 1, Group 2, and Group 3.

(Minimum of 6 credits from each of Group 1, Group 2 or Group 3) with the option (and approval of the Academic Adviser) of taking 6 credits from other courses offered in the Faculty of Engineering. A minimum of 12 credits must be taken from 200-400 level courses.

#### Group 1 - Soil and Water

BREE 214	(3)	Geomatics
BREE 217	(3)	Hydrology and Water Resources
BREE 322	(3)	Organic Waste Management
BREE 329	(3)	Precision Agriculture
BREE 416	(3)	Engineering for Land Development
BREE 418	(3)	Soil Mechanics and Foundations
BREE 509	(3)	Hydrologic Systems and Modelling
BREE 510	(3)	Watershed Systems Management
BREE 515	(3)	Soil Hydrologic Modelling
BREE 518	(3)	Ecological Engineering
BREE 529	(3)	GIS for Natural Resource Management
BREE 533	(3)	Water Quality Management

#### Group 2 - Food Processing

BREE 325	(3)	Food Process Engineering
BREE 519	(3)	Advanced Food Engineering
BREE 520	(3)	Food, Fibre and Fuel Elements
BREE 530	(3)	Fermentation Engineering
BREE 531	(3)	Post-Harvest Drying
BREE 532	(3)	Post-Harvest Storage
BREE 535	(3)	Food Safety Engineering

### **Group 3 - Other Engineering**

BREE 314	(3)	Agri-Food Buildings
BREE 412	(3)	Machinery Systems Engineering
BREE 423	(3)	Biological Material Properties
BREE 497	(3)	Bioresource Engineering Project
BREE 501	(3)	Simulation and Modelling
BREE 504	(3)	Instrumentation and Control
BREE 522	(3)	Bio-Based Polymers

### **3.3.4 Bachelor of Engineering (Bioresource) – B.Eng.(Bioresource) Related Programs**

#### **3.3.4.1 Minor in Environmental Engineering**

For more information, see [section 3.6.9: Minor in Environmental Engineering](#).

#### **3.3.4.2 Barbados Field Study Semester**

For more information, see [Study Abroad & Field Studies > Undergraduate > : Barbados Field Study Semester](#).

### **Internship Opportunities**

FDSC 330	(3)	Food Processing
FDSC 400	(3)	Food Packaging
FDSC 442	(3)	Food Microbiology
FDSC 495D1	(1.5)	Food Science Seminar
FDSC 495D2	(1.5)	Food Science Seminar
FDSC 525	(3)	Food Quality Assurance
		BileSC 495D1

AEMA 310	(3)	Statistical Methods 1
AGRI 510	(3)	Professional Practice
BREE 324	(3)	Elements of Food Engineering
FDSC 200	(3)	Introduction to Food Science
FDSC 213	(3)	Analytical Chemistry 1
FDSC 251	(3)	Food Chemistry 1
FDSC 300	(3)	Principles of Food Analysis 1
FDSC 310	(3)	Post Harvest Fruit and Vegetable Technology
FDSC 319	(3)	Food Commodities
FDSC 330	(3)	Food Processing
FDSC 400	(3)	Food Packaging
FDSC 442	(3)	Food Microbiology
FDSC 495D1	(1.5)	Food Science Seminar
FDSC 495D2	(1.5)	Food Science Seminar
FDSC 525	(3)	Food Quality Assurance
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
NUTR 207	(3)	Nutrition and Health

#### **Additional Required Courses - Food Science Option (21 credits)**

FDSC 233	(3)	Physical Chemistry
FDSC 305	(3)	Food Chemistry 2
FDSC 315	(3)	Separation Techniques in Food Analysis 1
FDSC 334	(3)	Analysis of Food Toxins and Toxicants
FDSC 405	(3)	Food Product Development
FDSC 516	(3)	Flavour Chemistry
FDSC 540	(3)	Sensory Evaluation of Foods

#### **Honours Courses**

Students choose either Plan A or Plan B.

##### **Honours Plan A**

Two 6-credit Honours research courses in the subject area of the student's major, chosen in consultation with the Program Director of the student's major and the professor who has agreed to supervise the research project.

FAES 401	(6)	Honours Research Project 1
FAES 402	(6)	Honours Research Project 2

##### **Honours Plan B**

A minimum of two 3-credit Honours courses and 6 credits in 400- or 500-level courses, from the Faculty of Agricultural and Environmental Sciences, selected in consultation with the Program Director of the student's major. The topic of the Honours research project must be on a topic related to their major and selected in consultation with the Program Director of the student's major and the professor who has agreed to supervise the research project.

FAES 405	(3)	Honours Project 1
FAES 406	(3)	Honours Project 2

### Elective Courses (6 credits)

Electives are selected in consultation with an academic adviser, to meet the minimum 90-credit requirement for the degree. A portion of these credits should be in the humanities/social sciences.

### 3.4.3 Bachelor of Science (Food Science) (B.Sc.(F.Sc.)) - Major Food Science - Food Chemistry Option (90 credits)

This program is intended for those students interested in the multidisciplinary field of food science. The courses are integrated to acquaint the student with food processing, food chemistry, quality assurance, analytical procedures, food products, standards, and regulations. The program prepares graduates for employment as scientists in industry or government, in regulatory, research, quality assurance, or product development capacities.

Graduates have the academic qualifications for membership in the Canadian Institute of Food Science and Technology (CIFST). Graduates of the Food Science Major with Food Chemistry Option can also qualify for recognition by the Institute of Food Technologists (IFT) and the Ordre des chimistes du Québec (OCQ). Food Chemistry Option is completed to 90 credits with free elective courses.

Please refer to "Faculty Information and Regulations" > "Minimum Credit Requirements" in this eCalendar for prerequisites and minimum credit requirements.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

### Required Courses (54 credits)

Note: If an introductory CEGEP-level Organic Chemistry course has not been completed, then FDSC 230 (Organic Chemistry) must be completed as a replacement.

AEMA 310	(3)	Statistical Methods 1
AGRI 510	(3)	Professional Practice
BREE 324	(3)	Elements of Food Engineering
FDSC 200	(3)	Introduction to Food Science
FDSC 213	(3)	Analytical Chemistry 1
FDSC 251	(3)	Food Chemistry 1
FDSC 300	(3)	Principles of Food Analysis 1
FDSC 310	(3)	Post Harvest Fruit and Vegetable Technology
FDSC 319	(3)	Food Commodities
FDSC 330	(3)	Food Processing
FDSC 400	(3)	Food Packaging
FDSC 442	(3)	Food Microbiology
FDSC 495D1	(1.5)	Food Science Seminar
FDSC 495D2	(1.5)	Food Science Seminar
FDSC 525	(3)	Food Quality Assurance
FDSC 540	(3)	Sensory Evaluation of Foods
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
NUTR 207	(3)	Nutrition and Health

### Additional Required Courses - Food Chemistry Option (30 credits)

Note: Graduates of this program are qualified for recognition by the Institute of Food Technologists (IFT) and the Ordre des chimistes du Québec (OCQ).

FDSC 233	(3)	Physical Chemistry
FDSC 305	(3)	Food Chemistry 2
FDSC 315	(3)	Separation Techniques in Food Analysis 1
FDSC 334	(3)	Analysis of Food Toxins and Toxicants
FDSC 405	(3)	Food Product Development
FDSC 490	(3)	Research Project 1



FDSC 491	(3)	Research Project 2
FDSC 515	(3)	Enzymology
FDSC 516	(3)	Flavour Chemistry
FDSC 520	(3)	Biophysical Chemistry of Food

### Electives (6 credits)

Electives are selected in consultation with an academic adviser, to meet the minimum 90-credit requirement for the degree. A portion of these credits should be in the humanities/social sciences.

#### 3.4.4 About the Concurrent B.Sc.(F.Sc.) and B.Sc.(Nutr.Sc.)

Unique in North America, the concurrent degree program in Food Science and Nutritional Science allows students to complete two degrees at once while offering the best education in these complementary fields. This program opens the door to a multitude of career paths in the nutrition and food industries.

The **Food Science** component of the program focuses on the chemistry of food and the scientific principles underlying food safety, preservation, processing, and packaging, to provide consumers with quality foods. The **Nutritional Science** component deals with the science of human nutrient metabolism and the nutritional aspects of food. The program has been carefully structured to ensure that students receive the training that the industry demands, including a stage placement in the Nutrition or Food Industry.

##### 3.4.4.1 Concurrent Bachelor of Science in Food Science (B.Sc.(F.Sc.)) and Bachelor of Science Nutritional Sciences (B.Sc.(Nutr.Sc.)) - Food Science/Nutritional Science Major (Concurrent) (122 credits)

The concurrent program B.Sc.(F.Sc.) and B.Sc.(Nutr.Sc.) is designed to give motivated students the opportunity to combine the two fields. The two disciplines complement each other with Food Science providing the scientific foundation in the fundamentals of food science and its application in the food system, while Nutritional Sciences brings the fundamental knowledge in the nutritional aspects of food and metabolism. The program aims to train students with the fundamental knowledge in both disciplines to promote the development of healthy food products for human consumption. The overall program is structured and closely integrated to satisfy the academic requirements of both degrees as well as the professional training or exposure to industry.

Refer to "Faculty Information and Regulations" > "Minimum Credit Requirements" in this publication for prerequisites and minimum credit requirements.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

### Required Courses (80 credits)

AEMA 310	(3)	Statistical Methods 1
ANSC 234	(3)	Biochemistry 2
ANSC 323	(3)	Mammalian Physiology
ANSC 424	(3)	Metabolic Endocrinology
FDSC 200	(3)	Introduction to Food Science
FDSC 213	(3)	Analytical Chemistry 1
FDSC 251	(3)	Food Chemistry 1
FDSC 300	(3)	Principles of Food Analysis 1
FDSC 305	(3)	Food Chemistry 2
FDSC 310	(3)	Post Harvest Fruit and Vegetable Technology
FDSC 315	(3)	Separation Techniques in Food Analysis 1
FDSC 319	(3)	Food Commodities
FDSC 330	(3)	Food Processing
FDSC 334	(3)	Analysis of Food Toxins and Toxicants
FDSC 400	(3)	Food Packaging
FDSC 442	(3)	Food Microbiology
FDSC 497	(1.5)	Professional Seminar: Food
FDSC 525	(3)	Food Quality Assurance
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology

NUTR 207	(3)	Nutrition and Health
NUTR 214	(4)	Food Fundamentals
NUTR 307	(3)	Metabolism and Human Nutrition
NUTR 337	(3)	Nutrition Through Life
NUTR 344	(4)	Clinical Nutrition 1
NUTR 497	(1.5)	Professional Seminar: Nutrition
NUTR 512	(3)	Herbs, Foods and Phytochemicals

### Complementary Courses (30 credits)

Complementary courses are selected as follows:

At least 9 credits from the following:

AGEC 200	(3)	Principles of Microeconomics
AGEC 201	(3)	Principles of Macroeconomics
AGEC 330	(3)	Agriculture and Food Markets
AGEC 430	(3)	Agriculture, Food and Resource Policy
AGEC 442	(3)	Economics of International Agricultural Development
AGEC 450	(3)	Agribusiness Management
NUTR 342	(3)	Applied Human Resources

At least 9 credits from the following:

ANSC 551	(3)	Carbohydrate and Lipid Metabolism
ANSC 552	(3)	Protein Metabolism and Nutrition
ENVR 203	(3)	Knowledge, Ethics and Environment
FDSC 516	(3)	Flavour Chemistry
FDSC 535	(3)	Food Biotechnology
FDSC 536	(3)	Food Traceability
FDSC 537	(3)	Nutraceutical Chemistry
NUTR 322	(3)	Applied Sciences Communication
NUTR 341	(3)	Global Food Security
NUTR 503	(3)	Nutrition and Exercise

12 credits from the following:

FDSC 480	(12)	Food Industry Internship
NUTR 480	(12)	Nutrition Industry Internship

### Elective Courses (12 credits)

Electives are selected in consultation with an academic adviser.

\* Not all courses may be offered every year, please consult with your adviser when planning your program.

### 3.4.4.2 Concurrent Bachelor of Science in Food Science (B.Sc.(F.Sc.)) and Bachelor of Science Nutritional Sciences (B.Sc.(Nutr.Sc.)) - Food Science/Nutritional Science Honours (Concurrent) (122 credits)

Students can use their electives to complete the Honours program. The courses credited to the Honours program must be in addition to any required or complementary courses taken to satisfy the requirements of the student's major and specialization.

In addition to satisfying the research requirements, students must apply for the Honours program in March or April of their U3 year. It is the responsibility of the student to find a professor who is willing to support and supervise the research project. No student will be accepted into the program until a supervisor has agreed to supervise the student. Applicants must have a minimum CGPA of 3.3 to enter the Honours program and they must earn a B grade (3.0) or higher in the courses making up the Honours program. Students are required to achieve a minimum overall CGPA of 3.3 at graduation to obtain honours. Students can use their electives to complete the Honours program. The courses credited to the Honours program must be in addition to any required or complementary courses taken to satisfy the requirements of the student's major and specialization.

The Honours program consists of 12 credits of courses that follow one of two plans listed below.

Students who meet all the requirements will have the name of their program changed to include the word "Honours."

A brief description of the research activities involved will be documented and signed by the Program Director of the student's major, the supervisor of the research project, and the student.

The concurrent program B.Sc.(F.Sc.) and B.Sc.(Nutr.Sc.) is designed to give motivated students the opportunity to combine the two fields. The two disciplines complement each other with Food Science providing the scientific foundation in the fundamentals of food science and its application in the food system, while Nutritional Sciences brings the fundamental knowledge in the nutritional aspects of food and metabolism. The program aims to train students with the fundamental knowledge in both disciplines to promote the development of healthy food products for human consumption. The overall program is structured and closely integrated to satisfy the academic requirements of both degrees as well as the professional training or exposure to industry.

Refer to "Faculty Information and Regulations" > "Minimum Credit Requirements" in this eCalendar for prerequisites and minimum credit requirements.

#### Required Courses (80 credits)

AEMA 310	(3)	Statistical Methods 1
ANSC 234	(3)	Biochemistry 2
ANSC 323	(3)	Mammalian Physiology
ANSC 424	(3)	Metabolic Endocrinology
FDSC 200	(3)	Introduction to Food Science
FDSC 213	(3)	Analytical Chemistry 1
FDSC 251	(3)	Food Chemistry 1
FDSC 300	(3)	Principles of Food Analysis 1
FDSC 305	(3)	Food Chemistry 2
FDSC 310	(3)	Post Harvest Fruit and Vegetable Technology
FDSC 315	(3)	Separation Techniques in Food Analysis 1
FDSC 319	(3)	Food Commodities
FDSC 330	(3)	Food Processing
FDSC 334	(3)	Analysis of Food Toxins and Toxicants
FDSC 400	(3)	Food Packaging
FDSC 442	(3)	Food Microbiology
FDSC 497	(1.5)	Professional Seminar: Food
FDSC 525	(3)	Food Quality Assurance
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
NUTR 207	(3)	Nutrition and Health
NUTR 214	(4)	Food Fundamentals
NUTR 307	(3)	Metabolism and Human Nutrition
NUTR 337	(3)	Nutrition Through Life
NUTR 344	(4)	Clinical Nutrition 1
NUTR 497	(1.5)	Professional Seminar: Nutrition

NUTR 512 (3) Herbs, Foods and Phytochemicals

### **Honours Courses**

Students choose either Plan A or Plan B.

#### **Honours Plan A**

Two 6-credit Honours research courses in the subject area of the student's major, chosen in consultation with the Program Director of the student's major and the professor who has agreed to supervise the research project.

FAES 401 (6) Honours Research Project 1

FAES 402 (6) Honours Research Project 2

#### **Honours Plan B**

A minimum of two 3-credit Honours courses and 6 credits in 400- or 500-level courses, from the Faculty of Agricultural and Environmental Sciences, selected in consultation with the Program Director of the student's major. The topic of the Honours research project must be on a topic related to their major and selected in consultation with the Program Director of the student's major and the professor who has agreed to supervise the research project.

FAES 405 (3) Honours Project 1

FAES 406 (3) Honours Project 2



NUTR 322	(3)	Applied Sciences Communication
NUTR 337	(3)	Nutrition Through Life
NUTR 341	(3)	Global Food Security
NUTR 342	(3)	Applied Human Resources
NUTR 343	(3)	Financial Management and Accounting
NUTR 344	(4)	Clinical Nutrition 1
NUTR 345	(4)	Food Service Systems Management
NUTR 346	(2)	Quantity Food Production
NUTR 408*	(1)	Professional Practice Stage 3A
NUTR 409*	(9)	Professional Practice Stage 3B
NUTR 438	(3)	Interviewing and Counselling
NUTR 450	(3)	Research Methods: Human Nutrition
NUTR 505	(3)	Public Health Nutrition
NUTR 508*	(7)	Professional Practice Stage 4A
NUTR 509*	(7)	Professional Practice Stage 4B
NUTR 545	(4)	Clinical Nutrition 2
NUTR 546	(4)	Clinical Nutrition 3

### Complementary Courses (3 credits)

3 credits (200 level or higher) in human behavior social science from the following list, or another 3-credit human behavior course approved by your adviser.

EDPE 300	(3)	Educational Psychology
NUTR 301	(3)	Psychology
PSYC 215	(3)	Social Psychology
SOCI 210	(3)	Sociological Perspectives

### Elective Courses (3 credits)

Students who need to improve their proficiency in either English or French are strongly encouraged to choose their electives for that purpose. Students who wish to take language courses should check with the French Language Centre, Faculty of Arts, as placement testing may be required. Students are encouraged to develop a working knowledge of French in order to optimize their participation and learning in Stage placement sites. Similar to the language policy for Medicine, a functional working knowledge of French is expected by second year. Alternate elective choices may include, but are not limited to:

AEHM 300	(3)	ESL: High Intermediate 1
AEHM 301	(3)	ESL: High Intermediate 2
AEHM 330	(3)	Academic and Scientific Writing
NUTR 501	(3)	Nutrition in Developing Countries
NUTR 503	(3)	Nutrition and Exercise
NUTR 512	(3)	Herbs, Foods and Phytochemicals

### A Compulsory Immunization

A compulsory immunization program exists at McGill which is required for Dietetics students to practise. Students should complete their immunization before or soon after arriving at Macdonald campus; confirmation of immunization will be coordinated by the Health nurse through Student Services (<http://www.mcgill.ca/studenthealth/>). Certain deadlines may apply.

food safety, product development and influence of constituents of food on health. This degree does not lead to professional licensure as a Dietitian/Nutritionist. Graduates are qualified for careers in the biotechnology field, pharmaceutical and/or food industries, government laboratories, and the health science communications field. Graduates often continue on to graduate studies preparing for careers in research, medicine, and dentistry or as specialists in nutrition.

Refer to "Faculty Information and Regulations" > "Minimum Credit Requirements", in this eCalendar for prerequisites and minimum credit requirements.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

### **Required Courses (60 credits)**

All required courses must be passed with a minimum grade of C.

AEMA 310	(3)	Statistical Methods 1
ANSC 234	(3)	Biochemistry 2
ANSC 323	(3)	Mammalian Physiology
ANSC 424	(3)	Metabolic Endocrinology
FDSC 200	(3)	Introduction to Food Science
FDSC 251	(3)	Food Chemistry 1
FDSC 300	(3)	Principles of Food Analysis 1
FDSC 305	(3)	Food Chemistry 2
LSCI 204	(3)	Genetics
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
NUTR 207	(3)	Nutrition and Health
NUTR 214	(4)	Food Fundamentals
NUTR 307	(3)	Metabolism and Human Nutrition
NUTR 322	(3)	Applied Sciences Communication
NUTR 337	(3)	Nutrition Through Life

NUTR 551	(3)	Analysis of Nutrition Data
PARA 438	(3)	Immunology

At least 9 credits from the following courses:

AGRI 510	(3)	Professional Practice
ANSC 350	(3)	Food-Borne Pathogens
FDSC 315	(3)	Separation Techniques in Food Analysis I
FDSC 319	(3)	Food Commodities
FDSC 330	(3)	Food Processing
FDSC 334	(3)	Analysis of Food Toxins and Toxicants
FDSC 405	(3)	Food Product Development
FDSC 442	(3)	Food Microbiology
FDSC 516	(3)	Flavour Chemistry
FDSC 520	(3)	Biophysical Chemistry of Food
FDSC 525	(3)	Food Quality Assurance
FDSC 535	(3)	Food Biotechnology
FDSC 537	(3)	Nutraceutical Chemistry
FDSC 540	(3)	Sensory Evaluation of Foods
NUTR 430	(3)	Directed Studies: Dietetics and Nutrition I
NUTR 551	(3)	Analysis of Nutrition Data

### **Elective Courses (15 credits)**

15 credits of electives are taken to meet the minimum credit requirement for the degree. Reciprocal agreement allows all students to take a limited number of electives at any Quebec university. With prior approval students can take electives at any Canadian or international university.

### **3.5.3 Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Major Nutrition - Global Nutrition (90 credits)**

This Major covers many aspects of human nutrition and food and their impact on health and society at the community and international level. It offers a core emphasis on the scientific fundamentals of nutrition and metabolism throughout the lifespan. The specialization in global nutrition emphasizes the importance of the interaction of nutrition, diet, water, environment, and infection. This degree does not lead to professional licensure as a Dietitian/Nutritionist. Graduates are qualified for careers in national and international governmental and non-governmental food and health agencies, in world dev



LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
NUTR 207	(3)	Nutrition and Health
NUTR 214	(4)	Food Fundamentals
NUTR 307	(3)	Metabolism and Human Nutrition
NUTR 322	(3)	Applied Sciences Communication
NUTR 337	(3)	Nutrition Through Life
NUTR 344	(4)	Clinical Nutrition 1
NUTR 401	(1)	Emerging Issues in Nutrition
NUTR 450	(3)	Research Methods: Human Nutrition
NUTR 501	(3)	Nutrition in Developing Countries
NUTR 512	(3)	Herbs, Foods and Phytochemicals

### Complementary Courses (15 credits)

15 credits of complementary courses are selected as follows:

#### Common Complementary Courses

At least 6 credits selected from:

ANSC 433	(3)	Animal Nutrition and Metabolism
ANSC 551	(3)	Carbohydrate and Lipid Metabolism
ANSC 552	(3)	Protein Metabolism and Nutrition
ANSC 560	(3)	Biology of Lactation
FDSC 537	(3)	Nutraceutical Chemistry
FDSC 545	(3)	Advances in Food Microbiology
NUTR 503	(3)	Nutrition and Exercise
NUTR 511	(3)	Nutrition and Behaviour
NUTR 545	(4)	Clinical Nutrition 2
NUTR 546	(4)	Clinical Nutrition 3
NUTR 551	(3)	Analysis of Nutrition Data
PARA 438	(3)	Immunology

At least 9 credits selected from:

AGEC 330	(3)	Agriculture and Food Markets
AGEC 442	(3)	Economics of International Agricultural Development
AGRI 340	(3)	Principles of Ecological Agriculture
AGRI 411	(3)	Global Issues on Development, Food and Agriculture
ANSC 560	(3)	Biology of Lactation
ANTH 227	(3)	Medical Anthropology
ANTH 302	(3)	New Horizons in Medical Anthropology
ENVR 203	(3)	Knowledge, Ethics and Environment
GEOG 303	(3)	Health Geography
GEOG 403	(3)	Global Health and Environmental Change
NRSC 221	(3)	Environment and Health



PARA 438 (3) Immunology

### Complementary Courses (15 credits)

15 credits of complementary courses are selected as follows:

#### Common Complementary Courses

At least 6 credits from the following:

ANSC 433	(3)	Animal Nutrition and Metabolism
ANSC 551	(3)	Carbohydrate and Lipid Metabolism
ANSC 552	(3)	Protein Metabolism and Nutrition
ANSC 560	(3)	Biology of Lactation
FDSC 537	(3)	Nutraceutical Chemistry
FDSC 545	(3)	Advances in Food Microbiology
NUTR 501	(3)	Nutrition in Developing Countries
NUTR 503	(3)	Nutrition and Exercise
NUTR 511	(3)	Nutrition and Behaviour
NUTR 545	(4)	Clinical Nutrition 2
NUTR 546	(4)	Clinical Nutrition 3
NUTR 551	(3)	Analysis of Nutrition Data

At least 9 credits from the following courses:

ANAT 214	(3)	Systemic Human Anatomy
ANAT 261	(4)	Introduction to Dynamic Histology
ANSC 312	(3)	Animal Health and Disease
ANSC 560	(3)	Biology of Lactation
MICR 341	(3)	Mechanisms of Pathogenicity
MIMM 414	(3)	Advanced Immunology
NUTR 430	(3)	Directed Studies: Dietetics and Nutrition 1
NUTR 551	(3)	Analysis of Nutrition Data
PARA 424	(3)	Fundamental Parasitology
PATH 300	(3)	Human Disease
PHAR 300	(3)	Drug Action
PHAR 301	(3)	Drugs and Disease
PHAR 303	(3)	Principles of Toxicology
PHGY 311	(3)	Channels, Synapses and Hormones
PHGY 312	(3)	Respiratory, Renal, & Cardiovascular Physiology
PHGY 313	(3)	Blood, Gastrointestinal, & Immune Systems Physiology

#### Elective Courses (15 credits)

15 credits of electives are taken to meet the minimum credit requirement for the degree. A reciprocal agreement allows all students to take a limited number of electives at any Quebec university. With prior approval students can take electives at any Canadian or international university.

### 3.5.5 Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Major Nutrition - Nutritional Biochemistry (90 credits)

This Major offers a core emphasis on the scientific fundamentals of nutrition and metabolism throughout the lifespan from the molecular to the organismal level. This concentration in nutritional biochemistry links nutrigenomics, nutrigenetics, and biotechnology with human health, regulation of metabolism, and the pathophysiology of inherited and chronic disease. This degree does not lead to professional licensure as a dietitian/nutritionist. Graduates are qualified for careers in the biotechnology field, pharmaceutical and/or food industries, government laboratories, and the health science communications field. Graduates often continue on to graduate studies preparing for careers in research, medicine, and dentistry or as specialists in nutrition.

Refer to "Faculty Information and Regulations" > "Minimum Credit Requirements," in this eCalendar for prerequisites and minimum credit requirements.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### Required Courses (60 credits)

All required courses must be passed with a minimum grade of C.

AEMA 310	(3)	Statistical Methods 1
ANSC 234	(3)	Biochemistry 2
ANSC 323	(3)	Mammalian Physiology
ANSC 424	(3)	Metabolic Endocrinology
BTEC 306	(3)	Experiments in Biotechnology
FDSC 200	(3)	Introduction to Food Science
FDSC 251	(3)	Food Chemistry 1
FDSC 305	(3)	Food Chemistry 2
LSCI 204	(3)	Genetics
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
NUTR 207	(3)	Nutrition and Health
NUTR 214	(4)	Food Fundamentals
NUTR 307	(3)	Metabolism and Human Nutrition
NUTR 322	(3)	Applied Sciences Communication
NUTR 337	(3)	Nutrition Through Life
NUTR 344	(4)	Clinical Nutrition 1
NUTR 401	(1)	Emerging Issues in Nutrition
NUTR 450	(3)	Research Methods: Human Nutrition
NUTR 512	(3)	Herbs, Foods and Phytochemicals

#### Complementary Courses (15 credits)

15 credits of complementary courses are selected as follows:

##### Common Complementary Courses

At least 6 credits from the following:

ANSC 433	(3)	Animal Nutrition and Metabolism Carboh
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NUTR 503	(3)	Nutrition and Exercise
NUTR 511	(3)	Nutrition and Behaviour
NUTR 545	(4)	Clinical Nutrition 2
NUTR 546	(4)	Clinical Nutrition 3
NUTR 551	(3)	Analysis of Nutrition Data
PARA 438	(3)	Immunology

At least 9 credits from the following courses:

ANAT 262	(3)	Introductory Molecular and Cell Biology
ANSC 324	(3)	Developmental Biology and Reproduction
ANSC 400	(3)	Eukaryotic Cells and Viruses
ANSC 420	(3)	Animal Biotechnology
ANSC 551	(3)	Carbohydrate and Lipid Metabolism
ANSC 552	(3)	Protein Metabolism and Nutrition
BINF 301	(3)	Introduction to Bioinformatics
BIOC 312	(3)	Biochemistry of Macromolecules
BIOL 300	(3)	Molecular Biology of the Gene
BTEC 535	(3)	Functional Genomics in Model Organisms
EXMD 401	(3)	Physiology and Biochemistry Endocrine Systems
EXMD 502	(3)	Advanced Endocrinology 1
EXMD 503	(3)	Advanced Endocrinology 02
MICR 341	(3)	Mechanisms of Pathogenicity
MIMM 314*	(3)	Intermediate Immunology
MIMM 414	(3)	Advanced Immunology
NUTR 430	(3)	Directed Studies: Dietetics and Nutrition 1
NUTR 551	(3)	Analysis of Nutrition Data
PARA 438*	(3)	Immunology

\* Note: Students take either PARA 438 or MIMM 314

### Elective Courses (15 credits)

15 credits of electives are taken to meet the minimum credit requirement for the degree. A reciprocal agreement allows all students to take a limited number of electives at any Quebec university. With prior approval students can take electives at any Canadian or international university.

### 3.5.6 Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Major Nutrition - Sports Nutrition (90 credits)

This Major offers a core emphasis on the scientific fundamentals of nutrition and metabolism throughout the lifespan from the molecular to the organismal level. The concentration in sports nutrition integrates the influence of exercise and physical activity on health and chronic disease prevention. This degree does not lead to professional licensure as a Dietitian/Nutritionist. Graduates are qualified for careers in the biotechnology field, pharmaceutical and/or food industries, government laboratories, and the health science communications field. Graduates often continue on to graduate studies preparing for careers in research, medicine, and dentistry or as specialists in nutrition.

Refer to "Faculty Information and Regulations" > "Minimum Credit Requirements", in this eCalendar for prerequisites and minimum credit requirements.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

### Required Courses (60 credits)

All required courses must be passed with a minimum grade of C.

AEMA 310	(3)	Statistical Methods 1
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ANSC 234

(3)

Biochemistry 2

ANSC 323

(3)

Mammalian Physiology



FAES 310	(3)	Agribusiness Entrepreneurship
INTG 201	(3)	Integrated Management Essentials 1
INTG 202	(3)	Integrated Management Essentials 2
MGPO 362	(3)	Fundamentals of Entrepreneurship

#### **Complementary Courses (6 credits)**

6 credits from the following:

BUSA 465	(3)	Technological Entrepreneurship
FAES 300*	(3)	Internship 2
MGPO 364	(3)	Entrepreneurship in Practice
MGPO 438	(3)	Social Entrepreneurship and Innovation

\* Note: To be counted towards the Minor in Agribusiness Entrepreneurship, the placement in FAES 300 must be approved by the program coordinator as having entrepreneurial focus.

### **3.6.3 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Agricultural Economics (24 credits)**

The Minor in Agricultural Economics will complement a student's education in four ways. First, as a social science, Economics will provide an alternative perspective for students in the Faculty. Second, the Minor will provide an excellent foundation of the workings of the economy at large. Third, it will aid students in understanding the business environment surrounding the agri-food industry. Finally, it will challenge students to analyze the interaction between the agricultural economy and the natural resource base.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### **Required Courses (12 credits)**

AGEC 200	(3)	Principles of Microeconomics
AGEC 201	(3)	Principles of Macroeconomics
AGEC 330	(3)	Agriculture and Food Markets
AGEC 333	(3)	Resource Economics

#### **Complementary Courses (12 credits)**

12 credits of complementary courses selected from:

AGEC 231	(3)	Economic Systems of Agriculture
AGEC 242	(3)	Management Theories and Practices
AGEC 320	(3)	Intermediate Microeconomic Theory
AGEC 332	(3)	Farm Management and Finance
AGEC 425	(3)	Applied Econometrics
AGEC 430	(3)	Agriculture, Food and Resource Policy
AGEC 442	(3)	Economics of International Agricultural Development
AGEC 450	(3)	Agribusiness Management
AGEC 491	(3)	Research & Methodology
AGEC 492	(3)	Special Topics in Agricultural Economics 01



### **3.6.4 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Agricultural Production (24 credits)**

This Minor program is designed to allow students in non-agricultural production majors to receive credit for courses in agricultural production and to stimulate "cross-over" studies. The Minor can be associated with existing major programs in the Faculty, but in some instances it may require more than 90 credits to meet the requirements of both the Major and the Minor.

Students are advised to consult their major program adviser and the Academic Adviser of the Minor in their first year. At the time of registration for their penultimate year, students must declare their intent to obtain a Minor Agricultural Production. With the agreement of their major program adviser, they must submit their program of courses already taken, and to be taken in their final year, to the Academic Adviser of the Agricultural Production Minor. The Academic Adviser of the Agricultural Production Minor will then certify which courses the student will apply toward the Minor and that the student's program conforms with the requirements of the Minor.

Notes:

1. Most courses listed at the 300 level and higher have prerequisites. Although instructors may waive prerequisite(s) in some cases, students are urged to prepare their program of study well before their final year.
2. Not all courses are offered every year. For information on available courses, consult Class Schedule at <http://www.mcgill.ca/minerva>. Complete listings can be found in the "Courses" section of this eCalendar.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### **General Regulations**

To obtain a Minor in Agricultural Production, students must:

- a) ensure that their academic record at the University includes a C grade or higher in the courses as specified in the course requirements given below.
- b) offer a minimum total of 24 credits from the courses as given below, of which not more than 6 credits may be counted for both the Major and the Minor programs. This restriction does not apply to elective courses in the Major program.

#### **Required Courses (12 credits)**

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ANSC 323	(3)	Mammalian Physiology
ANSC 324	(3)	Developmental Biology and Reproduction
ANSC 420	(3)	Animal Biotechnology
PARA 438	(3)	Immunology

### Complementary Courses (9 credits)

9 credits selected from:

ANSC 234	(3)	Biochemistry 2
ANSC 251	(3)	Comparative Anatomy
ANSC 326	(3)	Fundamentals of Population Genetics
ANSC 400	(3)	Eukaryotic Cells and Viruses
ANSC 424	(3)	Metabolic Endocrinology
ANSC 433	(3)	Animal Nutrition and Metabolism
ANSC 560	(3)	Biology of Lactation
ANSC 565	(3)	Applied Information Systems
LSCI 451	(3)	Research Project 1

### 3.6.6 Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Minor Animal Health and Disease (24 credits)

The Minor in Animal Health and Disease is offered to students wishing to understand general animal physiology and function, the susceptibility of animals to various diseases, methods for limiting and controlling potential outbreaks, and the resulting implications for the animal, the consumer, and the environment. It is an ideal choice for students who are interested in the care of animals, or in working in laboratories where diseases are being researched. It would also be useful to students who wish to apply to most veterinary colleges in North America.

This Minor is not open to students in B.Sc.(Ag.Env.Sc.) programs. These students may register for the specialization in Animal Health and Disease.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

### Required Courses (18 credits)

ANSC 312	(3)	Animal Health and Disease
ANSC 323	(3)	Mammalian Physiology
ANSC 350	(3)	Food-Borne Pathogens
ANSC 424	(3)	Metabolic Endocrinology
MICR 341	(3)	Mechanisms of Pathogenicity
PARA 438	(3)	Immunology

### Complementary Courses (6 credits)

6 credits selected from the following list:

ANSC 234	(3)	Biochemistry 2
ANSC 251	(3)	Comparative Anatomy
ANSC 303	(2)	Farm Livestock Internship
ANSC 324	(3)	Developmental Biology and Reproduction
ANSC 433	(3)	Animal Nutrition and Metabolism

### 3.6.7 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor 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 Minor Applied

Ecology 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. Concepts and tools will be presented that help you to deal with the complexity that an ecosystem perspective brings. The goal of this minor 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.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

To obtain a Minor in Applied Ecology, students [minfo/advising](#)

To obtain a Minor in Ecological Agriculture, students must:

- a) Ensure that their academic record at the University includes a C grade or higher in the courses as specified in the course requirements given below.
- b) Offer a minimum total of 24 credits from the courses as given below, of which not more than 6 credits may be counted for both the Major and the Minor programs. This restriction does not apply to elective courses in the Major program.

**Required Courses (12 credits)**

at the beginning of their U2 year. They must then consult with the academic adviser in the School of Human Nutrition to obtain approval for their course selection. Since some courses may not be offered every year and many have prerequisites, students are cautioned to plan their program in advance.

**3.6.11 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor International Agriculture (24 credits)**

### 3.7.1 Certificate (Cert.) Ecological Agriculture (30 credits)

This 30-credit certificate program is very similar to the Minor program and is designed to focus on the principles underlying the practice of ecological agriculture. The certificate may be of special interest to professional agrologists who want further training, as well as formal recognition that they have completed a coherent program of courses beyond their B.Sc. studies.

Students holding a B.Sc. in agriculture or a related area are eligible to register for this program provided that they are otherwise acceptable for admission to the University. Students who have completed the Minor or specialization in Ecological Agriculture are not permitted to register for this program.

For information on academic advising, see: <http://www.mcgill.ca/macdonald/studentinfo/advising>

#### General Regulations

To obtain a certificate in Ecological Agriculture, students must complete a minimum total of 30 credits from the courses as given below.

#### Notes:

1. Most courses listed at the 300 level and higher have prerequisites. Although instructors may waive prerequisite(s) in some cases, students are urged to prepare their program of study to ensure that they have met all conditions.
2. Students using AGRI 310 toward the requirements of the Specialization/Minor/Certificate are limited to an experience on farms or other enterprises that are organic, biodynamic, or practising permaculture. The placement must be approved by the academic adviser for the specialization/Minor/certificate.

#### Required Courses (12 credits)

AGEC 430	(3)	Agriculture, Food and Resource Policy
AGRI 215	(3)	Agro-Ecosystems Field Course
AGRI 340	(3)	Principles of Ecological Agriculture
SOIL 535	(3)	Ecological Soil Management

#### Complementary Courses (18 credits)

18 credits chosen from the following, in consultation with the Academic Adviser for Ecological Agriculture.

Internship in Agriculture/Environment

the field of food science and then choose complementary courses that allow a broad-based exposure in areas such as food chemistry/analysis, food microbiology/nutrition, quality assurance/safety, processing/engineering, communication skills, and ethics.

**Required Course (3 credits)**

FDSC 200 (3) Introduction to Food Science

**Complementary Courses (27 credits)**

27 credits (select no more than two 200-level courses)

AGRI 510	(3)	Professional Practice
BREE 324	(3)	Elements of Food Engineering
BREE 535	(3)	Food Safety Engineering
FDSC 213	(3)	Analytical Chemistry 1
FDSC 251	(3)	Food Chemistry 1
FDSC 300	(3)	Principles of Food Analysis 1
FDSC 305	(3)	Food Chemistry 2
FDSC 310	(3)	Post Harvest Fruit and Vegetable Technology
FDSC 315	(3)	Separation Techniques in Food Analysis 1
FDSC 319	(3)	Food Commodities
FDSC 330	(3)	Food Processing
FDSC 400	(3)	Food Packaging
FDSC 405	(3)	Food Product Development
FDSC 442	(3)	Food Microbiology
FDSC 495D1	(1.5)	Food Science Seminar
FDSC 495D2	(1.5)	Food Science Seminar
FDSC 515	(3)	Enzymology
FDSC 516	(3)	Flavour Chemistry
FDSC 519	(3)	Advanced Food Processing
FDSC 520	(3)	Biophysical Chemistry of Food
FDSC 525	(3)	Food Quality Assurance
FDSC 535	(3)	Food Biotechnology
FDSC 536	(3)	Food Traceability
FDSC 537	(3)	Nutraceutical Chemistry
LSCI 211	(3)	Biochemistry 1
LSCI 230	(3)	Introductory Microbiology
NUTR 207	(3)	Nutrition and Health

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### 3.8 Field Studies

#### 3.8.1 Africa Field Study Semester

The Department of Geography, Faculty of Science, coordinates the 15-credit interdisciplinary Africa Field Study Semester. For more information, see [Study Abroad & Field Studies > Undergraduate > : Africa Field Study Semester](#).



### **3.8.2 Barbados Field Study Semester**

This program takes place at Bellairs Research Institute in Barbados; it is a full 15-credit program offered each Fall semester. For more information, see [Study Abroad & Field Studies > Undergraduate > : Barbados Field Study Semester](#).

### **3.8.3 Barbados Interdisciplinary Tropical Studies Field Semester**

This 15-credit program is offered in collaboration with several partners in Barbados, including the University of the West Indies (UWI). McGill students live at the Bellairs Research Institute, while BITS courses are conducted both at UWI and Bellairs. For more information, see [Study Abroad & Field Studies > Undergraduate > : Barbados Interdisciplinary Tropical Studies Field Semester](#).

### **3.8.4 Panama Field Study Semester**

This program is a joint venture between McGill University and the Smithsonian Tropical Research Institute (STRI) in Panama. For more information, see [Study Abroad & Field Studies > Undergraduate > : Panama Field Study Semester](#).

- Animal Production
- International Agriculture

Each of these specializations must be taken within the context of a major, and will depend on the student's orientation towards animal production management, animal biotechnology, further studies in animal health, international studies, and/or graduate studies.

Any student with an interest in animals who wishes to become a professional agrologist (a member of the *Ordre des agronomes du Québec*), should register in the Agro-Environmental Sciences Major and take the specialization in Animal Production, as well as the obligatory specialization in Professional Agrology.

#### 4.1.3 Animal Science Faculty

##### Chair

Raj Duggavathi; B.V.Sc., M.V.Sc.(B'lore), Ph.D.(Sask.)

##### Emeritus Professors

Roger B. Buckland; B.Sc.(Agr.), M.Sc.(McG.), Ph.D.(Md.)

Eduardo R. Chavez; Ing.Agr.(Chile), M.Sc., Ph.D.(Calif., Davis)

Eugene Do(v) 562.841 ThilV1 a

Telephone: 514-398-7773

Website: [www.mcgill.ca/bioeng](http://www.mcgill.ca/bioeng)

#### 4.2.2 About the Department of Bioresource Engineering

Bioresource Engineering is an interdisciplinary program that integrates engineering, design, and the biological sciences. It is a unique profession that applies engineering principles to the enhancement and sustainability of the world's natural resources. Bioresource engineers seek solutions to problems that involve plants, animals, and the environment.

Bioresource Engineering includes the design, construction, operation, maintenance, remediation, and upgrading of systems that contain biological components. This also includes the design of many of the technological constructions that are part of such systems. Thus, Bioresource Engineering includes quite a few subdisciplines, which are linked because of their biological orientation.

For more information on programs associated with this department, see [section 3.3: Bachelor of Engineering \(Bioresource\) – B.Eng.\(Bioresource\)](#).

#### 4.2.3 Bioresource Engineering Faculty

##### Chair

Viacheslav I. Adamchuk

##### Graduate Program Director

G.S. Vijaya Raghavan

##### Associate Graduate Program Director

Valérie Orsat

##### Emeritus Professors

Robert S. Broughton; B.S.A., B.A.Sc.(Tor.), S.M.(MIT), Ph.D.(McG.), LL.D.(Dal.)

Robert Kok; B.E.Sc., Ph.D.(UWO)

##### Professors

Viacheslav I. Adamchuk; B.Sc.(NUBiP), M.Sc., Ph.D.(Purd.)

Chandra A. Madramootoo; B.Sc.(Agr.Eng.), M.Sc., Ph.D.(McG.), D.Sc.(Guelph) (*James McGill Professor*)

Michael O. Ngadi; B.Eng.(Agr.Eng.), M.A.Sc., Ph.D.(Dal.Tech.) (*James McGill Professor*)

Valérie Orsat; B.Sc., M.Sc., Ph.D.(McG.)

Shiv O. Prasher; B.Tech., M.Tech.(Punj.), Ph.D.(Br. Col.), LL.D.(Dal.) (*Distinguished James McGill Professor*)

G.S. Vijaya Raghavan; B.Eng.(B'lore), M.Sc.(Guelph), Ph.D.(Colo. St.), D.Sc.(TNAU), D.Sc.(UAS Dharwad) (*James McGill Professor*)

##### Associate Professors

Jan Adamowski; B.Eng.(RMC), M.Phil.(Camb.), M.B.A.(WUT, LBS, HEC Paris, NHH), Ph.D.(WUT) (*Liliane and David M. Stewart Scholar in Water Resources*) (*William Dawson Scholar*)

Grant Clark; B.Sc.(Alta.), M.Sc., Ph.D.(McG.)

Marie-Josée Dumont; B.Eng, M.Sc.(Laval), Ph.D.(Alta.) (*William Dawson Scholar*)

Mark Lefsrud; B.Sc.(Sask.), M.Sc.(Rutg.), Ph.D.(Tenn.) (*William Dawson Scholar*)

Zhiming Qi; B.Sc., M.Sc.(China Agr.), Ph.D.(Iowa St.) (*James H. Brace Associate Professor*)

##### Assistant Professor

Abdolhamid Akbarzadeh Shafaroudi; B.Sc.(IUT, Iran), M.Sc.(AUT, Iran), Ph.D.(New Br.)

##### Adjunct Professors

Luis Del Rio; B.Sc., M.Sc.(S. Fraser), Ph.D.(Br. Col.)

Boris Tartakovsky; M.Sc., Ph.D.(Moscow St.)

#### Faculty Lecturers

Alice Cherestes; B.Sc., M.Sc.(QC, CUNY), Ph.D.(CUNY)

David Titley-Peloquin; B.Sc., Ph.D.(McG.)

#### Research/Academic Associates

Yvan Gariepy; B.Sc., M.Sc.(McG.)

Ebenezer Kwofie; B.Sc.(KNUST), M.Sc.(Borås), Ph.D.(McG.)

Li (Laura) Liu; B.Sc., M.Sc.(Harbin Inst. Tech.), Ph.D.(PolyU, Hong Kong)

Darwin Lyew; B.Sc., M.Sc., Ph.D.(McG.)

#### Technical

Scott Manktelow

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### 4.3 Farm Management and Technology Program

#### 4.3.1 Location

Farm Management and Technology Program  
Faculty of Agricultural and Environmental Sciences  
Macdonald Campus of McGill University  
21,111 Lakeshore Road, Harrison House  
Sainte-Anne-de-Bellevue QC H9X 3V9  
Telephone: 514-398-7814  
Fax: 514-398-7955  
Email: [fmt.macdonald@mcgill.ca](mailto:fmt.macdonald@mcgill.ca)  
Website: [www.mcgill.ca/fmt](http://www.mcgill.ca/fmt)

#### 4.3.2 About the Farm Management and Technology Program

The Farm Management and Technology (FMT) program is a 3-year academic and practical college program, offered on the Macdonald Campus and taught by the staff of the Faculty of Agricultural and Environmental Sciences of McGill University. For further information on the program, please refer to our [website](#).

#### 4.3.3 Diploma of College Studies — Farm Management Technology

This three-year academic and practical program is offered on the Macdonald campus and taught by the staff of the Faculty of Agricultural and Environmental Sciences of McGill University.

Finally, courses in English, Français, Humanities, Physical Education, and two complementary subjects taken during the program will entitle the student to receive a Diploma of College Studies (DEC) from the MEESR.

### **Program Outline**

#### **Fall 1**

FMT4 001	(1.33)	Fall Stage (152-VSA-MC)
FMT4 002	(1.67)	Soil Tillage (152-VSB-MC)
FMT4 003	(1.33)	Information Management (152-VSC-MC)
FMT4 004	(1.33)	Animal Physiology and Anatomy (152-VSD-MC)
FMT4 005	(2.33)	Introduction to Plant Science (152-VSE-MC)
FMT4 006	(1.33)	Pesticides and the Environment (152-VSF-MC)
FMT4 080	(2)	English Upgrading
FMT4 090	(1)	Physical Activity and Health (109-101-MQ)

#### **Winter 1**

FMT4 007	(2)	Health and Safety (152-VSG-MC)
FMT4 008	(2.33)	Animal Genetics and Nutrition (152-VSH-MC)
FMT4 009	(2)	Soil Fertility (152-VSJ-MC)
FMT4 010	(1.33)	Winter Stage (152-VSK-MC)
FMT4 011	(2)	Farm Accounting (152-VSL-MC)
FMT4 012	(1.67)	Machinery Maintenance (152-VSM-MC)
FMT4 077	(2.67)	Introduction to College English

#### **Summer 1**

Agricultural Internship 221.949 1.949 1484 Tint603 Tml2(2.67)

### Summer 2

FMT4 018	(2.33)	Enterprise Management 1 (152-VSU-MC)
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### Fall 3

FMT4 019	(2)	Nutrient Management Plan (152-VSV-MC)
FMT4 020	(2)	Conservation of Soil and Water (152-VSW-MC)
FMT4 021	(2.67)	Enterprise Management 2 (152-VSX-MC)
FMT4 022	(1.67)	Equipment Management (152-VSY-MC)
FMT4 078	(2)	FMT English (603-VSB-MC)
FMT4 086	(2)	Humanities 2: World Views (345-102-03)
FMT4 097	(2)	Landscape Design (504-VSG-MC)

### Winter 3

FMT4 023	(1.33)	Building Management (152-VSZ-MC)
FMT4 024	(1.67)	Farm Building Development (152-VTA-MC)
FMT4 025	(2.33)	Enterprise Management 3 (152-VTB-MC)
FMT4 026	(1.67)	Human Resources (152-VTC-MC)
FMT4 027	(1.33)	Precision Agriculture (152-VTD-MC)
FMT4 087	(2)	Humanities 3: Env. & Org. Issues (345-VSH-MC)
FMT4 092	(1)	Physical Activity and Autonomy (109-103-MQ)

### Elective Production Courses

We offer four production courses in the area of Animal Science and four production courses in the area of Plant Science. Students must take a minimum of two courses in each category for a total of four courses. Students could elect to take more than four courses if they wish, after a discussion with their academic adviser. They must take a minimum of two courses per semester.

#### Animal Science Category

FMT4 028	(2.67)	Dairy Replacement Management (152-VTE-MC)
FMT4 029	(2.67)	Dairy Performance Management (152-VTF-MC)
FMT4 030	(2.67)	Swine and Poultry Management (152-VTG-MC)
FMT4 031	(2.67)	Beef and Sheep Management (152-VTH-MC)

#### Plant Science Category

FMT4 033	(2.67)	Vegetable and Fruit Crops (152-VTK-MC)
FMT4 034	(2.67)	Greenhouse Crop Production (152-VTL-MC)
FMT4 035	(2.67)	Field Crop Management 1 (152-VTM-MC)
FMT4 036	(2.67)	Field Crop Management 2 (152-VTN-MC)

#### Complementary Courses\*

Students must take two complementary courses to meet the program requirements. The program offers the following.

\* After consultation with their academic adviser, students can substitute complementary courses taken at another collegial institution. This includes science courses which are required for further studies in a degree program. The cost associated with courses taken elsewhere must be assumed by the students.

FMT4 074	(2)	Complementary Course 2
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FMT 097 (2) Landscape Design (504-VSG-MC)

### Comprehensive Assessment

The objective of this examination is to ensure that students have attained the objectives and standards for each competency in the program. Successful completion of the Comprehensive Assessment is mandatory to obtain the DEC.

The passing grade is 60%. The mark indicating that the student has successfully completed the Comprehensive Assessment will appear on the student's transcript.

### English Exit Examination

All students who wish to graduate and obtain the DEC must pass the English Exit Examination that is prepared and corrected by the MEESR. Students must take this examination on the dates selected by the MEESR.

#### 4.3.4 Farm Management and Technology Program Faculty

##### Director

Peter Enright; B.Sc.(Agr.Eng.), M.Sc.(McG.)

##### Associate Director

David Wees; B.Sc.(Agr.), M.Sc.(McG.)

##### Faculty Lecturers

Caroline Begg; B.Sc.(Agr.)(McG.), M.Sc.(Sask.), Ph.D.(McG.)

Christian Molgat; B.Sc.(Bio.)(Ott.), B.Sc.(Agr.)(Guelph)

Pascal Thériault; B.Sc.(Agr.), M.Sc.(Kansas St.)

#### 4.3.5 Academic Rules and Information – FMT

The Farm Management and Technology program follows the rules and regulations of McGill University as well as from the *Ministère de l'Éducation et de l'Enseignement supérieur* (MEES) for the collegial level.

##### 4.3.5.1 Entrance Requirements – FMT

1. Students should have a good practical knowledge of farming under eastern Canadian conditions. One year of experience is recommended, but under special conditions a four-month summer season is acceptable.
2. The **minimum academic entrance requirements** are a Quebec Secondary School Diploma (SSD) or its equivalent and the successful completion of the following five courses:
  - Secondary IV: History and Citizenship Education or History of Quebec and Canada
  - Secondary IV: Science and Technology or Applied Science and Technology or Physical Science
  - Secondary IV: Mathematics
  - Secondary V: Language of Instruction
  - Secondary V: Second Language
3. The minimum entrance requirements for **students from Ontario** are the Ontario Secondary School Diploma (OSSD), as well as:
  - grade 10 French as a second language
  - science: SNC2P (recommended with TCJ20 or TDJ20 or TMJ20) or SNC2D (desired with TCJ20 or TDJ20 or TMJ20)
  - mathematics: MFM2P or MPM2D

For **other Canadian students**, the minimum French requirement is grade 10 second language. Please contact the department for more information.

For **international students**, a recognized French proficiency test may be required. An English proficiency test may also be required. For details on proof of English proficiency, visit [www.mcgill.ca/applying/requirements/prep](http://www.mcgill.ca/applying/requirements/prep).

4. All candidates for admission must make arrangements to come to the Macdonald campus for an interview prior to admission to the program.
5. Admission to this program is only in the Fall semester.
6. We strongly encourage incoming students to acquire their driver's permit (both for cars **and** farm equipment) before coming to Macdonald campus. This is first for safety reasons, given that students may work with farm equipment during the first semester. As well, most farmers require their employees and trainees (stagiaires) to drive and possess the appropriate driver's license.

#### **4.3.5.2 Important Dates – FMT**

##### **4.3.5.2.1 Sessional Dates**

The number of teaching and examination days is set by the *Ministère de l'Éducation et de l'Enseignement supérieur* (MEES). The sessional dates vary from year to year. At the present time, each semester has 75 teaching days and seven days of exams.

##### **4.3.5.2.2 Last Day for Withdrawal or Course Additions**

The last day to make course registration changes for Fall term courses is **September 20**.

The last day to make course registration changes for Winter term courses is **February 15**.

##### **4.3.5.3 Registration – FMT**

Students in the Farm Management and Technology program must register online using Minerva at



#### **4.3.6.2 Textbooks and Supplies**

The cost of textbooks and supplies is estimated at \$250.00 per semester.

#### **4.3.6.3 Financial Assistance**

In-Course Financial Aid (including loans and bursaries) is available to full-time students on the basis of demonstrated financial need; however, it is recommended that all applicants apply for the maximum government student assistance program for which they are eligible. Students may apply for In-Course Financial Aid through the *Financial Aid & Awards Menu* on Minerva and will then be asked to make an appointment with the Financial Aid Counsellor at the Macdonald Student Service Centre. For more information, consult [University Regulations and Resources > Undergraduate > : Scholarships and Student Aid](#) or contact the Student Services Centre at 514-398-7992.

#### **4.3.7 Residence Accommodation – FMT**

Laird Hall is a co-educational residence with a capacity of 250 students. It accommodates students in double and single rooms. Each floor includes shared washrooms, a fully-equipped kitchen, a television lounge, and a laundry room. For more information, refer to [University Regulations and Resources > Undergraduate > Residential Facilities > : University Residences – Macdonald Campus](#)

### **Emeritus Professors**

Frederik R. van de Voort; B.Sc., M.Sc., Ph.D.(Br. Col.)

### **Professors**

Hosahalli S. Ramaswamy; B.Sc.(B'lore), M.Sc., Ph.D.(Br. Col.)

Benjamin K. Simpson; B.Sc.(KNUST), Ph.D.(Nfld.)

Varoujan A. Yaylayan; B.Sc.(Beirut), M.Sc., Ph.D.(Alta.)

### **Associate Professors**

Saji George; B.Sc., M.Sc.(MGU, Kerala), Ph.D.(NUS) (*Canada Research Chair*)

Ashraf A. Ismail; B.Sc., Ph.D.(McG.)

Salwa Karboune; B.Sc., M.Sc.(IA)

The **Nutrition Major** is a 90-credit undergraduate degree. At its core, it deals with how diet, nutrition, and metabolism affect human health and disease risk. It offers you exciting opportunities to specialize in one of *five concentrations* (Food Function and Safety; Global Nutrition; Health and Disease; Nutritional Biochemistry; and Sports Nutrition), to incorporate research experience, travel for field studies, or a Minor in your program. It does not lead to professional licensure as a Dietitian/Nutritionist. However, it is excellent preparation for further studies including graduate, medical, veterinary, and other professional schools; or for many careers in the food, pharma, or other industry, government or NGO, or global health organizations.

**B.Sc.(F.Sc.)/B.Sc.(Nutr.Sc.):** The School also offers a dual degree, the **B.Sc. Food Science/Nutritional Science Major**, which is a 122-credit undergraduate degree. You will obtain a strong background in chemical sciences regarding the physical nature and chemical properties of foods, combined with an advanced understanding of the important role of nutrition and metabolism in health and disease.

For more information on programs associated with this school, see [section 3.5: Bachelor of Science \(Nutritional Sciences\) – B.Sc.\(Nutr.Sc.\)](#).

### 4.5.3 Degrees Offered by the School of Human Nutrition

#### Bachelor of Science in Nutritional Sciences – B.Sc.(Nutr.Sc.)

Two undergraduate degree programs are offered by the School.

- The **Dietetics** Major leads to professional qualification
- The **Nutrition** Major offers five concentrations:
  - Food Function and Safety
  - Global Nutrition
  - Health and Disease
  - Nutritional Biochemistry
  - Sports Nutrition

#### M.Sc.A., M.Sc., and Ph.D.

Graduate degrees in Human Nutrition are also offered in thesis- and non-thesis-based research at the master's level and thesis-based research at the doctoral level. Three options are available in the M.Sc. Applied degree:

- Dietetics Credentialing
- Practicum
- Project

For further information, contact the School or refer to the Agricultural & Environmental Sciences' [Graduate and Postdoctoral Studies](#) section.

### 4.5.4 Human Nutrition Faculty

#### Director

Linda J. Wykes

#### Emeritus Professor

Harriet V. Kühnlein; B.S.(Penn. St.), M.S.(Ore. St.), Ph.D.(Calif.), R.D.

Timothy A. Johns; B.Sc.(McM.), M.Sc.(Br. Col.), Ph.D.(Mich.)

#### Professors

Luis B. Agellon; B.Sc., Ph.D.(McM.)

Hope Weiler; B.A.Sc.(Guelph), Ph.D.(McM.), R.D.(CDO) (*on leave*)

Linda J. Wykes; B.Sc., M.Sc., Ph.D.(Tor.)

#### Associate Professors

Niladri Basu; B.Sc.(Qu.), M.Sc.(Br. Col.), Ph.D.(McG.) (*Canada Research Chair*) (*joint appt. with Natural Resource Sciences*) (*Assoc. Member of Epidemiology and Biostatistics, Faculty of Medicine*)

Stéphanie Cheyk



## Affiliate Members

Monica Melcone; B.Sc.(McG.), PDt (*Ste-Anne's Hospital*)

Laura Li Ching Ng; B.Sc.(McG.), PDt (*McGill University Health Centre*)

Marilyn Rabin; B.Sc.(McG.), PDt (*Douglas Mental Health Institute*)

Donna Schafer; B.Sc., M.Sc.(McG.), PDt (*CIUSSS Centre-Ouest de l'Ile de Montréal*)

Sondra Sherman; B.Sc., B.F.Sc.(McG.), RD, CDE (*Jewish General Hospital*)

Patricia Urrico; B.Sc.(McG.), PDt (*Jewish General Hospital*)

### 4.5.5 Application Procedures

Entry into the Dietetics major, the Nutrition major and the Freshman Program of the BSc.(Nutr.Sc.) is only possible in September.

Application deadlines:

- Applicants studying outside of Canada: **January 15**
- Applicants from Canadian high schools outside of Quebec: **February 1**
- CEGEP applicants: **March 1**
- Transfer/Second degree applicants from Canadian universities: **May 1**
- Mature students: **May 1**

Applications to the School of Human Nutrition must be submitted online. Online applications and admissions information are available at [www.mcgill.ca/applying](http://www.mcgill.ca/applying).

### 4.5.6 Admission Requirements

**Nutrition:**

- Students applying directly from high school will apply into the BSc.(Nutr.Sc.) Freshman program. Upon successful completion of this program, students will automatically progress into the Nutrition program.
- Students applying with Advanced Levels, Advanced Subsidiary





Email: [info.macdonald@mcgill.ca](mailto:info.macdonald@mcgill.ca)

Website: [www.mcgill.ca/nrs](http://www.mcgill.ca/nrs)

#### **4.6.2 About the Department of Natural Resource Sciences**

As humans depend on a wide variety of ecosystem services, society is becoming increasingly aware of the need for sustainable management of natural resources. We require the natural world to provide us with necessities such as air, water, food, and energy, but also depend on ecosystems for services such as nutrient cycling, biodiversity, recreation, and the splendour of nature. Sustainable management of natural resources via governance of human activities requires an understanding of all of these elements.

The Department of Natural Resource Sciences is a multidisciplinary group with a wide range of interests, including wildlife and fish biology, entomology, agriculture, soil science, microbiology, genomics, meteorology, forest science, landscape ecology, agricultural and resource economics, and environmental policy. We are concerned with the populations and diversity of or



## Professors

James W. Fyles; B.Sc., M.Sc.(Vic., BC), Ph.D.(Alta.) (*Tomlinson Chair in Forest Ecology*) – *Forest Resources*

Paul J. Thomassin; B.Sc.(McG.), M.S., Ph.D.(Hawaii Pac.) – *Agricultural and Environmental Economics*

Joann Whalen; B.Sc.(Agr.)(Dal.), M.Sc.(McG.), Ph.D.(Ohio St.) – *Soil Science (William Dawson Scholar)*

Lyle G. Whyte; B.Sc.(Regina), Ph.D.(Wat.) – *Microbiology*

## Associate Professors

Niladri Basu; B.Sc.(Qu.), M.Sc.(Br. Col.), Ph.D.(McG.) (*Canada Research Chair*) (*joint appt. with School of Human Nutrition*) – *Ecotoxicology*

Jeffrey Cardille; B.Sc.(Carn. Mell), M.Sc.(Georgia Tech.), M.Sc., Ph.D.(Wisc. Madison) (*joint appt. with McGill School of Environment*) – *Landscape Ecology*

Benoît Côté; B.Sc.A., Ph.D.(Laval) – *Forest Resources*

Brian T. Driscoll; B.Sc., Ph.D.(McM.) – *Microbiology*

Gary B. Dunphy; B.Sc.(New Br.), M.Sc., Ph.D.(Nfld.) – *Entomology*

Sebastien Faucher; B.Sc., Ph.D.(Montr.) – *Microbiology*

Gordon Hickey; B.For.Sci.(Melb.), Ph.D.(Br. Col.), EMPA(ANZSOG, Monash) – *Sustainable Natural Resource Management (William Dawson Scholar)*

Murray Humphries; B.Sc.(Manit.), M.Sc.(Alta.), Ph.D.(McG.) – *Wildlife Biology (Northern Research Chair)*

Nicolas Kosoy; B.Sc.(USB), M.Sc., Ph.D.(Autonoma, Barcelona) (*joint appt. with McGill School of Environment*) – *Ecological Economics*

Ian B. Strachan; B.Sc.(Tor.), M.Sc., Ph.D.(Qu.) – *Micrometeorology*

## Assistant Professors

Kyle Elliott; B.Sc.(Br. Col.), M.Sc., Ph.D.(Manit.) (*Canada Research Chair*)

Canada  
Telephone: 514-398-7722  
Fax: 514-398-7857  
Email: [graduate.parasitology@mcgill.ca](mailto:graduate.parasitology@mcgill.ca)  
Website: [www.mcgill.ca/parasitology](http://www.mcgill.ca/parasitology)

#### 4.7.2 About the Institute of Parasitology

The Institute of Parasitology is one of the oldest recognized centres of interdisciplinary research in Canada. We focus on parasitic organisms, the relationship with their host, and the means to limit the impact of parasitic disease on health and well-being.

For more information, please visit the Institute of Parasitology [website](#).

#### 4.7.3 Parasitology Faculty

##### Director

Armando Jardim

##### Emeritus Professors

Timothy G. Geary; B.Sc.(Notre Dame), Ph.D.(Mich.)

##### Professors

Roger Prichard; B.Sc., Ph.D.(UNSW) (*James McGill Professor*)

Marilyn Scott; B.Sc.(New Br.), Ph.D.(McG.)

##### Associate Professors

Robin N. Beech; B.Sc.(Nott.), Ph.D.(Edin.)

Elias Georges; B.Sc., Ph.D.(McG.) (*Canadian Pacific Chair in Biotechnology*)

Armando Jardim; B.Sc., Ph.D.(Vic., BC)

Petra Rohrbach; B.Sc.(McG.), Ph.D.(Heidel.)

Reza Salavati; B.Sc. M.Sc.(Calif. St.), Ph.D.(Wesl.)

##### Assistant Professors

Igor Cestari; B.Sc.(UFPE, Brazil), M.Sc., Ph.D.(FIOCRUZ, Brazil)

Thavy Long; B.Sc., M.Sc., Ph.D.(ULille)

Fernando Lopes; B.Sc.(UniBH, Brazil), M.Sc., Ph.D.(UFMG, Brazil)

Jianguo Xia; B.Sc.(PKUHSC), M.Sc., Ph.D.(Alta.) (*Canada Research Chair in Bioinformatics and Big Data Analytics*)

##### Associate Members

Gregory J. Matlashewski; B.Sc.(C'dia), Ph.D.(Ott.)

Momar Ndao; B.Sc., DVM(UCAD, Senegal), M.Sc., Ph.D.(IMFA, Belgium)

Martin Olivier; B.Sc., M.Sc.(Montr.), Ph.D.(McG.)

Mary Stevenson; B.A.(Hood Coll.), M.Sc., Ph.D.(CUA)

Brian Ward; M.Sc.(Oxf.), M.D.,C.M.(McG.), DTM&H(Lond.)

##### Adjunct Professors

Boakye Boatin; M.D.(Ghana), M.Sc.(Liv.), M.Phil.(Lond.)

Tatiana Scorza Dagert; B.Sc.(ULA, Venezuela), M.Sc., Ph.D.(VUB, Belgium)

Traian Sulea; M.Sc.(UPT, Romania), Ph.D.(UVT, Romania)

Karine Thivierge; B.Sc.(Laval), M.Sc., Ph.D.(McG.)

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## 4.8 Department of Plant Science

### 4.8.1 Location

Raymond Building, Room R2-019  
McGill University, Macdonald Campus  
21,111 Lakeshore Road  
Sainte-Anne-de-Bellevue QC H9X 3V9  
Canada  
Telephone: 514-398-7773  
Fax: 514-398-8732  
Email: [plant.science@mcgill.ca](mailto:plant.science@mcgill.ca)  
Website: [www.mcgill.ca/plant](http://www.mcgill.ca/plant)

### 4.8.2 About the Department of Plant Science

Our understanding of biological systems has advanced exponentially during the twenty-first century, and technological developments now allow us to pose questions that simply could not be asked a few decades ago. We also live in a time of great challenges: the human population is now over 7 billion and continues to rise at an alarming rate; the climate is changing; worldwide energy availability is decreasing; quality freshwater is becoming scarce; biodiversity is disappearing; and a number of wild habitats are threatened by human activities.

How can we keep feeding the growing population with quality food while resources are scarcer than ever? How will plants react to a changing climate? How can we design effective conservation strategies to preserve biodiversity? Plant scientists have a crucial role to play in solving these problems, and using the knowledge accumulated in the field of biology to answer these questions.

The Department of Plant Science contributes to several undergraduate programs that will train tomorrow's agrologists, ecologists, botanists, and biotechnologists. These include **Specializations** in Ecological Agriculture, Plant Biology, Plant Production, as well as both the Environmetrics and the Food Production and Environment domains of the McGill School of Environment. For related program information, see [section 3.2: Bachelor of Science \(Agricultural and Environmental Sciences\) – B.Sc.\(Ag.Env.Sc.\)](#).

### 4.8.3 Plant Science Faculty

#### Chair

Martina V. Stromvik (*Sabbatic Leave 2019-2020*)

Kevin Wade (*Acting Chair 2019-2020*)

#### Emeritus Professors

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### Associate Professors

Martina V. Stromvik; B.A., M.Sc.(Stockholm), Ph.D.(Ill.)

### Assistant Professors

Valerio Hoyos-Villegas; B.Sc.(Caldas), M.Sc.(Missouri/Col.), Ph.D.(Mich.)

### Faculty Lecturers

Caroline Begg; B.Sc.(Agr.)(McG.), M.Sc.(Sask.), Ph.D.(McG.)

David Wees; B.Sc.(Agr.), M.Sc.(McG.)

### Adjunct Professors

Konstantinos Aliferis

Annick Bertrand

Olivia Wilkins; B.Sc.(Manit.), Ph.D.(Tor.)

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## 5 Instructional Staff

### Instructional Staff

Adamchuk, Viacheslav I.; B.S.(National Agricultural Univ., Ukraine), M.S., Ph.D.(Purd.); Professor, Bioresource Engineering and Chair, Department of Bioresource Engineering

Adamowski, Jan; B.Eng.(RMC), M.Phil.(Camb./MIT), M.B.A.(Warsaw/HEC Paris/London Business School/NHH), Ph.D.(Warsaw); Associate Professor, Bioresource Engineering (*William Dawson Scholar*)

Agellon, Luis B.; B.Sc., Ph.D.(McM.); Professor, Human Nutrition

Akbarzadeh Shafaroudi, Abdolhamid; B.Sc.(IUT, Iran), M.Sc.(AUT, Iran), Ph.D.(New Br.); Assistant Professor, Bioresource Engineering

Basu, Niladri; B.Sc.(Qu.), M.Sc.(Br. Col.), Ph.D.(McG.); Associate Professor, Nutrition/Environmental Toxicology (*Canada Research Chair*)

Bayen, Stephane; B.Sc.(ENSCM), M.Eng.(NUS), M.Sc., Ph.D.(ENSCM); Assistant Professor, Food Science and Agricultural Chemistry

Bede, Jacqueline; B.Sc.(Calg.), M.Sc., Ph.D.(Tor.); Associate Professor, Plant Science

Beech, Robin N.; B.Sc.(Nott.), Ph.D.(Edin.); Associate Professor, Parasitology and Associate Dean, Graduate and Postdoctoral Studies

Begg, Caroline; B.Sc.(Agr.)(McG.), M.Sc.(Sask.), Ph.D.(McG.); Faculty Lecturer, Plant Science

1J2c(I2.D.(Edin.)QhEleOPL0oh.D.(Edin.); )Tj1 0 0 1 211.806.OPL0oh.D.(Edssociate Professor

## **Instructional Staff**

Delormier, Treena; B.Sc., M.Sc.(McG.), Ph.D.(Montr.); Associate Professor, Indigenous Peoples' Nutrition and Food Security (*Canada Research Chair*)

de Blois, Sylvie; B.Sc.(McG.), M.Sc., Ph.D.(Montr.); Associate Professor, Plant Science and Director, McGill School of Environment

Driscoll, Brian T.; B.Sc., Ph.D.(McM.); Associate Professor, Microbiology and Chair, Department of Natural Resource Sciences

Dugg

## Instructional Staff

McCourt, George; B.Sc., M.Sc.(Alta.), M.Sc.(McG.); Senior Faculty Lecturer, McGill School of Environment

McKinney, Melissa; B.Sc.(Br.Col.), M.Sc.(Windsor), Ph.D.(Car.); Assistant Professor, Fish Biology/Environmental Biology (*Canada Research Chair*)

Melgar-Quiñonez, Hugo Ramiro; M.D., D.Sc.(Friedrich Schiller); Associate Professor, Human Nutrition and Director, McGill Institute for Global Food Security

Molgat, Christian; B.Sc.(Guelph), B.Sc.(Ott.); Faculty Lecturer, Farm Management and Technology Program

Mustafa, Arif F.; B.Sc., M.Sc.(UofK, Sudan), Ph.D.(Sask.); Associate Professor, Animal Science

Ngadi, Michael O.; B.Eng.(Nigeria), M.A.Sc., Ph.D.(Dal.Tech); Professor, Bioresource Engineering (*James McGill Professor*)

Nielsen, Daiva; B.Sc., Ph.D.(Tor.); Assistant Professor in Nutritional Epidemiology

Orsat, Valérie; B.Sc., M.Sc., Ph.D.(McG.); Associate Dean (Student Affairs) and Professor, Bioresource Engineering

Phillips, Sandy; B.A.(Qu.), B.Sc.(F.Sc.), M.Sc.(A.)(McG.); Senior Faculty Lecturer (Stage), Human Nutrition

Plourde, Hugues; B.Sc.(Nutr.Sci.)(McG.), M.Sc.(Nutr.)(Montr.); Faculty Lecturer (Stage), Human Nutrition

Prasher, Shiv O.; B.Tech., M.Tech.(Punj.), Ph.D.(Br. Col.); Professor, Bioresource Engineering (*Distinguished James McGill Professor*)

Prichard, Roger K.; B.Sc., Ph.D.(UNSW); Professor, Parasitology (*James McGill Professor*)

Qi, Zhiming; B.S., M.S.(China Agr.), Ph.D.(Iowa St.); Associate Professor, Bioresource Engineering (*Brace Professorship in Irrigation*)

Raghavan, G.S. Vijaya; B.Eng.(B'lore), M.Sc.(Guelph), Ph.D.(Colo. St.); Professor, Bioresource Engineering (*James McGill Professor*)

Ramaswamy, Hosahalli; B.Sc.(B'lore), M.Sc.(Mysore), M.Sc., Ph.D.(Br. Col.); Professor, Food Science and Agricultural Chemistry

Rohrbach, Petra; B.Sc.(McG.), Diplom Biology(Heidel.), Dr. rer. Nat.(Deutsches Krebsforschungszentrum); Associate Professor, Parasitology

Ronholm, Jennifer; B.Sc.(Wat.), Ph.D.(Ott.); Assistant Professor, Food Safety

Rose, Maureen; B.Sc.(F.Sc.), M.Ed., Ph.D.(McG.); Senior Faculty Lecturer (Stage), Human Nutrition

Routhier, Joane; B.Sc.(F.Sc.)(McG.); Faculty Lecturer (Stage), Human Nutrition

Roy, Denis; B.Sc.(Qu.), M.Sc.,Ph.D.(Windsor); Assistant Professor, Population Genetics/Genomics

Salavati, Reza; B.Sc, M.Sc.(Calif. St.), Ph.D.(Wesl.); Associate Professor, Parasitology

Scott, Marilyn E.; B.Sc.(New Br.), Ph.D.(McG.); Associate Dean (Academic) and Professor, Parasitology

Seguin, Philippe; B.Sc.(Agr.), M.Sc.(McG.), Ph.D.(Minn.); Professor, Plant Science

Simpson, Benjamin K.; B.Sc.(KNUST), Ph.D.(Nfld.); Professor, Food Science and Agricultural Chemistry

Singh, Jaswinder; B.Sc., M.Sc.(PAU), Ph.D.(Syd.); Associate Professor, Plant Science

Smith, Donald L.; B.Sc., M.Sc.(Acad.), Ph.D.(Guelph); Professor, Plant Science (*Distinguished James McGill Professor*)

Strachan, Ian; B.Sc.(Tor.), M.Sc., Ph.D.(Qu.); Associate Professor, Agrometeorology and Associate Dean (Graduate Education)

Stromvik, Martina V.; B.A., M.S.(Stockholm), Ph.D.(Ill.-Chic.); Associate Professor, Plant Science and Chair, Department of Plant Science

Thériault, Pascal; B.Sc.(Agr.), M.Sc.(Kansas St.); Faculty Lecturer, Farm Management and Technology Program

Thomassin, Paul; B.Sc.(Agr.)(McG.), M.S., Ph.D.(Hawaii Pac.); Professor, Agricultural Economics

Titley-Péloquin, David; B.Sc., M.Sc., Ph.D.(McG.); Faculty Lecturer, Bioresource Engineering

Vasseur, Elsa; B.Sc., M.Sc.(ISA, Lille), M.Sc.(AgroParisTech), Ph.D.(Laval); Assistant Professor, Animal Science

Wade, Kevin; B.Agr.Sc., M.Agr.Sc.(Dublin), Ph.D.(Cornell); Associate Professor, Animal Science

Wang, Yixiang; B.Sc., Ph.D.(Wuhan); Assistant Professor, Advanced Food Packaging

Wees, David D.; B.Sc.(Agr.), M.Sc.(McG.); Faculty Lecturer, Plant Science

Weiler, Hope; B.Af Ph.D.(Cornell 149.92 Tm(, HopegWSTm(Y)Tj1 0 0 1 97.991931 1 3.36 Tm(ang, )Tj1 0 0 1 ue88.121 165.64 9.92 Tmhalelse(, Jn D.; B.Sc.(Agr)Tj1

**Instructional Staff**

Yaylayan, Varoujan A.; B.Sc., M.Sc.(Beirut), Ph.D.(Alta.); Professor, Food Science and

