# Faculty of Agricultural and Environmental Sciences, including School of Human Nutrition

# Programs, Courses and University Regulations

# 2019-2020

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

**1 .** McGill University reserves the right to mak

## *Publication Information*

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# 1 About the Faculty of Agricultural and Environmental Sciences, including School of Human Nutrition

**Mission Statement:** The Faculty of Agricultural and Environmental Sciences is committed to excellence in teaching, research, and service to ensure that humanity's present and future food, health, and natural resource needs are met while protecting the environment.

# 2 History of the Faculty

## 3.4 Lyman Entomological Museum and Research Laboratory

Originally established in 1914 and formerly housed in the Redpath Museum, the Lyman Entomological Museum was moved to the Macdonald campus in 1961. It houses the largest university collection of insects in Canada, second in size only to the National Collection. The Museum also has an active graduate research program in association with the Department of Natural Resource Sciences. Study facilities are available, on request from the Curator, to all bona fide students of entomology. Visits by other interested parties can be arranged by calling 514-398-7914. More information is available at *lyman.mcgill.ca*.

## 3.5 Brace Centre for Water Resources Management

The Brace Centre for Water Resources Management is located on the Macdonald campus. It is a multidisciplinary and advanced research and training centre of McGill University, dedicated to solving problems of water management for all human and environmental uses. It brings together staff from several McGill faculties to undertake research, teaching, specialized training, and policy and strategic studies, both in Canada and internationally. The Centre draws on the wide range of facilities available within the University0.16 T5no40T1(w77e Uni)Tj1 0 0 1 221.421 3hin t5Tm(v)Tj1 0 0 1 151.236 661.72 Tm(ailable at )Tj0 0 1 rg0 0 3

## 4.3 Administrative Officers

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

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

**Associate Deans**

James W. Fyles; B.Sc., M.Sc.(Vic., BC), Ph.D.(Alta.) (*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.)

## 4.4 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*.

Applications are submitted directly online at *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
Email:

### 4.5.1 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*.

### 4.5.2 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), 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*

### 4.5.3 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*.

All Student Services, whether at the Macdonald or the Downtown campuses, fall under the direction of the Office of the Executive Director, Services for Students; see *: Office of the Senior Director, Services for Students*.

### 4.5.4 Macdonald Campus Residences

Please see *University Regulations and Resources* > *Undergraduate* > *Residential Facilities* > *: University Residences – Macdonald Campus*; *www.mcgill.ca/students/housing/residence-options/macdonald*; or email *residences.macdonald@mcgill.ca*.

### 4.5.5 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.

### 4.5.6 Fees

Please refer to the *Student Accounts* website for information and step-by-step instructions regarding fees.

#### 4.5.6.1 Tuition Fees

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

#### 4.5.6.2 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* in the Centennial Centre.

Uniforms are required for food laboratories. If you are in the B.Sc.(Nutr.Sc.) program, you will be advised of the uniform requirements on acceptance or promotion.

### 4.5.7 Immunization for Dietetics Majors

As a student in the Dietetics Major, you are required to initiate and complete the Compulsory Immunization Program for Health Care Students in Fall of U1, in the NUTR 208 Professional Practice Stage 1A course. Students will meet with our health nurse at the beginning of U1 and should have all previous vaccination records available at that time. Participation in any further Professional Practice (Stage) courses in the Dietetics program will only be permitted if all immunization requirements are complete. Updates to your immunizations may be required during your program. For full details, see *www.mcgill.ca/wellness-hub/access-care/vaccines*.

### 4.5.8 Language Requirement for Professions

Quebec law requires that candidates seeking admission to provincially recognized Quebec professional corporations or *Ordres* have a working knowledge of the French language, i.e., be able to communicate verbally and in writing in that language. Agrologists, chemists, dietitians, and engineers are among those within this group.

For additional information, see *University Regulations and Resources* > *Undergraduate* > *Admission to Professional and Graduate Studies* > *: Language Requirements for Professions*.

## 4.6 Faculty Information and Regulations

**Each student in the Faculty of Agricultural and Environmental Sciences must be aware of the Faculty Regulations as stated in this publication.** While departmental and faculty advisers and staff are always available to give advice and guidance, the ultimate responsibility for completeness and correctness of your course selection and registration, for compliance with, and completion of your program and degree requirements, and for the observance of regulations and deadlines, *rests with you*. It is your responsibility to seek guidance if in any doubt; misunderstanding or misapprehension will not be accepted as cause for dispensation from any regulation, deadline, program, or degree requirement.

### 4.6.1 Minimum Credit Requirement

You must complete the minimum credit requirement for your degree as specified in your letter of admission.

Students are normally admitted to a four-year program requiring the completion of 120 credits, but Advanced Standing of up to 30 credits may be granted if you obtain satisfactory results in the Diploma of Collegial Studies, International Baccalaureate, French Baccalaureate, Advanced Levels, and Advanced Placement tests.

Normally, Quebec students who have completed the *Diplôme d'études collégiales* (DEC) or equivalent diploma are admitted to the first year of a program requiring the completion of a minimum of 90 credits, 113 credits for Bioresource Engineering, 115 credits for Dietetics, and 122 credits for the Concurrent Degrees in Food Science and Nutritional Sciences, including any missing basic science prerequisites.

Students from outside Quebec who are admitted on the basis of a high school diploma enter the Freshman Major, which comprises 30 credits (see *section 6.1: Freshman Major* in this publication).

You will not receive credit toward your degree for any course that overlaps in content with a course successfully completed at McGill, at another university, at CEGEP, or Advanced Placement exams, Advanced Level results, International Baccalaureate Diploma, or French Baccalaureate.

Students transferring from another university must complete a minimum of 60 McGill credits in order to receive a McGill degree.

If you are a student in the B.Sc.(Ag.Env.Sc.) and in the Diploma in Environment (AES(d)Tj1 0 0 1 672 4275(p)Tj1 0 v23 656.44 Tm(ac74Guand44 Tm(a1 0 0 1 12000s

2. If you are in Probationary Standing, you may register for no more than 14 credits per term.
3. While in Probationary Standing, you must achieve a TGPA of 2.50 to continue in Probationary Standing or a CGPA of 2.00 in order to return to Satisfactory Standing. Failure to meet at least one of these conditions will result in Unsatisfactory Standing. (In the case of Fall term, this will be Interim Unsatisfactory Standing and the rules for Probationary Standing will apply.)
4. When your CGPA (or TGPA in the first term of the program) falls below 1.50, your Academic Standing becomes Unsatisfactory and you must withdraw. (In the case of Fall term, the Standing will be Interim Unsatisfactory Standing and the rules for Probationary Standing will apply.)
5. If you are in Unsatisfactory Standing, you may not continue in your program. You may apply for readmission only after your registration has been interrupted for at least one term (not including Summer term).
6. Readmission will be in the Standing Unsatisfactory/Readmit and a CGPA of 2.00 must be achieved to return to Satisfactory Standing or a TGPA of 2.50 must be achieved for Probationary Standing. If you fail to meet at least one of these conditions, you will be required to withdraw permanently.
7. Students in the School of Human Nutrition have additional standards in place for the professional program (Dietetics). See *section 6.5.1: Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Major Dietetics (115 credits)*.

#### 4.6.5.1 Committee on Academic Standing

The Faculty's Committee on Academic Standing, consisting of academic staff, administrative staff, and a student representativ

#### 4.6.8.1 Procedures for Minor Programs

If you want to register for a Minor program, you must complete a Minor Approval form (usually at the beginning of your U2 year), and return it duly completed to the Student Affairs Office. The Minor program will then be added to your record and will automatically continue each year unless you officially cancel it in writing. If you want to cancel the Minor, you must notify both the Minor Adviser and the Student Affairs Office. The Minor Approval form is available on the Faculty website and in the Student Affairs Office, Laird Hall, Room 106.

### 4.6.9 Course Change Information

1. **Courses**: please refer to *University Regulations and Resources* > *Undergraduate* > *Registration* > *: Course Change Period*, and the *Important Dates website*.
2. **Course withdrawal** (Transcript notation of "W"): please refer to *University Regulations and Resources* > *Undergraduate* > *Registration* > *: Course Withdrawal*, and the *Important Dates website*.
3. **Other changes**: information about changes may be obtained from the Student Affairs Office of the Faculty.

### 4.6.10 Graduate Courses Available to Undergraduates

Undergraduates who want to take graduate courses must have a cumulative grade point average (CGPA) of at least 3.20. Final approval must be obtained from Enrolment Services. Be advised that graduate courses taken for credit toward an undergraduate degree will not be credited toward a graduate program.

### 4.6.11 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.

### 4.6.12 Incomplete Grades

Please refer to *University Regulations and Resources* > *Undergraduate* > *Student Records* > *: Incomplete Courses*.

**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.

### 4.6.15 Graduation Honours

For information on the designation of graduation honours and awards, see *University Regulations and Resources* > *Undergraduate* > *Graduation* > *: Graduation Honours*.

### 4.6.16 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*.

## 5 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

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

*section 5.13: Environmental Sciences Programs (Overview)*

## 5.1 Internship Opportunities

Internships allow students to gain practical, hands-on e

- Agricultural Economics *****
- Agro-environmental Sciences *****
- Environmental Biology
- Global Food Security
- Life Sciences (Biological and Agricultural)
- Major in Environment – see *McGill School of Environment* > *Undergraduate* > *: Major in Environment – B.Sc.(Ag.Env.Sc.) and B.Sc.*

Full program descriptions are listed at *section 6.2.1: B.Sc.(Ag.Env.Sc.) Major and Honours Programs*.

**Note:** In the program description for each major is a suggested list of specializations that complement that major.

### 5.3.2 Specializations

Each specialization consists of 24 credits of courses (required and complementary) that provide a coherent package designed to prepare students for a future in a given discipline. Students will select at least one specialization. However, students wishing to broaden their training have the option of choosing to do two. Although the list of suggested specializations appears under each major in the programs section, students interested in other specializations should consult with their academic adviser.

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 6.2.2: Specializations*.

- Agribusiness, *section 6.2.2.1: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Agribusiness (24 credits)*
- Animal Biology, *section 6.2.2.2: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Animal Biology (24 credits)*
- Animal Health and Disease, *section 6.2.2.3: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Animal Health and Disease (24 credits)*
- Animal Production, *section 6.2.2.4: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Animal Production (24 credits)*
- Applied Ecology, *section 6.2.2.5: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Applied Ecology (24 credits)*
- Ecological Agriculture, *section 6.2.2.6: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Ecological Agriculture (24 credits)*
- Environmental Economics, *section 6.2.2.7: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Environmental Economics (24 credits)*
- International Agriculture, *section 6.2.2.8: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - International Agriculture (24 credits)*
- Life Sciences (Multidisciplinary), *section 6.2.2.9: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Life Sciences (Multidisciplinary) (24 credits)*
- Microbiology and Molecular Biotechnology, *section 6.2.2.10: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Microbiology and Molecular Biotechnology (24 credits)*
- Plant Biology, *section 6.2.2.11: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Plant Biology (24 credits)*
- Plant Production, *section 6.2.2.12: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Plant Production (24 credits)*
- Professional Agrology, *section 6.2.2.13: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Professional Agrology (24 credits)*
- Soil and Water Resources, *section 6.2.2.15: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Soil and Water Resources (24 credits)*
- Wildlife Biology, *section 6.2.2.16: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Wildlife Biology (24 credits)*

## 5.4 Bachelor of Engineering in Bioresource Engineering – B.Eng.(Bioresource) (Overview)

Bioresource engineering is the unique branch of engineering that includes biological engineering and bioengineering where professional engineering practice intersects with biological sciences. Bioresource engineers design, improve, and manage biology-based systems to operate in efficient and sustainable ways for the well-being of the environment and society.

The Department of Bioresource Engineering collaborates with other departments and the Faculty of Engineering in providing courses of instruction for a curriculum in Bioresource Engineering. Graduates qualify to apply for registration as professional engineers in any province of Canada. The Professional Agrology option qualifies graduates to apply for registration to the *Ordre des agronomes du Québec*.

There are three optional streams offered within the Bioresource Engineering Major. Via the appropriate choice of elective course sets, a particular area of study may be emphasized. More information about these streams and the suggested course sets for each can be found on the Department website at *www.mcgill.ca/bioeng*.

**Bioresource Engineering**

**Freshman Adviser**

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

## 5.7 Concurrent Bachelor of Science in Food Science – B.Sc.(F.Sc.) and Bachelor of Science in Nutritional Sciences – B.Sc.(Nutr.Sc.) (Overview)

Please refer to *section 6.4.4: About the Concurrent B.Sc.(F.Sc.) and B.Sc.(Nutr.Sc.)* for details.

## 5.8 Honours Programs (Overview)

**Honours Programs**

- *section 6.2.1.2: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Agricultural Economics (42 credits)*
- *section 6.2.1.4: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Agro-Environmental Sciences (54 credits)*
- *section 6.2.1.6: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Environmental Biology (54 credits)*
- *section 6.2.1.8: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Global Food Security (54 credits)*
- *section 6.2.1.10: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Life Sciences (Biological and Agricultural) (54 credits)*
- *section 6.3.2: Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Honours Bioresource Engineering (113 credits)*
- *section 6.4.2: Bachelor of Science (Food Science) (B.Sc.(F.Sc.)) - Honours Food Science - Food Science Option (90 credits)*
- *section 6.4.4.2: 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)*
- *: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Honours Environment (69 credits)*, listed under the *McGill School of Environment*

## 5.9 Minor Programs (Overview)

**Minor Programs**

- Agribusiness Entrepreneurship – *section 6.6.2: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Agribusiness Entrepreneurship (18 credits)*
- Agricultural Economics – *section 6.6.3: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Agricultural Economics (24 credits)*
- Agricultural Production – *section 6.6.4: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Agricultural Production (24 credits)*
- Animal Biology – *section 6.6.5: Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Minor Animal Biology (24 credits)*
- Animal Health and Disease – *section 6.6.6: Bachelor of Engineering (Bioresource) (B.Eng.(Bioresource)) - Minor Animal Health and Disease (24 credits)*
- Applied Ecology – *section 6.6.7: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Applied Ecology (24 credits)*
- Ecological Agriculture – *section 6.6.8: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Ecological Agriculture (24 credits)*
- Environmental Engineering – *section 6.6.9: Minor in Environmental Engineering*
- Human Nutrition – *section 6.6.10: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Human Nutrition (24 credits)*
- International Agriculture – *section 6.6.11: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor International Agriculture (24 credits)*
- Environment – listed under *McGill School of Environment* > *Undergraduate* > *Minor in Environment* > *: Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) or Bachelor of Science (B.Sc.) - Minor Environment (18 credits)*
- Some minors of interest to FAES students can also be found at *: Minors for Non-Management Students* – listed under *Desautels Faculty of Management*

**Post-Baccalaureate Cer**

Information on these programs and related fellowships is available from the Graduate and Postdoctoral Studies office, Macdonald Campus of McGill University, 21,111 Lakeshore Road, Macdonald-Stew

** Freshman students planning to choose the Agricultural Economics Major will still be required to complete 90 credits in the Major. Since A

**Required Cour**

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 |
| AEPH 114 | (4) | Introductory Physics 2 |
| AGRI 196 | (.5) | Freshman Seminar 2 |
| FDSC 230 | (4) | Organic Chemistry |

## 6.2 Bachelor of Science (Agricultural and Environmental Sciences) – B.Sc.(Ag.Env.Sc.)

Please refer to *section 5.3: Bachelor of Science in Agricultural and Environmental Sciences – B.Sc.(Ag.Env.Sc.) (Overview)* for general rules and other information regarding B.Sc.(Ag.Env.Sc.) programs.

### 6.2.1 B.Sc.(Ag.Env.Sc.) Major and Honours Programs

The faculty offers the following B.Sc.(Ag.Env.Sc.) Major and Honours programs.

The McGill School of Environment also offers several B.Sc.(Ag.Env.Sc.) programs; for more information, please visit *McGill School of Environment* > *Undergraduate* > *Browse Academic Programs* > *: Major in Environment – B.Sc.(Ag.Env.Sc.) and B.Sc.* and *: Honours Program in Environment*.

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

Program Director: Professor Paul Thomassin

**Program Prerequisites**

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

**Required Courses (33 credits)**

| | | |
|---|---|---|
| AGEC 200 | (3) | Principles of Microeconomics |
| AGEC 201 | (3) | Principles of Macroeconomics |
| AGEC 231 | (3) | Economic Systems of Agriculture |
| AGEC 320 | (3) | Intermediate Microeconomic Theory |
| AGEC 330 | (3) | Agriculture and Food Markets |
| AGEC 333 | (3) | Resource Economics |
| AGEC 425 | (3) | Applied Econometrics |
| AGEC 430 | (3) | Agriculture, Food and Resource Policy |
| AGEC 442 | (3) | Economics of International Agricultural Development |
| AGEC 491 | (3) | Research & Methodology |
| ENVB 210 | (3) | The Biophysical Environment |

**Complementar**

| | | |
|---|---|---|
| ENVB 210 | (3) | The Biophysical Environment |

### 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 |

### Complementary Courses (9 credits)

With the approval of the Academic Adviser, one introductory course in each of the following areas:

- Accounting
- Statistics
- Written/Oral Communication

### Specialization (21 - 24 credits)

Specializations designed to be taken with the Agricultural Economics Matio3E31eN4 Th0 1 v.l Economics the b Tf1 0 0 1 65.83ral Economics usin of0 1  382.551 Tm*

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Refer to "Faculty Information and Regulations" > "Minimum Credit Requirements" in th6

In addition to satisfying the Honour 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. 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.

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 des agronomes du Québec (O

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 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.

#### 6.2.1.5 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 "F ws.3 0 0 0 1 67.52 249.783 TI3 Tm(or inl seRm(aculty e)Tj1  0 1 67.52 24gul speci" > "Mmeet thC minimRm credit rs",ch couthroC483 darequir03 T

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 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 (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 |
| WILD 302 | (3) | Fish Ecology |
| | | LSCI 230 |

| | | |
|---|---|---|
| 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 |
| | (3) | Cropping Systems |

Or

### Specialization (24 credits)

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

#### 6.2.1.9 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 |

| | | |
|---|---|---|
| AEHM 205 | (3) | Science Literacy |
| AEMA 310* | (3) | Statistical Methods 1 |
| 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.

### 6.2.2 Specializations

The faculty offers the following specializations, to be paired with a B.Sc.(Ag.Env.Sc.) major. Each major program description suggests a complementary specialization, though another may be selected following a consultation with your academic adviser.

#### 6.2.2.1 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Agribusiness (24 credits)

The development of commercial agriculture relies on a large supporting sector of manufacturing and service companies involved in the supply of inputs to farming and the transportation, processing, and marketing of agricultural and food products.

This 24-credit specialization includes courses in agricultural sciences, agribusiness, and courses at the Desautels Faculty of Management.

This specialization is limited to students in the Major in Agricultural Economics.

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

**Required Courses (15 credits)**

| | | |
|---|---|---|
| AEBI 210 | (3) | Organisms 1 |
| AGEC 242 | (3) | Management Theories and Practices |
| AGEC 332 | (3) | Farm Management and Finance |
| AGEC 450 | (3) | Agribusiness Management |
| ANSC 250 | (3) | Principles of Animal Science |

**Complementary Courses (9 credits)**

9 credits chosen from the following list:

| | | |
|---|---|---|
| ACCT 361 | (3) | Management Accounting |
| AGRI 310 | (3) | Internship in Agriculture/Environment |
| BUSA 364 | (3) | Business Law 1 |
| MGCR 341 | (3) | Introduction to Finance |
| MGCR 352 | (3) | Principles of Marketing |
| MGCR 382 | (3) | International Business |
| MGSC 373 | (3) | Operations Research 1 |
| ORGB 321 | (3) | Leadership |

#### 6.2.2.2 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Animal Biology (24 credits)

The specialization in Animal Biology is intended for students who wish to further their studies in the basic biology of large mammals and birds. Successful completion of the program should enable students to qualify for application to most veterinary colleges in North America, to study in a variety of postgraduate biology programs, and to work in many laboratory settings.

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

**Required Courses (15 credits)**

| | | |
|---|---|---|
| ANSC 312 | (3) | Animal Health and Disease |
| 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 |

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#### 6.2.2.3 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Animal Health and Disease (24 credits)

This specialization is offered for 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 interested in the care of animals, or in working in laboratories where diseases are being researched.

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 424 | (3) | Fundamental Parasitology |

**Complementary Courses (6 credits)**

6 credits of complementary courses selected from:

| | | |
|---|---|---|
| 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 |
| FAES 371 | (1) | Special Topics 01 |

#### 6.2.2.4 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Animal Production (24 credits)

This specialization will be of interest to students who wish to study the improved efficiency of livestock production at the national and international levels. Students are exposed to animal nutrition, physiology, and breeding in a context that respects environmental concerns and animal-welfare issues. When taken in conjunction with the Major Agro-Environmental Sciences and the specialization in Professional Agriculture, it conforms with the eligibility requirements of the Ordre des agronomes du Québec.

| | | |
|---|---|---|
| WILD 307 | (3) | Natural History of Vertebrates |
| WILD 350 | (3) | Mammalogy |
| WILD 420 | (3) | Ornithology |

#### 6.2.2.6 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Ecological Agriculture (24 credits)

This specialization focuses on the principles underlying the practice of ecological agriculture. When coupled with the Major in Environmental Biology, agriculture as a managed ecosystem that responds to the laws of community ecology is examined; when combined with the Major Agro-Environmental Sciences and the specialization in Professional Agrology, this specialization focuses more directly on the practice of ecological agriculture and conforms with the eligibility requirements of the Ordre des agronomes du Québec. It is suitable for students wishing to farm and do extension and government work, and those intending to pursue postgraduate work in this field.

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

**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 (12 credits)**

Minimum of 6 agronomic credits from:

| | | |
|---|---|---|
| AGRI 310 | (3) | Internship in Agriculture/Environment |
| AGRI 411 | (3) | Global Issues on Development, Food and Agriculture |
| ANSC 312 | (3) | Animal Health and Disease |
| BREE 327 | (3) | Bio-Environmental Engineering |
| ENTO 352 | (3) | Biocontrol of Pest Insects |
| PLNT 307 | (3) | Agroecology of Vegetables and Fruits |
| PLNT 312 | (3) | Urban Horticulture |
| PLNT 434 | (3) | Weed Biology and Control |

Other complementary courses:

| | | |
|---|---|---|
| MICR 331 | (3) | Microbial Ecology |
| NUTR 341 | (3) | Global Food Security |
| PLNT 302 | (3) | Forage Crops and Pastures |
| PLNT 460 | (3) | Plant Ecology |
| WOOD 441 | (3) | Integrated Forest Management |

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

This specialization integrates environmental sciences and decision making with the economics of environment and sustainable development. It is designed to prepare students for careers in natural resource management and the analysis of environmental problems and policies.

This specialization is limited to students in the Major Agricultural Economics.

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

**Required Courses (9 credits)**

| | | |
|---|---|---|
| ENVB 305 | (3) | Population & Community Ecology |
| ENVB 437 | (3) | Assessing Environmental Impact |

| | | |
|---|---|---|
| ENVB 506 | (3) | Quantitative Methods: Ecology |

**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 |

**Bachelor of Science (Agricultural and Envir**

| | | |
|---|---|---|
| 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

#### 6.2.2.9 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

| | | |
|---|---|---|
| FDSC 442 | (3) | Food Microbiology |
| MICR 331 | (3) | Microbial Ecology |
| 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 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 |

#### 6.2.2.10 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 |
| FDSC 442 | (3) | Food Microbiology |
| MIMM 324 | (3) | Fundamental Virology |

PLNT 304 (3) Biology of Fungi

#### 6.2.2.11 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 eBioy261ej 1 51li8li40390 0 WhecheakTm(v)Tj1 0260336li8li40390 0 echsetconj.5cf pl6F29ttpat3M

F

| | | |
|---|---|---|
| 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 |

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

For more information on this major, please see *section 5.4: Bachelor of Engineering in Bioresource Engineering – B.Eng.(Bioresource) (Overview)*.

### 6.3.1 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 |

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 205 | (3) | Engineering Design 1 |
| BREE 210 | (3) | Mechanical Analysis & Design |
| BREE 216 | (3) | Bioresource Engineering Materials |
| | (3) | Computing for Engineers |

FAES 406 (3) Honours Project 2

Plus 6 credits of BREE courses at the 500 level.

6 credits - Set A

**Set A**

| | | |
|---|---|---|
| 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 |

### 6.3.3 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 |
| | (3) | Mechanical Analysis & Design |

| | | |
|---|---|---|
| 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 |

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

#### 6.3.4.1 Minor in Environmental Engineering

For more information, see *section 6.6.9: Minor in Environmental Engineering*.

#### 6.3.4.2 Barbados Field Study Semester

For more information, see *Study Abroad & Field Studies* > *Undergraduate* > *: Barbados Field Study Semester*.

#### 6.3.4.3 Internship Opportunities and Co-op Experiences

For more information, see *section 5.1: Internship Opportunities*.

## 6.4 Bachelor of Science (Food Science) - B.Sc.(F.Sc.)

Please refer to *section 5.5: Bachelor of Science in Food Science – B.Sc.(F.Sc.) (Overview)* for advising and other information on these B.Sc.(F.Sc.) programs.

### 6.4.1 Bachelor of Science (Food Science) (B.Sc.(F.Sc.)) - Major Food Science - Food Science 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 Science Option can also qualify for recognition by the Institute of Food Technologists (IFT).

The Food Science Option is completed to 90 credits with free elective courses.

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 (51 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 |
| 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 |

#### Elective Courses (18 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.

### 6.4.2 Bachelor of Science (Food Science) (B.Sc.(F.Sc.)) - Honours Food Science - Food Science Option (90 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 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.

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 Science Option can also qualify for recognition by the Institute of Food Technologists (IFT).

The Food Science Option is completed after 90 credits with free elective courses.

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 (51 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 |
| 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) | Honours Research<br>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

#### 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.

### 6.4.3 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.

| | | |
|---|---|---|
| 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)**

Electiv

| | | |
|---|---|---|
| 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 446 | (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) | Bioenergetics and the Lifespan |

12 credits from the following:

| | | |
|---|---|---|
| | | Food Industry Internship |

#### 6.4.4.2 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 |

### 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 |

At least 9 credits from the following:

| | | |
|---|---|---|
| AGEC 242 | (3) | Management Theories and Practices |
| ENVR 203 | (3) | Knowledge, Ethics and Environment |
| NRSC 340 | (3) | Global Perspectives on Food |
| NUTR 301 | (3) | Psychology |
| NUTR 322 | (3) | Applied Sciences Communication |
| NUTR 446 | (3) | Applied Human Resources |

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.

### 6.4.5 Bachelor of Science (Food Science) – B.Sc.(F.Sc.) Related Programs

#### 6.4.5.1 Certificate in Food Science

Detailed information on this certificate program can be found under *section 6.7.2: Certificate (Cert.) Food Science (30 credits)* in this publication.

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

Please refer to *section 5.6: Bachelor of Science in Nutritional Sciences – B.Sc.(Nutr.Sc.) (Overview)* for advising and other information regarding the Dietetics and Nutrition majors.

### 6.5.1 Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Major Dietetics (115 credits)

The Major Dietetics, which includes a 40-week internship (Stage) as part of its degree requirements, is a professional program that leads to eligibility for membership in a provincial regulatory body and registration as a professional Dietitian/Nutritionist (R.D. or p.dt). Graduates are qualified for challenging professional and leadership positions related to food and health, as dietitians, nutritionists, and food administrators. The designations "Dietitian" and "Nutritionist" are reserved titles associated with reserved acts in the province of Quebec. As clinical dietitians/nutritionists, dietitians may work in healthcare settings, nutrition counselling centres, clinics, and private practice. As community nutritionists, dietitians are involved in nutrition education programs through community health programs, school boards, and local and international health agencies. The dietitian in the food service sector participates in all aspects of management to assure quality food products and services. Postgraduate programs are available to qualified graduates. The duration of the program is 3.5 years, with the 40 weeks of supervised internship (Stage) integrated into each year in a planned sequence. Successful graduates are qualified to apply for membership with the Ordre professionnel des diététistes du Québec (O.P.D.Q.) and/or other provincial regulatory bodies, as well as Dietitians of Canada.

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

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

*** Advising Notes for Professional Practice (Stage):**

The School firmly applies prerequisite requirements for registration in all required courses in the Dietetics Major. All required and complementary courses must be passed with a minimum grade of C. Undergraduate registration for all Professional Practice (Stage) courses is restricted to students in the Dietetics Major with a CGPA greater than or equal to 3.00. The CGPA requirement is firmly applied. Students in the Dietetics Major who have a CGPA below 3.0 for two consecutive year3 Tmioean -0303 Tm9ormation re

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 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 courses:

| | | |
|---|---|---|
| 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) | Bioenergetics and the Lifespan |
| 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:

| | | |
|---|---|---|
| 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) | Bioenergetics and the Lifespan |
| 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 |

| | | |
|---|---|---|
| NRSC 340 | (3) | Global Perspectives on Food |
| | | Global F |

| | | |
|---|---|---|
| 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 |
| | (3) | Bioenergetics and the Lifespan |

### 6.5.5 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 |
| 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 |
| | | Nutrition in De |

| | | |
|---|---|---|
| NUTR 503 | (3) | Bioenergetics and the Lifespan |
| 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 |
| | | AniM9 544.5 Tm(32(3).oiFtTm(ANSC 324)iMCe8)Tj1 0 0 1 16570.*.nN1glea1 70.52 575.6ng courses: |

| | | |
|---|---|---|
| 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 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 503 | (3) | Bioenergetics and the Lifespan |
| 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 |
| 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 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:

| | | |
|---|---|---|
| ANAT 214 | (3) | Systemic Human Anatomy |
| EDKP 261 | (3) | Motor Development |
| EDKP 330 | (3) | Physical Activity and Health |
| EDKP 395 | (3) | Exercise 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.

### 6.6.3 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 |

### 6.6.4 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)

(3) Organisms 1

| | | |
|---|---|---|
| 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 |

### 6.6.6 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 |

### 6.6.7 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 en

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)**

| | | |
|---|---|---|
| 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 (12 credits)**

| | | |
|---|---|---|
| AGRI 310 | (3) | Internship in Agriculture/Environment |
| AGRI 411 | (3) | Global Issues on Development, Food and Agriculture |
| ANSC 312 | (3) | Animal Health and Disease |
| BREE 327 | (3) | Bio-Environmental Engineering |
| ENTO 352 | (3) | Biocontrol of Pest Insects |
| MICR 331 | (3) | Microbial Ecology |
| NUTR 341 | (3) | Global Food Security |
| PLNT 302 | (3) | Forage Crops and Pastures |
| PLNT 307 | (3) | Agroecology of Vegetables and Fruits |
| PLNT 312 | (3) | Urban Horticulture |
| PLNT 434 | (3) | Weed Biology and Control |
| PLNT 460 | (3) | Plant Ecology |
| WOOD 441 | (3) | Integrated Forest Management |

### 6.6.9 Minor in Environmental Engineering

The Minor program consists of 21 credits in courses that are environment related. By means of a judicious choice of complementary courses, Bioresource Engineering students may obtain this Minor with a minimum of 12 additional credits.

The Environmental Engineering Minor is administered by the Faculty of Engineering, Department of Civil Engineering and Applied Mechanics (see *Faculty of Engineering > Undergraduate > Browse Academic Units & Programs > Minor Programs > : Bachelor of Engineering (B.Eng.) - Minor Environmental Engineering (21 credits)*).

| **Courses available in the Faculty of Agricultural and Environmental Sciences (partial listing)** | |
|---|---|
| BREE 217 | Hydrology and Water Resources |
| BREE 322 | Organic Waste Management |
| BREE 416 | Engineering for Land Development |
| BREE 518 | Ecological Engineering |
| MICR 331 | Microbial Ecology |

For academic advising, please consult *www.mcgill.ca/macdonald/studentinfo/advising*.

### 6.6.10 Bachelor of Science (Agricultural and Environmental Sciences) (B.Sc.(Ag.Env.Sc.)) - Minor Human Nutrition (24 credits)

The Minor Human Nutrition is intended to complement a student's primary field of study by providing a focused introduction to the metabolic aspects of human nutrition. It is particularly accessible to students in Biochemistry, Biology, Physiology, Anatomy and Cell Biology, Microbiology and Immunology, Animal Science, or Food Science programs. The completion of 24 credits is required, of which at least 18 must not overlap with the primary program. All courses must be taken in the appropriate sequence and passed with a minimum grade of C. Students may declare their intent to follow the Minor program

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.

The Minor program does not carry professional recognition; therefore, it is not suitable for students wishing to become nutritionists or dietitians. However, successful completion may enable students to qualify for many postgraduate nutrition programs.

Note:

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.

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

### Required Courses (6 credits)

| | | |
|---|---|---|
| NUTR 337 | (3) | Nutrition Through Life |

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

Students enter this minor 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)

| | | |
|---|---|---|
| AGRI 992 | (3) | Agricultural De |

(3)

oodSsecurity

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 |

## 6.8 Field Studies

### 6.8.1 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*.

### 6.8.2 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*.

### 6.8.3 Barbados Interdisciplinary Tropical Studies Field Semester

*ender* This 15-credit program is offered in collaboration with several partners in Barbados, including the University of the West Indies (UWI). McGill students *er* e live at the Bellairs Research Institute, while BITS courses *study* conducted both at UWI and Bellairs. F

- Animal Production
- International Agriculture

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

A 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).

### 7.1.3 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 Donefer; B.Sc., M.Sc.(Cornell), Ph.D.(McG.)

Urs Kühnlein; B.Sc.(ETH Zurich), Ph.D.(Geneva)

Sherman Touchburn; M.S.A.(Br. Col.), Ph.D.(Ohio St.)

**Professors**

Xin Zhao; B.Sc., M.Sc.(Nanjing IT), Ph.D.(Cornell) (*James McGill Professor*)

**Associate Professors**

Vilceu Bordignon; D.V.M.(URCAMP, Brazil), M.Sc.(UFPel, Brazil), Ph.D.(Montr.)

Roger I. Cue; B.Sc.(Newcastle, UK), Ph.D.(Edin.)

Sarah Kimmins; B.Sc.(Dal.), M.Sc.(Nova Scotia Ag.), Ph.D.(Dal.) (*CRC Chair, Tier 2*)

Humberto G. Monardes; Ing.Agr.(Concepcion, Chile), M.Sc., Ph.D.(McG.)

Arif F. Mustafa; B.Sc., M.Sc.(Khartoum), Ph.D.(Sask.)

Kevin M. Wade; B.Sc.(Agr.), M.Sc.(Agr.)(Dublin), Ph.D.(Cornell)

David Zadworny; B.Sc., Ph.D.(Guelph)

**Assistant Professors**

Sergio Burgos; B.Sc.(Flor.), M.Sc.(Calif., Davis), Ph.D.(Guelph)

Jennifer Ronholm; B.Sc.(Wat.), Ph.D.(Ott.) (*joint appt. with Food Science and Agricultural Chemistry*)

Elsa Vasseur; B.Sc., M.Sc.(ISA, Lille), M.Sc.(AgroParisTech), Ph.D.(Laval) (*Industrial Research Chair in the Sustainable Life of Dairy Cattle*)

Jianguo (Jeff) Xia; B.M.(Peking Health Science), M.Sc., Ph.D.(Alta.) (*joint appt. with Parasitology*) (*Canada Research Chair in Bioinformatics and Big Data Analytics*)

**Adjunct Professors**

Baurhoo Bushansingh, Eveline Ibeagha-Awemu, Pierre Lacasse, Daniel Lefebvre, Bruce Murphy, Débora Santschi

**Affiliate Member**

René Lacroix

## 7.2 Department of Bioresource Engineering

### 7.2.1 Location

Macdonald Stewart Building, Room MS1-028

**Adjunct Professors**

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

Satyanarayan Dev; B.Sc.(TNAU), M.Sc., Ph.D.(McG.)

Pierre Jutras; B.Sc.(McG.), M.Sc.(Montr.), Ph.D.(McG.)

Arun Mujumdar; B.Eng.(Bom.), M.Eng., Ph.D.(McG.) (*Post-Retirement Professor*)

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

**Faculty Lecturers**

Alice Cherestes; B.Sc., M.Sc.(Queens College), 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., M.Sc.(Boros), Ph.D.(McG.)

Six academic terms are spent on the Macdonald Campus studying a sequence of courses in soil, plant science, animal science, engineering, and management. The first summer of the program includes a 13-week internship on an agricultural enterprise other than the home farm, or an agricultural business, where the student learns the many skills related to modern commercial agriculture. Students prepare for their Agricultural Internship during both academic semesters of Year 1 through two Stage courses.

During the second summer, students are registered in Enterprise Management 1. During this period, the students will be responsible for data collection to be used in the next two Enterprise Management courses and the Nutrient Management Plan course when they return to the campus for the Fall semester. These internships will enable the students to relate their academic work to the reality of f

| | | |
|---|---|---|
| FMT4 016 | (2) | Budgeting and Administration (152-VSR-MC) |
| FMT4 017 | (1.33) | Agricultural Systems (152-VST-MC) |
| FMTP 083 | (2.33) | Literary Themes (603-103-04) |
| FMTP 091 | (1) | Physical Activity and Effectiveness (109-102-MQ) |
| FMTP 098 | (2) | Français agricole (602-VSG-MC) |

**Summer 2**

| | | |
|---|---|---|
| FMT4 018 | (2.33) | Enterprise Management 1 (152-VSU-MC) |

**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) |
| FMTP 078 | (2) | FMT English (603-VSB-MC) |
| FMTP 086 | (2) | Humanities 2: World Views (345-102-03) |
| FMTP 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) |
| FMTP 087 | (2) | Humanities 3:Env.& Org. Issues (345-VSH-MC) |
| FMTP 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.

For **international students**, a recognized French proficiency test may be required and a minimum IELTS score of 6.5 is required (other English proficiency exams are also accepted by McGill).

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.

#### 7.3.5.2 Important Dates – FMT

##### 7.3.5.2.1 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.

##### 7.3.5.2.2 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**.

#### 7.3.5.3 Registration – FMT

Students in the Farm Management and Technology program must register online using Minerva at *www.mcgill.ca/minerva* for each semester at McGill.

**Note:** The University reserves the right to make changes without prior notice to the information contained in this publication, including the alteration of various fees, schedules, conditions of admission and credit requirements, and the revision or cancellation of particular courses. In normal circumstances, individual courses will not be offered with fewer than five registrants.

#### 7.3.5.4 Academic Standing – FMT

Attendance in class is compulsory. Students with attendance of less than 80% may not be permitted to write examinations.

Examinations and other work in courses will be graded according to the percentage system. The minimum passing grade in a course is 60%.

When a student's cumulative percent average (CPA) or semestrial percent average (SPA) first drops below 60%, or they fail four or more courses in a semester, withdrawal is advised. Students who choose to remain in the program are on probation.

Students on probation are normally permitted to register for no more than 10 credits per semester. The

### 7.3.6 Fees and Expenses – FMT

#### 7.3.6.1 Fees

Tuition fees for all full-time students who are eligible for the Farm Management and Technology program are paid by the *Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec*. Student Services and Student Societies' fees, as well as course material fees, will be charged according to the schedule in effect for all Macdonald campus students. At the time of publishing, the fees* were $1091.04 for the Fall semester, and $778.28 for the Winter semester for Quebec residents. Additional fees will apply to out-of-province students.

* *2019–2019 fees; subject to change without notice*.

#### 7.3.6.2 Textbooks and Supplies

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

#### 7.3.6.3 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 & Awar*

### 7.4.3 Food Science and Agricultural Chemistry Faculty

**Chair**

Varoujan A. Yaylayan

**Graduate Program Director**

Ashraf Ismail

**Emeritus Professors**

Inteaz Alli; B.Sc.(Guyana), M.Sc., Ph.D.(McG.)

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

### 7.5.2 About the School of Human Nutrition

The health and well-being of individuals and populations in relation to food choices and metabolism prevails as the unifying theme of the programs in the School of Human Nutrition, a part of the McGill University Health Sciences.

The School offers a **B.Sc.(Nutr.Sc.)** in either the Dietetics Major or the Nutrition Major.

The **Dietetics Major** is an accredited professional program which leads to eligibility to register with a provincial dietetic regulatory body as a registered dietitian. The 3.5 year (115 credits) Dietetics Major is an undergraduate degree which includes 40 weeks of internship (Professional Practice - Stage) which is sequenced and integrated into each year of study. Students are exposed to a variety of practice settings including clinical nutrition, community nutrition, and food service management. The program is designed according to the Integrated Competencies for Dietetics Education and Practice (ICDEP) and is accredited by the *Partnership for Dietetic Education and Practice* (PDEP).

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 6.5: Bachelor of Science (Nutritional Sciences) – B.Sc.(Nutr.Sc.)*.

### 7.5.3 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 of

**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 Chevalier; B.Sc., M.Sc., Ph.D.(Montr.), Dt. P.(OPDQ) (*Assoc. Member Dept of Medicine*) (*Graduate Program Director*)

Treena Delormier: B.Sc., M.Sc.(McG.), Ph.D.(Montr.), P. Dt.(OPDQ) (*Associate Director of the Centre for Indigenous Peoples' Nutrition and Environment*)

Kristine G. Koski; B.S., M.S.(Wash.), Ph.D.(Calif.), R.D.(U.S.)

Stan Kubow; B.Sc.(McG.), M.Sc.(Tor.), Ph.D.(Guelph)

Grace S. Marquis; B.A.(Ind.), M.Sc.(Mich. St.), Ph.D.(Cornell)

Hugo Melgar-Quiñonez; M.Sc.(SPHM), M.D.(USAC), D.Sc.(Friedrich Schiller) (*Academic Scholar, Margaret A. Gilliam Institute for Global Food Security*)

**Assistant Professors**

Anne-Sophie Brazeau; B.Sc., Ph.D.(Montr.), P. Dt.(OPDQ) (*Director, Dietetics Education and Practice*)

Ryan Mailloux; B.Sc., Ph.D.(Laur.)

Daiva Nielsen; B.Sc., Ph.D.(Tor.)

**Academic Associate, Diet**

**Adjunct Professor**

Elizabeth D. Mansfield; B.Sc.(C'dia), B.Sc., M.Sc., Ph.D.(McG.),

**Affiliate Members**

Marie-Ève Besner; B.Sc.(Laval), PDt (*Montreal Children's Hospital*)

Sarah Bluden; B.Sc.(McG.), PDt, CDE (*LMC Diabetes and Endocrinology*)

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

Linda Falcon; B.Sc.(Montr.), PDt (*Douglas Mental Health Institute*)

Alexander McLean; B.Sc.(McG.), PDt (*Lakeshore General Hospital*)

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*)

### 7.5.5 Application Procedures

The academic year at McGill is made up of two sessions: the Fall/Winter (regular) session and the Summer session. These are subdivided into the Fall term (September to December), the Winter term (January to April) and the four months of the Summer session (May, June, July, and August). While most students enter in September, it is possible to be considered for admission to most of the Agricultural and Environmental Studies undergraduate programs in January. Entry at the Freshman Program level or to the Dietetics Major, however, are not available in January.

The deadlines for submission of applications are:

- Applicants studying outside of Canada: **January 15**
- Applicants from Canadian high schools outside of Quebec: **February 1**
- All other applicants: **March 1**

All applications must be accompanied by a non-refundable fee, in Canadian or U.S. funds only, payable by certified cheque, money order, or credit card. McGill does not ofMcGill doeSj1Uoes-0 0) and the four m 452.5at theMcGi47 meMcGiRGTj1 0 0 1 241.332 5363.1 1 61Uoes-0 0)wwns: the F

More information on language requirements is available at *University Regulations and Resources* > *Undergraduate* > *General Policies and Information* > *: Language Policy*.

#### 7.5.6.1 Quebec CEGEP Students

Applicants must have completed a two-year Quebec post-secondary collegial program (CEGEP) in the Pure and Applied Sciences, Health Sciences, or *Sciences de la nature*. (Applicants who have completed the *DEC en sciences, lettres et arts* are also eligible for admission. Applicants who have completed a DEC in a technical area will be considered on an individual basis.)

McGill uses the *cote de rendement au collégial* (Cote R) rather than CEGEP percentage grades for admission decisions. The Cote R is a method of comparing and ranking students from CEGEP; it measures how far above or below the class average a student places, with adjustments based on the relative strength of the group.

The current CEGEP profile for the B.Sc.(Nutr.Sc.) is:

Biology (00UK, 00XU);
Chemistry – NYA, NYB, Organic Chemistry I (00UL, 00UM, 00XV);
Mathematics – NYA, NYB (00UN, 00UP);
Physics – NYA, NYB, NYC (00UR, 00US, 00UT).

Based upon entry with the appropriate DEC, the **B.Sc.(Nutr.Sc.)** is offered as a 90-credit, three-year program for Nutrition and a 115-credit, three and one-half year program for Dietetics. Refer to *section 6.5: Bachelor of Science (Nutritional Sciences) – B.Sc.(Nutr.Sc.)* for program details.

#### 7.5.6.2 Applicants from Ontario

Applicants from Ontario must have completed the Ontario Secondary School Diploma (OSSD) prior to the start of classes with a minimum of six 4U and/or 4M courses.

The following prerequisite courses are required for admission into the School of Nutrition, and will be included when calculating your "Top 6" pre-university course average:

- 4U Calculus and Vectors
- Two of 4U Biology, Chemistry, or Physics
- 4U English or French (see below for additional information on language requirements)

Students who are accepted on the basis of a high school diploma enter a program which is extended by one year to include the 30 credits which comprise the **Freshman Year** (see *section 6.1.4: Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Freshman Program (30 credits)*). Students who complete the IB Diploma or individual IB Diploma Courses, however, may be granted advanced standing credits based on their final IB results.

**Note:** Admission to the Freshman Year is available for the Nutrition major only, not the Dietetics major. Students who wish to enter Year 1 of the Dietetics major and who first need to complete a freshman year, may complete the freshman year in the Nutrition Major, and then apply for transfer to year 1 of the Dietetics Major. Entry to Year 1 of the Dietetics major is based on CGPA.

If you come from a school where the language of instruction is English, then 4U-level English must be included in the six courses. If you come from a school where the language of instruction is French, then 4U-level French must be included in the six courses. English and French Second Language courses are not accepted as prerequisites.

At least four of the six required courses, as well as all prerequisite courses, must be taken at the 4U level. Admissions criteria will focus primarily on the top six 4U/M courses (including specified prerequisite courses). Generally speaking, all grades are taken into consideration in determining admission, including those of failed or repeated courses.

McGill reserves the right to revise its admission requirements without prior notice.

#### 7.5.6.3 Applicants from Other Canadian Provinces

Applicants from provinces other than Quebec and Ontario must hold:

- a high school diploma giving access to university education in their province/territory;

and must hav

Consideration will be given to the results for Grade 11 and 12 level courses (regardless of the calendar year in which they were taken), with emphasis on grades obtained in courses most relevant to the intended program of study. Generally speaking, all grades are taken into consideration in determining admission, including those of failed or repeated courses.

If the applicant comes from a school where the language of instruction is English, then Grade 12 English must be included in the academic record. If the applicant comes from a school where the language of instruction is French, then Grade 12 French is required. English and French Second Language courses are not accepted as prerequisites.

#### 7.5.6.4 Applicants from U.S. High School Programs

Applicants who are applying on the basis of a high school diploma from a school in the United States must have completed a pre-calculus course in functions, and at least two of biology, chemistry, and physics. Applicants must write College Entrance Examination Board tests including the SAT I and three SAT IIs. SAT IIs must include mathematics and at least one science. ACTs are also acceptable.

Applicants who have completed Advanced Placement Examinations in appropriate subjects with a grade of 4 or better will be granted some advanced standing, up to a maximum of 30 credits.

Students who are accepted on the basis of a high school diploma enter a program which is extended by one year to include the 30 credits which comprise the **Freshman Year** (see *section 6.1.4: Bachelor of Science (Nutritional Sciences) (B.Sc.(Nutr.Sc.)) - Freshman Program (30 credits)*).

> **Note:** Admission to the freshman year is available for the Nutrition major only, not the Dietetics major. Students who wish to enter Year 1 of the Dietetics major, and who first need to complete a freshman year, may complete the freshman year in the Nutrition Major, and then apply for transfer to year 1 of the Dietetics Major. Entry to Year 1 of the Dietetics major is based on CGP

### 7.5.6.8 Transfer Students – Interfaculty

Students wishing to transfer from one faculty to another must complete an interfaculty transfer form. The deadline for submitting a transfer form for admission to the School is **June 1** for admission in September and **December 1** for admission in January. There are no Winter term transfers for the Dietetics major.

For CGPA requirements please see *www.mcgill.ca/macdonald/studentinfo/undergrads/readmission*. For more information, please refer to *University Regulations and Resources* > *Undergraduate* > *Registration* > *: Interfaculty Transfer*.

### 7.5.6.9 Mature Student Admission

Residents of Canada who will be 23 years of age or older by September 1 (for admission for the Fall session) or January 1 (for admission for the Winter session) and who lack the academic background normally required for admission may apply for entrance as mature students.

Mature students must complete all entrance math/science requirements during their first year. This may require an additional year to the program due to the availability of required courses. Individuals interested in being considered for entrance under this policy should contact the *Student Affairs Office* for complete details.

**Note:** Mature students who are missing science entrance prerequisites are admitted to the Nutrition Major

Canada
Telephone: 514-398-7773
Fax: 514-398-7990
Email: *info.macdonald@mcgill.ca*
Website: *www.mcgill.ca/nrs*

### 7.6.2 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 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 organisms within ecosystems; the flow of energy and nutrients through ecosystems; and processes that influence human behaviour toward ecosystem services and the environment. Our graduate programs in agricultural economics, entomology, microbiology, and renewable resources, allow students to gain disciplinary depth and interdisciplinary breadth.

Natural Resource Sciences plays a strong role in several undergraduate programs, from the inter-departmental **Majors** in:

- Environmental Biology;
- Life Sciences (Biological and Agricultural);
- Environment (McGill School of Environment);
- Agro-Environmental Sciences; and
- Agricultural Economics;

to the **Specializations** such as:

- Applied Ecology;
- Wildlife Biology;
- Microbiology and Molecular Biotechnology;
- Agribusiness; and
- Environmental Economics.

### 7.6.3 Natural Resource Sciences Faculty

**Chair**

Brian Driscoll

**Graduate Program Director**

Benoît Côté

**Program Director - Agricultural Economics**

Paul J. Thomassin

**Emeritus Professors**

David M. Bird; B.Sc.(Guelph), M.Sc., Ph.D.(McG.) – *Wildlife Biology*

William H. Hendershot; B.Sc.(Tor.), M.Sc.(McG.), Ph.D.(Br. Col.) – *Soil Science*

Edmund S. Idziak; B.Sc.(Agr.), M.Sc.(McG.), D.Sc.(Delft) – *Microbiology*

Angus F. MacKenzie; B.S.A., M.Sc.(Sask.), Ph.D.(Cornell) – *Soil Science*

Peter H. Schuepp; Dipl.Sc.Nat.(Zürich), Ph.D.(Tor.) – *Agricultural Physics*

Robin K. Stewart; B.Sc.(Agr.), Ph.D.(Glas.) – *Entomology*

**Professors**

Peter Brown; B.A.(Haver.), M.A., Ph.D.(Col.) (*joint appt. with Geography and McGill School of Environment*) – *Environmental Policy and Ethics*

Christopher Buddle; B.Sc.(Guelph), Ph.D.(Alta.) – *Forest Insect Ecology*

## 7.7 Institute of Parasitology

### 7.7.1 Location

Institute of Parasitology
Parasitology Building
McGill University, Macdonald Campus
21,111 Lakeshore Road
Sainte-Anne-de-Bellevue QC H9X 3V9
Canada
Telephone: 514-398-7722
Fax: 514-398-7857
Email: *graduate.parasitology@mcgill.ca*
Website: *www.mcgill.ca/parasitology*

### 7.7.2 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*.

### 7.7.3 Parasitology Faculty

**Director**

Armando Jardim

**Professors**

Timothy G. Geary; B.Sc.(Notre Dame), Ph.D.(Mich.) (*Canada Research Chair in Parasite Biotechnology*)

Roger Prichard; B.Sc., Ph.D.(NSW) (*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.A., M.A.(Calif. St.), Ph.D.(Wesl.)

**Assistant Professors**

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

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

Jianguo Xia; B.Sc.(Peking), 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(Dakar), 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.(Los Andes, Venezuela), M.Sc., Ph.D.(Vrije, Belgium)

Traian Sulea; M.Sc.(Polytechnic, Timi oara), Ph.D.(West, Timi oara)

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

## 7.8 Department of Plant Science

### 7.8.1 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*
Website: *www.mcgill.ca/plant*

### 7.8.2 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 the Environmetrics and Food Production and Environment domains of the McGill School of Environment. For related program information, see *section 6.2: Bachelor of Science (Agricultural and Environmental Sciences) – B.Sc.(Ag.Env.Sc.)*.

### 7.8.3 Plant Science Faculty

**Chair**

Martina V. Stromvik

**Emerita Professor**

Deborah J. Buszard; B.Sc.(Bath), Ph.D.(Lond.)

**Professors**

Pierre Dutilleul; B.Sc., Ph.D.(Louvain)

Anja Geitmann; Diplom(Konstanz), Ph.D.(Siena) (*Canada Research Chair in Biomechanics of Plant Development*)

Suha Jabaji; B.Sc.(Beirut), M.Sc.(Guelph), Ph.D.(Wat.)

Ajjamada C. Kushalappa; B.Sc., M.Sc.(B'lore), Ph.D.(Flor.)

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

Donald L. Smith; B.Sc., M.Sc.(Acad.), Ph.D.(Guelph) (*Distinguished James McGill Prh6241 22 Tm83 4.603 Tm(Pie14351241 22 Tm83 555.601 Tm(v)Tj1 1ain8241 2*

**Associate Professors**

Jacqueline C. Bede; B.Sc.(Calg.), M.Sc., Ph.D.(Tor.)

Sylvie de Blois; B.Sc.(Agr.)(McG.), M.Sc., Ph.D.(Montr.)

Jean-Benoit Charron; B.Sc.(Montr.), M.Sc., Ph.D.(UQAM)

Valérie Gravel; B.Sc.(Agr.), M.Sc., Ph.D.(Laval)

Jaswinder Singh; B.Sc.(Agr.), M.Sc.(Punjab), Ph.D.(Syd.)

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.)

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

**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

# 8 Instructional Staff

**Instructional Staff**

Adamchuk, Viacheslav I.; B.S.(National Agricultural Univ., Ukraine), M.S., Ph.D.(Purd.); Associate 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; Ph.D.(New Br.), M.Sc.(Amirkabir Univ. of Tech., Tehran), B.Sc.(Isfahan Univ. of Tech.); 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., M.Eng.(Nat. Supérieure de Chimie, Montpellier), M.Sc., Ph.D.(NUS); 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

Bennett, Elena; B.A.(Oberlin), M.Sc., Ph.D.(Wisc.); Associate Professor, Ecosystem Ecology and Environment

Bordignon, Vilceu; Ag.Tec.(EAPC), M.Sc., D.V.M.(Região da Campanha, Brazil), Ph.D.(Montr.); Associate Professor, Animal Science

Brazeau, Anne-Sophie; B.Sc., Ph.D.(Montr.); Assistant Professor in Clinical Nutrition and Director of Dietetics Education and Practice

Brown, Peter G.; B.A.(Haver.), M.A., Ph.D.(Col.); Professor, Natural Resource Sciences (*joint appoint. with Geography and McGill School of Environment*)

Buddle, Christopher; B.Sc.(Guelph), Ph.D.(Alta.); Dean of Students and Professor, Forest Insect Ecology

Burgos, Ser

**Instructional Staff**

Cherestes, Alice; B.A., M.A., Ph.D.(CUNY); Senior Faculty Lecturer, Agricultural and Environmental Sciences

Chevalier, Stephanie; B.Sc., M.Sc., Ph.D.(Montr.); Associate Professor in Nutrition

Clark, Grant; B.Sc.(Agr.Eng.)(Alta.), Ph.D.(McG.); Associate Professor, Bioresource Engineering

Côté, Benoît; B.Sc., Ph.D.(Lav

**Instructional Staff**

**Instructional Staff**

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

Weiler, Hope; B.A.Sc.(Guelph), Ph.D.(McM.); Professor, Human Nutrition

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

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

Wilkins, Olivia; B.Sc.(Manit.), Ph.D.(Tor.); Assistant Professor, Plant Science

Wykes, Linda; B.Sc., M.Sc., Ph.D.(Tor.); Professor, Human Nutrition and Director, School of Human Nutrition

Xia, Jeff; B.Med.(Peking), M.Sc., Ph.D.(Alta.); Assistant Professor, Parasitology (*Canada Research Chair*)

Yaylayan, Varoujan A.; B.Sc., M.Sc.(Beirut), Ph.D.(Alta.); Professor, Food Science and Agricultural Chemistry and Chair, Department of Food Science and Agricultural Chemistry

Zadworny, David; B.Sc., Ph.D.(Guelph); Associate Professor, Animal Science

Zhao, Xin; B.Sc., M.Sc.(Nanjing IT), Ph.D.(Cornell); Professor, Animal Science (*James McGill Professor*)