



**Faculty of Agricultural and Environmental  
Sciences, including School of Human Nutrition  
(Graduate)  
Programs, Courses and University Regulations  
2023-2024**



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

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

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## 1 Dean's Welcome

Welcome to Graduate and Postdoctoral Studies (GPS) at McGill. You are joining a community of world-class researchers and more than 10,000 graduate students in over 400 programs. GPS is here to support you from admissions through to graduation and beyond. McGill's approach to graduate education emphasizes skills development; we cultivate your academic and professional growth through a variety of workshops, events and experiential learning opportunities. I invite you to consult the [GPS website](#) for information on the range of resources available to graduate students at McGill.

I would like to wish you all the best in your studies at McGill. We are here to make sure that you have the best possible experience.

*Josephine Nalbantoglu, Ph.D.*

*Associate Provost (Graduate Education) and Dean, Graduate and Postdoctoral Studies*

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## 2 Graduate and Postdoctoral Studies

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### 2.1 Administrative Officers

#### Administrative Officers

Josephine Nalbantoglu; B.Sc., Ph.D.(McG.)

**Associate Provost (Graduate Education) and Dean (Graduate and Postdoctoral Studies)**

Lorraine Chalifour; B.Sc., Ph.D. (Manit.)

**Associate Dean (Graduate and Postdoctoral Studies)**

Nathan Hall; B.A., M.A., Ph.D. (Manit.)

**Associate Dean (Graduate and Postdoctoral Studies)**

Russell Steele; B.S., M.S. (Carn. Mell), Ph.D. (Wash.)

**Associate Dean (Graduate and Postdoctoral Studies)**

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### 2.2 Location

James Administration Building, Room 400

845 Sherbrooke Street West

Montreal QC H3A 0G4

Website: [mcgill.ca/gps](http://mcgill.ca/gps)



**Note:** For inquiries regarding specific graduate programs, please contact the appropriate department.

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### 2.3 Graduate and Postdoctoral Studies' Mission

The mission of Graduate and Postdoctoral Studies (GPS) is to promote university-wide academic excellence for graduate and postdoctoral education at McGill. GPS provides leadership and strategic direction across the university in close collaboration with the academic and administrative units, and the graduate and postdoctoral community.

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## 3 Important Dates

For all dates relating to the academic year4857288(est)T1iron

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## **8.2 Guidelines and Policy for Academic Units on Postdoctoral Education**

Every unit hosting postdocs should apply institutional policies and procedures for the pro

- i. Postdocs are subject to the responsibilities outlined at [mcgill.ca/students/srr](http://mcgill.ca/students/srr) and must abide by the policies listed at [mcgill.ca/secretariat/policies-and-regulations](http://mcgill.ca/secretariat/policies-and-regulations).
- ii. Each academic unit hosting postdocs should clearly identify postdocs' needs and the means by which they will be met by the unit.
- iii. Each academic unit should assess the availability of research supervision facilities, office space, and research funding before recruiting postdocs.
- iv. Some examples of the responsibilities of the academic unit are:
  - to verify the postdoc's eligibility period for registration;
  - to provide postdocs with departmental policy and procedures that pertain to them;
  - to facilitate the registration and appointment of postdocs;
  - to assign departmental personnel the responsibility for postdoctoral affairs in the unit;
  - to oversee and sign off on the Letter of Agreement for Postdoctoral Education;
  - to ensure that each postdoc has a supervisor, lab and/or office space, access to research operating costs and necessary equipment;
  - to include postdocs in departmental career and placement opportunities; and
  - to refer postdocs to the appropriate University policies and personnel for the resolution of conflict that may arise between a postdoc and a supervisor.
- v. Some examples of the responsibilities of the supervisor are:
  - to uphold and transmit to their postdocs the highest professional standards of research and/or scholarship;
  - to provide research guidance;
  - to meet regularly with their postdocs;
  - to provide feedback on research submitted by the postdocs;
  - to clarify expectations regarding intellectual property rights in accordance with the University's policy;
  - to provide mentorship for career development; and
  - to prepare, sign, and adhere to a Letter of Agreement for Postdoctoral Education.
- vi. Some examples of the responsibilities of postdocs are:
  - to inform themselves of and adhere to the University's policies and/or regulations for postdocs as outlined at [mcgill.ca/gps/postdocs](http://mcgill.ca/gps/postdocs) and [mcgill.ca/students/srr](http://mcgill.ca/students/srr), and the Graduate and Postdoctoral Studies [University Regulations and Resources](#);
  - to submit a complete file for registration to Enrolment Services;
  - to sign and adhere to their Letter of Agreement for Postdoctoral Education;
  - to communicate regularly with their supervisor; and
  - to inform their supervisor of their absences.
- vii. Some examples of the responsibilities of the University are:
  - to register postdocs;
  - to provide an appeal mechanism in cases of conflict;
  - to provide documented policies and procedures to postdocs;
  - to provide postdocs with the necessary information on McGill University student services (Postdoctoral Fellows and Scholars) and HR policies and guidelines (Postdoctoral Researchers).

*Approved by Senate, April 2000; revised May 2014; February 2020.*

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### 8.3 Vacation Policy for Postdocs

Please refer to the : [Vacation Policy for Graduate Students and Postdocs](#).

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### 8.4 Leave of Absence for Health and Parental/Familial Reasons

A leave of absence may be granted for maternity or parental reasons or for health reasons (see [University Regulations & Resources > Graduate > Leave of Absence Status](#)).

Such a leave must be requested on a term-by-term basis and may be granted for a period of up to 52 weeks. For a maternity or parental leave, the eligibility period of a maximum of 52 consecutive weeks is determined based on when the child is born; if the leave is interrupted for one or two terms, the eligibility period cannot be extended. Students and Postdocs must make a request for such a leave in writing to their department and submit a medical certificate. The department shall forward the request to Enrolment Services. See the procedure in [University Regulations & Resources > Graduate > Leave of Absence Status](#).

Students who have been granted such a leave will have to register for the term(s) in question and their registration will show as "leave of absence" on their record. No tuition fees will be charged for the duration of the authorized leave. Research supervisors are not obligated to remunerate students and Postdocs on leave. A summary table of various leave policies (paid or unpaid) for students and Postdocs paid from the Federal and Quebec Councils through fellowships or research grants is available at [mcgill.ca/gps/funding/getting-paid](http://mcgill.ca/gps/funding/getting-paid) under "Leave Policies and Form."



- Service Point
- Student Rights and Responsibilities
- Student Services – Downtown and Macdonald Campuses
- Residential Facilities
- Athletics and Recreation
- Ombudsperson for Students
- Extra-Curricular and Co-Curricular Activities
- Bookstore
- Computer Store
- Day Care

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## 11 Information on Research Policies and Guidelines, Patents, Postdocs, Associates, Trainees

Refer to [University Regulations & Resources](#) > [Graduate](#) > [Research Policy and Guidelines](#) for information on the follo

- Environmental and Resource Economics;
- International Agricultural Development;
- Farm Management, Production, and Finance.

The program prepares graduates for rewarding careers in research, analysis, and decision-making in academia; private and NGO sectors; and government. For more information on the **M.Sc. in Agricultural Economics**, please refer to [section 12.7: Natural Resource Sciences](#). Further details can also be found at [mcgill.ca/nrs/academic/graduate/agricultural-economics](http://mcgill.ca/nrs/academic/graduate/agricultural-economics).

## 12.1.3 Agricultural Economics Admission Requirements and Application Procedures

### 12.1.3.1 Admission Requirements

This program provides students with applied economic concepts and tools to identify, define, and analyze economic problems affecting the performance of the agri-food sector and the environment. The ideal prior preparation is an undergraduate degree in Agricultural Economics or Economics, including undergraduate courses in intermediate economic theory (micro and macro), calculus, algebra, statistics, and econometrics.

Attention is given to the development of analytical skills in the broad areas of agricultural, environmental, and ecological economics. Students may specialize, by way of their research program, in agribusiness, development, finance, marketing and trade, policy, and resource economics. The program prepares graduates for rewarding careers in research, analysis, and decision-making in academia, private, and NGO sectors, and government.

When an applicant does not have sufficient background in economics for admission to the M.Sc., they may be admitted to a Qualifying Year program of undergraduate courses. To enter the M.Sc. in Agricultural Economics from the Qualifying Year program, a student must earn a GPA of at least a 3.2 in the approved program. In all cases, after completion of a Qualifying Year, an applicant interested in commencing the M.Sc. in Agricultural Economics must apply for admission by the posted deadline.

Details on the M.Sc. are available from [section 12.7: Natural Resource Sciences > section 12.7.5: Master of Science \(M.Sc.\) Agricultural Economics \(Thesis\) \(45 credits\)](#). Further details can also be found at [mcgill.ca/nrs/academic/graduate/agricultural-economics](http://mcgill.ca/nrs/academic/graduate/agricultural-economics).

#### Financial Aid

Financial aid is available but limited, and is highly competitive. It is suggested that students give serious consideration to their financial planning before submitting an application. Normally, a student will not be accepted unless adequate financial support can be provided through a scholarship/award and/or by the student's supervisor. Academic units cannot guarantee financial support via teaching assistantships.

#### English Language Proficiency

For graduate applicants whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized Canadian. e0 1 498.53

**Professor**

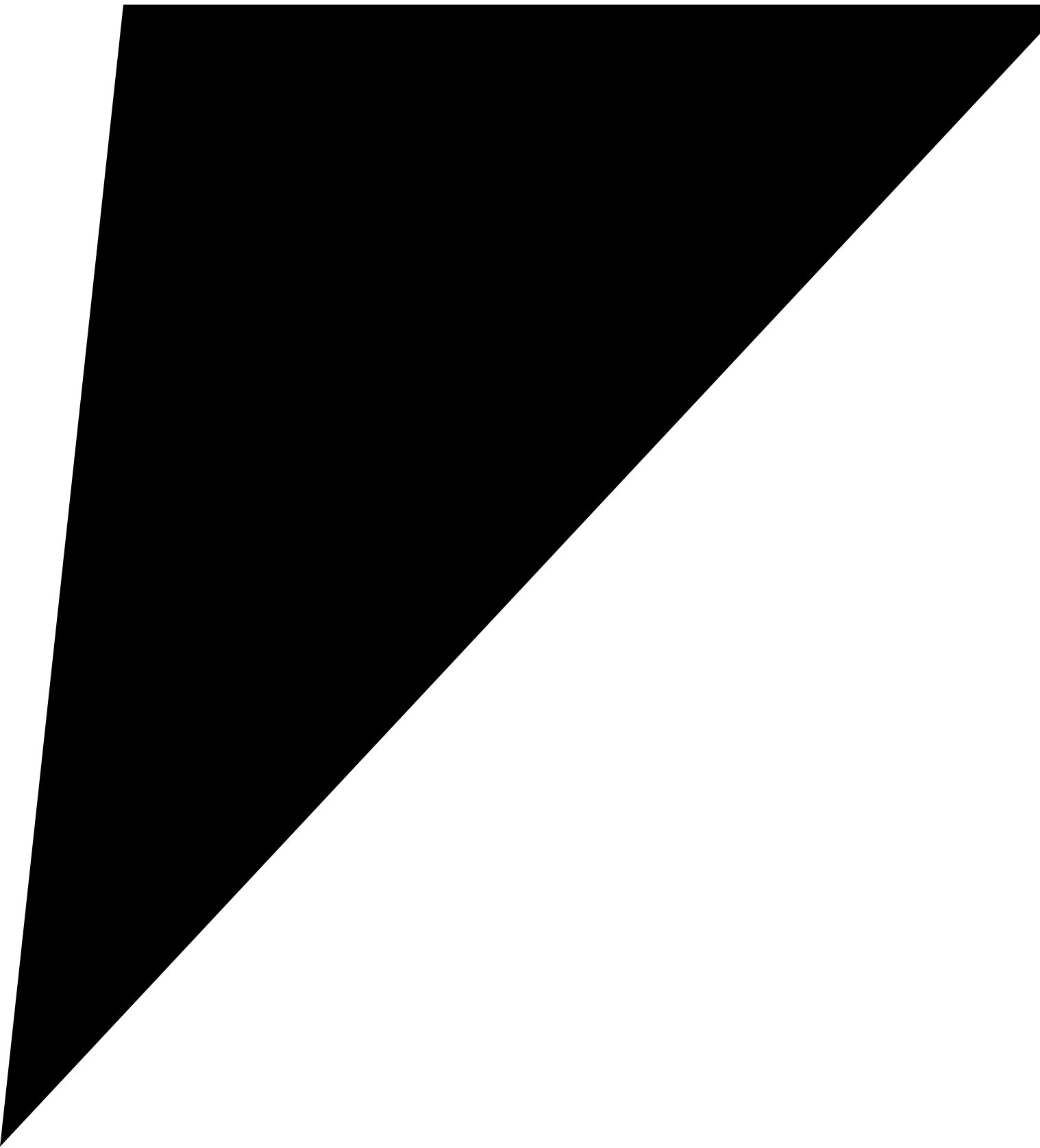
P.J. Thomassin

**Associate Professor**

N. Kosoy

**Assistant Professors**

M.K. Doidge; A.P. Harou





**section 12.2.6: Master of Science, Applied (M.Sc.A.) Animal Science (Non-Thesis) (45 credits)**

The Applied Master's program must be taken with the Sustainable Agriculture concentration. Please see the respective program description for the Sustainable Agriculture option.

**section 12.2.7: Master of Science, Applied (M.Sc.A.) Animal Science (Non-Thesis): Sustainable Agriculture (45 credits)**

Climate change and rising human population have increased the need for sustainable agricultural practices. The Sustainable Agriculture option is taken with a M.Sc. Applied (Non-Thesis) program, and designed for students who wish to supplement their basic degree with graduate studies in animal science, with a specific focus on sustainability in agriculture. Students will be exposed to different approaches to improve the sustainability of agricultural systems through specialized coursework and a project. The program aims to provide graduate training in applied areas of animal production with a view toward integrating technology and management in sustainable animal production with allied areas of agricultural resource utilization.

**section 12.2.8: Doctor of Philosophy (Ph.D.) Animal Science**

Since the Ph.D. is primarily a research degree, the amount of coursework required will normally be considerably less than is the case for the M.Sc. It depends on the background of the individual student and must be approved by the student's advisory committee. At a minimum, it includes two seminar courses at the graduate level and the Ph.D. Comprehensive Examination as an admission to candidacy for the Ph.D. As with the M.Sc. (Thesis), admission is based on an excellent track record. Suitable candidates are encouraged to contact potential supervisors within their chosen area of interest. Applicants should, however, be aware that no professor is in a position to accept students without formal approval of the application by the Graduate Admissions Committee.

**section 12.2.9: Doctor of Philosophy (Ph.D.) Animal Science: Bioinformatics**

Bioinformatics research lies at the intersection of biological/medical sciences and mathematics/computer science/engineering. The intention of the Bioinformatics Option is to train students to become researchers in this interdisciplinary field. This includes the development of strategies for experimental design, the construction of tools to analyze datasets, the application of modelling techniques, the creation of tools for manipulating bioinformatics data, the integration of biological databases, and the use of algorithms and statistics.

**12.2.3 Animal Science Admission Requirements and Application Procedures****12.2.3.1 Admission Requirements****M.Sc. (Thesis)**

Candidates are required to have either a bachelor's degree in Agriculture or a B.Sc. degree in an appropriate, related discipline with an equivalent cumulative grade point average (CGPA) of 3.0/4.0 (second class–upper division) or a grade point average (GPA) of 3.2/4.0 during the last two years of full-time university study. High grades are expected in courses considered by the academic unit to be preparatory to the graduate program.

**M.Sc. (Applied)**

All candidates are required to have a B.Sc. degree or equivalent.

**Ph.D.**

Candidates are normally required to have an M.Sc. degree in an area related to the chosen field of specialization for the Ph.D. program.

**Qualifying Students**

Some applicants whose academic degrees and standing entitle them to serious consideration for admission to graduate studies, but who are considered inadequately prepared in the subject selected may be admitted to a Qualifying program if they have met the Graduate and Postdoctoral Studies minimum CGPA of 3.0/4.0. The course(s) to be taken in a Qualifying program will be prescribed by the academic unit concerned. Qualifying students are registered in graduate studies, **but not as candidates for a degree**. Only one Qualifying year is permitted and can only be recommended at the discretion of the Department. **Successful completion of a Qualifying program does not guarantee admission to a degree program.**

**Financial Aid**

Financial aid is available but limited and highly competitive. It is suggested that students give serious consideration to their financial planning before submitting an application. Normally, a student will not be accepted unless adequate financial support can be provided through a scholarship/award and/or by the student's supervisor. Academic units cannot guarantee financial support via teaching assistantships.

**English Language Proficiency**

For graduate applicants whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized Canadian or American (English or French) institution or from a recognized foreign institution where English is the language of instruction, documented proof of English proficiency is required prior to admission. For a list of acceptable test scores and minimum requirements, visit [mcgill.ca/gradapplicants/international/proficiency](http://mcgill.ca/gradapplicants/international/proficiency).

**12.2.3.2 Application Procedures**

McGill's online application form for graduate program candidates is available at [mcgill.ca/gradapplicants/how-apply](http://mcgill.ca/gradapplicants/how-apply).

See [University Regulations & Resources](#) > [Graduate](#) > [Graduate Admissions and Application Procedures](#) > : [Application Procedures](#) for detailed application procedures.

#### 12.2.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Acceptance to all programs depends on a staff member agreeing to serve as the student's supervisor and the student obtaining financial support.
- The GRE – not required, but highly recommended.

#### 12.2.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Animal Science and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at [mcgill.ca/gps/contact/graduate-program](http://mcgill.ca/gps/contact/graduate-program).

Information on application deadlines is available at [mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines](http://mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines).

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

### 12.2.4 Animal Science Faculty

#### Chair

Raj Duggavathi

#### Emeritus Professors

Roger B. Buckland; Eduardo R. Chavez; Eugene Donefer; John F. Hayes; Urs Kühnlein; Sherman Touchburn

#### Professor

Xin Zhao

#### Associate Professors

Vilceu Bordignon; Sergio Burgos; Roger I. Cue; Raj Duggavathi; Elsa Vasseur; Kevin M. Wade; Jianguo (Jeff) Xia

#### Assistant Professors

Jennifer Ronholm; Alexander Bekele-Yitbarek

#### Adjunct Professors

Baurhoo Bushansingh; Pierre Lacasse; Bruce Murphy; Débora Santschi

#### Affiliate Member

René Lacroix

### 12.2.5 Master of Science (M.Sc.) Animal Science (Thesis) (45 credits)

#### Thesis Courses (36 credits)

ANSC 680	(9)	M.Sc. Thesis 1
ANSC 681	(9)	M.Sc. Thesis 2
ANSC 682	(9)	M.Sc. Thesis 3
ANSC 683	(9)	M.Sc. Thesis 4

#### Required Courses (9 credits)

6 credits of coursework at the 500 level or higher approved by the student's advisory committee, and three 1-credit seminars.

ANSC 695	(1)	MSc General Topic Seminar
ANSC 696	(1)	MSc Research Proposal Seminar
ANSC 697	(1)	MSc Research Results Seminar

Depending on the needs and competencies of the student, additional coursework may be assigned by the supervisory committee.

### **12.2.6 Master of Science, Applied (M.Sc.A.) Animal Science (Non-Thesis) (45 credits)**

The program aims to provide graduate training in applied areas of animal production with a view toward integrating technology and management in animal production with allied areas of agricultural resource utilization.

#### **Research Project (15 credits)**

ANSC 643	(3)	Project 1
ANSC 644	(3)	Project 2
ANSC 645	(3)	Project 3
ANSC 646	(3)	Project 4
ANSC 647	(3)	Project 5

#### **Complementary Courses (30 credits)**

ANSC 646	(3)	Project 4
ANSC 647	(3)	Project 5

**Required Courses (12 credits)**

ANSC 555	(3)	The Use and Welfare of Animals
BREE 533	(3)	Water Quality Management
IGFS 611	(3)	Advanced Issues on Development, Food and Agriculture
PLNT 602	(3)	Advances in Agronomy

**Complementary Courses (18 credits)**

3 credits from the following list:

AEMA 610	(3)	Statistical Methods 2
AEMA 611	(3)	Experimental Designs 1
AEMA 614	(3)	Temporal and Spatial Statistics 1

9-15 credits from the following list:

ANSC 530	(3)	Experimental Techniques in Nutrition
ANSC 551	(3)	Carbohydrate and Lipid Metabolism
ANSC 552	(3)	Protein Metabolism and Nutrition
ANSC 560	(3)	Biology of Lactation
ANSC 565	(3)	Applied Information Systems
ANSC 604	(3)	Advanced Animal Biotechnology
ANSC 611D1	(1.5)	Advanced Reproductive Biology
ANSC 611D2	(1.5)	Advanced Reproductive Biology Experimental

Two seminar courses at the 500, 600, or 700 level.

### 12.2.9 Doctor of Philosophy (Ph.D.) Animal Science: Bioinformatics

#### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### Required Courses (5 credits)

ANSC 701	(0)	Doctoral Comprehensive Examination
ANSC 797	(1)	Animal Science Seminar 3
ANSC 798	(1)	Animal Science Seminar 4
COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar

#### Complementar

- **Bio-process engineering**

- post-harvest technologies engineering;
- food process engineering;
- food quality, safety, and security engineering;
- food and bioprocess engineering;
-

***section 12.3.10: Master of Science, Applied (M.Sc.A.) Bioresource Engineering (Non-Thesis): Environmental Engineering (45 credits)***

The primary objective of the program is to train environmental professionals at the advanced level. The program is thus designed for individuals with a university undergraduate degree in engineering. Through this program, students will master specialized skills in their home disciplines and acquire a broader perspective and awareness of environmental issues.

***section 12.3.11: Master of Science, Applied (M.Sc.A.) Bioresource Engineering (Non-Thesis): Integrated Food and Bioprocessing (45 credits)***

This graduate program will provide students with the tools to understand how food and agricultural production interact to better manage agricultural, food, and biomass systems for the adequate supply of wholesome food, feed, fibre, biofuel, and any other bio-based material. This course-based program will present students with the skills needed to assess existing production, delivery, and quality management systems; introduce improvements; and communicate effectively with policy makers and with colleagues in multi-disciplinary teams.

The goals of this program are to provide up-to-date world class knowledge on techniques for adequate process design and management of biomass production strategies for the delivery of quality food, natural fibre, biochemicals, biomaterials, and biofuels, in a sustainable and environment-friendly way that benefits all. Training activities will include laboratory research and/or industrial/government internships.

***section 12.3.12: Doctor of Philosophy (Ph.D.) Bioresource Engineering***

This is a research-based degree and is offered in the following areas: plant and animal environments; ecological engineering (ecosystem modelling, design, management, and remediation); water resources management (hydrology, irrigation, drainage, water quality); agricultural machinery, mechatronics and robotics; food engineering and bio-processing; post-harvest technology; waste management and protection of the environment; bio-energy; and artificial intelligence.

***section 12.3.13: Doctor of Philosophy (Ph.D.) Bioresource Engineering: Environment***

**\*\*This program is not offered in the 2023-2024 academic year.\*\***

The Ph.D. Bioresource Engineering: Environment – Option is coordinated through the Bieler School of En

Financial aid is available but limited and highly competitive. It is suggested that students give serious consideration to their financial planning before submitting an application. Normally, a student will not be accepted unless adequate financial support can be provided through a scholarship/award and/or by the student's supervisor. Academic units cannot guarantee financial support via teaching assistantships.

### English Language Proficiency

For graduate applicants whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized Canadian or American (English or French) institution or from a recognized foreign institution where English is the language of instruction, documented proof of English proficiency is required prior to admission. For a list of acceptable test scores and minimum requirements, visit [mcgill.ca/gradapplicants/international/proficiency](http://mcgill.ca/gradapplicants/international/proficiency).

### 12.3.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at [mcgill.ca/gradapplicants/apply](http://mcgill.ca/gradapplicants/apply).

See [University Regulations & Resources](#) > Graduate > Graduate Admissions and Application Procedures > : [Application Procedures](#) for detailed application procedures.

### 12.3.3.2.1 Additional Requirements

The items and clarifications below are additional requirements set by this department:

- Acceptance to all programs depends on a staff member agreeing to serve as the student's supervisor and the student obtaining financial support.
- The GRE – not required, but highly recommended.

### 12.3.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Bioresource Engineering and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at [mcgill.ca/gps/contact/graduate-program](http://mcgill.ca/gps/contact/graduate-program).

Information on application deadlines is available at [mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines](http://mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines).

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit.

## 12.3.4 Bioresource Engineering Faculty

### Chair

Viacheslav I. Adamchuk

### Graduate Program Director

G.S. Vijaya Raghavan

### Associate Graduate Program Director

Zhiming Qi

### Emeritus Professors

Robert S. Broughton; Robert Kok

### Professors

Viacheslav I. Adamchuk; Jan Adamowski; Chandra A. Madramootoo; Michael O. Ngadi; Valérie Orsat; Shiv O. Prasher; G.S. Vijaya Raghavan

### Associate Professors

Abdolhamid Akbarzadeh Shafaroudi; Grant Clark; Mark Lefsrud; Zhiming Qi

### Assistant Professors

Benjamin Goldstein; Idaresit Ekaette; E. Miezah Kwofie; Shangpeng Sun

### Adjunct Professors

Marie-Josée Dumont; Boris Tartakovsky

### Faculty Lecturers

Fernando Altamura; Alice Cherestes; David Titley-Peloquin



**Research/Academic Associates**

Yvan Gariepy; Li (Laura) Liu; Sarah MacPherson

**Technical**

William Boyd Dumais

**Professor Post-Retirement**

Arun Mujumdar

**Affiliate Members**

Georges T. Dodds; Maxime Leduc; Wietske Medema; Marian V. Simpson

**12.3.5 Master of Science (M.Sc.) Bioresource Engineering (Thesis) (45 credits)**

This option for the M.Sc. degree is oriented toward individuals who intend to develop a career in bioresource engineering research.

**Thesis Courses (32 credits)**

BREE 691	(4)	M.Sc. Thesis 1
BREE 692	(4)	M.Sc. Thesis 2
BREE 693	(4)	M.Sc. Thesis 3
BREE 694	(4)	M.Sc. Thesis 4
BREE 695	(4)	M.Sc. Thesis 5
BREE 696	(4)	M.Sc. Thesis 6
BREE 697	(4)	M.Sc. Thesis 7
BREE 698	(3)	M.Sc. Thesis 8

**Required Courses (5 credits)**

BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2
BREE 699	(3)	Scientific Publication

**Complementary Courses (9 credits)**

500-, 600-, or 700-level courses in bioresource engineering and other fields to be determined in consultation with the Research Director.

**12.3.6 Master of Science (M.Sc.) Bioresource Engineering (Thesis): Environment (45 credits)**

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

The M.Sc. in Bioresource Engineering; (Thesis) Environment is a research program offered in collaboration with the Bieler School of Environment. As a complement to the unit's expertise, the program considers how various dimensions (scientific, social, legal, ethical.) interact to define environment and sustainability issues.

**Thesis Courses (32 credits)**

BREE 691	(4)	M.Sc. Thesis 1
BREE 692	(4)	M.Sc. Thesis 2
BREE 693	(4)	M.Sc. Thesis 3
BREE 694	(4)	M.Sc. Thesis 4
BREE 695	(4)	M.Sc. Thesis 5
BREE 696	(4)	M.Sc. Thesis 6

BREE 697	(4)	M.Sc. Thesis 7
BREE 698	(3)	M.Sc. Thesis 8

**Required Courses (8 credits)**

BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2
BREE 699	(3)	Scientific Publication
ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability

**Complementary Courses (6 credits)**

3-6 credits from:

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 614	(3)	Mobilizing Research for Sustainability

0-3 credits from:

Readings in Environment 9in En

**Research Project (12 credits)**

BREE 671	(6)	Project 1
BREE 672	(6)	Project 2

**Required Courses (2 credits)**

BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2

**Complementary Courses (31 credits)**

31 credits of 500-, 600-, or 700-level courses in bioresource engineering and other fields\* to be determined in consultation with the Project Director.

\* Note: 12 of the 31 credits are expected to be from collaborative departments, e.g., food process engineering: 12 credits divided between Food Science and Chemical Engineering.

**12.3.9 Master of Science, Applied (M.Sc.A.) Bioresource Engineering (Non-Thesis): Environment (45 credits)**

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

The M.Sc.(Applied) in Bioresource Engineering; Non-Thesis - Environment is a program offered in collaboration with the Bieler School of Environment. As a complement to the unit's expertise, the program considers how various dimensions (scientific, social, legal, ethical) interact to define environment and sustainability issues.

Candidates must meet the qualifications of a professional engineer either before or during their M.Sc.(Applied) program.

**Research Project (12 credits)**

BREE 671	(6)	Project 1
BREE 672	(6)	Project 2

**Required Courses (5 credits)**

BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2
ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability

**Complementary Courses (28 credits)**

3-6 credits from:

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 614	(3)	Mobilizing Research for Sustainability

0-3 credits

ENVR 585	(3)	Readings in Environment 2
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or 3 credits at the 500 level or higher recommended by the Advisory Committee and approved by the Environment Options Committee.

22 additional credits of 500-level or higher chosen in consultation with the academic adviser.



GEOG 601 (3) Advanced Environmental Systems Modelling

or an approved 500-, 600-, or 700-level alternative course.

**Environmental Policy Course**

3 credits from the following:

URBP 506 (3) Environmental Policy and Planning

or an approved 500-, 600-, or 700-level alternative course.

Further complementary courses (balance of coursework to meet the 45-credit program requirement):

Remaining Engineering or Non-Engineering courses from an approved list of courses, at the 500, 600, or 700 level, from the Faculty of Engineering, Faculty of Agricultural and Environmental Sciences, Faculty of Law, Faculty of Religious Studies, Desautels Faculty of Management, and Departments of Atmospheric and Oceanic Sciences, Biology, Chemistry, Earth and Planetary Sciences, Economics, Epidemiology and Biostatistics, Geography, Occupational Health, Political Science, Sociology, and the Bieler School of Environment.

**12.3.11 Master of Science, Applied (M.Sc.A.) Bioresource Engineering (Non-Thesis): Integrated Food and Bioprocessing (45 credits)**

**Required Courses (6 credits)**

BREE 600	(1)	Project/Internship Proposal
BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2

AGEC 642	(3)	Economics of Agricultural Development
AGRI 510	(3)	Professional Practice

Minimum of 3 credits selected from the following:

BTEC 502	(3)	Biotechnology Ethics and Society
FDSC 519	(3)	Advanced Food Processing
FDSC 538	(3)	Food Science in Perspective
GEOG 515	(3)	Contemporary Dilemmas of Development
NUTR 501	(3)	Nutrition in Developing Countries

9 credits of any relevant graduate-level course chosen in consultation with the Program Director.

### 12.3.12 Doctor of Philosophy (Ph.D.) Bioresource Engineering

Candidates for the Ph.D. degree will normally register for the M.Sc. degree first. In cases where the research work is proceeding very satisfactorily, or where the equivalent of the M.Sc. degree has been completed previously, candidates may be permitted to proceed directly to the Ph.D. degree.

#### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### Required Courses

BREE 701	(0)	Ph.D. Comprehensive Examination
BREE 751	(0)	Departmental Seminar Ph.D. 1
BREE 752	(0)	Departmental Seminar Ph.D. 2
BREE 753	(0)	Departmental Seminar Ph.D. 3
BREE 754	(0)	Departmental Seminar Ph.D. 4

#### Complementary Courses

Courses of study selected for a Ph.D. program will depend on the existing academic qualifications of the candidate, and on those needed for effective pursuit of research in the chosen field. Candidates are encouraged to take an additional course of study of their own choice in some field of the humanities, sciences, or engineering not directly related to their research. The program will be established by consultation of the candidate with a committee that will include the Research Director and at least one other professor.

### 12.3.13 Doctor of Philosophy (Ph.D.) Bioresource Engineering: Environment

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

The Ph.D. in Bioresource Engineering Environment is a research program offered in collaboration with the Bieler School of Environment. As a complement to the unit's expertise, the program considers how various dimensions (scientific, social, legal, ethical) interact to define environment and sustainability issues.

#### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to know

BREE 701	(0)	Ph.D. Comprehensive Examination
BREE 751	(0)	Departmental Seminar Ph.D. 1
BREE 752	(0)	Departmental Seminar Ph.D. 2
BREE 753	(0)	Departmental Seminar Ph.D. 3
BREE 754	(0)	Departmental Seminar Ph.D. 4
ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability

**Complementary Courses (6 credits)**

3-6 credits from:

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 614	(3)	Mobilizing Research for Sustainability

0-3 credits from:

ENVR 585	(3)	Readings in Environment 2
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or 3 credits at the 500 level or higher recommended by the Advisory Committee and approved by the Environment Option cm34 71 0 0 1 7"ul42REE 753

#### *section 12.4.6: Graduate Certificate (Gr. Cert.) Biotechnology (16 credits)*

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

Candidates must possess a bachelor's degree in the biological/molecular sciences or an equivalent program. This is a short, intense program for students wishing to deepen their understanding of biotechnology and gain hands-on experience via an intensive laboratory course using the latest molecular biology techniques. Students can choose from a wide range of complementary courses given throughout the McGill campuses to "design" their own program toward a future career choice. Graduates will find employment in research or industrial laboratories as assistants and/or technicians.

### **12.4.3 Biotechnology Admission Requirements and Application Procedures**

#### **12.4.3.1 Admission Requirements**

Candidates for the M.Sc.(Applied) in Biotechnology must possess a bachelor's degree in biological sciences or equivalent with a minimum cumulative grade point average (CGPA) of 3.2/4.0, as well as all prerequisites or their equivalents. Applicants are required to have sufficient background in biochemistry, cellular biology, and molecular biology, preferably at an advanced level for the Master's Applied.

#### **Financial Aid**

Financial support is not available for this applied program. It is suggested that students give serious consideration to their financial planning before submitting an application. Students should be self-financed or self-funded to ensure they can complete this program financially worry free. Academic units cannot guarantee financial support via teaching assistantships.

#### **English Language Proficiency**

For graduate applicants whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized Canadian or American (English or French) institution or from a recognized foreign institution where English is the language of instruction, documented proof of English proficiency is required prior to admission. For a list of acceptable test scores and minimum requirements, visit



BTEC 625 (2) Biotechnology Research Project 4

#### **Required Courses (20 credits)**

BIOT 505 (3) Selected Topics in Biotechnology  
BTEC 501 (3) Bioinformatics  
BTEC 619 (4) Biotechnology Laboratory 2  
BTEC 620 (4) Biotechnology Laboratory 1  
BTEC 621 (3) Biotechnology Management  
HGEN 660 (3) Genetics and Bioethics

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

9 credits at the 500 level or higher, selected within the Faculties of Agricultural and Environmental Sciences, Medicine, Science, or Management in consultation with the academic adviser of the program in line with the interests of the student.

#### **12.4.6 Graduate Certificate (Gr. Cert.) Biotechnology (16 credits)**

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

#### **Required Courses (10 credits)**

BIOT 505 (3) Selected Topics in Biotechnology  
BTEC 620 (4) Biotechnology Laboratory 1  
BTEC 621 (3) Biotechnology Management

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

Two courses chosen from the following:

##### **General Topics**

ANSC 622 (3) Experimental Techniques in Animal Science  
BINF 511 (3) Bioinformatics for Genomics  
BIOL 524 (3) Topics in Molecular Biology  
BIOL 568 (3) Topics on the Human Genome  
BTEC 501 (3) Bioinformatics  
BTEC 502 (3) Biotechnology Ethics and Society  
BTEC 535 (3) Functional Genomics in Model Organisms  
BTEC 555 (3) Structural Bioinformatics  
BTEC 691 (3) Biotechnology Practicum  
EXMD 511 (3) Joint Venturing with Industry  
EXMD 602 (3) Techniques in Molecular Genetics

##### **Health**

EXMD 610 (3) Molecular Methods in Medical Research  
PARA 635 (3) Cell Biology and Infection  
PHGY 518 (3) Artificial Cells

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#### 12.5.4 Food Science and Agricultural Chemistry Faculty

##### Chair

Varoujan A. Yaylayan

##### Graduate Program Director

Ashraf Ismail

##### Emeritus Professors

Inteaz Alli; Frederik R. van de Voort

##### Professors

Hosahalli S. Ramaswamy; Benjamin K. Simpson; Varoujan A. Yaylayan

##### Associate Professors

Stephane Bayen; Saji George; Ashraf A. Ismail; Salwa Karboune; Xiaonan Lu

##### Assistant Professors

Jennifer Ronholm; Yixiang Wang

##### Research/Academic Associates

Najla Ben Akacha; Jacqueline Sedman; Amanda Waglay

#### 12.5.5 Master of Science (M.Sc.) Food Science and Agricultural Chemistry (Thesis) (45 credits)

For candidates entering the M.Sc. program without restrictions, i.e., those not requiring a qualifying term/year, the M.Sc. degree consists of 45 graduate credits. These credits are obtained through a combination of graduate courses and a research thesis.

The residence time for a M.Sc. degree is three academic terms based on unqualified entry into the M.Sc. program. Students are encouraged to complete their studies within this time frame.

##### Thesis (30 credits)

FDSC 690	(8)	M.Sc. Literature Review
FDSC 691	(7)	M.Sc. Research Protocol
FDSC 692	(15)	M.Sc. Thesis

##### Required Courses (6 credits)

FDSC 695	(3)	M.Sc. Graduate Seminar 1
FDSC 696	(3)	M.Sc. Graduate Seminar 2

##### Complementary Courses (9 credits)

At least 9 credits, normally from 500- or 600-level departmental courses.

#### 12.5.6 Master of Science (M.Sc.) Food Science and Agricultural Chemistry (Non-Thesis) (45 credits)

This 45-credit program is offered to candidates who seek further training in Food Science, but do not wish to pursue independent research. These credits are obtained through a combination of graduate courses.

The residence time for a M.Sc. degree (Non-Thesis) is three academic terms.

**PROGRAM REQUF.883 9 de**

FDSC 697	(6)	M.Sc. Project Part 1
FDSC 698	(6)	M.Sc. Project Part 2

**Complementary Courses (18 credits)**

3 credits chosen from the following:

FDSC 695	(3)	M.Sc. Graduate Seminar 1
FDSC 696	(3)	M.Sc. Graduate Seminar 2

15 credits chosen from the following:

AGRI 510	(3)	Professional Practice
FDSC 515	(3)	Enzymology
FDSC 516	(3)	Flavour Chemistry
FDSC 519	(3)	Advanced Food Processing
FDSC 520	(3)	Biophysical Chemistry of Food
FDSC 536	(3)	Food Traceability
FDSC 537	(3)	Nutraceutical Chemistry
FDSC 538	(3)	Food Science in Perspective
FDSC 540	(3)	Sensory Evaluation of Foods
FDSC 545	(3)	Advances in Food Microbiology
FDSC 634	(3)	Food Toxins and Toxicants
FDSC 651	(3)	Principles of Food Analysis 2
FDSC 652	(3)	Separation Techniques in Food Analysis 2

**Elective Courses (15 credits)**

At the 500 level or higher, and chosen in consultation with the academic adviser.

**12.5.7 Master of Science (M.Sc.) Food Science & Agricultural Chemistry: Food Safety (Non-Thesis) (45 credits)**

The program is intended to train graduate students as specialists in food safety with the expectation that graduates will be well prepared academically to take on the challenging food safety events and issues that emerge both in Canada and globally. The program will cover food safety through the entire food supply chain from food production through processing/manufacturing to the food consumer; the courses which mts as specialiR418.9lfvr; the2ho.8510.52fho.851j1 0 0 s 1 sh in

3 credits chosen from the following:

FDSC 695	(3)	M.Sc. Graduate Seminar 1
FDSC 696	(3)	M.Sc. Graduate Seminar 2

12 credits chosen from the following:

AGRI 510	(3)	Professional Practice
BREE 535	(3)	Food Safety Engineering
FDSC 525	(3)	Food Quality Assurance
FDSC 536	(3)	Food Traceability
FDSC 555	(3)	Comparative Food Law
NUTR 512	(3)	Herbs, Foods and Phytochemicals
OCCH 612	(3)	Principles of Toxicology
PARA 515	(3)	Water, Health and Sanitation

### Elective Courses (6 credits)

At the 500 level or higher, and selected in consultation with the academic adviser.

## 12.5.8 Doctor of Philosophy (Ph.D.) Food Science and Agricultural Chemistry

Candidates will be judged principally on their research ability. Coursework will be arranged in consultation with the student's departmental graduate advisory committee.

### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

### Required Courses (9 credits)

Note: Candidates should be prepared to take the Comprehensive Preliminary Examination before the end of the second year of the program.

FDSC 700	(0)	Comprehensive Preliminary Examination
FDSC 725	(3)	Advanced Topics in Food Science
FDSC 797	(3)	Ph.D. Graduate Seminar 1
FDSC 798	(3)	Ph.D. Graduate Seminar 2

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## 12.6 Human Nutrition

### 12.6.1 Location

School of Human Nutrition  
Macdonald-Stewart Building  
McGill University, Macdonald Campus  
21,111 Lakeshore Road  
Sainte-Anne-de-Bellevue QC H9X 3V9  
Canada  
Telephone: 514-398-7838  
Email: [gradstudies.macdonald@mcgill.ca](mailto:gradstudies.macdonald@mcgill.ca)

Website: [mcgill.ca/nutrition](http://mcgill.ca/nutrition)

## 12.6.2 About Human Nutrition

In the School of Human Nutrition, cutting-edge nutrition research is conducted by tenure-track professors and six faculty lecturers in all areas recommended by North American Nutrition Societies. These areas include clinical, community, and international nutrition as well as molecular and cellular nutrition. Research at the School emphasizes the following domains:

- nutritional biochemistry and metabolism;
- nutrigenomics and lifestyle behaviour;
- global food security;
- fetal, perinatal, and childhood origins of health and disease;
- clinical and epidemiological studies addressing health outcomes in at-risk populations including Indigenous Peoples, mothers and children, and older adults; and
- nutritional management and development of novel nutritional approaches to optimize health during chronic diseases and for treatment during surgery and recovery from disease.

Research is conducted in our on-site research labs, the *Centre for Indigenous Peoples' Nutrition and Environment* (CINE), the *McGill Institute for Global Food Security*, the *Clinical Nutrition Research Unit (CNR)*

## **12.6.3 Human Nutrition Admission Requirements and Application Procedures**

### **12.6.3.1 Admission Requirements**

#### **M.Sc. Thesis and M.Sc. Applied (Project, Practicum, and Dietetics Credentialing)**

Applicants must be graduates of a university of recognized reputation and hold a B.Sc. degree equivalent to a McGill degree in a subject closely related to the one selected for graduate work. Applicants must have a minimum cumulative grade point average (CGPA) in McGill University's credit equivalency of 3.3/4.0 (high second class–upper division) for the M.Sc. Thesis and M.Sc. Applied during their bachelor's degree program. Eligible candidates to the M.Sc. (Applied) program may select one of three options:

- 1.** The project option;
- 2.** The practicum option, which is reserved for those who have completed a dietetics internship and six months of work experience and are members of the ODNQ and wish to further de



**12.6.4 Human Nutrition Faculty****Director**

Ryan J. Mailloux

**Professors Emeriti**

Harriet V. Kühnlein, Timothy A. Johns

**Professors**

Luis B. Agellon, Linda J. Wykes

**Associate Professors**

Niladri Basu (*Canada Research Chair*) (*joint appt. with Natural Resource Sciences*) (*Assoc. Member of Epidemiology and Biostatistics, Faculty of Medicine and Health Sciences*)

Stéphanie Chevalier (*Assoc. Member Dept of Medicine and Health Sciences*) (*Graduate Program Director*)

Treena Delormier (*Associate Director of the Centre for Indigenous Peoples' Nutrition and Environment*)

Kristine G. Koski

Stan Kubow

Ryan J. Mailloux

Grace S. Marquis

Hugo Melgar-Quiñonez (*Academic Scholar, Margaret A. Gilliam Institute for Global Food Security*)

**Assistant Professors**

*Institute for the Study of International Development (ISID):* Nii Addy

Anne-Sophie Brazeau (*Director, Dietetics Education and Practice*)

Daiva Nielsen

Chelsia Gillis

Brittany Jock

**Academic Associate**

Patrick Cortbaoui (*Managing Director, Margaret A. Gilliam Institute for Global Food Security*)

**Senior Faculty Lecturers**

Sandy Phillips (*University Coordinator, Professional Practice (Stage) in Dietetics*)

Hugues Plourde

Maureen Rose (*Director, Graduate Dietetics Programs*)

**Faculty Lecturers**

Paul-Guy Duhamel (*Manager, Food and Nutrition Laboratories*)

Mary Hendrickson

Joane Routhier

**Associate Members**

*Anaesthesia:* Franco Carli, Thomas Schricker

*Medicine and Health Sciences:* Larry Lands, José Morais

*Nursing:* Rosetta Antonacci

### **Adjunct Professors**

Isabelle Germain (*Agriculture and Agri-Food Canada*); Elizabeth D. Mansfield; Hope Weiler (*on leave*)

### **Affiliate Members**

Kathryn Arcudi (*CIUSSS du Centre-Ouest-de-l'Île-de-Montreal*)

Annyck Besso

Marie-Ève Besner (*Montreal Childr*

Dietetic Education and Practice (PDEP), and recognized in Québec by the Ordre des diététistes-nutritionnistes du Québec (ODNQ), and meets all the standards and requirements of this professional order.

### **Required Courses (77 credits)**

IPEA 500	(0)	Roles in Interprofessional Teams
IPEA 501	(0)	Communication in Interprofessional Teams
IPEA 502	(0)	Patient-Centred Care in Action
IPEA 503	(0)	Managing Interprofessional Conflict
NUTR 503	(3)	Nutrition and Exercise
NUTR 505	(3)	Public Health Nutrition
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
NUTR 603	(3)	Credentialing in Dietetics
NUTR 606	(3)	Human Nutrition Research Methods
NUTR 607	(3)	Counselling in Professional Practice
NUTR 611	(2)	Graduate Professional Practice 1
NUTR 612	(8)	Graduate Professional Practice 2 Management
NUTR 613	(7)	Graduate Professional Practice 3 Clinical Nutrition
NUTR 614	(8)	Graduate Professional Practice 4 Community Nutrition
NUTR 615	(7)	Graduate Professional Practice 5 Clinical Nutrition
NUTR 618	(1)	Dietetics Professional Practice
NUTR 625	(3)	Emerging Issues for Nutritionists
NUTR 629	(6)	Professional Dietetics Project
NUTR 651	(3)	M.Sc. (Applied) Literature Review
NUTR 660	(1)	M.Sc.(Applied) Final Presentation
NUTR 695	(1)	Human Nutrition Research Orientation
NUTR 696	(1)	Human Nutrition Seminar

### **Complementary Courses (3 credits)**

3 credits from the following: NUTR 651 NUTR 651

NUTR 506	(3)	Qualitative Methods in Nutrition
NUTR 507	(3)	Advanced Nutritional Biochemistry
NUTR 512	(3)	Herbs, Foods and Phytochemicals Indigenou0u12

**12.6.8 Master of Science, Applied (M.Sc.A.) Human Nutrition (Non-Thesis): Project (45 credits)****Research Project (12 credits)**

NUTR 652	(3)	M.Sc. (Applied) Project 1
NUTR 653	(3)	M.Sc. (Applied) Project 2
NUTR 654	(3)	M.Sc. (Applied) Project 3
NUTR 655	(3)	M.Sc. (Applied) Project 4

**Required Courses (6 credits)**

NUTR 651	(3)	M.Sc. (Applied) Literature Review
NUTR 660	(1)	M.Sc.(Applied) Final Presentation
NUTR 695	(1)	Human Nutrition Research Orientation
NUTR 696	(1)	Human Nutrition Seminar

**Complementary Courses (18 credits)**

3 credits of 500-level or higher Statistics.

3 credits in research methods at the 500 level or higher

12 credits of course work, at the 500 level or higher, in Nutrition, Animal Science, or Food Science chosen in consultation with the student's supervisor.

**Elective Courses (9 credits)**

9 credits of 500-level or higher courses in consultation with the student's academic adviser or supervisor.

**12.6.9 Doctor of Philosophy (Ph.D.) Human Nutrition****Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

**Required Courses**

NUTR 695	(1)	Human Nutrition Research Orientation
NUTR 701	(0)	Doctoral Comprehensive Examination
NUTR 796	(1)	PhD Research Presentation

**12.6.10 Graduate Diploma (Gr. Dip.) Registered Dietitian Credentialing (30 credits)**

The Graduate Diploma in Registered Dietitian Credentialing is open to students with a Ph.D. in Human Nutrition from the School of Human Nutrition who would like to become a member of the Ordre professionnel des diététistes du Québec (OPDQ). The Diploma consists of 30 weeks of stage placements in Clinical, Community, and Management rotations. Before acceptance into the program, students will be required to complete courses in clinical nutrition, and certain required courses in preparation for Stage; and to demonstrate a basic level of French competency. This preparation may be done during the Ph.D. program, or in a qualifying year after the Ph.D. On completion, students will meet OPDQ credits and professional practice requirements for licensure as a registered dietitian.

The Graduate Diploma is open to students who have completed a graduate degree with the School of Human Nutrition including NUTR 603 Credentialing in Dietetics.

**Required Courses (30 credits)**

NUTR 612	(8)	Graduate Professional Practice 2 Management
NUTR 613	(7)	Graduate Professional Practice 3 Clinical Nutrition
NUTR 614	(8)	Graduate Professional Practice 4 Community Nutrition
NUTR 615	(7)	Graduate Professional Practice 5 Clinical Nutrition

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## 12.7 Natural Resource Sciences

### 12.7.1 Location

Department of Natural Resource Sciences  
McGill University, Macdonald Campus  
21,111 Lakeshore Road  
Sainte-Anne-de-Bellevue QC H9X 3V9  
Canada  
Telephone: 514-398-7838  
Email: [gradstudies.macdonald@mcgill.ca](mailto:gradstudies.macdonald@mcgill.ca)  
Website: [mcgill.ca/nrs](http://mcgill.ca/nrs)

### 12.7.2 About Natural Resource Sciences

The Department of Natural Resource Sciences offers programs leading to **M.Sc.** and **Ph.D.** degrees in:

- Agricultural Economics (M.Sc. only)
- Entomology (Neotropical Environment option available)
- Microbiology (Bioinformatics option available)
- Renewable Resources (this includes Forest Science, Micrometeorology, Soil Science, and Wildlife Biology; Neotropical Environment options available)

An **interdisciplinary** option in Bioinformatics for doctoral students in Microbiology is also available.

The Department possesses, or has access to, excellent facilities for laboratory and field research. Affiliated with the Department are the [Lyman Entomological Museum and Research Laboratory](#), the [Molson Nature Reserve](#), the [Morgan Arboretum](#), and the [Ecomuseum](#) of the *St. Lawrence Valley Natural History Society*; details are available on the [Natural Resource Sciences website](#).

#### Master of Science Degrees

##### *section 12.7.5: Master of Science (M.Sc.) Agricultural Economics (Thesis) (45 credits)*

This program provides students with applied economic concepts and tools to identify, define, and analyze economic problems affecting the performance of the agri-food sector and the environment. The ideal prior preparation is an undergraduate degree in Agricultural Economics or Economics, including undergraduate courses in intermediate economic theory (micro and macro), calculus, algebra, statistics, and econometrics.

Attention is given to the development of analytical skills in the broad areas of agricultural, environmental, and ecological economics. Students may specialize, by way of their research program, in agribusiness, development, finance, marketing and trade, policy, and resource economics. The program prepares graduates for rewarding careers in research, analysis, and decision-making in academia, private and NGO sectors, and government.

##### *section 12.7.6: Master of Science (M.Sc.) Entomology (Thesis) (45 credits)*

Graduate students in the entomology program work within, and often across, multiple disciplines of basic and applied environmental sciences. Specialties within the program include terrestrial arthropod ecology, physiology, zoogeography, diversity, and systematics. Our students typically have exceptionally strong backgrounds in one or more of these specialties and an interest in research that advances both theory and applied management of ecosystems. After completing their degrees they go on to careers in academia, environmental policy, government agencies, industry, and other fields.

##### *section 12.7.7: Master of Science (M.Sc.) Entomology (Thesis): Neotropical Environment (45 credits)*

Please contact the Department for more information about this program.

##### *section 12.7.8: Master of Science (M.Sc.) Microbiology (Thesis) (45 credits)*

Graduate students in the microbiology program work within, and often across, multiple disciplines of basic and applied environmental sciences. Specialties within the program range from the study of microbial diversity in extreme environments, either natural or man-induced, to the role of microbes in managed

***section 12.7.8: Master of Science (M.Sc.) Microbiology (Thesis) (45 credits)***

ecosystems, such as in agriculture and forests. Our students typically have exceptionally strong backgrounds in one or more of these specialties and an interest in research that advances our fundamental knowledge about microorganisms as well as leads to improved efficiencies of our managed ecosystems. After completing their degrees they go on to careers in academia, environmental policy, government agencies, industry, and other fields.

***section 12.7.9: Master of Science (M.Sc.) Renewable Resources (Thesis) (45 credits)***

Graduate students in the renewable resources program work within, and often across, multiple disciplines of basic and applied environmental sciences. Specialties within the program include environmental and ecological economics, environmental health and toxicology, forest ecology, fish and fisheries biology, landscape ecology, limnology, micrometeorology, soil science, and wildlife biology. They typically have exceptionally strong backgrounds in one or more of these specialties and an interest in research that advances both theory and applied management of natural resources. After completing their degrees they go on to careers in academia, environmental policy, government agencies, industry, and other fields.

***section 12.7.10: Master of Science (M.Sc.) Renewable Resources (Thesis): Neotropical Environment (45 credits)***

Please contact the Department for more information about this program.

**Ph.D. Degrees in Entomology, Microbiology, or Renewable Resources (Includes Micrometeorology, Forest Science, Soil Science, and Wildlife Biology)*****section 12.7.11: Doctor of Philosophy (Ph.D.) Entomology***

Graduate students in the entomology program work within, and often across, multiple disciplines of basic and applied environmental sciences. Specialties within the program include terrestrial arthropod ecology, physiology, zoogeography, diversity, and systematics. Our students typically have exceptionally strong backgrounds in one or more of these specialties and an interest in research that advances both theory and applied management of ecosystems. After completing their degrees, they go on to careers in academia, environmental policy, government agencies, industry, and other fields.

***section 12.7.12: Doctor of Philosophy (Ph.D.) Entomology: Environment***

\*\*This program is not offered in the 2023-2024 academic year.\*\*

Please contact the Department for more information about this program.

***section 12.7.13: Doctor of Philosophy (Ph.D.) Entomology: Neotropical Environment***

Please contact the Department for more information about this program.

***section 12.7.14: Doctor of Philosophy (Ph.D.) Microbiology***

Graduate students in the microbiology program work within, and often across, multiple disciplines of basic and applied environmental sciences. Specialties within the program range from the study of microbial diversity in extreme environments, either natural or man-induced, to the role of microbes in managed ecosystems, such as in agriculture and forests. Our students typically have exceptionally strong backgrounds in one or more of these specialties and an interest in research that advances our fundamental knowledge about microorganisms and leads to improved efficiencies of our managed ecosystems. After completing their degrees they go on to careers in academia, environmental policy, government agencies, industry, and other fields.

***section 12.7.15: Doctor of Philosophy (Ph.D.) Microbiology: Bioinformatics***

Please contact the Department for more information about this program.

***section 12.7.16: Doctor of Philosophy (Ph.D.) Renewable Resources***

Graduate students in the renewable resources program work within, and often across, multiple disciplines of basic and applied environmental sciences. Specialties within the program include environmental and ecological economics, environmental health and toxicology, forest ecology, fish and fisheries biology, landscape ecology, limnology, micrometeorology, soil science, and wildlife biology. Our students typically have exceptionally strong backgrounds in one or more of these specialties and an interest in research that advances both theory and applied management of natural resources. After completing their degrees they go on to careers in academia, environmental policy, government agencies, industry, and other fields.

***section 12.7.17: Doctor of Philosophy (Ph.D.) Renewable Resources: Environment***

\*\*This program is not offered in the 2023-2024 academic year.\*\*

Please contact the Department for more information about this program.

Please contact the Department for more information about this program.

### **12.7.3 Natural Resource Science Admission Requirements and Application Procedures**

#### **12.7.3.1 Admission Requirements**

##### **M.Sc. Thesis (Agricultural Economics)**

Direct admission to the M.Sc. requires the completion of a B.Sc. in Agricultural Economics or a closely related area, with the minimum equivalent cumulative grade point average (CGPA) of 3.0/4.0 (second class–upper division) or minimum grade point average (GPA) of 3.2/4.0 during the last two years of full-time university study. High grades are expected in courses considered by the academic unit to be preparatory to the graduate program.

The ideal preparation includes courses in agricultural economics, economic theory (intermediate micro and macro), calculus, linear algebra, and statistics. Students with deficiencies in these areas will be required to take additional courses as part of their degree program.

##### **M.Sc. Thesis (Entomology, Microbiology, Renewable Resources)**

Candidates are required to have a bachelor's degree with a minimum equivalent CGPA of 3.0/4.0 (second class–upper division) or a minimum GPA of 3.2/4.0 during the last two years of full-time university study. High grades are expected in courses considered by the academic unit to be preparatory to the graduate program.

##### **M.Sc. in Renewable Resources (Non-Thesis) – Environmental Assessment Option**

Applications are not being accepted for the current academic year; the program is currently under review.

##### **Ph.D. Thesis (Entomology, Microbiology, Renewable Resources)**

Candidates are normally required to hold an M.Sc. degree and will be judged primarily on their ability to conduct an original and independent research study.

##### **Qualifying Program**

Some applicants whose academic degrees and standing entitle them to serious consideration for admission to graduate studies, but who are considered inadequately prepared in the subject selected, may be admitted to a Qualifying program if they have met the Graduate and Postdoctoral Studies minimum CGPA of 3.0/4.0. The course(s) to be taken in a Qualifying program will be prescribed by the academic unit concerned. Qualifying students are registered in graduate studies, **but not as candidates for a degree**. Only one Qualifying year is permitted. **Successful completion of a Qualifying program does not guarantee admission to a degree program.**

##### **Financial Aid**

Financial aid is available but limited and highly competitive. It is suggested that students give serious consideration to their financial planning before submitting an application. Normally, a student will not be accepted unless adequate financial support can be provided through a scholarship/award and/or by the student's supervisor. Academic units cannot guarantee financial support via teaching assistantships.

##### **English Language Proficiency**

For graduate applicants whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized Canadian or American (English or French) institution or from a recognized foreign institution where English is the language of instruction, documented proof of English proficiency is required prior to admission. For a list of acceptable test scores and minimum requirements, visit [mcgill.ca/gradapplicants/international/proficiency](http://mcgill.ca/gradapplicants/international/proficiency).

#### **12.7.3.2 Application Procedures**

McGill's online application form for graduate program candidates is available at [mcgill.ca/gradapplicants/apply](http://mcgill.ca/gradapplicants/apply).

See [University Regulations & Resources](#) > Graduate > Graduate Admissions and Application Procedures > : [Application Procedures](#) for detailed application procedures.

##### **12.7.3.2.1 Additional Requirements**

The items and clarifications below are additional requirements set by this department:

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#### 12.7.4 Natural Resource Sciences Faculty

**Chair**

Brian Driscoll

**Graduate Program Director**

Sébastien Faucher

**Complementary Courses (18 credits)**

6 credits, two theory courses chosen from:

ECON 610	(3)	Microeconomic Theory 1
ECON 620	(3)	Macroeconomic Theory 1

or a theory course, at the 500 level or higher, approved by the Graduate Program Director.

At least 3 credits of quantitative methods course chosen from:

ECON 662D1	(3)	Econometrics
ECON 662D2	(3)	Econometrics
ECON 665	(3)	Quantitative Methods

or a quantitative course, at the 500 le

**Required Courses (9 credits)**

BIOL 640	(3)	Tropical Biology and Conservation
ENVR 610	(3)	Foundations of Environmental Policy
NRSC 643	(1)	Graduate Seminar 1
NRSC 644	(1)	Graduate Seminar 2
NRSC 651	(1)	Graduate Seminar 3

Note: Participation in the MSE-Panama Symposium presentation in Montreal is also required.

**Elective Courses (3 credits)**

3 credits, at the 500 level or higher, on environmental issues to be chosen in consultation with and approved by the student's supervisor AND the Neotropical Environment Options Director.

**12.7.8 Master of Science (M.Sc.) Microbiology (Thesis) (45 credits)****Thesis Courses (36 credits)**

NRSC 691	(12)	M.Sc. Thesis Research 1
NRSC 692	(12)	M.Sc. Thesis Research 2
NRSC 693	(12)	M.Sc. Thesis Research 3

**Required Courses (3 credits)**

NRSC 643	(1)	Graduate Seminar 1
NRSC 644	(1)	Graduate Seminar 2
NRSC 651	(1)	Graduate Seminar 3

**Complementary Courses (6 credits)**

Two 3-credit 500-, 600-, or 700-level courses; normally one of these will be a course in statistics.

**12.7.9 Master of Science (M.Sc.) Renewable Resources (Thesis) (45 credits)**

Includes Micrometeorology, Forest Science, Soil Science and Wildlife Biology as areas of research.

**Thesis Courses (36 credits)**

NRSC 691	(12)	M.Sc. Thesis Research 1
NRSC 692	(12)	M.Sc. Thesis Research 2
NRSC 693	(12)	M.Sc. Thesis Research 3

**Required Courses (3 credits)**

NRSC 643	(1)	Graduate Seminar 1
NRSC 644	(1)	Graduate Seminar 2
NRSC 651	(1)	Graduate Seminar 3

**Complementary Courses (6 credits)**

Two 3-credit courses at the 500 level or higher recommended by the supervisory committee; one of which must be in quantitative methods/techniques.

### 12.7.10 Master of Science (M.Sc.) Renewable Resources (Thesis): Neotropical Environment (45 credits)

The McGill-STRI Neotropical Environment Option (NEO) is a research-based option for Masters or PhD students in the departments of Anthropology, Biology, Bioresource Engineering, Geography, Natural Resource Sciences, Plant Science, and Political Science at McGill University. NEO is aimed at students who wish to focus their graduate research on environmental issues relevant to the Neotropics and Latin American countries. NEO favors interdisciplinary approaches to research and learning through the participation of researchers from McGill and from STRI. Students will complete their research in Latin America and NEO's core and complementary courses will be taught in Panama. NEO's educational approach seeks to facilitate a broader understanding of tropical environmental issues and the development of skills relevant to working in the tropics.

Whether applying to a Master or a PhD, students are expected to meet all the degree.

#### Thesis Courses (33 credits)

NRSC 691	(12)	M.Sc. Thesis Research 1
NRSC 692	(12)	M.Sc. Thesis Research 2
NRSC 694	(9)	M.Sc. Thesis Research 4

#### Required Courses (9 credits)

BIOL 640	(3)	Tropical Biology and Conservation
ENVR 610	(3)	Foundations of Environmental Policy
NRSC 643	(1)	Graduate Seminar 1
NRSC 644	(1)	Graduate Seminar 2
NRSC 651	(1)	Graduate Seminar 3

Note: Participation in the MSE-Panama Symposium presentation in Montreal is also required.

#### Elective Courses (3 credits)

3 credits, at the 500 level or higher, on environmental issues to be chosen in consultation with and approved by the student's supervisor AND the Neotropical Environment Options Director.

### 12.7.11 Doctor of Philosophy (Ph.D.) Entomology

Includes Micrometeorology, Forest Science, Soil Science, and Wildlife Biology.

#### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

#### Required Courses

NRSC 701	(0)	Ph.D. Comprehensive Examination
NRSC 751	(0)	Graduate Seminar 4
NRSC 752	(0)	Graduate Seminar 5
NRSC 753	(0)	Graduate Seminar 6
NRSC 754	(0)	Graduate Seminar 7

#### Coursework

Course requirements are specified by the staff in the discipline, bdu discipline, b-0.462 Tw1 03nW

The Ph.D. in Entomology Environment is a research program offered in collaboration with the Bieler School of Environment. As a complement to the unit's expertise, the program considers how various dimensions (scientific, social, legal, ethical) interact to define environment and sustainability issues.

### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

### Required Courses (3 credits)

ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability
NRSC 701	(0)	Ph.D. Comprehensive Examination
NRSC 754	(0)	Graduate Seminar 7

### Complementary Courses (6 credits)

3-6 credits from:

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 614	(3)	Mobilizing Research for Sustainability

0-3 credits from:

ENVR 585	(3)	Readings in Environment 2
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or 3 credits at the 500 level or higher recommended by the Advisory Committee and approved by the Environment Option Committee.

Additional course requirements may be specified by the staff in the discipline but are flexible and depend largely on the student's background, immediate interests, and ultimate objectives.

## 12.7.13 Doctor of Philosophy (Ph.D.) Entomology: Neotropical Environment

### Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

### Required Courses

BIOL 640	(3)	Tropical Biology and Conservation
ENVR 610	(3)	Foundations of Environmental Policy
NRSC 701	(0)	Ph.D. Comprehensive Examination
NRSC 751	(0)	Graduate Seminar 4
NRSC 752	(0)	Graduate Seminar 5
NRSC 753	(0)	Graduate Seminar 6
NRSC 754	(0)	Graduate Seminar 7

Note: Participation in the MSE-Panama Symposium presentation in Montreal is also required.

### Elective Courses

3 credits, at the 500 level or higher, on environmental issues to be chosen in consultation with and approved by the student's supervisor AND the Neotropical Environment Options Director.

#### **12.7.14 Doctor of Philosophy (Ph.D.) Microbiology**

Includes Micrometeorology, Forest Science, Soil Science, and Wildlife Biology.

##### **Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner. The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate how the research advances knowledge in the field. Finally, the thesis must be written in compliance with norms for academic and scholarly expression and for publication in the public domain.

##### **Required Courses**

NRSC 701	(0)	Ph.D. Comprehensive Examination
NRSC 751	(0)	Graduate Seminar 4
NRSC 752	(0)	Graduate Seminar 5
NRSC 753	(0)	Graduate Seminar 6
NRSC 754	(0)	Graduate Seminar 7

##### **Coursework**

Course requirements are specified by the staff in the discipline, but are flexible and depend largely on the student's background, immediate interests, and ultimate objectives.

##### **Doctor of Philosophy (Ph.D.) Microbiology:**

Additional courses at the 500, 600, or 700 level may be required at the discretion of the candidate's supervisory committee.





- biochemistry;
- bioinformatics;
- pharmacology;
- control and drug resistance;
- immunology;
- epidemiology;
- biology;
- neurobiology;
- drug discovery; and
- the ecology of parasitic organisms—such as helminths and protozoa, viruses, and cancer cells.

The non-thesis program in Biotechnology offers course-based curricula with practical training in laboratory courses and internships.

The Institute is housed in its own building adjacent to the Macdonald Campus Library and has well-equipped modern laboratories with excellent facilities for molecular research, and includes a confocal suite. Small and large animal facilities are available on the Macdonald Campus. The Institute is affiliated with the *J. Paul LeJan Centre for Tropical Diseases* at the McGill University Health Centre (MUHC).

Graduates typically go on to academic and research careers; enter private industry in the biotechnology and pharmaceutical sectors in research, management, technical services, and sales; or accept positions in the health, agriculture, food safety, and other government sectors.

### **Parasitology Programs**

#### *section 12.8.5: Master of Science (M.Sc.) Parasitology (Thesis) (45 credits)*

A research project is undertaken in an area of parasitology under the direction of a supervisor, and a thesis is produced. Coursework is minimal. Graduates have gone on to medical school, to teaching positions, or have found employment in scientific fields.

#### *section 12.8.6: Doctor of Philosophy (Ph.D.) Parasitology*

An advanced, original research project is undertaken in an area of parasitology



PARA 687	(10)	Thesis Research 1
PARA 688	(10)	Thesis Research 2
PARA 689	(12)	Thesis Research 3

**Required Courses (10 credits)**

PARA 606	(2)	Parasitology Seminar
PARA 607	(2)	Parasitology Research Seminar
PARA 635	(3)	Cell Biology and Infection
PARA 655	(3)	Host-Parasite Interactions

Other course work in related subjects may be required, depending upon the candidate's background and research orientation.

**12.8.6 Doctor of Philosophy (Ph.D.) Parasitology**

**Thesis**

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to know

**Complementary Courses (6 credits)**

6 credits chosen from the following:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics
COMP 618	(3)	Bioinformatics: Functional Genomics
PHGY 603	(3)	Systems Biology and Biophysics

Additional courses at the 500, 600, or 700 level may be required at the discretion of the candidate's supervisory committee.

***section 12.9.6: Master of Science (M.Sc.) Plant Science (Thesis): Bioinformatics (45 credits)***

biological/medical sciences and mathematics/computer science/engineering. This option has an added emphasis on bioinformatics, including additional seminars. Subsequent career paths are varied, but include work with government agencies, the private sector, or further graduate studies in a related field.

***section 12.9.7: Master of Science (M.Sc.) Plant Science (Thesis): Environment (48 credits)***

**\*\*This program is not offered in the 2023-2024 academic year.\*\***

This M.Sc. in Plant Science requires approximately two years for completion. Overall, the program consists of two graduate-level courses, seminars, and a research project leading to a thesis. The courses and the research project are chosen and defined with the help of an advisory committee. Subsequent career paths are varied, but include work with government agencies, the private sector, or further graduate studies in a related field. This Environment graduate option has an added emphasis on environmental sciences, including additional courses and seminars. It is aimed at students who wish to take an interdisciplinary approach in their graduate research on environmental issues and who wish to benefit from interactions with students from a wide range of disciplines.

***section 12.9.8: Master of Science (M.Sc.) Plant Science (Thesis): Neotropical Environment (45 credits)***

This M.Sc. in Plant Science requires approximately two years for completion. Overall, the program consists of two graduate-level courses, seminars, and a research project leading to a thesis. The courses and the research project are chosen and defined with the help of an advisory committee. Subsequent career paths are varied, but include work with government agencies, the private sector, or further graduate studies in a related field. This option has an added emphasis on neotropical environments, including additional courses and seminars. Part of the program takes place in Panama.

***section 12.9.9: Master of Science, Applied (M.Sc.A.) Plant Science (Non-Thesis) (45 credits)***

**\*\*Please note that program is currently under revision and will not be accepting applicants.\*\***

This M.Sc. in Plant Science requires about 18 months or four to five terms for completion. Overall, the program consists of graduate-level courses, seminars, and a research project. The courses and the research project are chosen and defined with the help of an advisory committee. Subsequent career paths are varied, but include work with government agencies, the private sector, or further graduate studies in a related field.

***section 12.9.10: Doctor of Philosophy (Ph.D.) Plant Science***

This Ph.D. in Plant Science requires approximately three years for completion. Overall, the program consists of seminars and a research project leading to a thesis. Students must also complete a comprehensive examination within their first year of study. The research project is defined with the help of an advisory committee. Subsequent career paths are varied, but include work with government agencies, universities, or the private sector.

***section 12.9.11: Doctor of Philosophy (Ph.D.) Plant Science: Bioinformatics***

This Ph.D. in Plant Science requires approximately three years for completion. Overall, the program consists of seminars and a research project leading to a thesis. Students must also complete a comprehensive examination within their first year of study. The research project is defined with the help of an advisory committee. Subsequent career paths are varied, but include work with government agencies, universities, or the private sector. This Bioinformatics option has an added emphasis on bioinformatics, including additional courses and seminars. The goal of this option is to train students to become researchers in the interdisciplinary field of bioinformatics, which lies at the intersection of biological/medical sciences and mathematics/computer science/engineering.

***section 12.9.12: Doctor of Philosophy (Ph.D.) Plant Science: Environment***

**\*\*This program is not offered in 2023-2024 academic year.\*\***

This Ph.D. in Plant Science requires approximately three years for completion. Overall, the program consists of seminars and a research project leading to a thesis. Students must also complete a comprehensive examination within their first year of study. The research project is defined with the help of an advisory committee. Subsequent career paths are varied, but include work with government agencies, universities, or the private sector. This Environment graduate option has an added emphasis on environmental sciences, including additional courses and seminars. It is aimed at students who wish to take an interdisciplinary approach in their graduate research on environmental issues and who wish to benefit from interactions with students from a wide range of disciplines.

***section 12.9.13: Doctor of Philosophy (Ph.D.) Plant Science: Neotropical Environment***

This Ph.D. in Plant Science requires approximately three years for completion. Overall, the program consists of seminars and a research project leading to a thesis. Students must also complete a comprehensive examination within their first year of study. The research project is defined with the help of an advisory committee. Subsequent career paths are varied, but include work with government agencies, universities, or the private sector. This option has an added emphasis on neotropical environments, including additional courses and seminars. Part of the program takes place in Panama.

#### *section 12.9.14: Graduate Certificate (Gr. Cert.) Bioinformatics (15 credits)*

The Graduate Certificate in Bioinformatics is a new cross-disciplinary program that teaches students the foundations of bioinformatics thinking, methodology, and applications through hands-on experience with computers and bioinformatics tools. The program introduces students to many areas of application such as medicine, agriculture, and chemistry. Required courses include basic UNIX skills, genomics data, common bioinformatics software, relational databases, and web resources. The Certificate is completed in one term (Winter term **only**) after which graduates may go on to pursue successful careers in the biomedical, biotechnology, and biosciences fields.

### **12.9.3 Plant Science Admission Requirements and Application Procedures**

#### **12.9.3.1 Admission Requirements**

##### **General**

The minimum cumulative grade point average (CGPA) is 3.0/4.0 (second class–upper division) or a minimum GPA of 3.2/4.0 during the last two years of full-time university study. High grades are expected in courses considered by the academic unit to be preparatory to the graduate program.

##### **Ph.D.**

Ph.D. candidates are required to have an M.Sc. degree in an area related to the chosen field of specialization for the Ph.D. program. Outstanding M.Sc. students may be permitted to transfer to the second year of the Ph.D. program following one year of study.

##### **Qualifying Students**

Some applicants whose academic degrees and standing entitle them to serious consideration for admission to graduate studies, but who are considered inadequately prepared in the selected subject, may be admitted to a Qualifying program if they have met the Graduate and Postdoctoral Studies minimum CGPA of 3.0/4.0. The course(s) to be taken in a Qualifying program w 8 8bd1 0 htudentsCGPW

**Associate Chair and Graduate Program Director**

Valérie Gravel

**Associate Graduate Program Director**

Mehran Dastmalchi

**Emeriti Professors**

Deborah J. Buszard; Ajjamada C. Kushalappa; Alan K. Watson

**Professors**

Pierre Dutilleul; Anja Geitmann; Deep Saini; Philippe Seguin; Donald L. Smith

**Associate Professors**

Jacqueline C. Bede; Jean-Benoit Charron; Valérie Gravel; Jaswinder Sind

**Required Invitational Seminar**

PLNT 690 (0) Research Horizons in Plant Science 1

**Required Courses (3 credits)**

COMP 616D1 (1.5) Bioinformatics Seminar

COMP 616D2 (1.5) Bioinformatics Seminar

PLNT 691 (0) Research Horizons in Plant Science 2

**Complementary Courses (6 credits)**

Chosen from the following:

BINF 511 (3) Bioinformatics for Genomics

**6 credits)** vitatF 0 0 1 221.9496.332R23 T24(Bioinformatics Molecular Biology) 81.305R23 T24(vitatvi1onr)TjminPolic 0 0 1 151.8339.06R23 T24(vitat1 0 0 1 165.8





\* Must be taken within one year of registering

PLNT 701                      (0)                      Doctoral Comprehensive Examination

**Complementary Courses**

Any courses at the 500 or 600 level deemed necessary for the chosen area of specialization.

PLNT 690

(0)

Research Horizons in Plant Science 1

**Required Courses (3 credits)**

\* Must be taken within the first year of registering

Interdisciplinary Approach En

**12.9.14 Graduate Certificate (Gr. Cert.) Bioinformatics (15 credits)**

**Required Courses (9 credits)**

BINF 511	(3)	Bioinformatics for Genomics
BINF 660	(3)	Advances in Bioinformatics
BTEC 555	(3)	Structural Bioinformatics

**Complementary Courses (6 credits)**

6 credits from the following:

ANSC 565	(3)	Applied Information Systems
BMDE 652	(3)	Bioinformatics: Proteomics
COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
COMP 616N1	(1.5)	Bioinformatics Seminar
COMP 616N2	(1.5)	Bioinformatics Seminar
COMP 618	(3)	Bioinformatics: Functional Genomics
GLIS 673	(3)	Bioinformatics Resources
HGEN 663	(3)	Beyond the Human Genome