Faculty of Agricultural and Environmental Sciences, including School of Human Nutrition (Graduate)

Programs, Courses and University Regulations

2017-2018

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 Dean's Welcome

To Graduate Students and Postdoctoral Fellows:

Welcome to Graduate and Postdoctoral Studies (GPS) at McGill. You are joining a community of world-class researchers and more than 9,000 graduate students in over 400 programs. *GPS* is here to support you from admissions through to graduation and beyond. We take a holistic approach to graduate student success; we support not only your academic development, but also your career-planning and professional development, and your well-being and student life. I invite you to consult the website *Resources for Your Success*, which is a one-stop-shop for the many resources and support systems in place for you across the University.

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.
Dean, Graduate and Postdoctoral Studies

2 Graduate and Postdoctoral Studies

2.1 Administrative Officers

Administrative Officers	
Josephine Nalbantoglu; B.Sc., Ph.D. (McG.)	**Dean (Graduate and Postdoctoral Studies)**
Robin Beech; B.Sc.(Nott.), Ph.D.(Edin.)	**Associate Dean (Graduate and Postdoctoral Studies)**
France Bouthillier; B.Ed., C.Admin.(UQAM), M.B.S.I.(Montr.), Ph.D.(Tor.)	**Associate Dean (Graduate and Postdoctoral Studies)**
Jean-Jacques Lebrun; B.Sc.(La Roche-sur-Yon), M.Sc.(Rennes), Ph.D.(Paris V)	**Associate Dean (Graduate and Postdoctoral Studies)**
Elisa Pylkkanen; B.A., M.A.(McG.)	**Director (Graduate and Postdoctoral Studies)**

2.2 Location

James Administration Building, Room 400
845 Sherbrooke Street West
Montreal QC H3A 0G4
Website: *www.mcgill.ca/gps*

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

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 works in collaboration and consultation with faculties, graduate programs, graduate student and postdoctoral associations, and other administrative and academic units to oversee graduate policies and regulations, advocate broadly for the cause of graduate education, and foster an environment that actively promotes each student's or postdoctoral scholar's realization of his or her full academic and research potential.

If the courses completed elsewhere or at McGill prior to admission were used to complete a degree, exemptions may be granted without credit, i.e., the e

French language courses are available at the French Language Centre. The teaching is intensive and class sizes are kept small. While undergraduate students are given preference, graduate students who are certain they can devote sufficient time to the work may enrol.

Thesis – Doctoral

The thesis for the Ph.D. degree must display original scholarship expressed in good literate style and must be a distinct contribution to knowledge. **Formal notice of a thesis title and names of examiners must be submitted to the Thesis section of GPS on the *Nomination of Examiners and Thesis Submission* form, available at**

i. Postdocs have the same pertinent rights as the ones granted to McGill students in the *Handbook on Student Rights and Responsibilities* ("Green Book"), available at *www.mcgill.ca/secretariat/policies/students*.

ii. Postdocs have full graduate student borrowing privileges in McGill libraries through their identity card.

iii. As a rule, Postdocs who are Canadian citizens or who have Permanent Resident status may take courses for credit. Admission to such courses should be sought by submitting application documents directly to the appropriate program by the Postdoc. They must be admitted by the department offering the courses as Special Students. These Postdocs may only be enrolled as part-time students in non-degree granting programs. They will be charged fees for these courses.

iv. Postdocs may be listed in the McGill directory. The Computing Centre will grant Postdocs email privileges on the same basis as graduate students upon presentation of a valid identity card.

v. The Department of Athletics will grant Postdocs access to sports facilities upon presentation of their identity card. A fee will be charged on an annual or term basis.

vi. Postdocs are mandatory members of the Post-Graduate Students' Society (PGSS) and an annual association fee is automatically charged. PGSS fees are mandatory. Postdocs are permitted membership in the Faculty Club; an annual fee will be charged for this membership.

vii. Postdocs are encouraged to participate in Professional Development Workshops provided by Graduate and Postdoctoral Studies and Teaching and Learning services. These sessions are usually free of charge.

viii. Postdocs have access to the services provided by the Ombudsperson.

ix. Postdocs may enrol as part-time students in the second language written and spoken English/French courses offered by the School of Continuing Studies/French Language Centre. Postdocs will be charged tuition for these courses. International Postdocs may be required to obtain a CAQ and a Study Permit.

x. Access to student services and athletic services are available to the Postdoc on an opt-in basis. Fees are applicable.

5. Responsibilities

Approved by Senate, April 2000; revised May 2014

8.3 Vacation Policy for Graduate Students and Postdocs

Graduate students and Postdocs should normally be entitled to vacation leave equivalent to university holidays and an additional total of fifteen (15) working days in the year. Funded students and Postdocs with fellowships and research grant stipends taking additional vacation leave may have their funding reduced accordingly.

Council of FGSR April 23, 1999

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 *www*

- the individual must have adequate proficiency in English, but is not required to provide official proof of English competency to Enrolment Services;
- the individual must comply with regulations and procedures governing research ethics and safety and obtain the necessary training;
- the individual will be provided access to McGill libraries, email, and required training in research ethics and safety. Any other University services must be purchased (e.g., access to athletic facilities);
- the individual must arrange for basic health insurance coverage prior to arrival at McGill and may be required to provide proof of coverage.

9 Graduate Studies Guidelines and Policies

Refer to *University Regulations & Resources* > *Graduate* > *: Guidelines and Policies* for information on the following:

- Guidelines and Regulations for Academic Units on Graduate Student Advising and Supervision
- Policy on Graduate Student Research Progress Tracking
- Ph.D. Comprehensives Policy
- Graduate Studies Reread Policy
- Failure Policy
- Guideline on Hours of Work

10 Information on Research Policies0 1 9 21u0301.5c Patent5cPostdoc5cAssociat.5c Trainees

Refer to *University Regulations & Resources* > *Graduate* > *: Research Policy0 1 9 21u0301.5c Patent5c Postdoc5cAssociat.5c Trainees* for information on the following:

- Policy on Research Ethics
- Regulations on Research Policy
- Policy on Research Integrity
- Guidelines for Research Involving Human Subjects
- Guidelines for Research with Animal Subjects
- Policy on Intellectual Property
- Regulations Governing Conflicts of Interest
- Safety in Field Work
- Office of Sponsored Research
- Postdoc5
- Research Associat.5

11 Browse Academic Units & Programs

The programs0 1 9courses in the following sections have been approved for the 2017–2018 session as listed. The Faculty/School reserves the right to introduce changes as may be deemed necessary or desirable at any time throughout the year.

11.1 Agricultural Economics

11.1.1 Location

Department of Natural Resource Sciences
Macdonald Campus
21,111 Lakeshore Road

Sainte-Anne-de-Bellevue QC H9X 3V9
Canada
Telephone: 514-398-7838
Email: *gradstudies.macdonald@mcgill.ca*
Website: *www.mcgill.ca/nrs/academic/graduate/agricultural-economics*

11.1.2 About Agricultural Economics

The goal of graduate training in Agricultural Economics is to provide students with the applied concepts and tools to identify, define, and analyze economic problems affecting the performance of the agri-food sector and the environment. Attention is given to:

- the development of analytical skills in the broad areas of agricultural, environmental, and ecological economics;
- development;
- resource allocation in production and marketing in agriculture.

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 11.7: Natural Resource Sciences*. Further details can also be found at *www.mcgill.ca/nrs/academic/graduate/agricultural-economics*.

11.1.3 Agricultural Economics Admission Requirements and Application Procedures

11.1.3.1 Admission Requirements

To be considered eligible for direct admission to the M.Sc. program, the applicant must have an undergraduate degree with a Cumulative Grade Point Average (CGP

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit. International applicants are advised to apply well in advance of these dates because immigration procedures may be lengthy.

11.1.4 Agricultural Economics Faculty

Program Director

P.J. Thomassin

Associate Professors

N. Kosoy; B.Sc.(Univ. Simon Bolivar), M.Sc.(Kent), M.Sc., Ph.D.(Autonoma de Barcelona)

P.J. Thomassin; B.Sc.(Agr.)(McG.), M.S., Ph.D.(Hawaii Pac.)

Assistant Professors

A.P.Harou; B.S.(Sus.), M.S.(Calif., Davis), Ph.D.(Cornell)

F

section 11.2.6: Master of Science, Applied (M.Sc.A.) Animal Science (Non-Thesis) (45 credits)

This non-thesis degree is oriented to animal scientists already working in industry or government, to undergraduate students inspired by concepts in sustainable and integrated animal agriculture, to project leaders interested in animal resource management, and to veterinarians. The program provides 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.

section 11.2.7: 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,Tj-0(vidual stu 1 1ed b Tm(,Tj-0(vi1 0 0stu 1 1ed bcandrabtquit infsid.08is mana tosits an adaciredm(graduatuperout12.0(gratd must be appro)Ttu 40

11.2.3.3 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 *www.mcgill.c67 TNrps/sultactJ3wTm(vised at an)Tj1 0 0d9rl.c8r51l.c67 TNrps/toral -pn*

Assistant Professors

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

Jianguo (Jeff) Xia; B.M.(Peking Health Science), M.Sc., Ph.D.(Alta.) (

ANSC 560	(3)	Biology of Lactation
ANSC 565	(3)	Applied Information Systems
ANSC 600	(3)	Advanced Eukaryotic Cells and Viruses
ANSC 604	(3)	Advanced Animal Biotechnology
ANSC 605	(3)	Estimation: Genetic Parameters
ANSC 606	(3)	Selection Index and Animal Improvement
ANSC 622	(3)	Selected Topics in Molecular Biology
ANSC 635	(3)	Vitamins and Minerals in Nutrition
ANSC 636	(3)	Analysis - Animal Breeding Research Data
ANSC 691	(3)	Special Topic: Animal Sciences
ANSC 692	(3)	Topic in Animal Sciences 1

0-15 credits selected from 500- and 600-level courses from across the Faculty (with the possibility of up to 9 credits from outside the Faculty if deemed appropriate by the supervisor).

11.2.7 Doctor of Philosophy (Ph.D.) Animal Science

Since the Ph.D. is primarily a research degree, the amount of coursework required will depend on the background of the individual student, and must be approved by the student's 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

ANSC 701	(0)	Doctoral Comprehensive Examination

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

11.2.8 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

Complementary Courses (6 credits)

Two courses 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.

11.3 Bioresource Engineering

11.3.1 Location

Department of Bioresource Engineering
Macdonald Campus
21,111 Lakeshore Road
Sainte-Anne-de-Bellevue QC H9X 3V9
Canada
Telephone: 514-398-7838
Email: *gradstudies.macdonald@mcgill.ca*
Website: *www.mcgill.ca/bioeng*

section 11.3.7

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. **Successful completion of a Qualifying program does not guarantee admission to a degree program.**

Financial Aid

Financial aid is very 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 by the student and/or the student's supervisor. Academic units cannot guarantee financial support via teaching assistantships or other funds.

11.3.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

11.3.3.2.1 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.

11.3.3.3 Application Dates and Deadlines

Professors
Chandra

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	(4)	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.

11.3.6 Master of Science (M.Sc.) Bioresource Engineering (Thesis): Environment (46 credits)

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	(4)	M.Sc. Thesis 8

Required Courses (11 credits)

BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2
BREE 699	(3)	Scientific Publication
ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3

Complementary Courses (3 credits)

Chosen from the following:

Global ,eTc0 credits)

or another 500-, 600-, or 700-level course recommended by the Advisory Committee and approved by the Environment Option Committee.

11.3.7 Master of Science (M.Sc.) Bioresource Engineering (Non-Thesis): Integrated Water Resources Management (45 credits)

Research Project (6 credits)

BREE 631	(6)	Integrated Water Resources Management Project

Required Courses (27 credits)

BREE 503	(3)	Water: Society, Law and Policy
BREE 510	(3)	Watershed Systems Management
BREE 630	(13)	Integrated Water Resources Management Internship
BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2
BREE 655	(3)	Integrated Water Resources Management Research Visits
PARA 515	(3)	Water, Health and Sanitation

Elective Courses (12 credits)

12 credits, at the 500 lev

BREE 672	(6)	Project 2

Required Courses (8 credits)

BREE 651	(1)	Departmental Seminar M.Sc. 1
BREE 652	(1)	Departmental Seminar M.Sc. 2
ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3

Complementary Courses (25 credits)

3 credits from the following courses below:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or another course at the 500, 600, or 700 level recommended by the Advisory Committee and approved by the Environment Option Committee.

22 additional credits of 500-, 600-, or 700-level courses chosen in consultation with the academic adviser.

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

This inter-departmental graduate program leads to a master's degree in Environmental Engineering. The objective of the program is to train environmental professionals at an advanced level. The program is designed for individuals with an undergraduate degree in engineering. This non-thesis degree falls within the M.Eng. and M.Sc. programs which are offered in the Departments of Bioresource, Chemical, Civil, and Mining, Metals, and Materials Engineering.

Research Project (6 credits)

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

* BREE 671 may also be taken as part of this requirement.

Required Courses (9 credits)

BREE 533	(3)	Water Quality Management
CHEE 591	(3)	Environmental Bioremediation
CIVE 615	(3)	Environmental Engineering Seminar

Complementary Courses (19 credits)

Data Analysis Course

3 credits from the following:

AEMA 611	(3)	Experimental Designs 1

CIVE 555	(3)	Environmental Data Analysis
PSYC 650	(3)	Advanced Statistics 1

Toxicology Course

3 credits from the following:

OCCH 612	(3)	Principles of Toxicology
OCCH 616	(3)	Occupational Hygiene

Water Pollution Engineering Course

4 credits from the following:

CIVE 651	(4)	Theory: Water / Wastewater Treatment
CIVE 652	(4)	Biological Treatment: Wastewaters
CIVE 660	(4)	Chemical and Physical Treatment of Waters

Air Pollution Engineering Course

3 credits from the following:

CHEE 592	(3)	Industrial Air Pollution Control
MECH 534	(3)	Air Pollution Engineering

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

Environmental Impact Course

3 credits from the following:

GEOG 501	(3)	Modelling Environmental Systems
GEOG 551	(3)	Environmental Decisions

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):

BREE 699	(3)	Scientific Publication

Complementary Courses (39 credits)

Minimum of 3 credits of graduate-level Statistics in any department

Minimum of 9 credits from courses selected from the following:

BREE 518	(3)	Ecological 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
BREE 603	(3)	Advanced Properties: Food and Plant Materials

Minimum of 12 credits selected from the following:

BREE 601	(6)	Integrated Food and Bioprocessing Internship 1
BREE 602	(6)	Integrated Food and Bioprocessing Internship 2
BREE 671	(6)	Project 1
BREE 672	(6)	Project 2

Minimum of 3 credits selected from the following:

AGEC 630	(3)	Food and Agricultural Policy
AGEC 633	(3)	Environmental and Natural Resource Economics
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 535	(3)	Food Biotechnology
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.

11.3.12 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

or another course at the 500, 600, or 700 level recommended by the Advisory Committee and approved by the Environment Option Committee.

11.4 Biotechnology

11.4.1 Location

Institute of Parasitology
Macdonald Campus
21,111 Lakeshore Road
Sainte-Anne-de-Bellevue QC H9X 3V9
Canada
Telephone: 514-398-7838
Email: *gradstudies.macdonald@mcgill.ca*
Website: *www.mcgill.ca/biotechgradprog*

11.4.2 About Biotechnology

A non-thesis M.Sc.(Applied) degree and a Graduate Certificate in Biotechnology are offered.

The non-thesis program in Biotechnology offers a course-based curriculum with practical training in laboratory courses and internships offered through the Institute of Parasitology. The Institute is housed on Macdonald Campus of McGill University in beautiful Sainte-Anne-de-Bellevue about 30 kilometers from the Montreal main campus downtown.

Graduates typically enter the biotechnology sector in research, management, or sales, or accept government positions.

Biotechnology Programs

section 11.4.5: Master of Science, Applied (M.Sc.A.) Biotechnology (Non-Thesis) (45 credits)

Candidates must possess a bachelor's degree in the biological/molecular sciences or an equivalent program. This applied master's program is unique in Quebec. It aims to prepare students for entry into the biotechnology and pharmaceutical industry or to pursue further graduate studies in biomedicine, agriculture, or the environment. 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. The program provides in-house training in molecular biology with a strong focus on the molecular/biochemical sciences. Concurrently, it provides teaching in management and gives students the opportunity to look at the business aspect of biotechnology.

A research internship of four to eight months is carried out in an active laboratory, and students learn to present and write research results. Graduates will find jobs ranging from positions as research assistants and/or technicians in biomedical or pharmaceutical laboratories to managerial or supervisory positions. They may also pursue a career in the business of biotechnology including patent and intellectual property management.

section 11.4.6: Graduate Certificate (Gr. Cert.) Biotechnology (16 credits)

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.

11.4.3 Biotechnology Admission Requirements and Application Procedures

11.4.3.1 Admission Requirements

Candidates for the Graduate Certificate and the M.Sc.(Applied) in Biotechnology must possess a bachelor’s degree in biological sciences or equivalent with a minimum cumulative grade point average of 3.0/4.0 or 3.2/4.0 GPA in the last two full-time years of univ

11.4.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application

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.

11.4.6 Graduate Certificate (Gr. Cert.) Biotechnology (16 credits)

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)	Selected Topics in Molecular Biology
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

Environment and Food

BREE 530	(3)	Fermentation Engineering
FDSC 535	(3)	Food Biotechnology

11.5 Food Science and Agricultural Chemistry

11.5.1 Location

Department of Food Science and Agricultural Chemistry
Macdonald-Stewart Building, Room MS1-033
Macdonald Campus of McGill University
21,111 Lakeshore Road

Sainte-Anne-de-Bellevue QC H9X 3V9
Canada
Telephone: 514-398-7838
Email: *gradstudies.macdonald@mcgill.ca*
Website: *www.mcgill.ca/foodscience*

11.5.2 About Food Science and Agricultural Chemistry

The Department of Food Science and Agricultural Chemistry offers M.Sc. (thesis and non-thesis) and Ph.D. programs. These programs provide training in evolving interdisciplinary areas of:

- food quality;
- food safety/food microbiology;
- food chemistry;
- food biotechnology;
- functional ingredients;
- applied infrared spectroscopy;
- food processing;
- thermal generation of aromas and toxicants;
- marine biochemistry;
- food chemical toxicants.

The Department has key infrastructure with all major equipment necessary for conducting research in all these areas. Our graduate program provides strong

11.5.4 Food Science and Agricultural Chemistry Faculty

Chair

Varoujan A. Yaylayan

Graduate Program Director

Ashraf Ismail

Professors

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

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

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

Associate Professors

Saji George; B.Sc., M.Sc.(Mahatma Gandhi, Kerala), Ph.D.(NUS)

Lawrence Goodridge; B.Sc., M.Sc., Ph.D.(Guelph)

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

Salwa Karboune; B.Sc., M.Sc.(Hassan II, Rabat), D.E.A., Ph.D.(Marseille)

Assistant Professor

Stephane Bayen; B.Sc.(ENSCM), M.Sc.(NUS), M.Eng.(ENSCM), Ph.D.(NUS)

Jennifer Ronholm; B.Sc.(Wat.), Ph.D.(Ott.) (*joint appt. with Animal Science*)

Adjunct Professors

John Austin; M.Sc.(Windsor), Ph.D.(W. Ont.)

Luis Garcia; M.Sc.(Guelph)

Jocelyn Pare; B.Sc.(McG.), Ph.D.(Car.)

Professors Post-Retirement

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

Selim Kermasha; B.Sc.(Baghdad), D.Sc.(Nancy)

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

11.5.5 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.

11.5.6 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 REQUIREMENTS

Research Project (12 credits)

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 535	(3)	Food Biotechnology
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 & 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.

11.5.7 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 make up the program reflect the food safety considerations at the different stages of the farm to table food supply chain.

Required Courses (12 credits)

FDSC 545	(3)	Advances in Food Microbiology
FDSC 624	(3)	Current Food Safety Issues
FDSC 626	(3)	Food Safety Risk Assessment
FDSC 634	(3)	Food Toxins & Toxicants

Research Project (12 credits)

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

Complementary Courses (15 credits)

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.

11.5.8 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

11.6 Human Nutrition

11.6.1 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*
Website: *www.mcgill.ca/nutrition*

11.6.2 About Human Nutrition

In the School of Human Nutrition, cutting-edge nutrition research is conducted by its ten tenure-track professors and six faculty lecturers in all areas recommended by North American Nutrition Societies. These include molecular and cellular nutrition, clinical, community, and international nutrition. Domains emphasized by School researchers include:

- nutritional biochemistry and metabolism;
- embryonic and fetal origins of health and disease;
- studies optimizing health in at-risk populations including Aboriginal populations, mothers and children, and the elderly;
- the development of novel nutritional and/or nutraceutical approaches 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 *Mary Emily Clinical Nutrition Research Unit* (MECNRU), and the MUHC Teaching Hospitals. Students can conduct research or participate in clinical rotations in Ghana and field sites in Asia, Africa, Latin America, and the Caribbean.

section 11.6.5: Master of Science (M.Sc.) Human Nutrition (Thesis) (45 credits)

A master's degree in Human Nutrition offers advanced Nutrition courses in a broad range of research areas. The program is suitable for students with an undergraduate degree in nutritional sciences, exercise physiology, kinesiology, food science, biochemistry, medicine, or another closely related field. Students are required to complete 14 credits in advanced nutrition coursework plus 31 credits related to their thesis research. Graduates of our M.Sc. thesis degree have pursued successful careers in research, international health agencies, government agencies, and industry.

section 11.6.7: Master of Science, Applied (M.Sc.A.) Human Nutrition (Non-Thesis): Practicum (45 credits) **and** ***section 11.6.8: Master of Science, Applied (M.Sc.A.) Human Nutrition (Non-Thesis): Project (45 credits)***

The M.Sc. Applied program is a course-based master's program. It allows students to further develop knowledge and expertise in nutrition. Students are required to complete 29 credits in advanced Nutrition courses plus 16 credits related to a research project or an advanced practicum (reserved for registered dietitians). Careers include managerial positions for practising dietitians, and careers in nutrition programs, government, and industry.

section 11.6.6: Master of Science, Applied (M.Sc.A.) Human Nutrition (Non-Thesis): Dietetics Credentialing (83 credits)

The M.Sc. Applied program in Dietetics Credentialing is a course-based master's program with a dietetics *Stage* (internship) included. At the end of the program, students are qualified to be licensed with one of the provincial regulatory bodies in Canada, as well as in other countries, and practise in the areas of clinical nutrition, community nutrition, and foodservice management; French competency is an asset. The program is preceded by a Qualifying year, if necessary, to complete certain courses required for licensure. This is followed by three semesters of graduate-level courses (46 credits) and 3 semesters of *Stage* (37 credits), which include a practice-based graduate project.

section 11.6.9: Doctor of Philosophy (Ph.D.) Human Nutrition

A Ph.D. degree in Human Nutrition is suitable for students with an M.Sc. degree in Nutritional Sciences or related areas who wish to become independent researchers and/or leaders in the field of nutritional sciences. The School offers a stimulating research environment with opportunities in a wide range of areas of basic science, clinical research with our many hospital clinicians, as well as population health in Canada and abroad. Careers include academic, senior government, and industry positions within Canada and internationally.

section 11.6.10: Graduate Diploma (Gr. Dip.) Registered Dietitian Credentialing (30 credits)

In the School of Human Nutrition at McGill, students pursuing a Ph.D. in human nutrition have the opportunity to apply to our Graduate Diploma in R.D. Credentialing, upon completion of the Ph.D. program and upon completion of the undergraduate courses required by *l'Ordre professionnel des diététistes du Québec* (OPDQ). Additional preparatory courses for *Stages* (internships) are NUTR 513, NUTR 628, NUTR 515. This Diploma consists of two semesters of *Stage* (internship) in Clinical Nutrition, Community Nutrition, and Foodservice Management. Upon completion of the Diploma, the recipient is eligible to register and practice as a Dietitian in Quebec, as well as in other Canadian provinces and other countries.

11.6.3 Human Nutrition Admission Requirements and Application Procedures

11.6.3.1 Admission Requirements

M.Sc. Thesis and M.Sc.

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	March 1	March 1	March 1
Winter Term*:	Feb. 15*	June 1*	Oct. 1*	Oct. 1*
Summer Term:	N/A	N/A	N/A	N/A

* Admission to the Winter term is open for thesis programs only.

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

International applicants are advised to apply well in advance of these dates because immigration procedures may be lengthy.

11.6.4 Human Nutrition Faculty

Director

Linda J. Wykes

Emeritus Professor

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

Professors

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

Tim A. Johns; B.Sc.(McM.), M.Sc.(Br. Col.), Ph.D.(Mich.) (*Director, McGill Canadian Field Studies in Africa [CFSIA]*)

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

Associate Professors

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

Treena Delormier: B.Sc., M.Sc.(McG.), Ph.D.(Montr.)

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-Quinonez; M.Sc.(SPHM), M.D.(USAC), D.Sc.(Friedrich Schiller Univ.) (*Director, McGill Institute for Global Food Security*)

Louise Thibault; B.Sc., M.Sc., Ph.D.(Laval), Dt. P.

Hope Weiler; B.A.Sc.(Guelph), Ph.D.(McM.), R.D. (CDO) (*Canada Research Chair*) (*Director, Mary Emily Clinical Nutrition Research Unit*)

Senior Faculty Lecturers

Sandy Phillips; B.Sc., M.Sc.(A.)(McG.), Dt. P. (*University Coordinator, Professional Practice (Stage) in Dietetics*)

Maureen Rose; B.Sc., M.Ed., Ph.D.(McG.), Dt. P. (*Director, Food and Nutrition Laboratories*)

Faculty Lecturers

Paul-Guy Duhamel; B.Sc.(McG.), M.Sc.(Montr.), Dt. P. (*Manager, Food and Nutrition Laboratories*)

Mary Hendrickson-Nelson; B.A.(St. Benedict), B.Sc.(Minn.), M.Sc.(Colo. St.), Dt. P.

Hugues Plourde; B.Sc.(McG.), M.Sc., Ph.D.(Montr.), Dt. P.

Joane Routhier; B.Sc.(McG.)

Sessional Lecturers

Peter Bender (PT); B.Ed., M.A.(McG.), Ph.D.(Flor. St.)

Sessional Lecturers
Sté

NUTR 503	(3)	Bioenergetics and the Lifespan
NUTR 513	(3)	Credentialing in Dietetics
NUTR 515	(1)	Dietetics French Examination
NUTR 545	(4)	Clinical Nutrition 2
NUTR 602	(3)	Nutritional - Status Assessment
NUTR 606	(3)	Human Nutrition Research Methods
NUTR 612	(8)	Graduate Professional Practice 2 Management
NUTR 613	(14)	Graduate Professional Practice 3 Clinical Nutrition
NUTR 614	(8)	Graduate Professional Practice 4 Community Nutrition
NUTR 626	(3)	Writing for Dietetics Practice
NUTR 627	(1)	Professional Dietetics Presentation
NUTR 628	(1)	Dietetics Comprehensive Examination
NUTR 629	(6)	Professional Dietetics Project
NUTR 651	(3)	M.Sc. (Applied) Nutrition 1
NUTR 660	(1)	M.Sc. (Applied) Nutrition 2
NUTR 695	(1)	Human Nutrition Research Orientation
NUTR 696	(1)	Human Nutrition Seminar

Complementary Courses (9 credits)

3 credits of statistics from the following:

AEMA 610	(3)	Statistical Methods 2
EPIB 507	(3)	Biostats for Health Sciences
PSYC 650	(3)	Advanced Statistics 1

3 credits from the following:

ANSC 551	(3)	Carbohydrate and Lipid Metabolism
	(3)	Protein Metabolism and Nutrition

To be chosen, at the 500 level or higher, in consultation with the Program Coordinator.

11.6.7 Master of Science, Applied (M.Sc.A.) Human Nutrition (Non-Thesis): Practicum (45 credits)

Practicum (12 credits)

NUTR 656	(3)	M.Sc. (Applied) Practicum 1
NUTR 657	(3)	M.Sc. (Applied) Practicum 2
NUTR 658	(3)	M.Sc. (Applied) Practicum 3
NUTR 659	(3)	M.Sc. (Applied) Practicum 4

Required Courses (6 credits)

NUTR 651	(3)	M.Sc. (Applied) Nutrition 1
NUTR 660	(1)	M.Sc. (Applied) Nutrition 2
NUTR 695	(1)	Human Nutrition Research Orientation
NUTR 696	(1)	Human Nutrition Seminar

Complementary Courses (18 credits)

3 credits in statistics at the 500 level or higher

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.

11.6.8 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) Nutrition 1
NUTR 660	(1)	M.Sc. (Applied) Nutrition 2
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)

section 11.7.5: Master of Science (M.Sc.) Agricultural Economics (Thesis) (46 credits)

This program pro

section 11.7.15: 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 11.7.16: Doctor of Philosophy (Ph.D.) Entomology: Environment

Please contact the Department for more information about this program.

section 11.7.17: Doctor of Philosophy (Ph.D.) Entomology: Neotropical Environment

Please contact the Department for more information about this program.

section 11.7.18: 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 11.7.19: Doctor of Philosophy (Ph.D.) Microbiology: Bioinformatics

Please contact the Department for more information about this program.

section 11.7.20: Doctor of Philosophy (Ph.D.) Microbiology: Environment

Please contact the Department for more information about this program.

section 11.7.21: 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. 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 11.7.22: Doctor of Philosophy (Ph.D.) Renewable Resources: Environment

Please contact the Department for more information about this program.

section 11.7.23: Doctor of Philosophy (Ph.D.) Renewable Resources: Neotropical Environment

Please contact the Department for more information about this program.

11.7.3 Natural Resource Science Admission Requirements and Application Procedures

11.7.3.1 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 equivalent cumulative grade point average of 3.0/4.0 (second class–upper division) or 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 an equivalent cumulative grade point average of 3.0/4.0 (second class–upper division) or 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.

11.7.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at *www.mcgill.ca/gradapplicants/apply*.

See *University Regulations & Resources* > *Graduate* > *Graduate AalGr*

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.(Zür.), 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.) (

Adjunct Professors

Suren Kulshreshtha

Christopher Solomon

Affiliate Member

Geoffrey Sunahara

11.7.5 Master of Science (M.Sc.) Agricultural Economics (Thesis) (46 credits)

Students may specialize, by way of their research program, in agri-business, development, finance, marketing and trade, policy, and resource and ecological economics.

Thesis Courses (27 credits)

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

Required Course

(1 credit)

AGEC 690	(1)	Seminar

Complementary Courses (18 credits)

6 credits, two theory courses chosen from:

AGEC 633	(3)	Environmental and Natural Resource Economics
ECON 610	(3)	Microeconomic Theory 1
ECON 611	(3)	Microeconomic Theory 2
ECON 620	(3)	Macroeconomic Theory 1
ECON 621	(3)	Macroeconomic Theory 2

3 credits, one quantitative methods course chosen from:

AEMA 610	(3)	Statistical Methods 2
ECON 525	(3)	Project Analysis
ECON 662	(6)	Econometrics
ECON 665	(3)	Quantitative Methods
MGSC 679	(3)	Applied Deterministic Optimization

9 credits, three 3-credit courses at the 500, 600, or 700 level, at least one of which must be in Agricultural Economics, chosen in consultation with the Agricultural Economics Adviser.

11.7.6 Master of Science (M.Sc.) Entomology (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 courses at the 500, 600, or 700 level; normally one of these will be a course in statistics.

11.7.7 Master of Science (M.Sc.) Entomology (Thesis): Environment (46 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 (7 credits)

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3
NRSC 651	(1)	Graduate Seminar 3

Complementary Courses (3 credits)

One of the following courses:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or another 500-, 600-, or 700-level course recommended by the Advisory Committee and approved by the Environment Option Committee.

11.7.8 Master of Science (M.Sc.) Entomology (Thesis): Neotropical Environment (48 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 (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.

11.7.9 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.

11.7.10 Master of Science (M.Sc.) Microbiology (Thesis): Environment (46 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 (7 credits)

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3
NRSC 651	(1)	Graduate Seminar 3

Complementary Course (3 credits)

One of the following courses:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or another 500-, 600-, or 700-level course recommended by the Advisory Committee and approved by the Environment Option Committee.

11.7.11 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.

11.7.12 Master of Science (M.Sc.) Renewable Resources (Thesis): Environment (46 credits)

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 (7 credits)

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2
ENVR 652	(1)	Environmental Seminar 3
NRSC 651	(1)	Graduate Seminar 3

Complementary Courses (6 credits)

3 credits, one of the following courses:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species

ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or another 500-, 600-, or 700-level course recommended by the Advisory Committee and approved by the Environment Option Committee.

3 credits of statistics at the 500, 600, or 700 level.

NRSC 611	(3)	Environmental Assessment Knowledge Base
NRSC 612	(3)	Environmental Assessment and Sustainable Development
NRSC 613	(3)	Strategic and Sectoral Environmental Assessment
NRSC 614	(3)	Meeting Environmental Assessment Regulations

Complementary Courses (6 credits)

500- or 600-level relevant courses to be chosen in consultation with the Supervisor and Program Director.

11.7.15 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 must be aginal3

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.

11.7.19htTjDjc1.0 1 fPhilosophy (Ph.D.) in Toxicology Student Thesis 43.-0.2Tj/w1 0 0 1 67.52 703.741 Tm630.1639htTjAt's si1 fsopine, ilosoal

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.

Complementary Courses

One course chosen from the following:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or another 500-, 600-, or 700-level course recommended by the Advisory Committee and approved by the Environment Option Committee.

11.7.21 Doctor of Philosophy (Ph.D.) Renewable Resources

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.

11.7.22 Doctor of Philosophy (Ph.D.) Renewable Resources: 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

ENVR 610	(3)	Foundations of Environmental Policy
ENVR 650	(1)	Environmental Seminar 1
ENVR 651	(1)	Environmental Seminar 2

ENVR 652	(1)	Environmental Seminar 3
NRSC 701	(0)	Ph.D. Comprehensive Examination
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.

Complementary Courses

One course chose from the following:

ENVR 519	(3)	Global Environmental Politics
ENVR 544	(3)	Environmental Measurement and Modelling
ENVR 620	(3)	Environment and Health of Species
ENVR 622	(3)	Sustainable Landscapes
ENVR 630	(3)	Civilization and Environment
ENVR 680	(3)	Topics in Environment 4

or other graduate course recommended by the Advisory Committee and approved by the Environment Option Committee.

11.7.23 Doctor of Philosophy (Ph.D.) Renewable Resources: 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 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.

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section 11.8.7: Doctor of Philosophy (Ph.D.) Parasitology: Bioinformatics

An advanced, original research project in an area of parasitology is undertaken supervised by faculty staff, and a thesis is produced. Additional coursework in the field of bioinformatics is required for this option. Graduates are well suited for a teaching or research career, especially where there is particular emphasis on the science of bioinformatics.

section 11.8.8: Doctor of Philosophy (Ph.D.) Parasitology: Environment

An advanced, original research project in an area of parasitology is undertaken supervised by faculty staff, and a thesis is produced. There is additional coursework on environmental topics for this option. Graduates are prepared for careers in academia, industry, or government, especially where the focus is on environmental protection or management of valuable natural resources, such as water.

	Application Opening Dates		Application Deadlines	
Summer Term:	N/A	N/A	N/A	N/A

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit. International applicants are advised to apply well in advance of these dates because immigration procedures may be lengthy.

11.8.4 Parasitology Faculty

Director

Timothy G. Geary

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.)

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

Jerry Aldridge; B.Sc.(Lenoir-Rhyne), Ph.D.(Wake Forest)

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.)

Sean Forrester; B.Sc.(Cape Breton), M.Sc.(Lake.), Ph.D.(McG.)

Raymond Hui; B.Sc., M.Sc., Ph.D.(Tor.)

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.)

11.8.5 Master of Science (M.Sc.) Parasitology (Thesis) (45 credits)

Thesis Courses (32 credits)

PARA 687	ses (3a5ian	(10)	Thesis Research 1
PARA 688		(10)	Thesis Research 2

PARA 689	(12)	Thesis Research 3

Required Courses (10 credits)

PARA 600	(4)	Thesis Proposal for M.Sc
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.

11.8.6 Doctor of Philosophy (Ph.D.) Parasitology

Thesis

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

6 credits chosen from the following:

BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
		Structural Bioinformatics

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Telephone: 514-398-7838
Email: *gradstudies.macdonald@mcgill.ca*
Website: *www.mcgill.ca/plant*

11.9.2 About Plant Science

The Department offers an M.Sc. and Ph.D. in Plant Science with options in Bioinformatics, Environment, or Neotropical Environment, and provides for study in all fields of plant science. Research facilities—both field and laboratory—are available for investigations in plant breeding, crop physiology, crop management, crop quality, plant ecology, the epidemiology and biology of plant diseases, epigenetics, biosystematics, recombinant DNA technology, mycology, weed biology, tissue culture, plant biochemistry, and bioinformatics. Facilities include:

- Horticultural Research Centre;
- Emile A. Lods Agronomy Research Centre;
- greenhouses;
- growth cabinets;
- McGill University Herbarium;
- CT Scanning laboratory;
- Level 2 Quarantine Facility.

An advisory committee is named for each student and has the responsibility of developing the program of study appropriate to the student's background and area of specialization.

section 11.9.5: Master of Science (M.Sc.) Plant Science (Thesis) (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.

section 11.9.6: Master of Science (M.Sc.) Plant Science (Thesis): Bioinformatics (48 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. The goal of the Bioinformatics 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. 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 11.9.7: Master of Science (M.Sc.) Plant Science (Thesis): Environment (48 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 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 11.9.8: Master of Science (M.Sc.) Plant Science (Thesis): Neotropical Environment (48 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 11.9.9: Master of Science, Applied (M.Sc.A.) Plant Science (Non-Thesis) (45 credits)

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 11.9.10: 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 11.9.11: 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 11.9.12: Doctor of Philosophy (Ph.D.) Plant Science: Environment /F1 0 1 Tf1 0 0 1 70.52 558.06 Tm(This Neotrop.9216an added empha32TmTj4 l7nce: Epproxima

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

Application Pr

Associate Professors

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

Assistant Professors

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

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.)

Associate Members

Gregory Brown (*Department of Biology*)

Timothy A. Johns (*School of Human Nutrition*)

Adjunct Professor

Annick Bertrand

11.9.5 Master of Science (M.Sc.) Plant Science (Thesis) (45 credits)

Thesis Courses (39 credits)

PLNT 664	(12)	M.Sc. Thesis 1
PLNT 665	(12)	M.Sc. Thesis 2
PLNT 666	(15)	M.Sc. Thesis 3

Required Invitational Seminar

PLNT 690	(0)	Research Horizons in Plant Science 1

Complementary Courses (6 credits)

Two graduate-level courses

Additional courses may be required at the discretion of the candidate's supervisory committee.

11.9.6 Master of Science (M.Sc.) Plant Science (Thesis): Bioinformatics (48 credits)

Thesis Courses (39 credits)

PLNT 664	(12)	M.Sc. Thesis 1
PLNT 665	(12)	M.Sc. Thesis 2
PLNT 666	(15)	M.Sc. Thesis 3

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
BINF 621	(3)	Bioinformatics: Molecular Biology
BMDE 652	(3)	Bioinformatics: Proteomics
BTEC 555	(3)	Structural Bioinformatics
COMP 618	(3)	Bioinformatics: Functional Genomics

11.9.8 Master of Science (M.Sc.) Plant Science (Thesis): Neotropical Environment (48 credits)

11.9.11 Doctor of Philosophy (Ph.D.) Plant 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 Invitational Seminar

PLNT 690	(0)	Research Horizons in Plant Science 1

Required Courses (3 credits)

* Must be taken within one year of registering.

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar