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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 gro

4 Graduate Studies at a Glance

Please refer to [University Regulations & Resources](#) > *Graduate* > : *Graduate Studies at a Glance*

8.2 Guidelines and Policy for Academic Units on Postdoctoral Education

Ev

i. Postdocs are subject to the responsibilities outlined at mcgill.ca/students/srr and must abide by the policies listed at mcgill.ca/secretariat/policies-and-regulations.

8.5 Postdoctoral Research Trainees

Eligibility

If your situation does not conform to the Government of Quebec's definition of a Postdoctoral Fellow, you may be eligible to attend McGill as a Postdoctoral Research Trainee. While at McGill, you can perform research only (you may not register for courses or engage in clinical practice). Medical specialists who will have clinical exposure and require a training card must register through Postgraduate Medical Education of the Faculty of Medicine and Health Sciences—not Graduate and Postdoctoral Studies.

The category of Postdoctoral Research Trainee is for:

Category 1: An individual who has completed requirements for the Doctoral degree or medical specialty, but whose degree/certification has not yet been awarded. An individual in this category will subsequently be eligible for registration as a Postdoctoral Fellow.

Category 2: An individual who is not eligible for Postdoctoral Registration according to the Government of Quebec's definition, but is a recipient of an external postdoctoral award from a recognized Canadian funding agency.

Category 3: An individual who holds a professional degree (or equivalent) in a regulated health profession (as defined under CIHR-eligible health profession) and is enrolled in a program of postgraduate medical education at another institution. This individual wishes to conduct the research stage or elective component of their program of study at McGill University under the supervision of a McGill professor. This individual will be engaged in full-time research with well-defined objectives, responsibilities, and methods of reporting. Applications must be accompanied by a letter of permission from the applicant's home institution (signed by the Department Chair, Dean, or equivalent) confirming registration in their program and stating the expected duration of the research stage. Individuals who are expecting to spend more than one year are encouraged to obtain formal training (master's or Ph.D.) through application to a relevant graduate program.

Category 4: An individual with a regulated health professional degree (as defined under CIHR-eligible health profession), but not a Ph.D. or equivalent or medical specialty training, but who fulfils criteria for funding on a tri-council operating grant or by a CIHR fellowship (up to maximum of five years post-degree).



Note: Individuals who are not Canadian citizens or permanent residents must inquire about eligibility for a work permit.

General Conditions

- The maximum duration is three years
- The individual must be engaged in full-time research
- The individual must provide copies of official transcripts/diplomas
- The individual must have the approval of a McGill professor to supervise the research and of the Unit
- 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 Graduate Student Services and Information

Graduate students are encouraged to refer to [: Student Services and Information](#) for information on the following topics:

- Service Point
- Student Rights & Responsibilities
- Student Services – Downtown & Macdonald Campuses
- Residential Facilities
- Athletics and Recreation
- Omb

12.1.2 About Atmospheric and Oceanic Sciences

The Department of Atmospheric and Oceanic Sciences offers courses and research opportunities in atmospheric sciences and physical oceanography leading to the **M.Sc.** and **Ph.D.** degrees. Research programs borrow from fundamental fields such as mathematics, statistics, physics, chemistry, and computing to address a broad range of topics relating to weather and climate. Examples include:

- atmospheric chemistry;
-

12.1.3 Atmospheric and Oceanic Sciences Admission Requirements and Application Procedures

12.1.3.1 Admission Requirements

Applicants to the M.Sc. program must meet the general requirements of Graduate and Postdoctoral Studies and hold a bachelor's degree with high standing in atmospheric science, oceanic science, physics, mathematics, engineering, chemistry, or a similar field.

Applicants to the Ph.D. program would normally have a strong background in meteorology, physical oceanography, or related disciplines such as mathematics, physics, chemistry, and engineering. Many students will have an M.Sc. degree in one of these fields, although this is not a formal requirement. All Ph.D. students are required to take at least two courses in atmospheric and oceanic sciences. Students entering without a master's degree or without a sufficient background in atmospheric and oceanic sciences are admitted at the Ph.D. 1 level and are required to take an additional five courses in atmospheric and oceanic science, these usually be

12.1.4 Atmospheric and Oceanic Sciences Faculty

Chair

D. Kirshbaum

CHEM 519* (3) Advances in Chemistry of Atmosphere

* Students may select either ATOC 519 or CHEM 519.

Or other courses at the 500 level or higher recommended by the Department's Graduate Program Director.

Students with a strong background in atmospheric or oceanic science, or a Diploma in Meteorology, will take at least the 7-credit minimum. Students with no previous background in atmospheric or oceanic science must take the 20-credit maximum.

12.1.6 Doctor of Philosophy (Ph.D.) Atmospheric and Oceanic Sciences

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

(1 credit)

ATOC 700	(1)	Ph.D. Proposal Seminar
ATOC 701	(0)	Ph.D. Comprehensive (General)

Complementary Courses (7 credits)

Students are required to take ATOC 751D1 and ATOC 751D2 OR ATOC 752D1 and ATOC 752D2.

1 credit from:

AT	(.5)	Seminar: Physical Meteorology
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the form of literature-based seminars. To complement their classroom and research training, students regularly attend seminar series and journal clubs, and present their own work annually in a formal seminar.

The Department of Biology is embedded in an outstanding and collaborative research environment with access to state-of-the-art infrastructure in the Stewart Biology Building and Bellini Life Science Complex, as well as excellent field facilities in Canada and abroad. Affiliated centres and field stations include:

- *McGill University Phytotron*
- *Redpath Museum*
- *Integrated Quantitative Biology Initiative (IQBI)*
- *Advanced BioImaging Facility (ABIF)*
- *Gault Nature Reserve* at Mont St. Hilaire (Quebec)
- *Penfield Nature Conservancy* on Lake Memphrémagog (Quebec)
- *McGill Subarctic Research Station* at Schefferville (Quebec)
- *Bellairs Research Institute* (Barbados)
- *Smithsonian T*

section 12.2.10: Doctor of Philosophy (Ph.D.) Biology: Neotropical Environment

The McGill-STRI *Neotropical Environment Option (NEO)* is a research-based program in which students work under the supervision of researchers from McGill and/or the *Smithsonian Tropical Research Institute (STRI)*. Aimed at students who wish to focus their graduate research on environmental issues relevant to the Neotropics and Latin American countries, the 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 the NEO's core and complementary courses will be taught in Panama.

12.2.3 Biology Admission Requirements and Application Procedures

12.2.3.1 Admission Requirements

Admission is based on evaluation by the Graduate Training Committee and acceptance by a faculty member within the department who agrees to supervise and fund the applicant. Before applying to Graduate Studies in Biology, students should contact faculty members with whom they wish to study to see if they are accepting new students (see [Faculty Member Profiles](#)).

Prospective Biology graduate students will have a strong background in the biological sciences, often with specific strengths in their proposed area of study. To encourage interdisciplinary work, the program may also accept students with a high scholastic standing in fields other than biology (medicine, engineering, chemistry, physics, etc.).

The minimum Cumulative Grade Point Average (CGPA) is 3.0/4.0, or a Grade Point Average (GPA) of 3.2/4.0 in the last two years of full-time studies. B.Sc. students who wish to apply directly to Ph.D1 must have a minimum CGPA of 3.5/4.

The Test of English as a Foreign Language (*TOEFL*) is required of applicants to graduate studies whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone). A score of 86 on the TOEFL Internet-based test (iBT) with each component score not less than 20, or 6.5 on *IELTS* is the minimum standard for admission.

12.2.3.2 Application Procedures

McGill's online application form for graduate program candidates is available at mcgill.ca/gradapplicants/apply. All applicants should consult [Biology > Graduate Studies > How to Apply](#) page of the Biology Department's website before completing the application form for departmental information on the application process, required documents, summaries of faculty research areas, and contact information.

See [University Regulations & Resources > Graduate > Graduate Admissions and Application Procedures](#)

Graduate Program Director

Frédéric Guichard

Tamara Western: *Acting GPD*

Fiona Soper: *Acting Vice-GPD*

Emeritus Professors

Gregory G. Brown; A. Howard Bussey; Robert L. Carroll, *in memoriam*; Ronald Chase; Rajinder S. Dhindsa; Jacob Kalff; Donald L. Kramer; Martin J. Lechowicz; Louis Lefebvre; Barid B. Mukherjee; Gerald S. Pollack; Ronald Poole; Derek Roff; Rolf Sattler.

Professors

Ehab Abouheif; Graham A.C. Bell; Lauren Chapman; Melania Cristescu; Gregor Fussmann; Andrew Gonzalez; Irene Gregory-Eaves; Frédéric Guichard; Siegfried Hekimi; Andrew Hendry, *joint appt. with Redpath Museum*; Paul F. Lasko; Laura Nilson; Catherine Potvin; Neil M. Price; Richard Roy; Daniel J. Schoen.

Associate Professors

Gary Brouhard; Thomas E. Bureau; David Dankort; Joseph A. Dent; Paul Harrison; Michael Hendricks; Brian Leung; Nam-Sung Moon; Simon Reader; Rodrigo Reyes-Lamothe, *on sabbatical*); Jon Sakata; Frieder Schoeck; Jacalyn Vogel; Alanna Watt; Tamara Western; Sarah Woolley; Monique Zetka; Hugo Zheng.

Assistant Professors

Abigail Gerhold; Mélanie Guigueno; Anna Hargreaves; Arnold Hayer; Tomoko Ohyama; Lars Iversen; Laura Pollock; Fiona Soper; Jennifer Sunday; Stephanie C. Weber.

Associate Members

BioEngineering: Adam Hendricks

Complementary Courses (6 credits)

3 credits from the following [choose BIOL 601 and either BIOL 602 or BIOL 603]:

(1.5) Introduction to Graduate Studies in Biology

BIOL 698 (13) Master's Thesis Research 2

Required Courses (6 credits)

BIOL 640 (3) Tropical Biology and Conservation
ENVR 610 (3) Foundations of Environmental Policy

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.

12.2.8 Doctor of Philosophy (Ph.D.) Biology

The Doctor of Philosophy in Biology is a research-focused program that encompasses a diverse range of topics in biology, from molecules and cells to organisms and ecosystems, including development, behaviour and evolution. Research themes include: (1) molecular, cellular and developmental biology, (2) conservation, ecology and evolution, and (3) neurobiology and behaviour. This program allows students considerable flexibility in their choice of research and coursework and encourages cross-disciplinary thinking.

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 (6 credits)

BIOL 700 (0) Doctoral Qualifying Examination
BIOL 702 (6) Ph.D. Seminar

Complementary Courses (9 credits)

3 credits from the following [choose BIOL 601 and either BIOL 602 or BIOL 603]:

BIOL 601 (1.5) Introduction to Graduate Studies in Biology
BIOL 602 (1.5) Molecular Biology Research and Professional Skills
BIOL 603 (1.5) Organismal Biology Research and Professional Skills

*Or 3 credits at the 500 level or higher with the approval of the Graduate Program Director.

6 credits at the 500, 600, or 700 level in Biology or other departments, and approved by the Supervisory Committee

12.2.9 Doctor of Philosophy (Ph.D.) Biology: Environment

The Ph.D. in Biology- Environment Option is a research program offered with the Bieler School of Environment and other academic units at McGill. 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

ENVR 615 (3) Interdisciplinary Approach Environment and Sustainability

Complementary Courses (6 credits)

3-6 credits chosen from:

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

0-3 credits chosen 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.

12.2.10 Doctor of Philosophy (Ph.D.) Biology: Neotropical Environment

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

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 (12 credits)

BIOL 640 (3) Tropical Biology and Conservation
 BIOL 700 (0) Doctoral Qualifying Examination
 BIOL 702 (6) Ph.D. Seminar
 ENVR 610 (3) Foundations of Environmental Policy

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.

12.3 Chemistry

12.3.1 Location

Department of Chemistry
 Otto Maass Chemistry Building
 801 Sherbrooke Street West
 Montreal QC H3A 0B8
 Canada
 Telephone: 514-398-6999
 Fax: 514-398-3797
 Email: graduate.chemistry@mcgill.ca
 Website: mcgill.ca/chemistry

12.3.2 About Chemistry

Research in Chemistry

Members of the Department are organized into various research themes. Some of the current research interests are listed below, and are presented in much more detail on the [Departmental website](#).

Analytical/Environmental

The Analytical/Environmental Thematic Research Group at McGill is involved in a wide range of exciting fundamental and applied research with focus on: state-of-the-art instrumental development in spectroscopy; imaging; chemometric and analytical bio-spectroscopy

section 12.3.6: Doctor of Philosophy (Ph.D.) Chemistry

Please consult the Department for more information about this program.

12.3.3 Chemistry Admission Requirements and Application Procedures

12.3.3.1 Admission Requirements

The minimum academic standard for admission to research thesis degree programs is a minimum standing equivalent to a cumulative grade point average (CGPA) of 3.0 out of a possible 4.0 or a GPA of 3.2/4.0 for the last two full-time academic years. Applicants from other institutions should have an academic background equivalent to that of a McGill graduate in the Chemistry Honours/Major programs. If possible, candidates should specify the field of research in which they are interested.

12.3.3.2 Application Procedures

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

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

FINANCIAL ASSISTANCE

M.Sc. and Ph.D. Degrees

Graduate students devote 12 hours per week (contact hours, plus grading of reports, etc.) during the academic session to their teaching duties. Financial assistance during the remainder of the year is provided from research funds. Scholarship holders, such as NSERC or awards of similar value, receive a tuition fee waiver.

12.3.3.2.1 Additional Requirements

- GRE – may be required for international degrees

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Emeritus Professors

T.H. Chan; A. Eisenberg; B.C. Eu; D.G. Gray; E.D. Salin; M.A. Whitehead.

Professors

M.P. Andrews; P. Ariya; B.A. Arndtsen; K. Auclair; C.J. Barrett; D.S. Bohle; I.S. Butler; G. Cosa; M.J. Damha; T. Friš i ; D.N. Harpp; A. Kakkar; R.B. Lennox; C.J. Li; N. Luedtke; J. Mauzeroll; N. Moitessier; D. Perepichka; H. Sleiman; J.L. Gleason; Y.S. Tsantrizos; T.G.M. van de Ven; P. Wiseman; A. Moores.

Associate Professors

A.S. Blum; P

CHEM 650	(1)	Seminars in Chemistry 1
CHEM 651	(1)	Seminars in Chemistry 2
CHEM 688	(3)	Progress Assessment 1
CHEM 701	(0)	Comprehensive Examination
CHEM 702	(0)	Progress Assessment 2

Complementary Courses

Students entering the program with an M.Sc. degree will normally take three (3) graduate-level courses. Students entering without an M.Sc. degree will normally take five (5) graduate-level courses.

Students may be required to take advanced undergraduate courses if background deficient.

12.4 Computer Science

12.4.1 Location

School of Computer Science
 McConnell Engineering, Room 318
 3480 University Street
 Montreal QC H3A 0E9
 Canada
 Telephone: 514-398-7071, ext. 00074
 Fax: 514-398-3883
 Email: grad.cs@mcgill.ca
 Website: cs.mcgill.ca

12.4.2 About Computer Science

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section 12.4.7: Master of Science (M.Sc.) Computer Science (Non-Thesis) (45 credits)

This program is designed for students who want to obtain broad knowledge of advanced topics in computer science but without the requirement of a thesis. It offers an excellent preparation for the job market, but is not recommended for students interested in eventually pursuing a Ph.D.

section 12.4.8: Doctor of Philosophy (Ph.D.) Computer Science

The Ph.D. program trains students to become strong, independent researchers in the field of their choice. Our graduates take challenging positions in industry or take academic positions at universities and research labs. In order to apply to the Ph.D. program, applicants should normally hold a master's degree in Computer Science or a closely related area, from a well-recognized university, but exceptional students can be admitted to the Ph.D. program directly without a master's degree.

section 12.4.9: Doctor of Philosophy (Ph.D.) Computer 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.

12.4.3 /Computer Science Admission Requirements and Application Procedures

12.4.3.1 Admission Requirements

Master of Science (M.Sc.)

The minimum requirement for admission is a bachelor's degree (cumulative grade point average (CGPA) of 3.2 out of 4.0 or better, or equivalent) with the coursework in Computer Science as listed on our [website](#). The website supplements the information in this publication, and should be consulted by all graduate students.

Ph.D.

In order to apply to the Ph.D. program, applicants should hold an M.Sc. degree in Computer Science or a closely related area, from a well-recognized university. Students who hold a B.Sc. degree in Computer Science but have an exceptionally strong academic record may be admitted directly to the Ph.D. program, but they must initially apply to the M.Sc. program. Students who are in the M.Sc. program have the option to be fast-tracked into the Ph.D. program at the end of their first academic year, contingent on excellent performance as judged by the Ph.D. committee.

12.4.3.2 Application Procedures

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

See

Application Opening Dates		Application Deadlines	
Winter Term: (*Ph.D. <i>only</i>)	Feb. 15*	Sept. 1*	Sept. 1*

COMP 698	(10)	Thesis Research 4
COMP 699	(12)	Thesis Research 5

Required Courses (2 credits)

COMP 602	(1)	Computer Science Seminar 1
COMP 603	(1)	Computer Science Seminar 2

Complementary Courses (14 credits)

14 credits of COMP (or approved) courses at the 500-, 600-, or 700-level.

Complementary courses must satisfy a Computer Science breadth requirement, with at least one course in two of the Theory, Systems, and Application areas. Areas covered by specific courses are determined by the Computer Science graduate program director.

Category A: Theory

COMP 523	(3)	Language-based Security
COMP 525	(3)	Formal Verification
COMP 527	(3)	Logic and Computation
COMP 531	(3)	Advanced Theory of Computation
COMP 540	(4)	Matrix Computations
COMP 547	(4)	Cryptography and Data Security
COMP 552	(4)	Combinatorial Optimization
COMP 553	(4)	Algorithmic Game Theory
COMP 554	(4)	Approximation Algorithms
COMP 562	(4)	Theory of Machine Learning
COMP 566	(3)	Discrete Optimization 1
COMP 567	(3)	Discrete Optimization 2
COMP 610	(4)	Information Structures 1

Math.102T 1 Tm(COMP 602)Tj1 0 0 1 221. th.102T 1 Tmc 9 709.84 Tm(Thesis R 70.52 350.662 Tm(COM5y)Tjmpu3

COMP 667	(4)	Software Fault Tolerance
COMP 762	(4)	Advanced Topics Programming 1
COMP 763	(4)	Advanced Topics Programming 2
COMP 764	(4)	Advanced Topics Systems 1
COMP 765	(4)	Advanced Topics Systems 2

Category C: Applications

COMP 514	(4)	Applied Robotics
COMP 521	(4)	Modern Computer Games
COMP 546	(4)	Computational Perception
COMP 549	(3)	Brain-Inspired Artificial Intelligence
COMP 550	(3)	Natural Language Processing
COMP 551	(4)	Applied Machine Learning
COMP 555	(4)	Software Privacy
COMP 557	(4)	Fundamentals of Computer Graphics
COMP 558	(4)	Fundamentals of Computer Vision
COMP 559	(4)	Fundamentals of Computer Animation
COMP 561	(4)	Computational Biology Methods and Research
COMP 564	(3)	Advanced Computational Biology Methods and Research
COMP 565	(4)	Machine Learning in Genomics and Healthcare
COMP 579	(4)	Reinforcement Learning
COMP 585	(4)	Intelligent Software Systems
COMP 588	(4)	Probabilistic Graphical Models
COMP 618	(3)	Bioinformatics: Functional Genomics
COMP 652	(4)	Machine Learning
COMP 654	(4)	Graph Representation Learning
COMP 680	(4)	Mining Biological Sequences
COMP 766	(4)	Advanced Topics Applications 1
COMP 767	(4)	Advanced Topics: Applications 2

12.4.6 Master of Science (M.Sc.) Computer Science (Thesis): Bioinformatics (45 credits)**Thesis Courses (24 credits)**

22 credits selected from:

COMP 691	(3)	Thesis Research 1
COMP 696	(3)	Thesis Research 2
COMP 697	(4)	Thesis Research 3
COMP 698	(10)	Thesis Research 4
COMP 699	(12)	Thesis Research 5

Required Courses (3 credits)

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

Required Course

COMP 601 (2) Thesis Literature Review

Complementary Courses (18 credits)

6 credits chosen from the following courses:

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

12 credits of 4-credit courses chosen from 500-, 600-, or 700-level Computer Science courses in consultation with the candidate's supervisor.

Note: Students with an appropriate background can substitute 4 credits by COMP 697.

12.4.7 Master of Science (M.Sc.) Computer Science (Non-Thesis) (45 credits)

Research Project (15 credits)

15 credits selected as follows:

COMP 693	(3)	Research Project 1
COMP 694	(6)	Research Project 2
COMP 695	(6)	Research Project 3

Required Courses (2 credits)

COMP 602	(1)	Computer Science Seminar 1
COMP 603	(1)	Computer Science Seminar 2

Complementary Courses (28 credits)

28 credits of COMP (or approved) courses at the 500, 600, or 700 level.

Complementary courses must satisfy a Computer Science breadth requirement, with at least one course in two of the Theory, Systems, and Application areas. Areas covered by specific courses are determined by the Computer Science graduate program director.

Category A: Theory

COMP 523	(3)	Language-based Security
COMP 525	(3)	Formal Verification
COMP 527	(3)	Logic and Computation
COMP 531	(3)	Advanced Theory of Computation
COMP 540	(4)	Matrix Computations
COMP 547	(4)	Cryptography and Data Security
COMP 552	(4)	Combinatorial Optimization
COMP 553	(4)	Algorithmic Game Theory
COMP 554	(4)	Approximation Algorithms
COMP 562	(4)	Theory of Machine Learning

COMP 566	(3)	Discrete Optimization 1
COMP 567	(3)	Discrete Optimization 2
COMP 610	(4)	Information Structures 1
COMP 611	(4)	Mathematical Tools for Computer Science
COMP 642	(4)	Numerical Estimation Methods
COMP 647	(4)	Advanced Cryptography
COMP 649	(4)	Quantum Cryptography

COMP 588	(4)	Probabilistic Graphical Models
COMP 618	(3)	Bioinformatics: Functional Genomics
COMP 652	(4)	Machine Learning
COMP 654	(4)	Graph Representation Learning
COMP 680	(4)	Mining Biological Sequences
COMP 766	(4)	Advanced Topics Applications 1
COMP 767	(4)	Advanced Topics: Applications 2

12.4.8 Doctor of Philosophy (Ph.D.) Computer Science

Required coursework: Students must take eight graduate courses, of which at least five are computer science courses. These courses should be chosen by the student in consultation with the supervisor (or co-supervisor) and the Progress 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

COMP 700	(0)	Ph.D. Comprehensive Examination
COMP 701	(3)	Thesis Proposal and Area Examination

Complementary Courses

18-24 credits selected from:

Category A: Theory and Applications

COMP 523	(3)	Language-based Security
COMP 525	(3)	Formal Verification
COMP 531	(3)	Advanced Theory of Computation
COMP 540	(4)	Matrix Computations
COMP 547	(4)	Cryptography and Data Security
COMP 549	(3)	Brain-Inspired Artificial Intelligence
COMP 552	(4)	Combinatorial Optimization
COMP 554	(4)	Approximation Algorithms
COMP 561	(4)	Computational Biology Methods and Research
COMP 562	(4)	Theory of Machine Learning
COMP 564	(3)	Advanced Computational Biology Methods and Research
COMP 565	(4)	Machine Learning in Genomics and Healthcare
COMP 566	(3)	Discrete Optimization 1
COMP 567	(3)	Discrete Optimization 2
COMP 588	(4)	Probabilistic Graphical Models
COMP 598	(3)	Topics in Computer Science 1
COMP 599	(4)	Topics in Computer Science 2
COMP 610	(4)	Information Structures 1
COMP 611	(4)	Mathematical Tools for Computer Science

COMP 618	(3)	Bioinformatics: Functional Genomics
COMP 642	(4)	Numerical Estimation Methods
COMP 647	(4)	Advanced Cryptography
COMP 649	(4)	Quantum Cryptography
COMP 654	(4)	Graph Representation Learning
COMP 680	(4)	Mining Biological Sequences
COMP 690	(4)	Probabilistic Analysis of Algorithms
COMP 760	(4)	Advanced Topics Theory 1
COMP 761 4)	(4)	Advanced Topics Theory 2

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

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
COMP 700	(0)	Ph.D. Comprehensive Examination
COMP 701	(3)	Thesis Proposal and Area Examination

Complementary Courses

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. Students who have completed the M.Sc.-level option in Bioinformatics must complete 6 credits of complementary courses not taken in the master's program.

12.5 Earth and Planetary Sciences

12.5.1 Location

Department of Earth and Planetary Sciences
Frank Dawson Adams Building
3450 University Street
Montreal QC H3A 0E8
Telephone: 514-398-6767
Email: grad.eps@mcgill.ca
Website: mcgill.ca/eps

12.5.2 About Earth and Planetary Sciences

The Department of Earth and Planetary Sciences offers both **M.Sc.** and **Ph.D.** degree programs. Graduate programs are based on research, although some

Facilities in the Department include low-temperature and pressure to high-temperature and pressure experimental laboratories, a stable-isotope mass spectrometer, laser-ablation ICP-MS, and electron microprobe, as well as atomic absorption spectrometers. Our students also make substantial use of other facilities at McGill and at nearby *Université du Québec à Montréal*.

Financial assistance is available in the form of teaching assistantships, research assistantships, and scholarships.

Areas of Research :

Aquatic Geochemistry

Application of chemical thermodynamics, kinetics, and surface chemistry to the characterization of mineral-solution interactions in aquatic environments; carbonate geochemistry; early diagenesis of marine and coastal sediments; trace metal and environmental geochemistry in freshwater and marine systems.

Biogeochemistry

Response of the marine ecosystem to climate change and anthropogenic stresses through observations of the modern ocean, and experimental and numerical simulations of ocean biogeochemistry. Reconstructions of past climate change using sediments from lacustrine, coastal, and marine sediments. The processes controlling carbon cycling in freshwater environments, including the burial of organic matter in sediments and the production of greenhouse gases through microbial respiration. Development of new isotopic methods for tracing carbon-cycle and hydrological change in the past and present. Investigating the dynamical relationships that link climate, biogeochemical cycles, ecosystems and humans using a combination of large datasets, simple theory, and numerical Earth system models to identify novel processes and quantitative relationships.

Economic Geology

Studies of the genesis of hydrothermal mineral deposits through a combination of field-based, experimental, and theoretical methods. Research focuses on the understanding of physico-chemical controls of mineralization, through geological mapping of deposits; experimental studies of metal solubility and speciation in hydrothermal systems; simulations of hydrothermal alteration; and theoretical studies designed to estimate conditions of alteration and ore formation. Trace-element chemistry of minerals as quantitative probes of the compositions of ore-forming fluids.

Exoplanet Climate

Using telescopes on the ground and in space to explore the surfaces and atmospheres of the diverse planets outside the Solar System: How much incident stellar flux do planets absorb? How do they move this energy through atmospheric and oceanic circulation? Which planets enjoy habitable surface conditions? Do any of them exhibit atmospheric biosignatures?

Geobiology

Understanding the role of microorganisms in biogeochemical cycles; cultivation of environmental microorganisms; applying molecular and isotopic tools to characterize microbial activity in present and past environments.

Geophysics and Climate

Applying physics to study the interactions between the solid Earth, ice, ocean, and climate systems; numerical modelling, analysis, and interpretation of paleo and modern sea-level changes, solid earth deformation and glacial isostatic adjustment, and ice in the Earth and climate systems.

Hydrogeology

Studies of pore-water flow in northern peatlands; heat transport; heat as a tracer of natural systems; groundwater modelling; coupled numerical models of pore water flow and heat transport with freeze/thaw processes; and the impact of melting tropical glaciers on water resources.

Igneous Petrology

Experimental studies of the structure, thermodynamics, and transport properties (diffusion and viscosity) of silicate melts and applications to igneous petrogenesis. The nature of the Earth's upper mantle and the processes within it which give rise to basaltic volcanism on both the Earth and the other terrestrial planets. Applications of laser ablation ICPMS; petrology, geochemistry, and tectonics of the Appalachian lithosphere.

Integrated Earth System Dynamics

Global data analysis and modelling; approaches that cut across traditional disciplinary boundaries; integration of human and natural systems; interactions between macroecology, biogeochemistry and climate change; Earth System Economics.

Isotopic Geochemistry and Sedimentary Geology

Sedimentology, stratigraphy, and isotope geochemistry as guides to reconstructing ancient environments. Reconstruction of Proterozoic paleogeographies and the origin and evolution of Proterozoic sedimentary basins. Documenting and interpreting paleoenvironmental change during the Proterozoic. Relationships

Volcanology

Petrology and geochemistry of intermediate and felsic magmas; understanding physical processes and forecasting eruptions at active subduction-zone volcanoes; geochemistry of volcanic gases, their use for eruption prediction, and their impact on the atmosphere.

section 12.5.5: Master of Science (M.Sc.) Earth and Planetary Sciences (Thesis) (45 credits)

The nature of graduate research in the Department of Earth and Planetary Sciences is highly variable. As a result, students may enter the graduate program with backgrounds in earth sciences, chemistry, or physics, depending on their research interests and the supervisor with whom they wish to work. Students pursuing an M.Sc. are required to take four courses, but their major project is an M.Sc. thesis that typically results in a journal publication. Research for the thesis typically begins in the first year of residence and is completed, together with the written results, in the second year of residence.

Students graduating from the program typically proceed to a Ph.D. or work in the mineral exploration or petroleum industries. Excellent students admitted into the M.Sc. program can be “fast-tracked” from the M.Sc. into the Ph.D. program at the end of the first year if suitable progress has been demonstrated. Such students are required to take a minimum of 18 credits of coursework in total, and a comprehensive oral examination before the end of 18 months in the Ph.D. program.

section 12.5.6: Doctor of Philosophy (Ph.D.) Earth and Planetary Sciences

The nature of graduate research in the Department of Earth and Planetary Sciences is highly variable. As a result, students may enter the graduate program with backgrounds in earth sciences, chemistry, or physics, depending on their research interests and the supervisor with whom they wish to work. Ph.D. students typically enter with an M.Sc., in which case they are required by our regulations to take only two courses, although a supervisor may require more, depending on the suitability of the student’s background. In addition to courses, Ph.D. students commence work on the thesis research project, including preparation for an oral examination on their research proposal before the end of 18 months from starting the program. Conduct of the research and preparation of the results for thesis and publication typically takes three additional years. Students entering the Ph.D. program without an M.Sc. are required to take a full year of courses before embarking on the processes described above.

Students graduating from our Ph.D. program pursue careers in universities and government-funded research institutes, and in the mineral-exploration and petroleum industries.

12.5.3 Earth and Planetary Sciences Admission Requirements and Application Procedures

12.5.3.1 Admission Requirements

Applicants should have an academic background equivalent to that of a McGill graduate in the Honours or Major programs in geology, geophysics, chemistry, biology, physics, engineering or a related degree (minimum CGPA of 3.0 out of 4.0). The Admissions Committee may modify the requirements in keeping with the field of graduate study proposed. In some cases, a Qualifying year may be required.

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

12.5.3.2 Application Procedures

Students should first *contact potential supervisors* within the Department of Earth and Planetary Sciences and assess their interest in accepting new students before starting the formal application procedure. General inquiries concerning the Department should be addressed to Graduate Admissions, Department of Earth and Planetary Sciences at grad.eps@mcgill.ca. Candidates should indicate their field(s) of interest when making formal applications for admission.

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

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

12.5.3.3 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 Earth and Planetary Sciences 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.

Application Opening Dates

Application Deadlines

Canadian citizens/Perm. residents of Canada (incl. v rg0 0 1 RGym110usilRG4v Tm4622n1001 Tm(esidecation)Tj0

	Application Opening Dates		Application Deadlines	
Winter Term:	Feb. 15	Sept. 1	Sept. 1	Sept. 1
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.

12.5.4 Earth and Planetary Sciences Faculty

Chair

TBA

Emeritus Professors

Jafar Arkani-Hamed; Donald Francis; Reinhard Hesse; Andrew J. Hynes; Robert F. Martin; Alfonso Mucci.

Professors

Don Baker; Eric Galbraith; Galen Halverson; Olivia G. Jensen; Jeffrey McKenzie; John Stix; A.E. (Willy) Williams-Jones.

Associate Professors

Kim Berlo; Nicolas Cowan; Natalya Gomez; James Kirkpatrick; Yajing Liu; Jeanne Paquette; Christie Rowe; Vincent van Hinsberg.

Assistant Professors

Peter Douglas; Nagissa Mahmoudi.

Faculty Lecturer

W. Minarik.

Adjunct Professors

R. Harrington; R. Léveillé; H. Short; B. Sundby.

12.5.5 Master of Science (M.Sc.) Earth and Planetary Sciences (Thesis) (45 credits)

Thesis Courses (33 credits)

EPSC 697	(9)	Thesis Preparation 1
EPSC 698	(12)	Thesis Preparation 2
EPSC 699	(12)	Thesis Preparation 3

Complementary Courses (12 credits)

Four 3-credit 500-, 600-, or 700-level EPSC courses chosen with the approval of the supervisor or the research director and GPS.

12.5.6 Doctor of Philosophy (Ph.D.) Earth and Planetary Sciences

Highly qualified B.Sc. graduates may be admitted directly to the Ph.D. 1 year. Students with the M.Sc. degree are normally admitted to the Ph.D. 2 year.

* Students are required to take four graduate-level courses in the Ph.D. 1 year, and two courses plus a comprehensive oral examination in the Ph.D. 2 year.

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

EPSC 700

(0)

Preliminary Doctoral Examination

Complementary Courses

Two to six courses (6 to 18 credits) approved at the 500, 600, or 700 level selected in consultation with the student's supervisor and approved by the Academic Standing Committee.

12.6 Geography

12.6.1 Location

Department of Geography
Burnside Hall
805 Sherbrooke Street West, Room 705
Montreal QC H3A 0B9
Canada
Telephone: 514-398-4111
Fax: 514-398-7437
Email: grad.geog@mcgill.ca
Website: mcgill.ca/geography

12.6.2 About Geography

The Department of Geography offers research and thesis-based graduate programs leading to a **Master of Arts** (M.A.), a **Master of Science** (M.Sc.), or a **Doctorate** (Ph.D.). In its scope, our program includes the opportunity to conduct field-based studies in both the natural (i.e., biophysical) and the social sciences. Thematic areas of study include:

- Political, Urban, Economic, and Health Geography;
- Environment and Development;
- Geographic Information Systems and Remote Sensing;
- Land Surface Processes, Ecosystem Biogeochemistry, and Ecohydrology;
- Earth System Science and Global Change;
- Sustainability Science and Environmental Management.

Geography houses McGill's Hitschfield Geographic Information Centre, maintains the *McGill Arctic Research Station* (Axel Heiburg Island, Nunavut Territory) and the *McGill Sub-Arctic Research Station* (Schefferville, Quebec), and has strong ties with McGill's *Bieler School of Environment*. Faculty and students conduct research in fields as diverse as climate change impacts, periglacial geomorphology, and forest resource history in regions ranging from the Arctic to Africa, Southeast Asia, and Latin America.

Being both a natural and a social science, geography provides a unique opportunity to obtain a broad interdisciplinary exposure to modes of analyzing the many environmental and situational problems of contemporary society. Because of this, a geography degree is a fantastic opportunity to obtain a career in one of a diverse range of fields. Our students have gone on to become United Nations field researchers in Laos, environmental consultants in Toronto, science teachers in the U.S., geography professors in many parts of the world, UNHCR volunteers in Malaysia, policy analysts, and physical scientists in government agencies and research councils, as well as health and social policy researchers in Montreal...the list goes on! If you're on Facebook, look for *McGill Geography Alumni* or [visit our website](#) to learn more about the advantages of having a geography degree from McGill!

Master's degrees in both the physical (M.Sc.) and social (M.A.) sciences are offered by Geography. The core of both programs for all students is field-based research supervised by a faculty member, culminating in a thesis. The core program consists of the thesis component, required, and complementary graduate (500- or 600-level) courses.

Geography also offers in association with other McGill departments and programs a number of M.A. and M.Sc. options that students may choose to follow. Students must pass the courses specified for their program, attend such additional courses as the Chair and the student's thesis supervisor see fit, and submit a thesis in an appropriate area of geographical inquiry approved by the adviser.

McGill Northern Research Stations

The *McGill Sub-Arctic Research Station* is located in Schefferville, in the centre of Quebec-Labrador. Facilities exist for research in most areas of physical and some areas of human geography in the subarctic.

McGill University also operates a *field station* at Expedition Fiord on Axel Heiberg Island in the High Arctic. Facilities are limited to a small lab, dorm building, and cookhouse. Research activities focus on the glacial and geological. For additional information on these stations, contact the Graduate Program Coordinator at grad.geog@mcgill.ca.

Master of Arts (M.A.) Programs in Geography

Detailed program requirements for the following M.A. programs are found in [Arts](#) > [Graduate Degrees in both the Arts & Programs](#) > [Geography](#).

: Master of Arts (M.A.) Geography (Thesis) (45 credits)

Master's degrees in both the physical (M.Sc.) and social (M.A.) sciences are offered by Geography. The core of both programs for all students is field-based research, supervised by a faculty member, culminating in a thesis. The core program consists of the thesis component, required, and complementary graduate (500- or 600-level) courses. Geography also offers a number of M.A. and M.Sc. options in association with other McGill departments and programs that students may choose to follow.

: Master of Arts (M.A.) Geography (Thesis): Development Studies (45 credits)

The Development Studies Option (DSO) is cross-disciplinary in scope within existing master's programs in Geography, Anthen337.38 T3og 0 0 1 456.025 16.8 Tm(xis

section 12.6.7: Master of Science (M.Sc.) Geography (Thesis): Neotropical Environment (45 credits)

Environment, and Political Science. NEO is aimed at students who wish to focus their graduate research on environmental issues relevant to the Neotropics and Latin American countries. NEO favours 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.

Ph.D. Programs in Geography

: Doctor of Philosophy (Ph.D.) Geography

The doctoral degree in Geography includes the successful completion of the comprehensive examination, a thesis based on original research, and coursework chosen in collaboration with the student's supervisor and/or research committee. The main elements of the Ph.D. are the thesis and comprehensive examination, a required Methods of Geographical Research course, and a minimum of two complementary courses.

: Doctor of Philosophy (Ph.D.) Geography: Environment

The Environment option consists of the thesis and comprehensive examination; required courses from Geography and Environment; and complementary courses in Environment or other fields recommended by the research committee and approved by the Environment Option Committee. The graduate option in Environment pro

English proficiency is required prior to admission. For a list of acceptable test scores and minimum requirements, visit mcgill.ca/gradapplicants/international/proficiency

12.6.3.2 Application Procedures

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

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

Further departmental application information is listed at mcgill.ca/geography/graduate.

12.6.3.2.1 Additional Requirements

12.6.5 Master of Science (M.Sc.) Geography (Thesis) (45 credits)

Thesis Courses (30 credits)

GEOG 698	(6)	Thesis Proposal
GEOG 699	(24)	Thesis Research

Required Course (3 credits)

GEOG 631	(3)	Methods of Geographical Research
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Complementary Courses (12 credits)

12 credits, four 3-credit courses at the 500 level or above selected according to guidelines of the Department. GEOG 696 can count among these complementary credits for students with an appropriate background.

12.6.6 Master of Science (M.Sc.) Geography (Thesis): Environment (45 credits)

The Environment Option is offered in association with the Bieler School of Environment and is composed of a thesis component (24 credits), required Geography and Environment courses (9 credits) and complementary Geography and Environment (12 credits) courses.

Thesis Courses (24 credits)

GEOG 697	(18)	Thesis Research (Environment Option)
GEOG 698	(6)	Thesis Proposal

Required Courses (9 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
GEOG 631	(3)	Methods of Geographical Research

Complementary Courses (12 credits)

9 credits of courses at the 500 level or higher selected according to guidelines of the Department. GEOG 696 can count among these complementary credits for students with an appropriate background.

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

12.6.7 Master of Science (M.Sc.) Geography (Thesis): Neotropical Environment (45 credits)

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

Thesis Courses (30 credits)

GEOG 698	(6)	Thesis Proposal
GEOG 699	(24)	Thesis Research

Required Courses (9 credits)

BIOL 640	(3)	Tropical Biology and Conservation
ENVR 610	(3)	Foundations of Environmental Policy
GEOG 631	(3)	Methods of Geographical Research

Complementary Course (3 credits)

3 credits, one Geography graduate course. GEOG 696 can count among these complementary credits for students with an appropriate background.

Elective Cour

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 (6 credits)

ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability
GEOG 631	(3)	Methods of Geographical Research
GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3

Complementary Courses (9 credits)

3-6 credits chosen from:

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

0-3 credits chosen 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.

0-3 credits of Geography course at the 500 level or higher selected according to the guidelines of the Department.

12.6.10 Doctor of Philosophy (Ph.D.) Geography: Gender and Women's Studies

The graduate option in Gender and Women's Studies is an interdisciplinary program for students who meet the degree requirements in Geography who wish to earn 9 credits of approved coursework focusing on gender and women's studies, and issues in feminist research and methods. The student's doctoral thesis must be on a topic centrally relating to issues of gender and/or women's studies.

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

GEOG 631	(3)	Methods of Geographical Research
GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3
WMST 601	(3)	Feminist Theories and Methods
WMST 602	(3)	Feminist Research Symposium

Complementary Courses

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12.6.11 Doctor of Philosophy (Ph.D.) Geography: Neotropical Environment

The Neotropical Option is offered in association with several University departments, the Bieler School of Environment, and the Smithsonian Tropical Research Institute (STRI-Panama) and includes the thesis, comprehensive examination, required courses (9 credits) in Geography, Environment and Biology, and complementary courses (3 credits) chosen from Geography, Agriculture Sciences, Biology, Sociology, Environment, and Political Science.

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

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
GEOG 631	(3)	Methods of Geographical Research
GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3

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 Mathematics and Statistics

12.7.1 Location

Department of Mathematics and Statistics
Burnside Hall, Room 1005
805 Sherbrooke Street West
Montreal QC H3A 0B9
Canada
Telephone: 514-398-3800
Fax: 514-398-3899
Email: grad.mathstat@mcgill.ca
Website: mcgill.ca/mathstat/

12.7.2 About Mathematics and Statistics

The Department of Mathematics and Statistics offers programs that can be focused on applied mathematics, pure mathematics, and statistics leading to master's degrees (**M.A.** or **M.Sc.**). The research groups are:

- Algebra;
- Algebraic Geometry;
- Analysis;
- Applied Mathematics;
- Differential Equations;
- Differential Geometry;
- Discrete Mathematics;
- Geometric Group Theory;

- Logic;
- Mathematical Biology;
- Mathematical Physics;
- Number Theory;
- Probability;
- Statistics.

In the basic master's programs, students must choose between the thesis option, and the non-thesis option which requires a project. The Ph.D. program is thesis only in Mathematics and Statistics.

The [Department's website](#) provides extensive information on the Department and its facilities, including the research activities and research interests of individual faculty members. It also provides detailed supplementary information concerning our programs, admissions, funding of graduate students, thesis requirements, advice concerning the choice of courses, etc.

Students are urged to consult the [Institut des Sciences Mathématiques](#)

The normal entrance requirement for the master's programs is a Canadian honours degree or its equivalent, with high standing, in mathematics or a closely related discipline in the case of applicants intending to concentrate in statistics or applied mathematics.

Applicants wishing to concentrate in pure mathematics should have a strong background in linear algebra, abstract algebra, and real and complex analysis.

Applicants wishing to concentrate in statistics should have a strong background in linear algebra and basic real analysis. A calculus-based course in probability and one in statistics are required, as well as some knowledge of computer programming. Some knowledge of numerical analysis and optimization is desirable.

Applicants wishing to concentrate in applied mathematics should have a strong background in most of the areas of linear algebra, analysis, differential equations, discrete mathematics, and numerical analysis. Some knowledge of computer programming is also desirable.

Students whose preparation is insufficient for the program they wish to enter may, exceptionally, be admitted to a Qualifying year.

Ph.D. Degree

A master's degree with high standing is required, in addition to the requirements listed above for the master's program. Students may transfer directly from the master's program to the Ph.D. program under certain conditions. Students without a master's degree, but with exceptionally strong undergraduate training, may be admitted directly to Ph.D. 1.

Application Procedures

Emeritus Professors

William J. Anderson; Michael Barr; William G. Brown; Marta Bunge; Ian Connell; Stephen Drury; K

12.7.7 Doctor of Philosophy (Ph.D.) Mathematics and Statistics

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

MATH 700	(0)	Ph.D. Comprehensive Examination Part A
MATH 701	(0)	Ph.D. Comprehensive Examination Part B

Complementary Courses (21 credits)

Minimum 21 credits of approved graduate courses, with at least two courses at the 600-level or above.

12.8 Physics

12.8.1 Location

Department of Physics
Ernest Rutherford Physics Building
3600 University Street
Montreal QC H3A 2T8
Canada
Telephone: 514-398-6485 (Graduate Information)
Fax: 514-398-8434

Although most of the teaching and research facilities are located in the Ernest Rutherford Physics Building, the Department has space and research facilities in the Wong Materials Science Centre, adjacent to the Rutherford Building. Our groups also conduct research at the [McGill University Health Centre](#) (MUHC), the [Jewish General Hospital](#), the [Montreal Neurological Institute](#) (MNI) and laboratories around the w

- dynamics and mechanical properties of soft matter systems and spatial organization and dynamics in living cells;
- mechanical behaviour of very small systems by high-resolution force microscopy;
- electronic properties that emerge at the limits of miniaturization and quantum computing;
- nuclear methods to study interactions in magnetic materials that lead to exotic magnetic ordering behaviour. This includes studies of nov

12.8.3.2 Application Procedures

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

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

Financial Assistance

Financial assistance will be offered to all students at the time of acceptance, if applicable. For more information, please visit our finance page: physics.mcgill.ca/grads/finance.html.

12.8.3.2.1 Additional Requirements

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

- 2 Letters of Reference
- Physics CV
- Personal Statement
- Thesis Abstract or Summary – optional
- *GRE* – recommended but not required

A list of supporting documentation required by the University can be found at mcgill.ca/gradapplicants/apply/prepare/checklist/documents. International students must also demonstrate proficiency in English. Details are available at mcgill.ca/gradapplicants/international/apply/proficiency.

by the Department of Physics PSET may be used at any time. Applicants must verify all documentation requirements with the appropriate McGill departmental website; please consult the list at <https://contact/graduate-program>.

Associate Professors

T. Brunner; H. Cynthia Chiang; L. Childress; B. Coish; D. Cooke; N. Cowan; A. Cumming; P. Francois; D. Haggard; M. Hilke; T. Pereg-Barnea; W. Reisner; S. Robertson; R. Rutledge; J. Childress; J. Sievers; B. Siwick; T. Webb.

Assistant Professors

K. Agarwal; S. Caron-Huot; E. Lee; A. Liu; K. Schutz.

Associate Members

Biochemistry - K. Gehring.

Chemistry - P. Kambhampati; D. Ronis.

Electrical and Computer Engineering - T. Szkopek.

Kinesiology - D. Rassier.

Medical Physics - J. Kildea; J. Seuntjens.

Oncology - S. Devic; S. Enger.

Physiology - G. Bub; M. Chacron; A. Khadra.

Adjunct Professors

O. Hernandez, B. Palmieri, M. Pearson, W. Witczak-Krempa

Curator (Rutherford Museum and McPherson Collection)

J. Barrette

12.8.5 Master of Science (M.Sc.) Physics (Thesis) (45 credits)**Thesis Courses (30 credits)**

PHYS 690	(24)	M.Sc. Thesis
PHYS 692	(6)	Thesis Project

Complementary Courses (15 credits)

12 credits at the 500, 600, or 700 level.

3 credits at the 600 or 700 level:

Students with an appropriate background may request Departmental permission to substitute up to 6 credits chosen from the following courses:

PHYS 691	(3)	Thesis Preparation
PHYS 693	(3)	M.Sc. Research

Students must also successfully complete all the other normal requirements of Graduate and Postdoctoral Studies.

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

Candidates must successfully complete two 3-credit graduate courses at the 600 level or above; one of these courses should be in the candidate's area of specialization. If the candidate completed two or more courses at the 600 level as part of the McGill Physics M.Sc. program, then one of these courses may be used as a substitute for one of the required courses. In all cases, candidates must also pass the Ph.D. preliminary examination (PHYS 700).

PHYS 700 (0) Preliminary Ph.D. Examination

12.9 Psychology

12.9.1 Location

Department of Psychology
2001 McGill College Avenue, 7th Floor
Montreal QC H3A 1G1
Canada
Telephone: 514-398-6127/514-398-6100
Fax: 514-398-4896
Email: grad.psych@mcgill.ca
Website: mcgill.ca/psychology

12.9.2 About Psychology

The aim of the Experimental program is to provide students with an environment in which they are free to develop skills and expertise that will serve during a professional career of teaching and research as a psychologist. Coursework and other requirements are at a minimum. Success in the program depends on the student's ability to organize unscheduled time for self education. Continuous involvement in research planning and execution is considered a very important component of the student's activities. Students are normally expected to do both master's and doctoral study.

M.A. and M.Sc. degrees may be awarded in Experimental Psychology, but only as a step to the Ph.D.—students undergo formal evaluation beginning with the submission of their master's requirements (thesis or fast-track paper) to enter Ph.D. 2.

The Clinical program adheres to the scientist practitioner model and as such is designed to train students for careers in university teaching or clinical research, and for service careers (working with children or adults in hospital, clinical, or educational settings). Most of our clinical graduates combine service and research roles. While there are necessarily many more course requirements than in the Experimental program, the emphasis is again on research training. There is no master's program in Clinical Psychology; the Department offers direct entry to a doctoral degree for holders of an undergraduate degree, and students are expected to complete the full program leading to a doctoral degree.

Research interests of members of the Psychology Department include:

- behavioural neuroscience;
- clinical psychology;
- cognition & cognitive neuroscience;
- developmental science;
- health psychology;
- quantitative psychology & modelling;
- social & personality psychology.

Facilities for advanced research in a variety of fields are available within the Department itself. In addition, arrangements exist with the Departments of Psychology at the Montreal Neurological Institute and Hospital, Allan Memorial Institute, Douglas Mental Health University Institute, Jewtf the Psycho

A cross-disciplinary option in Psychosocial Oncology is offered within the existing Ph.D. program in Psychology. Information about this option is available from the Department and at medicine.mcgill.ca/oncology/programs/programs_psychosocialoncology.asp and mcgill.ca/psychology/graduate/program-tracks/clinical/additional-program-opportunities.

: Master of Arts (M.A.) Psychology (Thesis) (45 credits)

Candidates must demonstrate a sound knowledge of modern psychological theory, of its historical development, and of the logic of statistical methods as used in psychological research. Candidates will be expected to have an understanding of the main lines of current work in areas other than their own field of specialization.

section 12.9.5: Master of Science (M.Sc.) Psychology (Thesis) (45 credits)

Candidates must demonstrate a sound knowledge of modern psychological theory, of its historical development, and of the logic of statistical methods as used in psychological research. Candidates will be expected to have an understanding of the main lines of current work in areas other than their own field of specialization.

: Doctor of Philosophy (Ph.D.) Psychology

Please contact the Department for more information about this program.

section 12.9.7: Doctor of Philosophy (Ph.D.) Psychology: Behavioural Neuroscience

The Ph.D. in Psychology: Behavioural Neuroscience program emphasizes modern, advanced theory and methodology aimed at the neurological underpinnings of behaviour in human and non-human animals. This program is intended for graduate students in any area of Psychology who wish to obtain unique, intensive training at the intersection of psychology and neuroscience, thereby enhancing their expertise, the interdisciplinary potential of their dissertation research, and enabling them to compete successfully for academic or commercial positions in either field alone, or their intersection. It requires that students complete a dissertation that addresses Behavioural Neuroscience themes.

section 12.9.8: Doctor of Philosophy (Ph.D.) Psychology: Language Acquisition

This unique interdisciplinary program focuses on the scientific exploration of language acquisition by different kinds of learners in diverse contexts. Students in the Language Acquisition program are introduced to theoretical and methodological issues on language acquisition from the perspectives of cognitive neuroscience, theoretical linguistics, psycholinguistics, education, communication sciences and disorders, and neuropsychology.

Psychology Admission Requirements

12.9.3.2 Application Procedures

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

See [University Regulations & Resources](#) > *Graduate*

Associate Professors

J. Bartz; J. Britt; E. Hehman; L. Human; G. O'Driscoll; K. Onishi; S. Racine; S. Sheldon; A. Weinberg.

Assistant Professors

J. Axt; R. Bagot; C. Falk; J. Flake; O. Hardt; B. Johns; M. Mioce

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 Course

PSYC 701	(0)	Doctoral Comprehensive Examination
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Complementary Courses

12-24 credits

12 credits (one course per term in Year 2 and Year 3) chosen from the following list:

PSYC 712	(3)	Comparative and Physiological Psychology 3
PSYC 715	(3)	Comparative and Physiological Psychology 6
PSYC 722	(3)	Personality and Social Psychology
PSYC 723	(3)	Personality and Social Psychology
PSYC 724	(3)	Personality and Social Psychology
PSYC 725	(3)	Personality and Social Psychology
PSYC 727	(3)	Personality and Social Psychology
PSYC 728	(3)	Ethics and Professional Issues
PSYC 729	(3)	Theory of Assessment
PSYC 730	(3)	Clinical Neuroscience Methods
PSYC 732	(3)	Clinical Psychology 1
PSYC 733	(3)	Clinical Psychology 2
PSYC 734	(3)	Developmental Psychology and Language
PSYC 735	(3)	Developmental Psychology and Language
PSYC 736	(3)	Developmental Psychology and Language
PSYC 740	(3)	Perception and Cognition
PSYC 741	(3)	Perception and Cognition
PSYC 742	(3)	Perception and Cognition
PSYC 743	(3)	Perception and Cognition
PSYC 744	(3)	Perception and Cognition
PSYC 746	(3)	Quantitative and Individual Differences
PSYC 747	(3)	Quantitative and Individual Differences
PSYC 748	(3)	Quantitative and Individual Differences
PSYC 749	(3)	Quantitative and Individual Differences
PSYC 750	(3)	Applied Bayesian Statistics
PSYC 752D1	(3)	Psychotherapy and Behaviour Change
PSYC 752D2	(3)	Psychotherapy and Behaviour Change
PSYC 753	(3)	Health Psychology Seminar 1

0-12 credits from the following (students without a master's degree from McGill need to take all 12 credits):

PSYC 650	(3)	Advanced Statistics 1
PSYC 651	(3)	Advanced Statistics 2
PSYC 660D1	(3)	Psychology Theory
PSYC 660D2	(3)	Psychology Theory

Note: The Department of Psychology does not ordinarily require an examination in a foreign language however, all students planning on practicing clinical psychology in the province of Quebec will be examined based on their proficiency in French before being admitted to the professional association.

12.9.7 Doctor of Philosophy (Ph.D.) Psychology: Behavioural Neuroscience

The Ph.D. in Psychology; Behavioural Neuroscience program emphasizes modern, advanced theory and methodology aimed at the neurobiological underpinnings of behaviour in human and non-human animals. This program is intended for graduate students in any area of Psychology who wish to obtain unique, intensive training at the intersection of psychology and neuroscience, thereby enhancing their expertise; the interdisciplinary potential of their dissertation research, and enabling them to compete successfully for academic or commercial positions in either field alone, or their intersection. It requires that students complete a dissertation that addresses Behavioural Neuroscience themes as determined by the graduate program director.

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 of Behavioural Neuroscience 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

PSYC 701	(0)	Doctoral Comprehensive Examination
PSYC 781	(3)	Behavioural Neuroscience Special Topics
	nce	Behavioural Neuroscience Advanced Seminar

15-32 credits

12 credits (one course per term in Year 2 and Year 3) chosen from the following list:

PSYC 712	(3)	Comparative and Physiological Psychology 3
PSYC 715	(3)	Comparative and Physiological Psychology 6
PSYC 722	(3)	Personality and Social Psychology
PSYC 723	(3)	Personality and Social Psychology
PSYC 724	(3)	Personality and Social Psychology
PSYC 725	(3)	Personality and Social Psychology
PSYC 727	(3)	Personality and Social Psychology
PSYC 728	(3)	Ethics and Professional Issues
PSYC 729	(3)	Theory of Assessment
PSYC 730	(3)	Clinical Neuroscience Methods
PSYC 732D1	(1.5)	Clinical Psychology 1
PSYC 732D2	(1.5)	Clinical Psychology 1
PSYC 733D1	(1.5)	Clinical Psychology 2
PSYC 733D2	(1.5)	Clinical Psychology 2
PSYC 734	(3)	Developmental Psychology and Language
PSYC 735	(3)	Developmental Psychology and Language
PSYC 736	(3)	Developmental Psychology and Language
PSYC 740	(3)	Perception and Cognition
PSYC 741	(3)	Perception and Cognition
PSYC 742	(3)	Perception and Cognition
PSYC 743	(3)	Perception and Cognition
PSYC 744	(3)	Perception and Cognition
PSYC 746	(3)	Quantitative and Individual Differences
PSYC 747	(3)	Quantitative and Individual Differences
PSYC 748	(3)	Quantitative and Individual Differences
PSYC 749	(3)	Quantitative and Individual Differences
PSYC 750	(3)	Applied Bayesian Statistics
PSYC 752D1	(3)	Psychotherapy and Behaviour Change
PSYC 752D2	(3)	Psychotherapy and Behaviour Change
PSYC 753	(3)	Health Psychology Seminar 1

At least 3 credits selected from the following list:

EDSL 620	(3)	Social Justice Issues in Second Language Education
EDSL 623	(3)	Second Language Learning
EDSL 624	(3)	Educational Sociolinguistics
EDSL 627	(3)	Instructed Second Language Acquisition Research
EDSL 632	(3)	Second Language Literacy Development
LING 555	()	
LING 590	()	
LING 651	(3)	Topics in Acquisition of Phonology

LING 655	(3)	Theory of L2 Acquisition
LING 751	(3)	Advanced Seminar: Experimental 1
LING 752	(3)	Advanced Seminar: Experimental 2
PSYC 545	(3)	Topics in Language Acquisition
PSYC 735	(3)	Developmental Psychology and Language
SCSD 619	(3)	Advanced Statistics 1 Phonological Development
SCSD 632	(3)	Phonological Disorders: Children
SCSD 633	(3)	Language Development
SCSD 637	(3)	Developmental Language Disorders 1
SCSD 643	(3)	Developmental Language Disorders 2
SCSD 652	(3)	Advanced Research Seminar 1
SCSD 653	(3)	Advanced Research Seminar 2
SCSD 654	(3)	Advanced Research Seminar 3

0-2 from the following:

EDPE 713	(2)	Language Acquisition Issues 5
EDSL 711	(2)	Language Acquisition Issues 3 Adv

0-3 credits of statistics from the following list:

EDPE 676	(3)	Intermediate Statistics
EDPE 682	(3)	Univariate/Multivariate Analysis
LING 620	(3)	Experimental Linguistics: Methods
PSYC 650	(3)	Advanced Statistics 1
PSYC 651	(3)	Advanced Statistics 2

Students who have taken an equivalent course in statistics will be deemed to have satisfied this requirement for the Language Acquisition Option.

These 3 credits are only required for students who have not previously taken an equivalent course in statistics.

0-12 credits from the follo

Montreal QC H3A 0C4
Canada
Telephone: 514-398-4086
Email: redpath.museum@mcgill.ca
Website: mcgill.ca/redpath

12.10.2 About Redpath Museum

The Redpath Museum is a unique interdisciplinary unit within the Faculty of Science offering graduate training in research devoted to biodiversity, ecology, conservation biology