Faculty of Science, including School of Computer Science (Graduate)

Programs, Courses and University Regulations

2023-2024

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

1 . McGill University reserves the right to mak

Publication Information

Published by

Enrolment Services
McGill University
3415 McTavish Street
Montreal, Quebec, H3A 0C8
Canada

Dean's Welcome, page 9

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

Every unit hosting postdocs should apply institutional policies and procedures for the provision of postdoctoral education and have established means for informing postdocs of policies, procedures, and privileges (available at *mcgill.ca/gps/postdocs*), as well as mechanisms for addressing complaints. For their part, postdocs are responsible for informing themselves of such policies, procedures, and privileges.

1. Definition and Status

i. Postdoctoral status will be recognized by the University in accordance with Quebec provincial regulations as may be modified from time to time. The eligibility period for postdoctoral status is up to five years from the date when the Ph.D. or equivalent degree was aw

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

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

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

- Regulations on Research Policy
- Regulations Concerning the Investigation of Research Misconduct
- Requirements for Research Involving Human Participants
- Policy on the Study and Care of Animals
- Policy on Intellectual Property
- Regulations Governing Conflicts of Interest
- Safety in Field Work
- Office of Sponsored Research
- Postdocs
- Research Associates

12 Browse Academic Units & Programs

The programs and courses in the following sections have been approved for the 2023–2024 session as listed.

12.1 Atmospheric and Oceanic Sciences

12.1.1 Location

Department of Atmospheric and Oceanic Sciences
Burnside Hall
805 Sherbrooke Street West, Room 305
Montreal QC H3A 0B9
Canada
Telephone: 514-398-3764
Fax: 514-398-6115
Email: *info.aos@mcgill.ca*; graduate studies: *graduateinfo.aos@mcgill.ca*
Website: *mcgill.ca/meteo*

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;
- climate dynamics;
- cloud and precipitation physics;
- dynamical oceanography and meteorology;
- geophysical turbulence;
- numerical modelling;
- numerical weather prediction;
- ocean carbon budgets;
- sea ice dynamics;
- synoptic and mesoscale meteorology; and
- remote sensing of weather and climate.

Some faculty members have close ties with other departments, schools, and centres, including the Chemistry and the Mathematics and Statistics departments; the *Bieler School of Environment*; *ArcticNet*; and *Quebec Ocean*. Facilities include the McGill Atmospheric Profiling Observatory, as well as state-of-the-art field and laboratory equipment for atmospheric chemistry. Graduate students have access to computers, ranging from desktop PCs to the high-performance computing clusters available through the Digital Research Alliance of Canada. In some cases, M.Sc. and Ph.D. research may include a field component. Most students also participate in national and international conferences.

Financial assistance in the form of research stipends is available for all qualified graduate students. Additional financial support is provided in the form of teaching assistantships, subject to availability and eligibility constraints.

section 12.1.5: Master of Science (M.Sc.) Atmospheric and Oceanic Sciences (Thesis) (45 credits)

Our program applies mathematics, physics, computing, and sometimes chemistry to study the atmosphere and/or oceans. The ideal student would therefore have a strong quantitative background in one or more of these fields. Although some of our students have undergraduate knowledge of meteorology or physical oceanography, this background is not necessary to succeed in the program. McGill offers the only program in Canada that includes both atmospheric and oceanic sciences. Students benefit from a high professor-to-student ratio and access to state-of-the-art computing, remote sensing, and atmospheric chemistry laboratory equipment. The Department also has close ties with Environment & Climate Change Canada's numerical weather prediction centre in Dorval, Quebec.

Our program allows considerable flexibility as to the choice of research topics, and gives students both a strong classroom knowledge of the subject as well as the opportunity to choose from a variety of thesis research projects. Students who do not choose to continue in academia find employment in a variety of areas and places; for example, working with Environment & Climate Change Canada as research associates or weather forecasters.

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

Our program applies mathematics, physics, computing, and sometimes chemistry to study the atmosphere and/or oceans. The ideal student would therefore have a strong quantitative background in one or more of these fields. Although some of our students have undergraduate knowledge of meteorology or physical oceanography, this background is not necessary to succeed in the program. McGill offers the only program in Canada that includes both atmospheric and oceanic sciences. Students benefit from a high professor-to-student ratio and access to state-of-the-art computing, remote sensing, and atmospheric chemistry laboratory equipment. The Department also has close ties with Environment & Climate Change Canada's numerical weather prediction centre in Dorval, Quebec. Students who do not choose to continue in academia find employment in a variety of areas including research careers at government labs such as Environment & Climate Change Canada.

section 12.1.7: Doctor of Philosophy (Ph.D.) Atmospheric and Oceanic Sciences: Environment

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

The Ph.D. in Atmospheric and Oceanic Sciences: Environment (option) is a research program offered in collaboration with the *Bieler School of Environment*. As a complement to the unit’s expertise, the program considers how various dimensions (scientific, social, legal, ethical) interact to define environment and sustainability issues. The Environment option builds on the same program and a similar undergraduate background as described under Doctor of Philosophy (Ph.D.) Atmospheric and Oceanic Sciences. In addition, the En

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 graduate-level courses in atmospheric and oceanic sciences. Students entering without a master's degree or without a sufficient background in atmospheric and/or oceanic sciences are admitted at the Ph.D. 1 level and are required to take an additional five graduate-level courses in atmospheric and oceanic sciences, these usually being completed in the first two semesters.

Applicants to the Environment Option of our Ph.D. program must apply for admission to both Atmospheric and Oceanic Sciences and the Bieler School of Environment and must meet the entrance requirements of both programs (see also information here: *mcgill.ca/environment/envroption*). Acceptability into the Environment option will be based on academic experience and performance, availability of a supervisor or co-supervisor, the proposed research, and plans for funding as articulated by the supervisor(s). This option is not available to students entering at the PhD 1 level, but can be chosen in subsequent years.

Inquiries should be addressed directly to the *Student Affairs Coordinator*

Associate Professors

F. Fabry (*joint appt. with Bieler School of Environment*); Y. Huang; D. Kirshbaum; T. Preston (*joint appt. with Chemistry*); D. Straub; A. Zuend

Assistant Professors

C. Dufour; R. Fajber; D. Romanic; I. Tan

Adjunct Professors

L. Barrie; M. Buehner; P. Kollias; H. Lin; L.-P. Nadeau

12.1.5 Master of Science (M.Sc.) Atmospheric and Oceanic Sciences (Thesis) (45 credits)

The M.Sc. degree requires a minimum of 45 credits, up to a maximum of 51 credits. The program includes from 9 to 27 credits of coursework (depending on the student's background).

Thesis Courses (24 credits)

ATOC 691	(3)	Master's Thesis Literature Review
ATOC 692	(6)	Master's Thesis Research 1
ATOC 694	(3)	Master's Thesis Progress Report and Seminar
ATOC 699	(12)	Master's Thesis

Although registration is not required, students registered in M.Sc. programs are expected to regularly attend one of the student seminar series (ATOC 751D1/D2 or ATOC 752D1/D2) and the Department seminar series during the entire period of their enrolment in the program.

Complementary Courses (21 credits)

Must complete or have completed the following courses or equivalent:

ATOC 512	(3)	Atmospheric and Oceanic Dynamics
ATOC 513	(3)	Waves and Stability
ATOC 515	(3)	Turbulence in Atmosphere and Oceans
ATOC 519*	(3)	Advances in Chemistry of Atmosphere
ATOC 521	(3)	Cloud Physics
ATOC 525	(3)	Atmospheric Radiation
ATOC 531	(3)	Dynamics of Current Climates
ATOC 540	(3)	Synoptic Meteorology 1
ATOC 541	(3)	Synoptic Meteorology 2
ATOC 548	(3)	Mesoscale Meteorology
ATOC 568	(3)	Ocean Physics
ATOC 626	(3)	Atmospheric/Oceanic Remote Sensing
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.45 ,0deda 1 ploma are 0 1 165.864 241.463 Tm389C 7

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

3-6 credits from:

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

0-3 credits from:

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

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

- *P*

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 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.D.1 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* > *: Application Procedures* for detailed application procedures.

12.2.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Biology Department 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*.

Information on application deadlines is available at *mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines*.

Admission to graduate studies is competitive; accordingly, late and/or incomplete applications are considered only as time and space permit. All inquiries pertaining to admission procedures should be directed to the Graduate Admissions Coordinator, *Ancil Gittens*.

Note: Applications for Summer term admission will not be considered.

12.2.4 Biology Faculty

Chair

Gregor Fussmann

Graduate Program Director

Tamara Western

Fiona Soper (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 (*on sabbatical)*; Irene Gregory-Eaves; Frédéric Guichard; Siegfried Heklnfitj/F1 8.1 Tf(d)Tj/F5 172 Tm67.5j1 0 0 1 391.243 141.1729 1a81ItdaE a

Assistant Professors

Abigail Gerhold; Mélanie Guigueno; Arnold Hayer; Tomoko Ohyama; Lars Iversen; Laura Pollock; Fiona Soper; Jennifer Sunday

Associate Members

BioEngineering: Adam Hendricks

Centre for Research in Neuroscience: Donald Van Meyel

Glen site: Hugh J. Clarke; Daniel Dufort; David Rosenblatt; Teruko Taketo

MNI: Kenneth Hastings

Physics: Paul Francois

Redpath Museum: Rowan Barrett; Da

BIOL 697	(13)	Master's Thesis Research 1
BIOL 698	(13)	Master's Thesis Research 2

Required Courses (3 credits)

ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability

Complementary Courses (6 credits)

3-6 credits, one of the following courses:

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.

12.2.7 Master of Science (M.Sc.) Biology (Thesis): Neotropical Environment (45 credits)

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

Whether applying to a Master or a PhD, students are expected to meet all the degree requirements of the department in which they are registered. In addition, NEO students will have to meet the specific requirements of the option.

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 le

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 adv

dynamics and function; mechanistic aspects involved in cellular adhesion and transport in membrane and zeolite channels; and cutting-edge microscopes used to examine transport, motility, and reactivity in cells.

Chemical Physics

The research interests of the members of the Chemical Physics Thematic Research Group are diverse, with groups focusing on high-end laser and NMR spectroscopies, kinetics and modelling of atmospheric chemical reactions, experimental and theoretical bioph

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.

12.3.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Chemistry 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*.

Information on application deadlines is available at *mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines*.

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

Note: Applications for Summer term admission will not be considered.

All inquiries concerning graduate work in the Department should be addressed to the Director of Graduate Studies, Department of Chemistry.

12.3.4 Chemistry Faculty

Chair
D. Perepichka

CHEM 694	(12)	M.Sc. Thesis Research 4
CHEM 695	(15)	M.Sc. Thesis Research 5

Required Courses

(5 credits)

CHEM 650	(1)	Seminars in Chemistry 1
CHEM 651	(1)	Seminars in Chemistry 2
CHEM 688	(3)	Progress Assessment 1

Complementary Cour

12.4.2 About Computer Science

The School of Computer Science is one of the leading teaching and research centres for computer science in Canada and offers several graduate programs. The Master of Science (M.Sc.) Thesis and Doctor of Philosophy (Ph.D.) are research-centric programs preparing students for research careers in academia or industry. They both offer an option in bioinformatics. The Master of Science (M.Sc.) Non-Thesis program is targeted at students looking for careers in applied research and development in industry. In all programs, students will be exposed to cutting-edge computer science developments. Research in the School covers a broad range of areas, including:

- **Theory**: algorithms, combinatorial optimization, computational geometry, cryptography, graph theory, logic and computation, programming languages, quantum computing, theory of computation, and scientific computing;
- **Systems**: compilers, computer games, distributed systems, storage systems, database systems, embedded and real-time systems, systems for data science, networks, software engineering, and model engineering;
- **Applications**: bioinformatics, many areas of artificial intelligence and machine learning, bioinformatics, robotics, computer animation, graphics, vision, and Human Factors in Computing.

More information can be found on the School's website.

section 12.4.5: Master of Science (M.Sc.) Computer Science (Thesis) (45 credits)

This program is designed for students with a strong interest in research in computer science who hold at least the equivalent of an undergraduate minor in CS. This program combines a strong course component with a research thesis. It is the usual (but not mandatory) entry point for students who wish to do a Ph.D., but is also the program of choice for students who want to find challenging and exciting jobs after their master's.

section 12.4.6: Master of Science (M.Sc.) Computer Science (Thesis): Bioinformatics (45 credits)

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.

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

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 and Mathematics as listed on our *School's 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 *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

12.4.3.2.1 Additional Requirements

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

- Curriculum Vitae – required for both M.Sc. and Ph.D. programs
- Statement of Purpose – required for both M.Sc. and Ph.D. programs
- *Graduate Record Examination* (GRE General Test) is optional for all programs.

For further details about each required document, consult the *School of Computer Science's website*.

12.4.3.3 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 School of Computer Science and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *mcgill.ca/gps/contact/graduate-program*.

Information on application deadlines is available at *mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines*.

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

For further details on our admission requirements, please visit our website at *cs.mcgill.ca/graduate/future/overview/*.

Scholarship Deadlines: December 15 for applicants who wish to be considered for scholarship awards; otherwise, December 15 for International and February 15 for Canadian students for admission to the Fall term.

12.4.4 Computer Science Faculty

Adjunct Professors

S. Andrews; D. Bahdanaum; M.G. Bellemare; X. Chen; F. Diaz; K. Dziugaite; G. Grant; W. Hamilton; S.E. Kahou; T. Kuo; A. Louis; I. Rekleitis; B. Shepherd; X. Si; A.R. Soriano; A. Szantner; D. Tarlow; A. Trischler

12.4.5 Master of Science (M.Sc.) Computer Science (Thesis) (45 credits)

Thesis Courses (29 credits)

29 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 (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 B: Systems

COMP 512	(4)	Distributed Systems
COMP 520	(4)	Compiler Design
COMP 529	(4)	Software Architecture
COMP 533	(3)	Model-Driven Software Development
COMP 535	(4)	Computer Networks 1
COMP 555	(4)	Information Privacy
COMP 614	(4)	Distributed Data Management
COMP 621	(4)	Program Analysis and Transformations
COMP 655	(4)	Distributed Simulation
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 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
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.

0-15 credits from:

COMP 689	(15)	Internship in Computer Science

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
	(4)	Advanced Topics Theory 2

COMP 585	(4)	Intelligent Software Systems
COMP 598	(3)	Topics in Computer Science 1
COMP 599	(4)	Topics in Computer Science 2
COMP 614	(4)	Distributed Data Management
COMP 621	(4)	Program Analysis and Transformations
COMP 652	(4)	Machine Learning
COMP 655	(4)	Distributed Simulation
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
COMP 766	(4)	Advanced Topics Applications 1
COMP 767	(4)	Advanced Topics: Applications 2

Note: Each year the Ph.D. Committee will determine which category COMP 598 and COMP 599 belong to according to the subjects taught in those courses.

12.4.9 Doctor of Philosophy (Ph.D.) Computer Science: Bioinformatics

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must sho

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*

About Earth and Planetar

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.

Hydrology and Ecohydrology

Studies of the storage, release, and transport of water, nutrients, and other contaminants in watersheds; combination of field, laboratory, big data science and modelling approaches; use of a complex-systems lens to identify the resistance and resilience of watersheds to climate and environmental change; implications for water management and policy in forested, agricultural, and mixed-used watersheds.

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 between tectonics (i.e., supercontinental break-up and assembly), seawater chemistry and ocean redox, and climate change. Calibrating the diversification of early eukaryotes and their impact on global biogeochemical cycles.

Mineralogy

Chemistry and crystallography of carbonate and a variety of rock-forming and biogenic minerals; experimental investigations of the effect of environmental factors (e.g., solution composition and temperature) on the morphology and composition of carbonate and phosphate minerals.

Seismology

Subduction earthquake nucleation and rupture propagation processes; physical mechanism of aseismic deformation transients, deep non-volcanic tremors, dynamic and static stress triggering of low-frequency earthquakes, and transients; pore-fluid pressure coupling with frictional strength and slip.

Tectonics and Structural Geology

Digital field mapping, microstructural characterization, and mineralogical analyses of deformation structure kinematics, geometry, and deformation processes; archean orogenic processes; structural controls on ore deposit genesis; fluid flow in faults, granular flow in faults, and catastrophic structural/geochemical events in faults; earthquake mechanics and processes recorded in rocks; brittle-ductile transition structures and rheology.

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.

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

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*.

Information on application deadlines is available at *mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines*.

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

12.5.4 Earth and Planetary Sciences Faculty

Chair

Galen Halverson

Emeritus Professors

Jafar Arkani-Hamed; Donald Francis; 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

Genevieve Ali; Kim Berlo; Nicolas Cowan; Peter Douglas; Natalya Gomez; James Kirkpatrick; Yajing Liu; Jeanne Paquette; Christie Rowe; Vincent van Hinsberg

Assistant Professor

Nagissa Mahmoudi

Faculty Lecturer

W. Minarik

Adjunct Professors

R. Harrington; R. Léveillé

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 305
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 *Geographic Information Centre (GIC)*, maintains arctic and subarctic field stations, 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 m 1 rts of dHorlterdiscippad1 0 0 1 434.331 0 0 1F1 80earn m 1 rts ty tge

: Master of Arts (M.A.) 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.

Master of Science (M.Sc.) Programs in Geography

Detailed program requirements for the following M.Sc. programs are found in ***Science*** *> Graduate > Browse Academic Units & Programs > Geography*.

section 12.6.5: Master of Science (M.Sc.) 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(500- all600-Tj1 0 0 1 4941587.502.721 7(Thej1 0 0 1 199.23.2Tm.721 7(Theelscirses wi.ograph)T

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

The McGill-STRI Neotropical Environment Option (NEO) is a research-based option for Ph.D. students 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 in Geography, Environment, and Biology; and complementary courses chosen from Geography, Agriculture Sciences, Biology, Sociology, 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 P

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
		Ci

GEOG 700	(0)	Comprehensive Examination 1
GEOG 701	(0)	Comprehensive Examination 2
GEOG 702	(0)	Comprehensive Examination 3

Complementary Courses

Two courses at the 500, 600, or 700 level selected according to guidelines of the Department.

Doctor of Philosophamination 2

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

Two substantive courses.

One of these two courses must be taken within the Department of Geography at the 500 level or above; one of the two courses must be on gender/women's issues at the 500, 600, or 700 level.

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
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 (**M.A.** or **M.Sc.**) and Ph.D. degrees. 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 in Mathematics and Statistics is thesis only.

The *Department's website* provides extensive information on the Department and its f

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

The Department offers a course of studies leading to the Ph.D. degree. It differs substantially from the master's programs in that the student must write a thesis that makes an original contribution to knowledge. The thesis topic is chosen by the student in consultation with the research supervisor. The thesis must be examined and approved by an internal examiner (usually a member of the Progress Tracking Committee), an external examiner, and the Oral Examination Committee. The student must present an oral defence of the thesis before that Committee. To submit a thesis for examination, the student must first pass the Ph.D. Qualifying Examination.

12.7.3 Mathematics and Statistics Admission Requirements and Application Procedures

12.7.3.1 Admission Requirements

In addition to the general Graduate and Postdoctoral Studies requirements, the Department requirements are as follows:

Master's Degree

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.

12.7.3.2 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.

12.7.3.2.1 Additional Requirements

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

- Personal Statement – In the personal statement, the applicants should clearly explain their choice of preferred research group(s) and preferred area(s) of research, as well as providing relevant information that will not be reflected on their transcripts
- Research Proposal (optional) – If applicants have a specific research problem of interest that they want to pursue, they may discuss the details in the research proposal
- Applicants in pure and applied mathematics should provide a GRE score report, if available

For more details, please consult *mcgill.ca/mathstat/postgraduate/prospective-students/admissions*.

12.7.3.3 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 Mathematics and Statistics 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*.

Information on application deadlines is available at *mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines*.

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

12.7.4 Mathematics and Statistics Faculty

Interim Chair

Rustum Choski

Graduate Program Director

Jérôme Vétois

Undergraduate Program Director
Armel Djivede Kelome

Complementary Courses (29 credits)

At least eight approved graduate courses, at the 500, 600, or 700 level, of 3 or more credits each.

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

The Ph.D. in Mathematics and Statistics focuses on research in the mathematical or statistical sciences, including the completion of original research publishable in mainstream refereed journals.

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.

- condensed-matter physics;
- high-energy physics;
- laser spectroscopy;
- material physics;
- non-linear dynamics and atmospheric physics;
- nuclear physics;
- statistical physics;
- medical-radiation physics.

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 MUHC),86.40 0 g BT /2 605.34 Tm (i59 Tm2236 60 1 86.40 1 86rg40 1 86RG1 020 1 81.693 634.07Tj 43i59 Tm2236 6J8

Theoretical: Current research programs involve the nonequilibrium, ab-initio modelling of molecular and nanoelectronic systems and devices; the study of quantum effects in interacting mesoscopic electron systems; nonequilibrium phenomena in extended systems; and applications of statistical mechanics to problems in biophysics.

Experimental: Current research programs involve:

- the study of the time evolution of non-equilibrium systems via X-ray diffraction;
- fundamental quantum properties of strongly correlated systems at temperatures very near absolute zero;
- macromolecular interactions in living cells using single-photon and two-photon imaging;
- molecular electronics and nanoelectronic systems by scanning probe microscopy;
- 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 dy n;

Director of Graduate Studies

N. Provatas

Emeritus Professors

J. Barrette; S. Das Gupta; N.B. de Takacsy; R. Harris; C.S. Lam; D.G. Stairs; J.O. Ström-Olsen; M. Sutton; M.J. Zuckermann

Professors (Post-Retirement)

F. Buchinger; M. Grant

Professors

R. Brandenberger; J. Cline; F. Corriveau; K. Dasgupta; M. Dobbs; C. Gale; G. Gervais; P. Grütter; H. Guo; D. Hanna; S. Jeon; V. Kaspi; S. Lovejoy; A. Maloney; N. Provatas; K. Ragan; D.H. Ryan; B. Vachon; A. Warburton; P. Wiseman

Associate Professors

T. Brunner; H. Cynthia Chiang; L. Childress; B. Coish; D. Cooke; N. Cowan; A. Cumming; 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; K. Wang

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

12.8.4 Physics Admission Requirements and Application Procedures

12.8.4.1 Admission Requirements

M.Sc.

We normally require a background that is equivalent to our *: Bachelor of Science (B.Sc.) - Major Physics (63 credits)*.

Ph.D.

The normal requirement is an M.Sc. in Physics or equivalent, but exceptional students may be considered for direct entry to the Ph.D. program. On the recommendation of the Departmental Graduate Committee, fast-tracking from the M.Sc. program into the Ph.D. program may be granted after one year, if:

- the student has fulfilled the M.Sc. coursework requirements, or;
- the Committee determines that the student qualifies based on the student's academic record.

All students who transfer to the Ph.D. program are required to fulfil Ph.D. coursework requirements in addition to the courses taken as an M.Sc. candidate.

12.8.4.2 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*.

12.8.4.2.1 Additional Requirements

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

- two 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*.

12.8.4.3 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 Physics 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*.

Information on application deadlines is available at *mcgill.ca/gradapplicants/how-apply/application-steps/application-deadlines*.

Please note, the Ph.D. program with a research emphasis on medical physics only accepts students in Fall.

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

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 le

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: 514-398-6127/514-398-6137
Email: *psychology.grad@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.

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; and
- 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, Jewish General Hospital, Montreal Children's Hospital, and Montreal General Hospital to permit graduate students to undertake research in a hospital setting.

Note: Many MUHC-affiliated hospitals and institutes are now located at the Glen site; further information is available on the *MUHC website*.

For inquiries about all programs and financial aid, and for application forms, contact the *Graduate Program*

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.

12.9.3 Psychology Admission Requirements and Application Procedures

12.9.3.1 Admission Requirements

Admission to the graduate program depends on an evaluation of students' research interests and their aptitude for original contributions to knowledge and, if applicable, for professional contributions in the applied field.

The usual requirement for admission is an Honours or Major degree (B.A. or B.Sc.) in Psychology. This usually includes an introductory course plus twelve courses in psychology (each equivalent to three term hours). Courses in experimental psychology, the theoretical development of modern ideas in psychology, and statistical methods as applied to psychological problems (equivalent to an introductory course) are essential. Applicants' knowledge of relevant biological, physical, and social sciences is considered. Students applying to the clinical program are advised to complete 42 specific undergraduate credits in psychology as specified by the *Order of Psychologists of Quebec* (*Ordre des psychologues du Québec*).

Applicants who hold a bachelor's degree but who have not met these usual requirements should consult the Graduate Program Director to determine which (if any) courses must be completed before an application can be considered. Students with insufficient preparation for graduate work may re

Associate Members

Jewish General Hospital: B Thombs

McGill Vision Research Centre: R. Hess; F.A.A. Kingdom; K. Mullen

Montreal Neurological Institute and Hospital: J. Armony; L.K. Fellows; D. Guitton; E. Ruthazer; W. Sossin; R. N. Spreng; V. Sziklas; R. Zatorre

Schulich School of Music: S. MacAdams

Psychiatry: D. Dunkley; F. Elgar; M. Leyton; S. Villeneuve

Adjunct Professor

R. Dumas; S. Harnad; E. Kaplan

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

Thesis Courses (27 credits)

PSYC 690	(15)	Masters Research 1
PSYC 699	(12)	Masters Research 2

Required Courses (18 credits)

PSYC 601	(6)	Master's Comprehensive
PSYC 650	(3)	Advanced Statistics 1
PSYC 651	(3)	Advanced Statistics 2
PSYC 660D1	(3)	Psychology Theory
PSYC 660D2	(3)	Psychology Theory

12.9.6 Doctor of Philosophy (Ph.D.) Psychology

All candidates for the Ph.D. degree must demonstrate broad scholarship, mastery of current theoretical issues in psychology and their historical development, and a detailed knowledge of their special field. Great emphasis is placed on the development of research skills, and the dissertation forms the major part of the evaluation at the Ph.D. level.

Ph.D. students in Clinical Psychology must fulfil similar requirements to Ph.D. students in the Experimental Program and must also take a variety of specialized courses, which include practicum and internship experiences.

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 Course

PSYC 701	(0)	Doctoral Comprehensive Examination

Complementary Cour

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
		Quantitative and Individual Difference u1 0 0 1 231.19.4.04 Tm(Qu-e and Indi)Tjg 721.949 Indi

Required Courses

PSYC 701	(0)	Doctoral Comprehensive Examination
PSYC 781	(3)	Behavioural Neuroscience Special Topics
PSYC 782	(3)	Behavioural Neuroscience Advanced Seminar

Complementary Courses

6-18 credits

6 credits (one course per term in Year 2 and Year 3) chosen from relevant 700-level courses in consultation with the supervisor and graduate program director.

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.

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

Students must satisfy all program requirements for the Ph.D. in Psychology. The Ph.D. thesis must be on a topic relating to language acquisition.

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)

LING 710	(2)	Language Acquisition Issues 2
PSYC 701	(0)	Doctoral Comprehensive Examination
PSYC 709	(2)	Language Acquisition Issues 1
SCSD 712	(2)	Language Acquisition Issues 4

Complementary Courses

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 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)	Phonological Development
SCSD 632	(3)	Phonological Disorders: Children
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

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 following (students without a McGill master's degree 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.

12.10 Redpath Museum

12.10.1 Location

Redpath Museum
859 Sherbrooke Street West
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, and evolutionary biology, leading to **M.Sc.** and **Ph.D.** degrees. It is an institution with extensive collections of ancient and modern organisms, minerals, and cultural artifacts. Research and teaching are centred on collections-based study, object-oriented investigation, and fieldwork. The Museum has a unique public engagement mission with large exhibit galleries and a vibrant outreach program.

12.10.3 Redpath Museum Admission Requirements and Application Procedures

12.10.3.1 Admission Requirements

The Redpath Museum does not have its own graduate programs. All graduate students of the professors in the Redpath Museum have affiliations with either **Biology**, **Earth and Planetary Sciences**, **Anthropology**, **Natural Resource Sciences**, or **Education**. Admission requirements are subject to those home departments' regulations.