Faculty of Medicine and Health Sciences (Graduate)

Programs, Cour

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

1 . McGill University reserves the right to mak

Publication Information

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1 Graduate and Postdoctoral Studies

1.1 Administrative Officers

Administrative Officers	
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Nathan Hall; B.A., M.A., Ph.D. (Manit.)	**Associate Dean (Graduate and Postdoctoral Studies)**
Russell Steele; B.S., M.S. (Carn. Mell), Ph.D. (Wash.)	**Associate Dean (Graduate and Postdoctoral Studies)**

1.2 Location

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

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

1.3 Graduate and Postdoctoral Studies' Mission

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

2 Important Dates

For all dates relating to the academic year, consult *mcgill.ca/importantdates*.

3 Graduate Studies at a Glance

Please refer to *University Regulations & Resources* > *Graduate* > *: Graduate Studies at a Glance* for a list of all graduate departments and degrees currently being offered.

4 Program Requirements

Refer to *University Regulations & Resources* > *Graduate* > *Regulations* > *: Program Requirements* for graduate program requirements for the following:

- Master's Degrees
- Doctoral Degrees

- Coursework for Graduate Programs, Diplomas, and Certificates

5 Graduate Admissions and Application Procedures

Please refer to *University Regulations & Resources* > *Graduate* >

ii. Upon registration, postdocs will be eligible for a University identity card issued by Enrolment Services.

iii. Leaves of absence must comply with the Graduate and Postdoctoral Studies Policies for Vacation, Parental/Familial, and Health Leave (see *section 7.3: Vacation Policy for Graduate Students and Postdocs* and *University Regulations & Resources* > Graduate > Regulations > Categories of Students > *: Leave of Absence Status*).

3. Appointment, Funding, Letter of Agreement

i. Postdoctoral appointments may not exceed the registration eligibility period as defined above.

ii. In order to be registered, the postdoc must be assured of financial support other than from personal means during their stay at McGill University. This amount must be equivalent to the minimal stipend requirement set by the University in accordance with guidelines issued by federal and provincial research granting agencies or the collective agreement, as applicable. Funding during parental leave is subject to the conditions of the funding agency or the collective agreement, as applicable.

iii. Postdocs require a *Letter of Agreement for Postdoctoral Education* signed by the postdoc, the supervisor, and the department/unit head or delegate.

iv. Postdocs with full responsibility for teaching a course should be compensated over and abov

- to clarify expectations regarding intellectual property rights in accordance with the University's policy;
- to provide mentorship for career development; and
- to prepare, sign, and adhere to a Letter of Agreement for Postdoctoral Education.

vi. Some examples of the responsibilities of postdocs are:

- to inform themselves of and adhere to the University's policies and/or regulations for postdocs as outlined at *mcgill.ca/gps/postdocs* and *mcgill.ca/students/srr*, and the Graduate and Postdoctoral Studies *University Regulations and Resources*;
- to submit a complete file for registration to Enrolment Services;
- to sign and adhere to their Letter of Agreement for Postdoctoral Education;
- to communicate regularly with their supervisor; and
- to inform their supervisor of their absences.

vii. Some examples of the responsibilities of the University are:

- to register postdocs;
- to provide an appeal mechanism in cases of conflict;
- to provide documented policies and procedures to postdocs;
- to provide postdocs with the necessary information on McGill University student services (Postdoctoral Fellows and Scholars) and HR policies and guidelines (Postdoctoral Researchers).

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

7.3 Vacation Policy for Postdocs

Please refer to the *: Vacation Policy for Graduate Students and Postdocs*.

Leave of Absence for Health and P

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 f

10 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

11.1.3.2 About Medical Physics

“Department” = Medical Physics Unit
"Program" = Graduate Diploma (Med Radiation Physics)
or
"Program" = Medical Radiation Physics-T
"Status" = Full Time

Under **Additional Questions**

MDPH 602	(3)	Radiotherapy Physics
MDPH 603	(2)	Laboratory Radiotherapy Physics
MDPH 607	(3)	Medical Imaging
MDPH 608	(2)	Laboratory - Diagnostic Radiology and Nuclear Medicine
MDPH 609	(2)	Radiation Biology
MDPH 610	(2)	Instrumentation and Computation in Medical Physics 2
MDPH 613	(2)	Health Physics
MDPH 614	(3)	Physics of Diagnostic Radiology
MDPH 615	(2)	Physics of Nuclear Medicine
MDPH 618	(3)	Anatomy and Physiology for Medical Physics

11.1.3.5 Graduate Diploma (Gr. Dip.) Medical Radiation Physics (30 credits)

The Graduate Diploma in Medical Radiation Physics is intended to provide candidates holding a graduate degree in a related field with the knowledge required to enter into the field of medical physics. The program relies on a strong fundamental science background. The graduate diploma program is accredited by the Commission for Accreditation of Medical Physics Education Programs (CAMPEP) only for students holding a Ph.D. degree.

Required Courses (30 credits)

* Or an equivalent course, at the 500-level or higher, as deemed appropriate by the Graduate Program Director.

MDPH 601	(3)	Radiation Physics
MDPH 602	(3)	Radiotherapy Physics
MDPH 603	(2)	Laboratory Radiotherapy Physics
MDPH 607	(3)	Medical Imaging
MDPH 608	(2)	Laboratory - Diagnostic Radiology and Nuclear Medicine
MDPH 609	(2)	Radiation Biology
MDPH 610	(2)	Instrumentation and Computation in Medical Physics 2
MDPH 613	(2)	Health Physics
MDPH 614	(3)	Physics of Diagnostic Radiology
MDPH 615	(2)	Physics of Nuclear Medicine
MDPH 618	(3)	Anatomy and Physiology for Medical Physics
PHIL 643*	(3)	Seminar: Medical Ethics

11.1.4 Medicine, Experimental

11.1.4.1 Location

Division of Experimental Medicine
Department of Medicine
1001 Decarie Boulevard
Montreal QC H4A 3J1
Canada
Telephone: 514-934-1934, ext. 34699 or 34700 or 36465
Email: *experimental.medicine@mcgill.ca*
Website: *mcgill.ca/expmed*

11.1.4.2 About Experimental Medicine

Experimental Medicine is a Division of the Department of Medicine charged with the task of providing graduate education in the Department, and enabling professors located in the research institutes of the McGill teaching hospitals and other centres to supervise graduate students. Graduate Students pursue cutting-edge medical research in a unique setting in which Ph.D. and M.D. researchers collaborate, favouring translational research into the pathogenesis

and treatment of disease. The Division offers various programs, each of which has different training objectives (see below). The internationally recognized high-quality training our graduates receive is in essence what distinguishes graduates of our programs from the graduates of comparable programs in peer institutions.

section 11.1.4.10: Graduate Certificate (Gr. Cert.) Regenerativ

design thinking methodology in clinical innovation. High-volume streams of clinical and health-related data from clinical systems, wearables and social media.

Thesis Courses (24 credits)

EXMD 693	(12)	Master's Thesis Research 4
EXMD 694	(12)	Master's Thesis Research 5

Required Courses (9 credits)

EXMD 601	(3)	Real World Applications of Data Science and Informatics
EXMD 634	(3)	Quantitative Research Methods
EXSU 500	(3)	Artificial Intelligence in Medicine

Complementary Course (6 credits)

3 credits from the following:

EPIB 600	(3)	Clinical Epidemiology
EXMD 600	(3)	Principles of Clinical Research

3 credits from the following:

EXMD 630	(3)	Developing Digital Innovations for Health Impact
EXSU 620	(3)	Surgical Innovation 1

Elective Courses (6 credits)

6 credits of courses at the 500 level or higher approved by the Director.

11.1.4.7 Master of Science (M.Sc.) Experimental Medicine (Thesis): Environment (45 credits)

** This program is currently not offered. **

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

Thesis Courses (27 credits)

EXMD 690	(3)	Master's Thesis Research 1
EXMD 693	(12)	Master's Thesis Research 4
EXMD 694	(12)	Master's Thesis Research 5

Required Course (3 credits)

ENVR 615	(3)	Interdisciplinary Approach Environment and Sustainability

Complementary Courses (15 credits)

3-6 credits from:

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

0-3 credits from:

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

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

9 credits of courses at the 500-level or higher. Course choices should be made in consultation with research supervisor(s). Courses may be taken outside the department at the 500 level or higher in medical and allied sciences*.

* Students must get approval of GPD for courses at the 500 level or higher from other Allied Health Sciences.

11.1.4.8 Doctor of Philosophy (Ph.D.) Experimental Medicine

The overall objectiv

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.

12 credits, at the 500 level or higher, are required for students admitted to Ph.D. 2, i.e. students entering the program with a prior Master's degree.

Or

18 credits, at the 500 level or higher, are required for students admitted to Ph.D. 1, i.e. students entering the program with only a B.Sc. or M.D. degree and who have been either admitted directly or fast-tracked to the Ph.D.

Course choices should be made in consultation with research supervisor(s). Courses may be taken outside the department at the 500 level or higher in medical and allied sciences *.

* Students must get approv

Complementary Courses (6 credits)

Six credits at the 500 level or higher chosen from: Experimental Medicine (EXMD), Pharmacology and Therapeutics (PHAR), Epidemiology and Biostatistics (EPIB). With prior approval from the Division's Student Affairs Coordinator, courses at the 500 level or higher, from other Allied Health Sciences departments may be accepted.

11.1.5 Medicine, Family

11.1.5.1 Location

Department of Family Medicine
5858 Côte-des-Neiges Road, 3rd Floor
Montreal QC H3S 1Z1
Email: *graduateprograms.fammed@mcgill.ca*
Website: *mcgill.ca/familymed/education/graduate-programs*

11.1.5.2 About Family Medicine

The McGill Department of Family Medicine is home to an exceptional community of primary health care professionals, researchers, students, and support staff, whose mission is to contribute to the health of the population and the sustainability of the health care system in Quebec, in Canada, and internationally by:

- developing research and scholarly activity to contribute to the academic discipline;
- promoting curriculum innovation and education research;
- engaging in international and global health activities;
- developing and engaging in public policy discussions;
- training medical students, residents, and other health care professionals to become committed to primary care, contributing to accessibility, continuity, coordination, accountability, patient-centredness, and health promotion and prevention;
- promoting innovation in family medicine and primary health care delivery and practice.

We understand that research in family medicine and primary care is essential to the achievement of excellence in health care delivery, patient care, and education. Our research division is composed of Ph.D. and clinical researchers who dedicate their efforts to producing and translating knowledge that advances the discipline, practice, and teaching of family medicine and primary care while supporting the scholarly activities of clinicians and residents in the Department. We have developed unique and rigorous research programs for **M.Sc.** and **Ph.D.** students that advance academic excellence in family medicine and primary health care through patient-oriented, community-based research with innovative methodologies and participatory approaches.

section 11.1.5.4: Master of Science (M.Sc.) Family Medicine (Thesis) (45 credits)

The M.Sc. in Family Medicine is a research-oriented thesis-based graduate program in family medicine. The objective is to increase the skills of those interested in carrying out research pertinent to the practice of family medicine.

As many relevant research questions cross conventional boundaries of disciplines and research traditions, we incorporate an **interdisciplinary approach** with an emphasis on **participatory research** and **community engagement**.

This program provides training in epidemiology and statistics, as well as in qualitative, quantitative and mixed methods. Students are also oriented for knowledge synthesis, and participatory research approaches.

An emphasis is placed on the relevance of the thesis research to family practice and primary health care. Close links are maintained with the main family medicine clinical sites located around Montreal and Quebec.

section 11.1.5.5: Master of Science (M.Sc.) Family Medicine (Thesis): Bioethics (45 credits)

The objectives of this program are to allow students to conduct innovative research in relation to a bioethical issue pertinent to health care and to acquire a working knowledge of bioethical issues from the current viewpoint of other relevant disciplines such as law, philosophy, and religious studies. A minimum of 45 credits is required including the thesis. The research culminates in the preparation of a thesis.

section 11.1.5.6: Master of Science (M.Sc.) Family Medicine (Thesis): Medical Education (45 credits)

This program will have very close ties to the *Family Medicine Educational Research Group* (FMER), which is the corollary of the educational innovations in teaching and research conceived and established in the McGill Department of Family Medicine since 2005. The FMER group's ultimate goal is to advance knowledge to:

1. constantly inform family medicine curricula innovations and continuing professional development to better family physicians' clinical practice;
2. significantly contribute to the development of the family medicine education field of inquiry;
3. rigorously develop and inform medical education policy.

section 11.1.5.6: Master of Science (M.Sc.) Family Medicine (Thesis): Medical Education (45 credits)

This research agenda of FMER is articulated into four interrelated streams:

1. family physician's professional identity formation;
2. information use and technology in the learning episodes of practicing physicians and organizational learning;
3. program evaluation of educational innovations;
4. knowledge synthesis.

section 11.1.5.7: Doctor of Philosophy (Ph.D.) Family Medicine & Primary Care

The Ph.D. program will build upon our M.Sc in Family Medicine. Research topics in the field of family medicine and primary health care cross conventional discipline boundaries and research traditions. Our training program focuses on patient-oriented, community-based research using innovative methodologies and participatory approaches. The program advances academic excellence in family medicine and primary health care.

11.1.5.3 Medicine, Family Admission Requirements and Application Procedures

11.1.5.3.1 Admission Requirements

Our program encourages the following applicants:

- Practicing family physicians
- Undergraduate university students with a strong interest in family medicine research
- Family medicine residents who are completing their residency and would like to continue with their education by completing an enhanced skills program specializing in family medicine research with the possibility of obtaining an M.Sc. degree. If interested, you may learn more about the Clinician Scholar Program *here*

What do we look for?

High academic achievement: A cumulative grade point average (CGPA) of 3.4 is required out of a possible maximum CGPA of 4.0, or a GPA of 3.6 is required in the last two years of full-time studies.

Proof of competency in oral and written English: TOEFL: International students who have not received their instruction in English, or whose mother tongue is not English, must pass the Test of English as a Foreign Language (*TOEFL*) with a minimum score of 86 on the Internet-based test (iBT), with each component score not less than 20 (internet-based test).

Note: The TOEFL institution code for McGill University is 0935. For further information, please refer to the *TOEFL website*.

Alternatively, students may submit International English Language Testing System (*IELTS*) scores with a minimum overall band score of 6.5. Original score reports must be submitted (photocopies will not be accepted).

For overseas graduates, an attempt is made to situate the applicant's academic grades among the standards of their universities. Grades are, however, converted to their McGill equivalent. *International Grade Conversion charts*, as well as required admission documentation for each country, are pro

McGill will contact these referees via email and invite them to upload reference letters on the applicant's behalf (along with the instructions on how to upload the documents). **Neither of these reference letters should be from the proposed supervisor.**

- **Personal Statement:** Applicants must submit a personal statement in which they:

  1. describe their background and the reasons why they are applying to the desired program;
  2. describe their research interests and with whom, among the list of potential supervisors, they would like to work;
  3. describe how they hope to impact family medicine practice; and
  4. describe future plans upon graduation from the desired program.

  The statement should be no more than tw

Thesis Courses (24 credits)

Thesis subject should be related to medical education.

FMED 697	(12)	Master's Thesis Research 1
FMED 698	(12)	Master's Thesis Research 2

Required Courses (12 credits)

EDPE 637	(3)	Issues in Health Professions Education
FMED 505	(3)	Epidemiology and Data Analysis in Primary Care 1
FMED 610	(1)	Foundations of Family Medicine
FMED 614	(2)	Foundations of Mixed Methods Research
FMED 625	(3)	Qualitative Health Research

Complementary courses (9 credits)

3 credits from the following:

FMED 509	(3)	Epidemiology and Data Analysis in Primary Care 2
FMED 603	(1)	Foundations of Participatory Research
FMED 606	(1)	Operational Issues in Survey Methods in Primary Care
FMED 615	(1)	Applied Knowledge Translation and Exchange in Health
FMED 616	(1)	Applied Literature Reviews

6 credits from the following:

EDEC 612	(3)	Digital Media and Learning
EDEM 644	(3)	Curriculum Development and Implementation
EDEM 673	(3)	Leadership Theory in Education
EDPE 635	(3)	Theories of Learning and Instruction
EDPE 664	(3)	Expertise, Reasoning and Problem Solving
EDPE 670	(3)	Educational Assessment and Evaluation

11.1.5.7 Doctor of Philosophy (Ph.D.) Family Medicine & Primary Care

The PhD program will build upon our MSc in F

Required Courses (9 credits)

FMED 601	(3)	Advanced Topics in Family Medicine
FMED 604	(3)	Advanced Participatory Research in Health
FMED 702*	(1)	Advanced Doctoral Primary Care Research Seminars

* Note: this slot course must be taken three times (3 cr.)

Elective Course (3 credits)

3 credits in advanced research methods, at the 600 level or higher. May be chosen from outside the Department, in consultation with the student's academic adviser or supervisor.

11.1.6 Oncology

11.1.6.1 Location

Gerald Bronfman Department of Oncology
5100 de Maisonneuve Blvd West, Suite 720
Montreal QC H4A 3T2
Website: *mcgill.ca/oncology*

11.1.6.2 Graduate Diploma in Oncology

The Graduate Diploma in Oncology provides students the opportunity to gain exposure to the principles and practice of oncology as well as its research domains, while exploring in more detail one of four areas of focus:

- Population and Global Cancer Control
- Psychosocial Oncology/Palliative Care
- Clinical Cancer Research
- Cancer Care Services and Quality

11.1.6.3 Graduate Diploma (Grad. Dip.) Oncology (30 credits)

The Graduate Diploma in Oncology provides exposure to the entire spectrum of principles and practice in all fields of oncology as well as its research domains while allowing exploration in more detail of a specific area of focus through courses and a practicum. The areas of focus are: population and global cancer control, psychosocial oncology/palliative care, clinical cancer research, or cancer care services and quality.**Required Cour9 credits)**

Living with Illness, Loss and Berea

11.1.7.3.3 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 Otolaryngology 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/gr*

organism down to specific components of the individual cell. Research in pathology often provides a unique link to human data, with an opportunity to translate experimental research into improved methods of diagnosis and therapy.

The Graduate Studies Program in the Department of Pathology has been designed to achieve three major goals:

1. To train students in the design, performance, interpretation, and documentation of laboratory research by guiding them as they carry out a thesis project in one of the many sub-disciplines of pathology.
2. To ensure that students have a comprehensive knowledge of biomedical science, with an advanced and up-to-date understanding of pathology. In addition to the scientific component, Ph.D. candidates should also become familiar with the general principles of diagnostic pathology. (Foreign medical graduates should be aware that this level of conceptual knowledge regarding diagnostic procedures is **not** adequate preparation for clinical employment and those wishing to practise Pathology as a medical specialty should apply for residency training rather than graduate studies.)
3. To provide initial training in effective techniques of scientific communication: organizing and delivering lectures and research seminars; preparing and evaluating manuscripts and grant applications.

The Pathology Department offers research training in a wide variety of areas such as:

- Cancer research, including the fundamental biology of breast cancer, ovarian cancer, brain tumors, soft tissue tumors, and the mechanisms of metastasis;
- Immunology and transplantation;
- Autoimmune disorders;
- Ophthalmic pathology;
- Stem cell biology;
- Pulmonary disease;
- Neurodegenerative disorders;
- Smooth muscle pathophysiology; and
- Genomic biology of cancer.

Modern techniques and equipment include light, fluorescence, and electron microscopy (both transmission and scanning), laser capture, flow cytometry, DNA, RNA, protein analysis, cell culture, advanced immunological, pharmacological, biochemical, and physiological techniques, as well as morphometry and computer-aided analysis.

section 11.1.8.4: Master of Science (M.Sc.) Pathology (Thesis) (45 credits)

Graduates can directly enter rewarding careers in research, or opt to continue with their studies and obtain a Ph.D. Some combine their research training with subsequent training in medicine, law, or business administration.

section 11.1.8.5: Doctor of Philosophy (Ph.D.) Pathology

Our graduates enter successful careers in industry, academia, government/international agencies, or clinical medicine, sometimes combining two of these options. They leave McGill with experience in leadership and communication skills in addition to being highly trained in biomedical research, and their career choices include a wide range of administrative and research positions around the world.

11.1.8.3 Pathology Admission Requirements and Application Procedures

11.1.8.3.1 Admission Requirements

Applicants must have a B.Sc. or an equivalent degree with an extensive background in the physiological and biological sciences. An academic record equivalent to or better than a cumulative grade point average (CGPA) of 3.2 out of 4.0 is required for at least the two final full-time years of undergraduate training, with a minimum CGPA of 3.0 overall, but acceptance is competitive and higher grades are generally required. It is an advantage if candidates have very favourable supporting letters or have demonstrated an exceptional aptitude for research. All candidates are expected to apply for scholarships and fellowships, which usually require a higher CGPA or other evidence of excellence.

after one year of training.

Applicants to graduate studies whose native language 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), must submit documented proof of competency in oral and written English. Before acceptance,Tm(rom.18 Tmuri1 0 0 1 100.463 388.817Tm(y in oraxamh.)ulha)Tj1 beTj-0.2f of ente

Applicants who already possess an additional de

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Pr*

PATH 620	(3)	Research Seminar 1
PATH 622	(3)	Research Seminar 2
PATH 701	(0)	Comprehensive Examination - Ph.D. Candidates

Complementary Courses (9 credits)

Three 500-, 600-, or 700-level courses offered by the Department; subject to the approval of the research director and Graduate Students Committee, up to one 500-, 600-, or 700-le

- A M.Sc., or M.A. degree
- The student's statement of purpose for seeking a Ph.D.
- Confirmation of supervision, including confirmation of funding from the supervisor or from an external scholarship

11.1.9.3.2 Application Procedures

McGill’s online application form for graduate program candidates is available at

Complementary Courses (3 credits)

3 credits from the following or 3 credits of 500 level or higher from another unit chosen in consultation with the student's academic advisor or supervisor:

PSYT 500	(3)	Advances: Neurobiology of Mental Disorders
PSYT 515	(3)	Advanced Studies in Addiction
PSYT 620	(3)	Trends in Clinical Psychiatry
PSYT 625	(3)	Qualitative Research in Health Care
PSYT 630	(3)	Statistics for Neurosciences
PSYT 633	(3)	Social and Cultural Research Methods
PSYT 682	(3)	Psychosocial Issues of Disease
PSYT 696	(3)	Special Topics in Psychiatry
PSYT 711	(3)	Cultural Psychiatry
PSYT 713	(3)	Psychiatric Epidemiology

11.1.10 Surgery, Experimental

11.1.10.1 Location

Surgery, Experimental
Montreal General Hospital
1650 Cedar Avenue

M.Sc. Concentrations

Generally a B.Sc. in biological, biomedical, and life science; physical science; computer science; an M.D. degree; or a B.Eng. is required. Exceptionally, on a case-by-case basis, an applicant holding a B.Com.; B.C.L./LL.B.; or B.A. or B.Sc. in humanities and social sciences will be considered. An applicant must have a minimum CGPA of 3.2/4.0.

Ph.D. Program

Admission is usually through one of the M.Sc. programs, either upon completion of the M.Sc. degree, or by transfer from the first year of M.Sc. to the second year of Ph.D. studies, within the Department. Request for such transfer is to be made in writing by the thesis supervisor during the candidate's first year of M.Sc. studies. A candidate for transfer must submit an application to the doctoral program according to normal procedures and deadlines. **Transfer is granted on the basis of an examination administered by the student's Research Advisory Committee.** Exceptional students with a minimum 3.5/4.0 CGPA may apply directly to the Ph.D. program.

Students with an M.Sc. degree from other departments or from other recognized universities whose M.Sc. topic is closely related to the subject of their Ph.D. research may be admitted directly into the Ph.D. program, at the level of Ph.D. 2, at the discretion of the Department. Exceptional students with a master's degree unrelated to their proposed research may be admitted to Ph.D. 1.

Graduate Certificate and Graduate Diploma

Generally a B.Sc. in biological, biomedical and life science; physical science; computer science; an M.D. degree; or a B.Eng. is required. Exceptionally, on a case-by-case basis, an applicant holding a B.Com.; B.C.L./LL.B.; or B.A. or B.Sc. in humanities and social sciences will be considered. An applicant must have a minimum CGPA of 3.2/4.0.

11.1.10.3.2 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.

11.1.10.3.2.1 Additional Requirements

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

- Curriculum Vitae
- Research Project Proposal
- Confirmation of Supervisor
- Letter of Understanding
- Tuition Assistance

Additional Requirements for the Concentrations in Surgical Education and Surgical Innovation and M.Sc. Non-Thesis, M.Sc. Non-Thesis Oncology

- Letter of Intent – gical Educatio2 Tm(T25)T./F1500.2(gshould577.9c204 j0Tf1 0 0 1 81.693 390.5 Tm(T3and5 0 0 1 86.278 390.5 Tm(uition)Tj1 030 0.52 38nten1

EXSU 693	(18)	M.Sc. Thesis

Required Courses (9 credits)

EPIB 507	(3)	Biostats for Health Sciences
EPIB 521	(3)	Regression Analysis for Health Sciences
EXSU 602	(3)	Knowledge Management 2

Complementary Courses (6 credits)

6 credits, taken from 500-, 600-, or 700-level courses in consultation with the Research Advisory Committee.

Depending on their individual background, students may be asked by their Research Advisory Committee to take additional courses.

11.1.10.7 Master of Science (M.Sc.) Experimental Surgery (Thesis): Surgical Education (45 credits)

The M.Sc. in Experimental Surgery, Concentration in Surgical Education, provides a foundation in surgical education practice and research. The program highlights the unique teaching and learning environment of surgery coupled with a basis in educational theory, curricular design, and implementation. A major emphasis of this program is surgical educational research with the elaboration, designs, implementation, and analysis of a research project founded in best practices of educational research. The research project may encompass, but is not limited to, surgical stimulation, technical skills acquisition, surgical technology, and assessment.

Thesis Courses (30 credits)

EXSU 690	(4)	M.Sc. Research 1
EXSU 691	(4)	M.Sc. Research 2
EXSU 692	(4)	M.Sc. Research 3
EXSU 693	(18)	M.Sc. Thesis

Required Courses (6 credits)

EDPH 689	(3)	Teaching and Learning in Higher Education
EXSU 603	(3)	Surgical Education Foundations

Complementary Courses (9 credits)

3 credits from the following:

EDPE 575	(3)	Statistics for Practitioners
EDPE 637	(3)	Issues in Health Professions Education
EXSU 606	(3)	Statistics for Surgical Research

And:

6 credits, taken from 500-, 600-, or 700-level courses in consultation with the Research Advisory Committee.

Depending on their individual backgrounds, students may be ask

EXSU 692	(4)	M.Sc. Research 3
EXSU 693	(18)	M.Sc. Thesis

Required Courses (12 credits)

EXSU 619	(3)	The Hospital Environment
EXSU 620	(3)	Surgical Innovation 1
EXSU 621	(3)	Surgical Innovation 2

And:

3 credits from the following:

EDPE 575	(3)	Statistics for Practitioners
EPIB 507	(3)	Biostats for Health Sciences
EXSU 606	(3)	Statistics for Surgical Research

Complementary Courses (3 credits)

3 credits taken from 500-, 600-, or 700- level courses in consultation with the Research Advisory Committee.

Depending on their individual background, students may be asked by their Research Supervisory Committee to take additional courses.

11.1.10.9 Master of Science (M.Sc.) Experimental Surgery (Thesis): Surgical Outcomes Research (45 credits)

The M.Sc. in Experimental Surgery; Surgical Outcomes Research program focuses on the science of measuring and improving the outcomes of surgical patients. Coursework addresses research methods, biostatistics, and strategies to measure and improve postoperative outcomes. The thesis component of the program must focus on a topic in the field of surgical outcomes research.

Required Courses (33 credits)

EXSU 610	(3)	Surgical Outcomes Research Foundations
EXSU 690	(4)	M.Sc. Research 1
EXSU 691	(4)	M.Sc. Research 2
EXSU 692	(4)	M.Sc. Research 3
EXSU 693	(18)	M.Sc. Thesis

Complementary Courses (12 credits)

3 credits from the following:

EPIB 600	(3)	Clinical Epidemiology
EXMD 600	(3)	Principles of Clinical Research

3 credits from the following:

EPIB 507	(3)	Biostats for Health Sciences
EXMD 634	(3)	Quantitative Research Methods

6 credits from the following:

EPIB 521	(3)	Regression Analysis for Health Sciences
EPIB 629	(3)	Knowledge Synthesis
EXSU 500	(3)	Artificial Intelligence in Medicine

FMED 625	(3)	Qualitative Health Research
PPHS 527	(3)	Economics for Health Services Research and Policy

Or other relevant 500-, 600-, or 700-level courses upon approval of the student's Research Advisory Committee.

11.1.10.10 Master of Science (M.Sc.) Experimental Surgery (Non-Thesis) (45 credits)

This M.Sc. in Experimental Surgery (Non Thesis) offers a graduate level training program in core fundamentals of modern surgical research. The program is based primarily on academic course work and short projects. It is designed to be flexible and provide students the opportunity to gain core disciplines whilst allowing training opportunities in more specific areas such as global surgery, innovation, education, or as the interest of the students dictates. The individual research interests of the faculty cover a wide spectrum, from injury, repair, recovery, tissue engineering, transplantation, fibrosis, cancer and stem cell biology, biomechanics, and organ failure, to surgical simulation, surgical innovation, education, and evaluative/outcomes research. Importantlys in.3351 194.733 59

BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices
DENT 669	(3)	Extracellular Matrix Biology
EDPE 637	(3)	Issues in Health Professions Education
EDPE 687	(3)	Qualitative Methods in Educational Psychology
EDPH 689	(3)	Teaching and Learning in Higher Education
EPIB 681	(3)	Global Health: Epidemiological Research
EXMD 609	(3)	Cellular Methods in Medical Research
EXMD 610	(3)	Molecular Methods in Medical Research
EXSU 501	(6)	Medical Technology Internship 1
EXSU 601	(3)	Knowledge Management 1
EXSU 605	(3)	Biomedical Research Innovation
EXSU 620	(3)	Surgical Innovation 1
EXSU 621	(3)	Surgical Innovation 2
EXSU 622D1	(6)	Surgery Research Project 1
EXSU 622D2	(6)	Surgery Research Project 1
EXSU 684	(3)	Signal Transduction
FMED 619	(3)	Program Management in Global Health and Primary Health Care
PHGY 518	(3)	Artificial Cells
PHGY 550	(3)	Molecular Physiology of Bone
PPHS 511	(3)	Fundamentals of Global Health
PPHS 529	(3)	Global Environmental Health and Burden of Disease

Elective Courses (9 credits)

9 credits taken from 500-, 600-, or 700-level courses at the University, which may include courses from the list above, will be taken with the approval of the director of the program/adviser.

11.1.10.11 Doctor of Philosophy (Ph.D.) Experimental Surgery

Thesis

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

Required Courses (3 credits)

EXSU 700	(0)	Comprehensive Examination

And:

3 credits from the following:

EDPE 575	(3)	Statistics for Practitioners
EPIB 507	(3)	Biostats for Health Sciences
EXSU 606	(3)	Statistics for Surgical Research

Complementary Courses (12 credits)

6 credits from the following:

EDPH 689	(3)	Teaching and Learning in Higher Education
EXMD 634	(3)	Quantitative Research Methods
EXSU 500	(3)	Artificial Intelligence in Medicine
EXSU 601	(3)	Knowledge Management 1
EXSU 602	(3)	Knowledge Management 2
EXSU 603	(3)	Surgical Education Foundations
EXSU 619	(3)	The Hospital Environment
EXSU 620	(3)	Surgical Innovation 1
EXSU 621	(3)	Surgical Innovation 2

And 6 credits at the 500 level or higher in the student's specialty, selected in consultation with the Research Supervisory Committee.

11.1.10.12 Graduate Certificate (Gr. Cert.) Surgical Innovation (15 credits)

The core of this 15-credit graduate program consists of two innovation courses (EXSU 620 and EXSU 621) delivered by McGill Department of Surgery, with some sessions offered by external partners: John Molson School of Business (lean start-up), Concordia (software design), Local Industry (Regulatory & IP), and ETS (prototyping). the first semester of the program core focuses on team building and, supported by lectures, the students embark on a needs-finding process by observing all aspect of clinical activity in their focus themes. Trainees learn basic prototyping skills, start up organization and project management, supplemented by a basic statistics course and an introduction to the current status of biomedical research innovation. This certificate provides a solid foundation in the innovation process.

Required Courses (12 credits)

9 credits in:

EXSU 619	(3)	The Hospital Environment
EXSU 620	(3)	Surgical Innovation 1
EXSU 621	(3)	Surgical Innovation 2

And:

3 credits from the following:

EDPE 575	(3)	Statistics for Practitioners
EPIB 507	(3)	Biostats for Health Sciences
EXSU 606	(3)	Statistics for Surgical Research

Some courses may be substituted with equivalents if timetabling requires it.

Elective Course (3 credits)

3 credits at the 500 level or higher, taken in consultation with the program director/adviser.

11.1.10.13 Graduate Diploma (Gr. Dip.) Surgical Innovation (30 credits)

The cores of this 30-credit program are two-fold. Firstly, two innovation courses are offered by the McGill Department of Experimental Surgery (EXSU 620-Surgical Innovation & 621-Surgical Innovation 2) and supporting courses are delivered by the McGill Department of Surgery with some sessions in those courses provided by external partners: Local Industry (Regulatory & IP), the John Molson School of Business (JMSB) (lean start-up), Concordia University (software design), and L'École de technologie supérieure (ETS) (prototyping). Secondly, fundamental business and management courses provided by the School of Continuing Studies (McGill) and JMSB are taken concurrently and reinforce the innovation project team experience. Students embark on a hospital-based needs finding process by observing all aspects of clinical activity in their focus themes. The trainees learn basic prototyping skills, start-up organization, and project management. This is supplemented by a basic statistics course and an introduction to the current status of biomedical research innovation. This graduate diploma then gives a business-oriented training in the surgical innovation process.

Required Courses (15 credits)

12 credits in:

CORG 556	(3)	Managing and Engaging Teamwork
EXSU 619	(3)	The Hospital Environment

EXSU 620	(3)	Surgical Innovation 1
EXSU 621	(3)	Surgical Innovation 2

And:

3 credits from the following:

EDPE 575	(3)	Statistics for Practitioners
EPIB 507	(3)	Biostats for Health Sciences
		Statistics for Sur

- cell and molecular biology;
- cellular immunology and hematology;
- reproductive biology;
- calcified tissue biology;
- tumour cell biology;
- developmental biology;
- neurobiology; and
- aging.

The Department offers contemporary facilities for the wide range of techniques currently employed in research. Modern methods of cell and molecular biology, immunology, and biochemistry are used in conjunction with specialized microscopy in a variety of experimental systems.

The Department has one of the largest and best-equipped electron microscope facilities in the world. Currently in use are four modern electron microscopes which include a Tecnai F20 and a Titan Krios. Combined with some of these microscopes are computer-aided analytical equipment capable of elemental microanalysis, histomorphometry, reconstruction, and quantitation. The high-voltage microscope is particularly useful for certain analytical electron optical procedures such as electron diffraction, lattice imaging, and three-dimensional electron microscopy.

Funding

The minimum yearly stipend for Canadian Citizens and Permanent Residents is $20,000 for MSc students, and $22,000 for Ph.D. students. M.Sc. and Ph.D. International students will receive a minimum yearly stipend of $24,000 to compensate for tuition fees higher than Canadian Citizens, Permanent Residents, and Quebec-resident students. The minimum stipend for International students is guaranteed for the duration of the residency period in which students pay their highest fees.

All students are financially supported either by their supervisor or through fellowships or scholarships. Prospective students are ur

Ph.D. Program (Cell Biology)

1. An M.Sc. degree in life sciences or any of M.D., D.D.S., or D.V.M. degrees from a university of recognized reputation
2. Evidence of a high academic achievement with a minimum cumulative grade point average (CGPA) of 3.0 out of 4.0 as indicated in the general guidelines set up by GPS

International Applicants

Graduate studies applicants 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), must submit the following:

TOEFL: Minimum score of 86 on the Internet-based test (iBT) with each component score 20 or higher.

or

IELTS: Minimum overall band score of 6.5.

11.2.2.3.2 Application Procedures

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

See *University Regulations & Resources* > *Graduate* > *Graduate Admissions and Application Procedures* for detailed application procedures. Further details from the department can be found our *Graduate webpage*.

All applicants are advised to contact potential research supervisors before the application process since supervisor acceptance is required. Information about the research interests of faculty members can be found in our *Departmental Directory*. A list of *professors who are actively recruiting* can also be found on the site.

Program guidelines are listed under the *Master's* and *Doctorate* pages on our *Graduate Webpage*.

11.2.2.3.2.1 Additional Requirements

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

- Agreement of a faculty member to act as Thesis Supervisor and to provide adequate financial support

11.2.2.3.3 Application Dates and Deadlines

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

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

11.2.2.4 Master of Science (M.Sc.) Cell Biology (Thesis) (45 credits)

Thesis Course (24 credits)

ANAT 698	(24)	M.Sc. Thesis Research 1

Required Course (12 credits)

ANAT 601	(3)	MSc Seminar Examination
ANAT 695	(3)	Seminars in Cell Biology 1
ANAT 696	(3)	Seminars in Cell Biology 2
ANAT 697	(3)	Seminars in Cell Biology 3

Complementary Courses (9 credits)

6 credits from one of two streams: Cell Developmental Biology Stream or Human Systems Biology Stream

Cell Developmental Biology Stream

ANAT 690D1	(3)	Cell and Developmental Biology
ANAT 690D2	(3)	Cell and Developmental Biology

Human Systems Biology Stream

** This stream is currently under review. **

6 credits required:

ANAT 690D1	(3)	Cell and Developmental Biology
ANAT 690D2	(3)	Cell and Developmental Biology

3 credits selected from:

BMDE 502	(3)	BME Modelling and Identification
BMDE 519	(3)	Biomedical Signals and Systems
BTEC 501	(3)	Bioinformatics
	(3)	Advanced Computational Biology Methods and Research

11.2.3.2 About Biochemistry

The Department of Biochemistry offers M.Sc. and Ph.D. programs, which emphasize laboratory research. Our research interests include:

- molecular and cell biology;
- the regulation of gene and protein expression;
- signal transduction;
- protein structure and function;
- membrane biology;
- cell death and differentiation;
- embryonic development;
- neurobiology;
- bioinformatics;
- cancer.

Specialized graduate training programs in Chemical Biology, Human Systems Biology (Bioinformatics), *Cancer Research/Oncology*, and *Structural Biology* are available. Laboratories are located in the new Bellini Life Sciences Building and Rosalind and Morris Goodman Cancer Research Institute, and the renov

section 11.2.3.6: Master of Science (M.Sc.) Biochemistry (Thesis): Chemical Biology (47 credits)

The Chemical Biology graduate option is centred on the pursuit of an original research project under the direction of one or more mentors. The program is supported by McGill University and by the Canadian Institutes of Health Research (CIHR) through its Strategic Training Initiatives program.

The program of training incorporates several important features, including a diverse curriculum and programs of seminars, workshops, and discussion groups designed to provide students with a well-rounded exposure to both the chemical and biological aspects of the discipline. The M.Sc. option provides a foundation in the concepts and approaches of Chemical Biology.

section 11.2.3.7: Doctor of Philosophy (Ph.D.) Biochemistry

The Ph.D. in Biochemistry trains students in laboratory-based research at the highest level. The Ph.D. program is streamlined to emphasize independent research, and the man

Candidates who have completed their M.Sc. degree may be admitted directly to the Ph.D. program. Candidates who are admitted to the M.Sc. program and who are interested in the Ph.D. may transfer into the Ph.D. program after successfully completing the transfer seminar (BIOC 701) and all course requirements. The M.Sc. thesis requirement is then waived.

International Applicants

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) must submit the following:

- *TOEFL* (Test of English as a Foreign Language): N.B. an institutional version of the TOEFL is not acceptable. Minimum acceptable scores are: IBT (Internet-Based Test): 86 overall, no less than 20 in each of the four component scores.

  or

  IELTS: (International English Language Testing System): a band score of 6.5 or greater (Academic module)
- International students who have received their de

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

* Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

11.2.3.6 Master of Science (M.Sc.) Biochemistry (Thesis): Chemical Biology (47 credits)

Thesis Courses (33 credits)

BIOC 695	(6)	Thesis Research 1 (Chemical - Biology)
BIOC 698	(12)	Thesis Research 2
BIOC 699	(15)	Thesis Research 3

Required Course (3 credits)

BIOC 696	(3)	Seminars in Biochemistry

Complementary Courses* (11 credits)

Two of the following courses:

BIOC 610	(1)	Seminars in Chemical Biology 1
BIOC 611	(1)	Seminars in Chemical Biology 3
BIOC 689	(1)	Seminars in Chemical Biology 2
BIOC 690	(1)	Seminars in Chemical Biology 4

At least 3 credits from the following:

CHEM 502	(3)	Advanced Bio-Organic Chemistry
CHEM 503	(3)	Drug Discovery
PHAR 503	(3)	Drug Discovery and Development 1

and at least 3 credits from the following:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

Plus additional credits, to a total of at least 11 complementary course credits from the following list:

CHEM 522	(3)	Stereochemistry
CHEM 582	(3)	Supramolecular Chemistry
CHEM 591	(3)	Bioinorganic Chemistry
CHEM 621	(5)	Reaction Mechanisms in Organic Chemistry
CHEM 629	(5)	Organic Synthesis
EXMD 510	(3)	Bioanalytical Separation Methods
EXMD 602	(3)	Techniques in Molecular Genetics
PHAR 504	(3)	Drug Discovery and Development 2
PHAR 562	(3)	Neuropharmacology
PHAR 563	(3)	Endocrine Pharmacology
PHAR 707	(3)	Topics in Pharmacology 6

* Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

11.2.3.7 Doctor of Philosophy (Ph.D.) Biochemistry

Thesis

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

Required Courses (3 credits)

BIOC 696*	(3)	Seminars in Biochemistry
BIOC 701**	(0)	Research Seminar 1
BIOC 702**	(0)	Ph.D. Thesis Proposal
BIOC 703**	(0)	Ph.D. Seminar

*Students promoted directly from the M.Sc. to the Ph.D. program, and who registered for and passed BIOC 696 at the M.Sc. level, do not register for BIOC 696 at the Ph.D. level.

** NOTE: Students DO NOT register for these courses until notified by the Student Affairs Officer.

Students must complete BIOC 701 in the third term after admission to the program, BIOC 702 in the fifth or sixth term, and BIOC 703 approximately six months prior to submission of the Ph.D. thesis.

Complementary Courses* (6 credits)**

At least 3 credits selected from:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

*** Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

11.2.3.9 Doctor of Philosophy (Ph.D.) Biochemistry: Chemical Biology

Thesis

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

Required Courses (7 credits)

BIOC 610	(1)	Seminars in Chemical Biology 1
BIOC 611	(1)	Seminars in Chemical Biology 3
BIOC 689	(1)	Seminars in Chemical Biology 2
BIOC 690	(1)	Seminars in Chemical Biology 4
BIOC 696*	(3)	Seminars in Biochemistry
BIOC 701**	(0)	Research Seminar 1
BIOC 702**	(0)	Ph.D. Thesis Proposal
BIOC 703**	(0)	Ph.D. Seminar

* Students promoted directly from the M.Sc. to the Ph.D. program, and who registered for and passed BIOC 696 at the M.Sc. level, do not register for BIOC 696 at the Ph.D. level.

** NOTE: Students DO NOT register for these courses until notified by the Student Affairs Officer.

Students must complete BIOC 701 in the third term after admission to the program, BIOC 702 in the fifth or sixth term, and BIOC 703 approximately six months prior to submission of the Ph.D. thesis.

Complementary Courses* (9 credits)**

At least 3 credits from the following:

CHEM 502	(3)	Advanced Bio-Organic Chemistry
CHEM 503	(3)	Drug Discovery
PHAR 503	(3)	Drug Discovery and Development 1

At least 3 credits from the following:

BIOC 600	(3)	Advanced Strategies in Genetics and Genomics
BIOC 603	(3)	Genomics and Gene Expression
BIOC 604	(3)	Macromolecular Structure
BIOC 605	(3)	Protein Biology and Proteomics
BIOC 670	(3)	Biochemistry of Lipoproteins
EXMD 615	(3)	Essentials of Glycobiology
EXMD 635D1	(3)	Experimental/Clinical Oncology
EXMD 635D2	(3)	Experimental/Clinical Oncology

Plus additional credits to a total of at least 9 complementary course credits from the following list:

CHEM 522	(3)	Stereochemistry
CHEM 582	(3)	Supramolecular Chemistry
CHEM 591	(3)	Bioinorganic Chemistry
CHEM 621	(5)	Reaction Mechanisms in Organic Chemistry
CHEM 629	(5)	Organic Synthesis
EXMD 510	(3)	Bioanalytical Separation Methods
EXMD 602	(3)	Techniques in Molecular Genetics
PHAR 504	(3)	Drug Discovery and Development 2
PHAR 562	(3)	Neuropharmacology
PHAR 563	(3)	Endocrine Pharmacology
PHAR 707	(3)	Topics in Pharmacology 6

*** Complementary courses are chosen in consultation with the Research Director.

The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate. BIOC 450 (Protein Structure and Function) and BIOC 454 (Nucleic Acids) are additional requirements for those who have not previously completed equivalent courses in their prior training.

11.2.4 Biomedical Engineering

11.2.4.1 Location

Department of Biomedical Engineering
Duff Medical Building
3775 University Street, Room 316
Montreal QC H3A 2B4
Canada
Telephone: 514-398-6736
Website: *mcgill.ca/bme*

11.2.4.2 About Biomedical Engineering

Excellent laboratory facilities for basic and applied research are available in the Department and in the laboratories of associated staff located elsewhere on campus. The Department operates a network of high-performance workstations and well-equipped mechanical and electronics workshops.

Basic research in the Department concentrates on the application of quantitative engineering analysis methods to basic biomedical research problems. Currently active areas of research include:

- neuromuscular and postural control;
- muscle mechanics;
- the vestibular system;
- oculomotor control;
- the auditory system;
- joint prosthetics;
- biomaterials;
- artificial cells and organs;
- cell and tissue engineering;
- drug delivj** Compleai8 314.71 81gm(j*r371 314.6 1)Tj/F1 10 Tf516.3ssue eiM098 TpDTf1 0C3f1 0 gmiTcontrol;jlcjlc

- bioinformatics in genomics and proteomics.

Staff members are also active in more applied research related to the development of quantitative analysis tools and instruments for biomedical research. Areas of activity here include: signal analysis, system identification, modelling, simulation and parameter estimation, image processing, pattern recognition, ultrasound, and biorobotics.

section 11.2.4.4: Master of Science, Applied (M.Sc.A.) Translational Biomedical Engineering (Non-Thesis) (45 credits)

The M.Sc.(Applied) in Translational Biomedical Engineering; Non-Thesis is a full-time specialized 13- to 16-month professional program in translation biomedical engineering. This is an intensive program that focusses on the biomedical engineering industry through a comprehensive curriculum covering essential skills and knowledge needed to translate biomedical engineering research into clinical and commercial solutions.

The program consists of three main components that are unique to the translational process in biomedical engineering, including: 1) translational course on intellectual property, regulatory affairs, quality management systems, clinical trials and reimbursement; 2) fundamental science courses in biomedical engineering; and 3) an experiential component, comprising of a closely supervised 4-month internship in the biomedical engineering industry.

None of the courses taken in the Graduate Certificate in Translational Biomedical Engineering can be credited towards the M.Sc.(Applied) once the Graduate Certificate has been awarded.

section 11.2.4.5: Graduate Certificate (Gr. Cert.) Translational Biomedical Engineering (15 credits)

This program will enable students to translate advances in biomedical engineering research to clinical and commercial solutions. Students will learn the complementary skills needed to take early-stage research results from the bench to the bedside and bridge the gap between invention and product innovation.

The graduate certificate responds to the demand from students for such training and addresses the needs of the biomedical industry for such highly qualified personnel.

The Graduate Certificate program, being a 15-credits program, is suitable for Canadian students and students with the Canadian Permanent Residency only.

For additional information, see the *Biomedical Engineering website*.

Biomedical Engineering Admission Requirements and Application Pr

Required Courses (30 credits)

BMDE 653	(3)	Patents in Biomedical Engineering
BMDE 654	(3)	Biomedical Regulatory Affairs - Medical Devices
BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices
BMDE 656	(3)	Medical Device Development Process
BMDE 657D1	(9)	Biomedical Engineering Industry Internship
BMDE 657D2	(9)	Biomedical Engineering Industry Internship

Complementary Courses (15 credits)

15 credits to be chosen listed from courses below, or other relevant 500-, 600- or 700-level courses chosen in consultation and with approval of the Program Director and the concerned offering unit/department.

General Biomedical Engineering

BMDE 501	(3)	Selected Topics in Biomedical Engineering
BMDE 600D1	(1.5)	Seminars in Biomedical Engineering
BMDE 600D2	(1.5)	Seminars in Biomedical Engineering

Biomedical Signals and Systems

BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems

Medical Imaging

BMDE 610	(3)	Functional Neuroimaging Fusion
BMDE 650	(3)	Advanced Medical Imaging
BMDE 660	(3)	Advanced MR Imaging and Spectroscopy of the Brain
MDPH 607	(3)	Medical Imaging

Biomaterials and Tissue Engineering

BMDE 503	(3)	Biomedical Instrumentation
BMDE 508	(3)	Introduction to Micro and Nano-Bioengineering

Rehab Engineering

BMDE 525D1	(3)	Design of Assistive Technologies: Principles and Praxis
BMDE 525D2	(3)	Design of Assistive Technologies: Principles and Praxis

11.2.4.5 Graduate Certificate (Gr. Cert.) Translational Biomedical Engineering (15 credits)

This program comprises mandatory courses dealing with topics that are unique to the translational process in the biomedical engineering environment. Topics covered will include: managing intellectual property; patents and the patenting process; regulatory affairs; medical standards; quality management systems; and clinical trials. Complementary courses will provide students with advanced training in a specialized area of biomedical engineering selected from the areas where Departmental staff have significant expertise.

In cases where students have taken one or more of the core courses as part of another program, these core courses will be replaced with the equivalent number of credits, at the 500 level or higher, by other appropriate courses selected in consultation with the program director.

Required Courses (9 credits)

Three courses dealing with issues related specifically to the translation of biomedical engineering advances to clinical and commercial environments:

BMDE 653	(3)	Patents in Biomedical Engineering
BMDE 654	(3)	Biomedical Regulatory Affairs - Medical Devices
BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices

Complementary Courses (6 credits)

Students must complete 6 credits of biomedical engineering course work selected from one or more of the following domains or other appropriate courses at the 500 level or higher approved by the Program Director:

General Biomedical Engineering

BMDE 501	(3)	Selected Topics in Biomedical Engineering

Biomedical Signals and Systems

BMDE 536	(3)	Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems

Medical Imaging

BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BMDE 610	(3)	Functional Neuroimaging Fusion
BMDE 650	(3)	Advanced Medical Imaging
MDPH 607	(3)	Medical Imaging

Biomaterials and Tissue Engineering

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications

11.2.5 Human Genetics

11.2.5.1 Location

Department of Human Genetics
Strathcona Anatomy & Dentistry Building
3640 University Street, Room 2/38F
Montreal QC H3A 0C7
Canada
Telephone: 514-398-4198
Fax: 514-398-2430
Email: *dept.humangenetics@mcgill.ca*
Website: *mcgill.ca/humangenetics*

11.2.5.2 About Human Genetics

The Department of Human Genetics provides a unified curriculum of study in genetics. Areas of specialization include:

- biochemical genetics
- genetics of development
- animal models of human diseases
- cancer genetics
- molecular pathology
- gene therapy
- genetic dissection of complex traits
- genetics of infectious and inflammatory diseases
- non-mendelian genetics
- bioinformatics
- behavioural genetics
- neurogenetics
- bioethics
- genomics

Many of our faculty hold cross-appointments in various departments (including: biochemistry, biology, cardiology, medicine, microbiology, immunology, neurology, pathology, pediatrics, pharmacology, psychiatry, etc.) within the Faculties of Science and Medicine and Health Sciences. This enables numerous opportunities for interdisciplinary research and collaboration. The Department conducts research on all sites of the McGill University Health Centre (MUHC), the Montreal Neurological Institute and Hospital, the McGill Life Sciences Complex, the Victor Phillip Dahdaleh Institute of Genomic Medicine, the Centre for Genomics and Policy, the Lady Davis Research Institute, the Douglas Hospital Research Centre and the Goodman Cancer Institute.

M.Sc. and Ph.D. Degrees in the Department of Human Genetics

The Department of Human Genetics offers a clinical master’s program, M.Sc. in Genetic Counselling, as well as research training at both the M.Sc. and Ph.D. levels in Human Genetics. Both the M.Sc. and Ph.D. in Human Genetics research programs require the completion of a thesis, which is the major focus of the student's effort. A minimal amount of coursework is required, but specific course choices are flexible and vary according to the student's previous training and current research interest.

Most of the faculty members of the Human Genetics Department are located in McGill teaching hospitals, reflecting the medically learned knowledge at the core of human genetic studies.

Detailed information regarding faculty research interests can be found on the *Department website*.

The Graduate Training Committee requires that students who hav3 238umee iperestf $20,000904lu thesiful001 Tm(A mituiDetai81 Tfend HC(train81 Td52 189.401 Tn

section 11.2.5.6: Master of Science (M.Sc.) Human Genetics (Thesis): Bioethics (45 credits)

McGill University offers specialized education in bioethics to graduate students in the Faculties of Medicine and Law, the School of Religious Studies, and the Department of Philosophy. The Master's degree Specialization in Bioethics is an interdisciplinary academic program that emphasizes both the conceptual and the practical aspects of bioethics.

section 11.2.5.5: Master of Science (M.Sc.) Human Genetics (Thesis): Bioinformatics (45 credits)

This program is currently not offered.

Students successfully completing the Bioinformatics option at the M.Sc. level will be fluent in the concepts, language, approaches, and limitations of the field. 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.

Enrolment in the Bioinformatics option can only be approved after a student has been admitted into the Department. There is an agreement for the option that must be signed by the student, supervisor, and Department, and enrolment in the option is subject to space availability and other constraints that the Department cannot assess at the time of admission. For more information, please contact the Graduate Program Coordinator.

section 11.2.5.7: Master of Science (M.Sc.) Genetic Counselling (Non-Thesis) (48 credits)

The M.Sc. in Genetic Counselling program provides the academic foundation and clinical training required for the contemporary practice of genetic counselling. Genetic counsellors are health professionals who provide information and support to families who have members with birth defects or genetic disorders and to families who may be at risk for a variety of inherited conditions. Genetic counsellors investigate the problem present in the family, analyze inheritance patterns and risks of recurrence, and review available options with the family. Some counsellors also work in administrative and academic capacities, and many engage in research activities.

The curriculum includes a variety of required courses in human genetics and other departments, and 40 weeks of supervised clinical training spread over four semesters. Graduates will be eligible to sit for both the Canadian Association of Genetic Counsellors and the American Board of Genetic Counselling certification examinations. Upon completion of the M.Sc. in Genetic Counselling program, students will demonstrate competence in, or satisfactory knowledge of: principles of human genetics, including cytogenetics, biochemical, molecular, and population genetics; methods of interviewing and counselling, and the dynamics of human behaviour in relation to genetic disease; and social, legal, and ethical issues in genetics. Enrolment will be limited to four students.

section 11.2.5.8: Doctor of Philosophy (Ph.D.) Human Genetics

- Bachelor's or medical degree – minimum cumulative grade point average (CGPA) of 3.2 out of 4.0, or 3.4 out of 4.0 in the last two full-time academicast tw

(15 credits or 6 credits depending on admission status as described above.)

Courses are to be chosen from the list below and/or from among 500-, 600-, or 700-level courses offered in the Faculties of Medicine and Science.

HGEN 660	(3)	Genetics and Bioethics
HGEN 661	(3)	Population Genetics
HGEN 663	(3)	Beyond the Human Genome
HGEN 690	(3)	Inherited Cancer Syndromes
HGEN 693	(3)	Using Bioinformatics Resources
HGEN 695	(3)	Psychiatric Genetics
HGEN 696	(3)	Advanced Readings in Genetics 1
HGEN 697	(3)	Advanced Readings in Genetics 2
HGEN 698	(3)	Advanced Readings in Genetics 3
HGEN 699	(3)	Advanced Readings in Genetics 4

Students are restricted to taking the following course.

HGEN 670	(3)	Advances in Human Genetics 1

Note: The Graduate Advisory Committee may stipulate additional coursework depending on the background of the candidate.

11.2.5.9 Doctor of Philosophy (Ph.D.) Human Genetics: Bioinformatics

** This program is currently not offered. **

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)

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
HGEN 692	(3)	Human Genetics
HGEN 701	(0)	Ph.D. Comprehensive Examination

Complementary Courses (6 credits)

* Two courses 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

* Note: Students who enter in Ph.D. 1 will need to take an additional 6 credits of complementary courses chosen from the departmental offerings listed for the Ph.D. in Human Genetics and/or from among 500-, 600-, or 700-level courses in the Faculties of Medicine or Science.

11.2.6 Microbiology and Immunology

11.2.6.1 Location

Department of Microbiology and Immunology
Duff Medical Building, Room 511
3775 University Street
Montreal QC H3A 2B4
Canada
Telephone: 514-398-3061
Fax: 514-398-7052
Email: *grad.microimm@mcgill.ca*
Website: *mcgill.ca/microimm*

11.2.6.2 About Microbiology and Immunology

The Department offers graduate programs leading to the degrees of **M.Sc.** and **Ph.D.**. Each program is tailored to fit the needs and backgrounds of individual students. The graduate program is designed to offer students state-of-the-art training, concentrating on four key areas of research:

- cellular and molecular immunology;
- microbial physiology and genetics;
- molecular biology of viruses;
- medical microbiology.

Basic research discoveries in microbiology may lead to improv

documented proof of competency in oral and written English. Before acceptance, appropriate exam results must be submitted directly from the *TOEFL* (Test of English as a Foreign Language) or *IELTS* (International English Language Testing Systems) Office. An institutional version of the TOEFL is not acceptable. Applications will not be considered if a TOEFL or IELTS test result is not available.

- TOEFL Internet-Based Test (iBT): a minimum overall score of 86 (no less than 20 in each of the four components)
- IELTS: a minimum overall band score of 6.5

The TOEFL Institution Code for McGill University is 0935.

Ph.D.

Students who have satisfactorily completed an M.Sc. degree in microbiology and immunology, a biological science, or biochemistry, or highly qualified students enrolled in the departmental M.Sc. program, may be accepted into the Ph.D. program provided they meet its standards.

11.2.6.3.2 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.

All applicants must approach academic staff members directly during or before the application process since no applicants are accepted without a supervisor.

11.2.6.3.2.1 Additional Requirements

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

- *Supervisor Confirmation Form*
- Personal Statement
- CV

11.2.6.3.3 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 Microbiology and Immunology 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*.

Online applications and all required documents must be submitted prior to the application deadline.

11.2.6.4 Master of Science (M.Sc.) Microbiology and Immunology (Thesis) (45 credits)

Thesis Courses (33 credits)

MIMM 697	(11)	Master's Research 1
MIMM 698	(11)	Master's Research 2
MIMM 699	(11)	Master's Research 3

Required Courses (6 credits)

MIMM 611	(3)	Graduate Seminars 1
MIMM 612	(3)	Graduate Seminars 2

Complementary Courses (6 credits)

Minimum 6 credits from:

MIMM 607	(3)	Biochemical Pathology
MIMM 616	(3)	Reading and Conference 1
MIMM 617*	(3)	Reading and Conference 2
MIMM 618*	(3)	Reading and Conference 3
MIMM 619*	(3)	Reading and Conference 4
NEUR 502	(3)	Basic and Clinical Aspects of Neuroimmunology

Any life sciences-related 500-level or above course (3 credits). Department approval required.

* Not offered in e

See *University Regulations & Resources* > *Graduate*

PHAR 609	(1)	Research Professionalism for Pharmacologists
PHAR 610	(2)	Scientific Communication for Pharmacologists
PHAR 670	(3)	Principles of Environmental Health Sciences 1
PHAR 671	(3)	Principles of Environmental Health Sciences 2
PHAR 712	(3)	Statistics for Pharmacologists

11.2.7.6 Doctor of Philosophy (Ph.D.) Pharmacology

The Ph.D. in Pharmacology focuses on research methodology, conducting a research project, analyzing data, and writing a thesis. It involves training in research professionalism, scientific communication, and statistics, critically analyzing scientific literature, and developing and conducting an original research project for scientific publication.

Thesis

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

Required Courses (9 credits)

PHAR 602	(3)	Principles of Pharmacology
PHAR 609	(1)	Research Professionalism for Pharmacologists
PHAR 610	(2)	Scientific Communication for Pharmacologists
PHAR 701	(0)	Ph.D. Comprehensive Exam
PHAR 712	(3)	Statistics for Pharmacologists

Complementary Courses (3 credits)

3 credits from the following:

PHAR 702	(3)	Topics in Pharmacology 1
PHAR 703	(3)	Topics in Pharmacology 2
PHAR 704	(3)	Topics in Pharmacology 3
PHAR 705	(3)	Topics in Pharmacology 4
PHAR 706	(3)	Topics in Pharmacology 5
PHAR 707	(3)	Topics in Pharmacology 6

or the equivalent, upon approval by the Graduate Training Committee (GTC.)

Doctor of Philosophy (Ph.D.) Pharmacology:.) Pharv6.0u3 Tm(opics70.52 311.3867.103 Tioe29 1001opics70.52 31vironmental Health Sc

PHAR 610	(2)	Scientific Communication for Pharmacologists
PHAR 670	(3)	Principles of Environmental Health Sciences 1
PHAR 671	(3)	Principles of Environmental Health Sciences 2
PHAR 701	(0)	Ph.D. Comprehensive Exam
PHAR 712	(3)	Statistics for Pharmacologists

Complementary Courses (3 credits)

3 credits from the following:

PHAR 702	(3)	Topics in Pharmacology 1
PHAR 703	(3)	Topics in Pharmacology 2
PHAR 704	(3)	Topics in Pharmacology 3
PHAR 705	(3)	Topics in Pharmacology 4
PHAR 706	(3)	Topics in Pharmacology 5
PHAR 707	(3)	Topics in Pharmacology 6

or the equivalent, upon approval by the Graduate Training Committee (GTC.)

11.2.7.8 Graduate Certificate (Gr. Cert.) Biomedical Science Translational Research (15 credits)

The Graduate Certificate in Biomedical Science Translational Research is an introduction to relevant clinical aspects of translating scientific discovery as a means of bridging the gap between research and application in clinical settings, while promoting future collaboration among scientists, clinicians and clinician-scientists while promoting future collaboration. The program includes clinical mentorship.

Required Courses (12 credits)

FMED 525	(3)	Foundations of Translational Science
PHAR 522D1	(3)	Fundamentals of Disease Therapy
PHAR 522D2	(3)	Fundamentals of Disease Therapy
PHAR 524	(3)	Clinical Mentorship

Complementary Courses (3 credits)

3 credits from:

BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices
EPIB 507	(3)	Biostats for Health Sciences
EXMD 617	(1)	Workshop in Clinical Trials 1
EXMD 618	(1)	Workshop in Clinical Trials 2
EXMD 619	(1)	Workshop in Clinical Trials 3
EXMD 620	(1)	Clinical Trials and Research 1
EXMD 633	(3)	Clinical Aspects of Research in Respiratory Diseases
EXMD 640	(3)	Experimental Medicine Topic 1
PHAR 508	(3)	Drug Discovery and Development 3
		Global Environmental Health and Burden of Disease

McIntyre Medical Sciences Building
3655 Promenade Sir-William-Osler
Montreal QC H3G 1Y6 Canada
Telephone: 514-398-4343
Website: *mcgill.ca/physiology*

11.2.8.2 About Physiology

The Ph

Required Courses (12 credits)

PHGY 601	(1)	M.Sc. Proposal Seminar
PHGY 602	(2)	Literature Search and Research Proposal
PHGY 604	(0)	Responsible Conduct in Research
PHGY 607	(3)	Laboratory Research 1
PHGY 608	(3)	Laboratory Research 2
PHGY 620	(3)	Progress in Research

Complementary Courses (6 credits)

3 credits from the following Chemical Biology seminars:

BIOC 610	(1)	Seminars in Chemical Biology 1
BIOC 611	(1)	Seminars in Chemical Biology 3
BIOC 689	(1)	Seminars in Chemical Biology 2
BIOC 690	(1)	Seminars in Chemical Biology 4

3 credits from the following:

CHEM 502	(3)	Advanced Bio-Organic Chemistry
CHEM 503	(3)	Drug Discovery
PHAR 503	(3)	Drug Discovery and Development 1

11.2.8.7 Doctor of Philosophy (Ph.D.) Physiology

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 (8 credits)

PHGY 604	(0)	Responsible Conduct in Research
PHGY 701	(0)	Ph.D. Comprehensive Examination
PHGY 703	(1)	Ph.D. Progress Seminar 1
PHGY 704	(1)	Ph.D. Progress Seminar 2
PHGY 720	(1)	Ph.D. Seminar Course 1
PHGY 721	(1)	Ph.D. Seminar Course 2
PHGY 722	(1)	Ph.D. Seminar Course 3
PHGY 723	(1)	Ph.D. Seminar Course 4
PHGY 724	(1)	Ph.D. Seminar Course 5
PHGY 725	(1)	Ph.D. Seminar Course 6

Elective Courses (9 credits)

9 credits of Physiology or Science at the 500 level or above, in consultation with the GSAAC and the candidate's supervisor.

11.2.8.8 Doctor of Philosophy (Ph.D.) Physiology: Bioinformatics

** This program is currently not offered. **

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 (11 credits)

COMP 616D1	(1.5)	Bioinformatics Seminar
COMP 616D2	(1.5)	Bioinformatics Seminar
PHGY 604	(0)	Responsible Conduct in Research
PHGY 701	(0)	Ph.D. Comprehensive Examination
PHGY 703	(1)	Ph.D. Progress Seminar 1
PHGY 704	(1)	Ph.D. Progress Seminar 2
PHGY 720	(1)	Ph.D. Seminar Course 1
PHGY 721	(1)	Ph.D. Seminar Course 2
PHGY 722	(1)	Ph.D. Seminar Course 3
PHGY 723	(1)	Ph.D. Seminar Course 4
PHGY 724	(1)	Ph.D. Seminar Course 5
PHGY 725	(1)	Ph.D. Seminar Course 6

Complementary Courses (6 credits)

6 credits to be 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

11.2.8.9 Doctor of Philosophy (Ph.D.) Physiology: Chemical Biology

** This program is currently not offered. **

The Graduate Option in Chemical Biology is centered on the pursuit of an original research project under the direction of one or more program mentors. This research training is augmented by student participation in lecture and seminar courses and in a series of thematic workshops, all of which are designed to expose students to the diverse approaches and research issues that characterize the current state of the field. Students with training in this interdisciplinary approach will be highly qualified to seek careers in academic research as well as the pharmaceutical and biotechnology industries.

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 (11 credits)

BIOC 610	(1)	Seminars in Chemical Biology 1
BIOC 611	(1)	Seminars in Chemical Biology 3
BIOC 689	(1)	Seminars in Chemical Biology 2

BIOC 690	(1)	Seminars in Chemical Biology 4
PHGY 604	(0)	Responsible Conduct in Research
PHGY 701	(0)	Ph.D. Comprehensive Examination
PHGY 703	(1)	Ph.D. Progress Seminar 1
PHGY 704	(1)	Ph.D. Progress Seminar 2
PHGY 720	(1)	Ph.D. Seminar Course 1
PHGY 721	(1)	Ph.D. Seminar Course 2
PHGY 722	(1)	Ph.D. Seminar Course 3
PHGY 723	(1)	Ph.D. Seminar Course 4
PHGY 724	(1)	Ph.D. Seminar Course 5

Complementary Courses (6 credits)

6 credits from the following:

CHEM 502	(3)	Advanced Bio-Organic Chemistry
CHEM 503	(3)	Drug Discovery
PHAR 503	(3)	Drug Discovery and Development 1

11.3 Communication Sciences and Disorders

11.3.1 Location

School of Communication Sciences and Disorders
2001 McGill College Avenue, Suite 800
Montreal QC H3A 1G1
Telephone: 514-398-4137
Fax: 514-398-8123
Email: *scsd@mcgill.ca*
Website: *mcgill.ca/scsd*

11.3.2 About Communication Sciences and Disorders

The School provides both professional and research training in communication sciences and disorders at the graduate level through its **M.Sc. (Applied)**, **M.Sc.**, and **Ph.D.** degrees. We were the first department in Canada to provide both clinical and research degrees. Our M.Sc.A. program aims to educate the next generation of well-prepared and innovative speech-language pathology professionals by providing enriched classroom training, clinical laboratory activities that enhance the transition from theory to practice, and outstanding clinical practicum experiences. Our research degrees are designed to develop leading researchers and scholars, who will go on to train future investigators in the field of communication sciences and disorders and who, through their research, will advance our understanding of the processes of human communication and its breakdown.

Our applied and research degrees may lead to employment in healthcare or educational facilities, academic settings, or private industry.

Interdisciplinary interactions are at the core of our research training approach, which includes preparation to conduct both fundamental and clinically applied investigations. Our professors have collaborative ties with many departments and institutes at McGill, including:

- psychology
- linguistics
- neuroscience
- otolaryngology
- biomedical engineering
- Montreal Neurological Institute and Hospital
- other Montreal universities

They also maintain national and international collaborations. Students can access this rich collaborative network via the *McGill Centre for Research on Brain, Language and Music*, a world-class interdisciplinary research centre established by the School. The multilingual context in which we reside provides a unique environment for language research.

The School offers:

- a professional degree in Communication Sciences and Disorders at the M.Sc. (Applied) level with specialization in Speech Language Pathology
- two research degrees: an M.Sc. (Research) and a Ph.D. in Communication Sciences and Disorders

Requirements for Licensure

The majority of provinces in Canada and certain states in the U.S. require that those intending to practice as speech-language pathologists within their borders comply with special provincial or state licensing regulations. Graduates wishing to practice in the province of Quebec must be members of the *Ordre des Orthophonistes et Audiologistes du Québec* (OOAQ) in order to call themselves speech-language pathologists. Further information is available from the OOAQ at:

630 Sherbrooke St. W., bureau 800
Montreal QC H3A 1E4
Telephone: 514-282-9123
Email: *info@ooaq.qc.ca*
Website: *www.ooaq.qc.ca*

Quebec law requires that candidates seeking licensure in provincially recognized professions demonstrate exceptional verbal and written knowledge of the French language. Please refer to *Language Requirements for Professions* .

Funding

IODE Canada funds a “Silence to Sound” award for studies in hearing impairment. These in-course awards are based on academic merit, Canadian citizenship, financial need, and n6ben tal nor s

research project. This flexible entry attracts independent scholars with diverse backgrounds and interests, which creates a stimulating and enriched training environment. The main component of the Ph.D. program (beyond the Qualifying year) has minimal required coursework and is structured to support students as they develop and pursue an innovative, individualized program of doctoral studies. Admission to the doctoral program requires identification of a SCSD professor(s) with relevant expertise to mentor the student in this process. Ph.D. students have the opportunity to pursue an interdisciplinary specialization in language acquisition through the McGill Language

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

Please see the *School of Communication Sciences and Disorders website* for required application materials.

11.3.3.2.1 Additional Requirements

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

M.Sc. (Applied)

- *Casper Online Test*
- 21 credits prerequisite coursework, provide details via the online application management system, as specified
- Brief personal statement
- Curriculum Vitae
- Two reference letters (one professional and one academic)

Required Courses (82 credits)

IPEA 500	(0)	Roles in Interprofessional Teams
IPEA 501	(0)	Communication in Interprofessional Teams
IPEA 502	(0)	Patient-Centred Care in Action

Students who have completed a Master's degree with research thesis in Communication Sciences and Disorders or a related area are admitted at level PhD 2. High-caliber students who have not completed a research thesis at the Master's level can enter the Qualifying Year Program (admitted at level PhD 1), which includes extra requirements (coursework and a research project) at the onset of the program.

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.

6 credits of statistics courses at the 500 level or higher, pre-approved by the supervisor and the graduate program director.

At least 3 credits at the 500 level or higher in language acquisition courses that have been approved by the Director of the Language Acquisition Program. For a pre-approved list go to: https://www

- Faculty of Law; and
- Faculty of Arts, Department of Philosophy, School of Religious Studies.

Students receive an **M.A.**, **LL.M.**, or **M.Sc.** degree in the discipline chosen with a specialization in Bioethics.

Some applicants are mid-career professionals currently working as physicians, nurses, social workers, other health care providers, or lawyers. Other applicants have recently completed their undergraduate degrees in science, philosophy, law, religious studies, or other disciplines, and wish to pursue specialized master's level training in bioethics before enrolling in doctoral level studies or entering the workplace.

Students pursuing the master's degree specialization normally take two semesters of courses before beginning their master's thesis. Courses offered include Bioethics Theory, Public Health Ethics and Policy, Research Ethics, and a Practicum that includes placement in a clinical or research setting. Research and writing the thesis normally takes one year. Students must also comply with the course and thesis requirements of their home disciplines.

11.4.2.3 Bioethics Admission Requirements and Application Procedures

11.4.2.3.1 Admission Requirements

M.D. degree, professional training in a health science, or bachelor's degree in the sciences, social sciences, law, philosophy, or religious studies. Other students may be considered on an individual basis.

Enrolment is limited to 12 students.

11.4.2.3.2 Application Procedures

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

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

Applications for the Master's Specialization in Bioethics are made initially through the Faculties of Law, Medicine, and Health Sciences (Division of Experimental Medicine, Department of Human Genetics, Department of Family Medicine), and Arts (Department of Philosophy, School of Religious Studies).

Applicants must satisfy the admission criteria for their chosen discipline and those of the Bioethics Unit, which administers the program and teaches the core courses; see *mcgill.ca/equity-ethics-policy/education/masters-specialization-bioethics*.

Applicants must be accepted by the appropriate faculty, the Bioethics Graduate Studies Advisory Committee, and Graduate and Postdoctoral Studies.

11.4.2.3.3 Application Dates and Deadlines

Deadlines coincide with those of the chosen base discipline. 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-progr*

- pharmacoepidemiology;
- population and public health;
- social epidemiology;
- epidemiologic methods;
- chronic diseases;
- reproductive and perinatal epidemiology;
- genetic epidemiology;
- global health;
- causal inference; and
- many cross-disciplinary activities.

Faculty members may have funding available for students through their research grants. We provide rich research environments at five university-affiliated hospitals, public health agencies, and university research centres. Graduates pursue careers in academia, clinical settings, government agencies, NGOs, and industry.

11.4.3.3 Epidemiology

The Department offers master's and doctoral degrees in Epidemiology. The methods learned in these fields are used not only in the study of diseases, but also in clinical research, health services research, public health, program planning and evaluation, and policy development. Our faculty members are at the forefront of their research domains and include epidemiologists, biostatisticians, clinician scientists, medical informatics specialists, public health specialists, health economists, medical sociologists, and health geographers. Research in the Department spans a broad range of areas, including:

- clinical and public health informatics;
- environmental and occupational health;
- health care delivery and organization;
- infectious diseases;
- pharmacoepidemiology;
- population and public health;
- social epidemiology;
- epidemiologic methods;
- chronic diseases;
- reproductive and perinatal epidemiology;
- genetic epidemiology;
- global health;
- causal inference; and
- many cross-disciplinary activities.

Faculty members may have funding available for students through their research grants. We provide rich research environments at five university-affiliated hospitals, public health agencies, and university research centres. Graduates pursue careers in academia, clinical settings, government agencies, NGOs, and industry.

section 11.4.3.3.3: Master of Science (M.Sc.) Epidemiology (Thesis) (45 credits)

Applicants to the M.Sc. program should preferably hold a bachelor’s degree in the natural sciences (e.g., chemistry, microbiology, human genetics), quantitative sciences (e.g., computer science, statistics), or social sciences (e.g., sociology, psychology, economics, geography), or hold a degree in one of the health professional sciences (e.g., medicine, nursing, social work, nutrition). Applicants must have an interest in health research, along with strong conceptual, analytic, and quantitative skills (e.g., differential and integral calculus, statistics) at the undergraduate level.

The program leading to a master’s degree is designed to provide training in both theory and practice in the selected discipline. Courses require intellectual and academic rigour, and the program provides students with an opportunity to synthesize the training in the form of a thesis. Students will study the foundations and principles of epidemiology and applied biostatistics, in order to design, conduct, and analyze clinical, population-based, environmental, pharmaco-epidemiological, policy, and methodological health-related research. Graduates of the program often go on to do doctoral work or become research associates in public, private, and academic settings. McGill graduates are known for methodological and quantitative rigour, and quantitative analytic independence. While their core training is in methods, rather than specific substantive areas, students learn about substantive areas in the context of their research and through elective courses.

section 11.4.3.3.4: Master of Science (M.Sc.) Epidemiology (Non-Thesis): Environmental & Occupational Health (48 credits)

This program provides in-depth training in methods used in Environmental and Occupational Health (EOH) and the application of these methods to study the effects of environmental and occupational exposures on human health. Students will be provided with tools to critically evaluate studies in EOH and be able to participate in these studies; learn hatistics), or1 aini223.733 75.24 Tm(the ef)Tj1 0 0 1 88.535 75.24 w8 Tmj0yti

section 11.4.3.3.10: Doctor of Philosophy (Ph.D.) Epidemiology: Population Dynamics

Health (EBOH) at McGill University. Students who have been admitted through their home department or faculty may apply for admission to the option. The option is coordinated by the CPD, in partnership with participating academic units.

Thus, in addition to the rigorous training provided in the Department of EBOH, graduate students who choose this option become *Centre on Population Dynamics* (CPD) student trainees. This affiliation offers opportunities for interdisciplinary research and supervision. The option also provides a forum whereby students bring their disciplinary perspectives together and enrich each other's learning through structured courses, a weekly seminar series, and informal discussions and networking.

With interdisciplinary research being increasingly important to understanding complex social and biological processes, CPD student trainees benefit from both a strong disciplinary foundation from their departmental affiliations, as well as from the sharing of knowledge across disciplinary boundaries through CPD activities.

11.4.3.3.1 Public Health

The Department offers a Master of Science in Public Health. Students apply the methods they learn to the study of diseases, clinical research, health services research, public health, program planning and evaluation, and policy development. Our faculty members are at the forefront of research in epidemiology, biostatistics, clinical medicine, biomedical informatics, public health, health economics, medical sociology, and health geography.

Faculty members in the Department draw on extensive contacts in the public health community locally, nationally, and internationally to facilitate practicum placements in many areas, including:

- urban public health practice;
- clinical and public health informatics;
- environmental and occupational health;
- health care delivery and organization;
- infectious diseases;
- maternal and child health;
- aboriginal health; and
- global health.

Graduates are highly sought after for careers in gov

applicants will have a demonstrated capacity in analytic and quantitative methods, b

Thesis Course (21 credits)

EPIB 690	(21)	M.Sc. Thesis

Required Courses (21 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
PPHS 602	(3)	Foundations of Population Health

Complementary Course (3 credits)

3 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor.

11.4.3.3.4 Master of Science (M.Sc.) Epidemiology (Non-Thesis): Environmental & Occupational Health (48 credits)

This program provides in-depth training for graduate students in methods used in Environmental and Occupational Health (EOH) and the application of these methods to study the effects of environmental and occupational exposures on human health. Students will be provided with tools to critically evaluate studies in EOH, as well as to be able to participate in these studies, learn how to apply specific methods to environmental and occupational problems, and understand how to apply research results to public health or policy. Career opportunities exist in academia, industry, and the public health sectors. Each student will be assigned a supervisor to provide guidance for their project. Research topics must be related to environmental and occupational health and approved by the program coordinating committee.

Research (12 credits)

EPIB 691	(12)	Research Project in Epidemiology

Required Courses (30 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
EPIB 684	(3)	Principles of Environmental Health Sciences 1
EPIB 685	(3)	Principles of Environmental Health Sciences 2
EPIB 686	(3)	Environmental Health Seminar
PPHS 602	(3)	Foundations of Population Health

Complementary Courses (6 credits)

6 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor. Complementary courses are meant to further the student's general knowledge in environment, environmental health, methodologies, and related aspects to a student's project.

11.4.3.3.5 Master of Science (M.Sc.) Epidemiology (Non-Thesis): Pharmacoepidemiology (48 credits)

This program provides in-depth training for graduate students on pharmacoepidemiologic methods and the application of these methods to study the population effects (benefits and harm) of pharmaceutical products. Students will develop knowledge and capacity to critically evaluate pharmacoepidemiologic studies, learn how to apply specific methods and understand how to apply research results for knowledge translation or policy purpose. Career opportunities for

graduates are multiple and include work in industry, government, or academia. Students will be required to participate in the Pharmacoepidemiology Journal Club. Research topics must be related to pharmacoepidemiology and approved by the program coordinating committee.

Research (12 credits)

EPIB 691	(12)	Research Project in Epidemiology

Required Courses (25 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits at the 500 level or higher.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
EPIB 634	(3)	Fundamentals of Pharmacoepidemiology
EPIB 662	(1)	Pharmacological Basis of Pharmacoepidemiology
PPHS 602	(3)	Foundations of Population Health

Complementary Courses (11 credits)

11 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor. Courses must be approved by the program's academic adviser.

11.4.3.3.6 Master of Science (M.Sc.) Public Health (Non-Thesis) (60 credits)

The M.Sc. in Public Health; Non-Thesis focuses on the foundations and principles of epidemiology and biostatistics as applied to public health research and practice, and to design, conduct, and analyze clinical, population-based, environmental, policy, and methodological public health-related research. The program will include a three-month practicum after the first year.

Required Courses (36 Credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

EPIB 601	(4)	Fundamentals of Epidemiology
EPIB 603	(4)	Intermediate Epidemiology
EPIB 605	(1)	Critical Appraisal in Epidemiology
EPIB 607	(4)	Inferential Statistics
EPIB 613	(1)	Introduction to Statistical Software
EPIB 621	(4)	Data Analysis in Health Sciences
PPHS 602	(3)	Foundations of Population Health
PPHS 612	(3)	Principles of Public Health Practice
PPHS 630	(12)	MScPH Practicum/Project

Practicum/Project

If a stream is chosen as part of the complementary courses, the practicum must be related to the subject of the selected stream.

Complementary Courses (9-18 Credits)

Environmental Health Sciences

3 credits from:

GEOG 503	(3)	Advanced Topics in Health Geography
OCCH 602	(3)	Occupational Health Practice

OCCH 604	(3)	Monitoring Occupational Environment
PPHS 529	(3)	Global Environmental Health and Burden of Disease

Or other course, at the 500 level or higher, selected with the Program's Academic Adviser.

Health Services Research Policy and Management

3 credits from:

PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 528	(3)	Economic Evaluation of Health Programs
PPHS 617	(3)	Impact Evaluation

Or other course, at the 500 level or higher, selected with the Program's Academic Adviser.

Population and Public Health Interventions (social and behavioural science)

3 credits from:

EPIB 632	(3)	Mental Disorders: Population Perspectives and Methods
PPHS 614	(3)	Knowledge Translation and Public Health Leadership
PPHS 616	(3)	Principles and Practice of Public Health Surveillance
PPHS 618	(3)	Program Planning and Evaluation in Public Health

Or other course, at the 500 level or higher, selected with the Program's Academic Adviser.

0-9 credits from one of the following six streams.

In consultation with and approval by the program’s academic adviser, students may focus on one of the following areas.

Courses may not satisfy more than one program requirement.

Stream 1: Epidemiology

9 credits from:

EPIB 628	(3)	Measurement in Epidemiology
EPIB 629	(3)	Knowledge Synthesis
EPIB 637	(3)	Advanced Modeling: Survival and Other Multivariable Data
EPIB 638	(3)	Mathematical Modeling of Infectious Diseases
EPIB 648	(3)	Methods in Social Epidemiology

Stream 2: Global Health

3 credits in:

PPHS 613	(3)	The Practice of Global Health

6 credits from:

EPIB 681	(3)	Global Health: Epidemiological Research
PPHS 511	(3)	Fundamentals of Global Health
PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 529	(3)	Global Environmental Health and Burden of Disease
PPHS 614	(3)	Knowledge Translation and Public Health Leadership
PPHS 615	(3)	Introduction to Infectious Disease Epidemiology

PPHS 618	(3)	Program Planning and Evaluation in Public Health

Stream 3: Population Dynamics

6 credits in:

SOCI 545	(3)	Sociology of Population
SOCI 626	(3)	Demographic Methods

3 credits from:

EPIB 648	(3)	Methods in Social Epidemiology
EPIB 681	(3)	Global Health: Epidemiological Research
PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 528	(3)	Economic Evaluation of Health Programs
PPHS 529	(3)	Global Environmental Health and Burden of Disease
SOCI 512	(3)	Ethnicity and Public Policy
SOCI 520	(3)	Migration and Immigrant Groups
SOCI 535	(3)	Sociology of the Family
SOCI 588	(3)	Biosociology/Biodemography

Stream 4: Health Policy and Ethics

3 credits in:

PPHS 624	(3)	Public Health Ethics and Policy

6 credits from:

PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 528	(3)	Economic Evaluation of Health Programs
PPHS 614	(3)	Knowledge Translation and Public Health Leadership

Stream 5: Infectious Disease

3 credits in:

PPHS 615	(3)	Introduction to Infectious Disease Epidemiology

6 credits from:

EPIB 638	(3)	Mathematical Modeling of Infectious Diseases
PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 528	(3)	Economic Evaluation of Health Programs
PPHS 615	(3)	Introduction to Infectious Disease Epidemiology
PPHS 618	(3)	Program Planning and Evaluation in Public Health
PPHS 624	(3)	Public Health Ethics and Policy

Stream 6: Environmental Health

9 credits from:

EPIB 684	(3)	Principles of Environmental Health Sciences 1
EPIB 685	(3)	Principles of Environmental Health Sciences 2
PPHS 529	(3)	Global Environmental Health and Burden of Disease

Or other courses, at the 500-level or higher, selected with the Academic Adviser.

Elective Courses (6-15 Credits)

6-15 credits of coursework, at the 500 level or higher. Students may choose to focus on more advanced methods in epidemiology, biostatistics, geography, or substantive areas such as environmental or occupational health, or to select a variety of courses that will deepen their general knowledge of the disciplines that influence population and public health.

Courses will be selected with and approved by the Program's Academic Adviser.

11.4.3.3.7 Doctor of Philosophy (Ph.D.) Epidemiology

Epidemiology is the study and analysis of the patterns and causes of disease in human populations. It forms the core discipline of public health by identifying excess illness and by gaining the etiologic understanding to intervene toward the improvement of population health. The PhD program in epidemiology at McGill trains scientists and health professionals to design and conduct studies, analyze health data and effectively communicate scientific results, and to gain novel insights into the causes and prevention of diseases at the population level. 0 1 324.6672sights into the causes and pre

EPIB 704	(4)	Doctoral Level Epidemiologic Methods 1
EPIB 705	(4)	Doctoral Level Epidemiologic Methods 2
EPIB 706	(3)	Doctoral Seminar in Epidemiology
EPIB 707	(3)	Research Design in Health Sciences
PPHS 511	(3)	Fundamentals of Global Health

Complementary Courses (9 credits)

6 credits of coursework at the 500 level or higher, with a minimum of 3 credits in biostatistics, and 3 credits in epidemiology. Courses must be chosen in consultation with the student's supervisor and/or the degree program's director or adviser.

3 credits of coursework at the 500 level or higher from this list, or any other course approved by the Global Health Option Committee that have not been taken to satisfy other program requirements.

GEOG 503	(3)	Advanced Topics in Health Geography
NUTR 501	(3)	Nutrition in Developing Countries
PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 527	(3)	Economics for Health Services Research and Policy
PPHS 529	(3)	Global Environmental Health and Burden of Disease
SOCI 513	(3)	Social Aspects HIV/AIDS in Africa
SOCI 519	(3)	Gender and Globalization
SOCI 545	(3)	Sociology of Population

11.4.3.3.9 Doctor of Philosophy (Ph.D.) Epidemiology: Pharmacoepidemiology

This program provides in-depth training for graduate students on pharmacoepidemiologic methods and the application of these methods to study the population effects (benefits and harm) of pharmaceutical products. Students will acquire the skills to become independent investigators and conduct original research in pharmacoepidemiology. Career opportunities for graduates are multiple and include work in industry, government, or academia. Students will be required to participate in the Pharmacoepidemiology Journal Club. Research topics must be related to pharmacoepidemiology and approved by the program coordinating 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 (25 credits)

EPIB 639	(4)	Pharmacoepidemiologic Methods
EPIB 654	(2)	Pharmacoepidemiology 4
EPIB 661	(2)	Pharmacoepidemiology 3
EPIB 662	(1)	Pharmacological Basis of Pharmacoepidemiology
EPIB 701	(0)	Ph.D. Comprehensive Examination
EPIB 702	(0)	Ph.D. Proposal
EPIB 703	(2)	Principles of Study Design
EPIB 704	(4)	Doctoral Level Epidemiologic Methods 1
EPIB 705	(4)	Doctoral Level Epidemiologic Methods 2
EPIB 706	(3)	Doctoral Seminar in Epidemiology
EPIB 707	(3)	Research Design in Health Sciences

Complementary Courses (3 credits)

3 credits of coursework in biostatistics at the 500 level or higher. Courses must be chosen in consultation with the student's supervisor and/or the degree program's director or adviser.

11.4.3.3.10 Doctor of Philosophy (Ph.D.) Epidemiology: Population Dynamics

The Ph.D. in Epidemiology; Population Dynamics program focuses on training in demographic methods (including life table analyese) and critical population dynamic issues such as population health, migration, aging, family dynamics, and labour markets.

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 (22 credits)

EPIB 701	(0)	Ph.D. Comprehensive Examination
EPIB 702	(0)	Ph.D. Proposal
EPIB 703	(2)	Principles of Study Design
EPIB 704	(4)	Doctoral Level Epidemiologic Methods 1
EPIB 705	(4)	Doctoral Level Epidemiologic Methods 2
EPIB 706	(3)	Doctoral Seminar in Epidemiology
EPIB 707	(3)	Research Design in Health Sciences
SOCI 545	(3)	Sociology of Population
SOCI 626	(3)	Demographic Methods

Complementary Courses (9 credits)

9 credits of coursework, at the 500 level or higher, with a minimum of 3 credits in biostatistics, 3 credits in epidemiology, and 3 credits from courses approved for the Population Dynamics Option from the list below:

ECON 634	(3)	Economic Development 3
ECON 641	(3)	Labour Economics
ECON 734	(3)	Economic Development 4
ECON 741	(3)	Advanced Labour Economics
ECON 742	(3)	Empirical Microeconomics
ECON 744	(3)	Health Economics
EPIB 648	(3)	Methods in Social Epidemiology
EPIB 681	(3)	Global Health: Epidemiological Research
PPHS 525	(3)	Health Care Systems in Comparative Perspective
PPHS 528	(3)	Economic Evaluation of Health Programs
PPHS 529	(3)	Global Environmental Health and Burden of Disease
PPHS 615	(3)	Introduction to Infectious Disease Epidemiology
SOCI 502	(3)	Sociology of Fertility
SOCI 512	(3)	Ethnicity and Public Policy
SOCI 513	(3)	Social Aspects HIV/AIDS in Africa
SOCI 520	(3)	Migration and Immigrant Groups
SOCI 525	(3)	Health Care Systems in Comparative Perspective
SOCI 535	(3)	Sociology of the Family
SOCI 588	(3)	Biosociology/Biodemography

Courses must be chosen in consultation with the student's supervisor and/or the degree program's director or adviser.

11.4.3.4 Biostatistics

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.

Completed applications, with all supporting documents, must be uploaded directly to the McGill *graduate admissions system* by the application deadlines.

Please see our website at *mcgill.ca/epi-biostat-occh/academic-programs/grad/biostatistics/applying* for information on required application documents.

11.4.3.4.1.3 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 Epidemiology, Biostatistics, and Occupational Health 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/epi-biostat-occh/education/grad*.

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

Admission to graduate studies is competitive; late or incomplete applications will not be considered.

11.4.3.4.2 Master of Science (M.Sc.) Biostatistics (Thesis) (45 credits)

Training in statistical theory and methods, applied data analysis, scientific collaboration, communication, and report writing by coursework and thesis.

Thesis Courses (21 credits)

BIOS 690	(21)	M.Sc. Thesis

Required Courses (24 credits)

Students exempted from any of the courses listed below must replace them with complementary course credits, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor.

BIOS 601	(4)	Epidemiology: Introduction and Statistical Models
BIOS 602	(4)	Epidemiology: Regression Models
MATH 523	(4)	Generalized Linear Models
MATH 533	(4)	Regression and Analysis of Variance
MATH 556	(4)	Mathematical Statistics 1
MATH 557	(4)	Mathematical Statistics 2

11.4.3.4.3 Master of Science (M.Sc.) Biostatistics (Non-Thesis) (48 credits)

Training in statistical theory and methods, applied data analysis, scientific collaboration, communication, and report writing by coursework and project.

Research Project (6 credits)

BIOS 630	(6)	Research Project/Practicum in Biostatistics

Required Courses (24 credits)

Students exempted from any of the courses listed below must replace them with additional complementary course credits.

BIOS 601	(4)	Epidemiology: Introduction and Statistical Models
BIOS 602	(4)	Epidemiology: Regression Models
MATH 523	(4)	Generalized Linear Models
MATH 533	(4)	Regression and Analysis of Variance
MATH 556	(4)	Mathematical Statistics 1
MATH 557	(4)	Mathematical Statistics 2

Complementary Courses (18 credits)

18 credits of coursework, at the 500 level or higher, chosen in consultation with the student's academic adviser or supervisor.

11.4.3.4.4 Doctor of Philosophy (Ph.D.) Biostatistics

Students will study theoretical and applied statistics and related fields; the program will train them to become independent scientists able to develop and apply statistical methods in medicine and biology and make original contributions to the theoretical and scientific foundations of statistics in these disciplines.

Graduates will be prepared to develop new statistical methods as needed and apply new and existing methods in a range of collaborativ

section 11.4.4.4: Master of Science, Applied (M.Sc.A.) Occupational Health (Non-Thesis) (Resident) (46 credits)

A three-term program leading to the degree of Master of Science (Applied) (M.Sc.A.) in Occupational Health Sciences, appropriate for graduates from engineering and basic sciences, physicians, and nurses. Occupational health training allows candidates to evaluate work environments and reduce or eliminate work hazards using prevention and control.

section 11.4.4.5: Master of Science, Applied (M.Sc.A.) Occupational Health (Non-Thesis) (Distance) (45 credits)

A three-and-a-half-year program completed mostly over the Internet.

section 11.4.4.6: Doctor of Philosophy (Ph.D.) Occupational Health

The objective of this program is to train independent researchers in the field of work environment and health.

11.4.4.3 Occupational Health Admission Requirements and Application Procedures

11.4.4.3.1 Admission Requirements

- Applicants to the M.Sc. Applied (On-Campus) program must hold a Bachelor's degree in a discipline relevant to Occupational Health, such as: chemistry, engineering, environmental sciences, physics, medicine, nursing, or other health science programs.
- Cumulative Grade Point Average (CGPA): 3.0/4.0 overall, or at least 3.2/4.0 over the last two years of study.
- Proof of competency in oral and written English (if applicable).

NOTE: Satisfaction of general requirements does not guarantee admission. Admission to graduate studies is limited and acceptance is on a very competitive basis.

Distance Education

Note: We are not accepting applications for the Occupational Health Distance program until further notice.

Ph.D. Program

Note: We are not accepting applications for the Occupational Health Ph.D. program until further notice.

Language Requirement

Minimum TOEFL scores required, when applicable, of 86 on the Internet-based test. Minimum score for IELTS: 6.5.

11.4.4.3.2 Application Procedures

All application material and supporting documents must be uploaded directly to the McGill admissions processing system. See *mcgill.ca/gradapplicants/how-apply* for information and instructions.

Applications are considered for the Fall term only. Applications for the Winter/Summer term admission will not be considered, see *mcgill.ca/epi-biostat-occh/education/grad/occh/admission-application-0* for further information on required documents and application procedures.

11.4.4.3.3 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 Department of Epidemiology, Biostatistics, and Occupational Health 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/epi-biostat-occh/education/grad/occh*.

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

Admission to graduate studies is competitive; accordingly, late or incomplete applications will not be considered.

Note: Applications for Winter/Summer term admission will not be considered, with the exception of admission as Special Students in the Winter term.

11.4.4.4 Master of Science, Applied (M.Sc.A.) Occupational Health (Non-Thesis) (Resident) (46 credits)

A three-term program leading to the degree of Master of Science(Applied) [M.Sc.(A.)] in Occupational Health; Non-Thesis, appropriate for graduates from engineering and basic sciences, physicians, and nurses. Occupational health training includes evaluation of work environments and reduction or elimination of work hazards using prevention and control.

Research Project (15 credits)

OCCH 699	(15)	Project Occupational Health and Safety

Required Courses (31 credits)

EPIB 507	(3)	Biostats for Health Sciences
EPIB 601	(4)	Fundamentals of Epidemiology
OCCH 602	(3)	Occupational Health Practice
OCCH 604	(3)	Monitoring Occupational Environment
OCCH 605	(6)	Physical Health Hazards
OCCH 608	(3)	Biological Hazards
OCCH 612	(3)	Principles of Toxicology
OCCH 615	(3)	Occupational Safety Practice
OCCH 616	(3)	Occupational Hygiene

11.4.4.5 Master of Science, Applied (M.Sc.A.) Occupational Health (Non-Thesis) (Distance) (45 credits)

This program is currently not accepting applicants.

Research Project (15 credits)

OCCH 699	(15)	Project Occupational Health and Safety

Required Courses (30 credits)

Note: Students must pass the Master's Integrative Examination (OCCH 600) before writing their Project.

Each course has a final (proctored) examination at the end of the term.

OCCH 600	(0)	Master's Integrative Exam
OCCH 602	(3)	Occupational Health Practice
OCCH 603	(3)	Work and Environment Epidemiology 1
OCCH 604	(3)	Monitoring Occupational Environment
OCCH 608	(3)	Biological Hazards
OCCH 612	(3)	Principles of Toxicology
OCCH 615	(3)	Occupational Safety Practice
OCCH 616	(3)	Occupational Hygiene
OCCH 617	(3)	Occupational Diseases
OCCH 624	(3)	Social and Behavioural Aspects - Occupational Health
OCCH 625	(3)	Work and Environment Epidemiology 2
OCCH 626	(3)	Basics: Physical Health Hazards
OCCH 627	(3)	Work Physiology and Ergonomics
OCCH 630	(3)	Occupational Diseases for OHNS
OCCH 635	(3)	Environmental Risks to Health

On-campus practicum may be held at the discretion of each professor. These sessions are held in Montreal on the McGill University campus. Their aim is to offer students additional specific learning activities. Participation in the practicum is an essential component of the program.

11.4.4.6 Doctor of Philosophy (Ph.D.) Occupational Health

This program is currently not accepting applicants.

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.