Faculty of Engineering, including Schools of Architecture and Urban Planning (Graduate)

Programs, Courses and University Regulations

2017-2018

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

1 . McGill University reserves the right to mak

Publication Information

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Not all courses are offered every year and changes can be made after publication. Always check the Minerva Class Schedule link at https://horizon.mcgill.ca/pban1/bwckschd.p_disp_dyn_sched for the most up-to-date information on whether a course is offered.

1 Dean's Welcome

To Graduate Students and Postdoctoral Fellows:

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

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

Josephine Nalbantoglu, Ph.D.
Dean, Graduate and Postdoctoral Studies

2 Graduate and Postdoctoral Studies

2.1 Administrative Officers

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

2.2 Location

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

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

2.3 Graduate and Postdoctoral Studies' Mission

The mission of Graduate and Postdoctoral Studies (GPS) is to promote university-wide academic excellence for graduate and postdoctoral education at McGill. GPS works in collaboration and consultation with faculties, graduate programs, graduate student and postdoctoral associations, and other administrative and academic units to oversee graduate policies and regulations, advocate broadly for the cause of graduate education, and foster an environment that actively promotes each student's or postdoctoral scholar's realization of his or her full academic and research potential.

8 Postdoctoral Research

Students must inform themselves of University rules and regulations and keep abreast of any changes that may occur. The *Postdoctoral Research* section of this publication contains important details required by postdoctoral scholars during their studies at McGill and should be periodically consulted, along with other sections and related publications.

8.1 Postdocs

Postdocs are recent graduates with a Ph.D. or equivalent (i.e., Medical Specialist Diploma) engaged by a member of the University's academic staff, including

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

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

9 Graduate Studies Guidelines and Policies

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

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

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

Refer to *University Regulations & Resources* > *Graduate* > *: Research Policy and Guidelines, Patents, Postdocs, Associates, Trainees* for information on the following:

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

11 Browse Academic Units & Programs

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

11.1 Architecture

11.1.1 Location

School of Architecture
Macdonald-Harrington Building
815 Sherbrooke Street West

Montreal QC H3A 0C2
Canada
Telephone: 514-398-6700
Fax: 514-398-7372
Website: *www.mcgill.ca/architecture*

11.1.2 About Architecture

M.Arch. (Professional) (Non-Thesis), M.Arch. (Post-professional) (Non-Thesis), Ph.D.

The School of Architecture at McGill University offers a professional Master of Architecture program, a post-professional Master of Architecture program, and a Ph.D. program.

The **M.Arch. (Professional)** requires the equivalency of the B.Sc. (Architecture) degree for admittance. There are two options for the completion of this *Canadian Architectural Certification Board* (CACB)-accredited degree:

- Design Studio (45 credits)
- Design Studio Directed Research (60 credits)

The M.Arch. (Professional) program is accredited by the CACB and is recognized as accredited by the *National Council of Architectural Registration Boards* (NCARB) in the U.S.

The **M.Arch. (Post-professional)** and the **Ph.D. programs** are for study beyond the professional degree in architecture. These programs have been conceived to respond to the needs of graduates with some professional experience who wish to acquire more specialized knowledge in architecture. The M.Arch. (Post-professional) program reflects a McGill tradition of academic inquiry and research, and provides an opportunity for a select number of students and staff to work together. The program is organized in such a way as to meet the needs of the professional practitioner and the researcher, and is intended to extend traditional architectural education as well as address new issues.

There are two areas of study in the M.Arch. (Post-professional) and Ph.D. programs:

- Architectural History and Theory
- Urban Design and Housing

Information concerning the duration of programs, documents required of applicants, etc., may be obtained at *www.mcgill.ca/architecture*.

Architectural Certification in Canada

In Canada, all provincial associations recommend a degree from an accredited professional degree program as a prerequisite for licensure. The *CACB*, which is the sole agency authorized to accredit Canadian professional degree programs in architecture, recognizes two types of accredited degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master's degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

Since all provincial associations in Canada recommend any applicant for licensure to have graduated from a CACB-accredited program, obtaining such a degree is an essential aspect of preparing for the professional practice of architecture. While graduation from a CACB-accredited program does not assure registration, the accrediting process is intended to verify that each accredited program substantially meets those standards that, as a whole, comprise an appropriate education for an architect.

Please note that the M.Arch. (Post-professional) degree is not a professional degree and does not satisfy the requirements for certification with the CACB.

Professional Programs

There are two options for the completion of this CACB-accredited degree:

section 11.1.5: Master of Architecture (M.Arch.) Professional (Non-Thesis): Design Studio (45 credits)

The Design Studio concentration is a 45-credit three-term (Fall, Winter, and Fall) program based on a design-intensive professional curriculum and centred on the traditional design studio. Students w, which

section 11.1.6

program. Candidates who have an adequate background at the post-professional master's level in the proposed area of research will be admitted to Ph.D. 2 with the stipulation of additional courses from the M.Arch. (Post-professional) curriculum, if necessary.

A working knowledge of a language or languages relevant to the area of research is required.

11.1.3.2 Application Procedures

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

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

11.1.3.2.1 Additional Requirements

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

Professional Master of Architecture:

- Summary of work experience. A minimum of 16 weeks of work experience is required. Further information and guidelines are provided at *www.mcgill.ca/architecture/bboard/bscmai/workexperience*. Please use the following: *Work Experience F*

- Two confidential letters of reference are required for your application. Once you have identified your referees (you must provide a valid institutional email address for each referee), McGill will send them an email asking for a reference in support of your application (Gmail, Yahoo, etc. domains cannot be accepted). Additionally, uploaded letters must be on university or company/business stationery and the referee must indicate his/her position and full contact information at the institution. Please refer to *www.mcgill.ca/gradapplicants/apply/prepare/checklist/documents*;
- Statement of research interest / Post-professional M.Arch. applicants: a one-page statement of research objectives indicating the option chosen and the reasons for that choice. Applicants should include a clear description of their research interest, as well as a brief explanation of why they wish to study at McGill University's School of Architecture. Applicants to the Post-professional M.Arch. program are strongly encouraged to become familiar with the research interests of the faculty before submitting an application and may indicate a preference for an adviser. If no preference is indicated, an adviser will be assigned prior to Fall registration. **OR**, Research proposal / Ph.D. applicants: a four-page research proposal, as well as a detailed explanation of why and with whom they wish to study at McGill University's School of Architecture;
- A digital portfolio (PDF format) of not more than 15 MB must be submitted containing at least five examples of the applicant's work. Doctoral applicants should submit evidence of research accomplishments, which could, in some cases, replace the portfolio requirement;
- Writing sample (*Post-professional M.Arch. applicants*): a recent sample of the applicant's written work, on any topic (not necessarily within the desired field of graduate study) and not necessarily previously submitted for evaluation or publication. **OR**, Written work (

Required Courses (32 credits)

ARCH 550	(3)	Urban Planning and Development
ARCH 672	(6)	Architectural Design 1
ARCH 673	(6)	Architectural Design 2

Elective Courses

0-3 credits

Up to 3 credits (at the 500 or 600 level) may be taken outside the School of Architecture, with the approval of an assigned faculty adviser.

11.1.6 Master of Architecture (M.Arch.) Professional (Non-Thesis): Design Studio-Directed Research (60 credits)

The Directed Research concentration is a 60-credit four-term (Fall, Winter, Summer, Fall) program that complements the regular 45-credit three-term concentration with a supervised 12-credit individual research report in the summer term. This forms the basis of the terminal design studio in the fourth (Fall) term. Each student is assigned a faculty adviser in the second term and follows a research-intensive curriculum shaped by complementary and elective courses chosen in consultation with, and approved by, the adviser.

Required Courses (48 credits)

ARCH 550	(3)	Urban Planning and Development
ARCH 626	(4)	Critical Design Strategies
ARCH 672	(6)	Architectural Design 1
ARCH 673	(6)	Architectural Design 2
ARCH 674	(3)	Professional Practice 1
ARCH 676	(12)	Directed Research Report
ARCH 678	(3)	Advanced Construction
ARCH 680	(2)	Field Sketching
ARCH 683	(9)	Directed Research Project 2

Complementary Courses

(9-12 credits)

Group A:

3-12 credits chosen from the following courses:

ARCH 523	(3)	Significant Texts and Buildings
ARCH 525	(3)	Seminar on Analysis and Theory
ARCH 531	(3)	Architectural Intentions Vitruvius - Renaissance
ARCH 532	(3)	Origins of Modern Architecture
ARCH 562	(3)	Innovative Homes and Communities
ARCH 602	(4)	Housing Seminar
ARCH 604	(4)	Urban Design Seminar
ARCH 684	(4)	Contemporary Theory 1
ARCH 685	(4)	Contemporary Theory 2

Group B:

0-9 credits chosen from the following courses:

ARCH 512	(3)	Architectural Modelling
ARCH 514	(4)	Community Design Workshop
ARCH 515	(3)	Sustainable Design
ARCH 517	(3)	Sustainable Residential Development
ARCH 520	(3)	Montreal: Urban Morphology
ARCH 521	(3)	Structure of Cities
ARCH 525	(3)	Seminar on Analysis and Theory

ARCH 526	(3)	Philosophy of Structure
ARCH 527	(3)	Civic Design
ARCH 528	(3)	History of Housing
ARCH 529	(3)	Housing Theory
ARCH 531	(3)	Architectural Intentions Vitruvius - Renaissance
ARCH 532	(3)	Origins of Modern Architecture
ARCH 533	(3)	New Approaches to Architectural History
ARCH 535	(3)	History of Architecture in Canada
ARCH 536	(3)	Heritage Conservation
ARCH 540	(3)	Selected Topics in Architecture 1
ARCH 541	(3)	Selected Topics in Architecture 2
ARCH 562	(3)	Innovative Homes and Communities
ARCH 564	(3)	Design for Development
ARCH 566	(3)	Cultural Landscapes Seminar
ARCH 602	(4)	Housing Seminar
ARCH 604	(4)	Urban Design Seminar
ARCH 622	(4)	Critical Writing
ARCH 627	(4)	Research Methods for Architects
ARCH 679	(3)	Writing in Architecture
ARCH 684	(4)	Contemporary Theory 1
ARCH 685	(4)	Contemporary Theory 2
ARCH 688	(3)	Directed Research 1
ARCH 689	(3)	Directed Research 2

Note: Courses taken are to be used to fulfil one group only.

Unless otherwise indicated, the above courses are restricted to students in the professional area.

Elective Courses

(0-3 credits)

Up to 3 credits (at the 500 or 600 level) may be taken outside the School of Architecture with the approval of an assigned faculty adviser.

11.1.7 Master of Architecture (M.Arch.) Post-professional (Non-Thesis): Architectural History & Theory (45 credits)

The history and theory program pursues intellectual inquiries in the history of architecture, focusing upon the discipline's continually changing theoretical framework. It aims to advance knowledge and foster ethical reflections in architecture through critical historical research into the philosophical, political, cultural, and technological contexts of the discipline. The one-year, three semester program is suited to recent graduates of professional architecture programs and experienced practitioners who wish to explore the complex connections among history, theory, and design; it also provides a thorough preparation for the subsequent pursuit of a PhD degree in the history and theory of architecture. It is structured around core seminars and lectures on topics that range from the history of architecture, the history of science and technology in design, the influence of cultural and gender studies on the discipline, and aesthetic philosophy. The curriculum culminates with an individual research project defined by the student in consultations with advisers.

The History and Theory option within the M.Arch. post-professional program enables students who have completed their professional M.Arch. degree (or some closely-related degree) to develop critical skills and knowledge vis-a-vis architecture as a broad cultural phenomenon. The twelve-month program comprises three consecutive semesters of coursework. Required seminars held during the first two terms involve intensive commitment to reading and writing. The Fall and Winter terms are rounded out with one elective course and Project Preparation (ARCH 623), in which students develop the strategy for their major independent research or design undertaking, the History and Theory Project (ARCH 624), which is completed in the Summer term.

Research Project (15 credits)

ARCH 624	(15)	History and Theory Project

Required Courses (27 credits)

ARCH 622	(4)	Critical Writing
ARCH 623	(3)	Project Preparation
ARCH 651	(6)	Architectural History and Theory Seminar 1
ARCH 652	(4)	Architectural History and Theory Seminar 2
ARCH 653	(4)	Architectural History and Theory Seminar 3
ARCH 654	(6)	Architectural History and Theory Seminar 4

Elective Course (3 credits)

Any course at the 500- or 600- level, with the approval of the School.

11.1.8 Master of Architecture (M.Arch.) Post-professional (Non-Thesis) Urban Design and Housing (45 credits)

The Urban Design and Housing program enables students who have already completed their professional M.Arch. degree (or equivalent) to develop specialized skills for contemporary practice in housing, urban design, and the management of human settlements. The twelve-month program comprises three consecutive semesters of coursework. Intensive seminars held during the first two terms focus on contemporary theory and research methods in urban design and housing. Students take ARCH 603 Urban Design and Housing Studio as an applied synthesis of the material discussed in the two core seminars. Nine credits of complementary coursework round out the Fall and Winter terms along with ARCH 623 Project Preparation, in which students develop the strategy for a major independent project (ARCH 632 Urban Design and Housing Research Report) to be completed in the Summer term.

Research Report (15 credits)

ARCH 632	(15)	Urban Design and Housing Research Report

Required Courses (18 credits)

ARCH 602	(3)	Housing Seminar
ARCH 603	(6)	Urban Design and Housing Studio
ARCH 604	(3)	Urban Design Seminar
ARCH 623	(3)	Project Preparation
ARCH 627	(3)	Research Methods for Architects

Complementary Courses (12 credits)

Group A

6-12 credits from the following:

ARCH 514	(4)	Community Design Workshop
ARCH 517	(3)	Sustainable Residential Development
ARCH 520	(3)	Montreal: Urban Morphology
ARCH 521	(3)	Structure of Cities
ARCH 529	(3)	Housing Theory
ARCH 562	(3)	Innovative Homes and Communities
ARCH 564	(3)	Design for Development
ARCH 566	(3)	Cultural Landscapes Seminar

Group B

0-6 credits from any courses at the 500 level or higher, approved by an adviser.

	Application Opening Dates	Application Deadlines		
	All Applicants	**Non-Canadian citizens (incl. Special, Visiting & Exchange)**	**Canadian citizens/Perm. residents of Canada (incl. Special, Visiting & Exchange)**	**Current McGill Students (any citizenship)**
Fall Term:	Sept. 15	Feb. 1	Feb. 1	Feb. 1
Winter Term:	Feb. 15	Sept. 10	Nov. 10	Nov. 10
Summer Term:	N/A	N/A	N/A	N/A

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

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

11.3.4 Biological and Biomedical Engineering Faculty

Biological and Biomedical Engineering is an interfaculty program offered jointly by the *Department of Bioengineering* in the Faculty of Engineering and the *Department of Biomedical Engineering* in the Faculty of Medicine.

Please refer to *section 11.2.4: Bioengineering Faculty* and *: Biomedical Engineering Faculty* for their respective faculty listings.

11.3.5 Master of Engineering (M.Eng.) Biological and Biomedical Engineering (Thesis) (45 credits)

** NEW PROGRAM **

The Biological and Biomedical Engineering (BBME) Master's program focuses on the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. With its unique multidisciplinary environment, and taking advantage of research collaborations between staff in the Faculties of Medicine, Science, and Engineering. BBME offers thesis-based graduate degrees (M.Eng.) that span broad themes in biomodelling, biosignal processing, medical imaging, nanotechnology, artificial cells and organs, probiotics, bioinformatics, bioengineering, biomaterials, and orthopaedics. BBME's internationally renowned staff provide frequent and stimulating interactions with physicians, scientists, and the biomedical industry. Through courses and thesis research, this program will prepare students for careers in industry, academia, hospitals and government and provide a solid basis for Ph.D. studies. Candidates should hold a bachelor's degree in engineering, science, or medicine with a strong emphasis on mathematics, physics, chemistry, and basic physiology or cell biology.

Thesis Courses (24 credits)

BBME 693	(6)	Thesis Research 1
BBME 694	(6)	Thesis Research 2
BBME 695	(12)	Thesis Submission

Required Courses (3 credits)

BBME 600D1	(1.5)	Seminars in Biological and Biomedical Engineering
BBME 600D2	(1.5)	Seminars in Biological and Biomedical Engineering

Complementary Courses (18 credits)

12 credits from BMDE or BIEN courses at the 500-level or higher which may also include MDPH 607, of which the following must be included:

3 credits from the following quantitative courses, or other quantitative courses (at the 500-level or higher) approved by the Graduate Program Director.

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BIEN 520	(3)	High Throughput Bioanalytical Devices
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BIEN 590	(3)	Cell Culture Engineering

BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 509	(3)	Quantitative Analysis and Modelling of Cellular Processes
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 610	(3)	Functional Neuroimaging Fusion

6 credits from the list below or from other courses (at the 500-level or higher) which have both biomedical content and content from the physical sciences, engineering, or computer science, with the approval of the supervisor and Graduate Program Director.

BIEN 510	(3)	Engineered Nanomaterials for Biomedical Applications
BIEN 520	(3)	High Throughput Bioanalytical Devices
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BIOT 505	(3)	Selected Topics in Biotechnology
BMDE 501	(3)	Selected Topics in Biomedical Engineering
BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 504	(3)	Biomaterials and Bioperformance
BMDE 505	(3)	Cell and Tissue Engineering
BMDE 506	(3)	Molecular Biology Techniques
BMDE 508	(3)	Introduction to Micro and Nano-Bioengineering
BMDE 509	(3)	Quantitative Analysis and Modelling of Cellular Processes
BMDE 510	(3)	Topics in Astrobiology
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 610	(3)	Functional Neuroimaging Fusion
BMDE 650	(3)	Advanced Medical Imaging
BMDE 651	(3)	Orthopaedic Engineering
BMDE 652	(3)	Bioinformatics: Proteomics
COMP 526	(3)	Probabilistic Reasoning and AI
COMP 546	(4)	Computational Perception
COMP 558	(3)	Fundamentals of Computer Vision
COMP 761	(4)	Advanced Topics Theory 2
ECSE 526	(3)	Artificial Intelligence
ECSE 681*	(4)	Colloquium in Electrical Engineering
EXMD 610	(3)	Molecular Methods in Medical Research
MDPH 607	(3)	Medical Imaging
MDPH 612	(3)	Instrumentation and Computation in Medical Physics
MECH 500*	(3)	Selected Topics in Mechanical Engineering
MECH 561	(3)	Biomechanics of Musculoskeletal Systems
PHGY 517	(3)	Artificial Internal Organs
PHGY 518	(3)	Artificial Cells

* When topic is appropriate.

Doctor of Philosophy (Ph.D

Biomedical engineering and biotechnology – The majority of professors in the Department are involved with biological engineering. This is a very broad research area that includes biotechnology and biomedical engineering. Biotechnology is an integrated approach of combining life sciences (e.g., biochemistry

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

Application Deadlines differ for International and Canadian (and Permanent Resident) students to allow time to obtain a visa.

11.4.4 Chemical Engineering Faculty

Chair

Sylvain Coulombe

Emeritus Professors

David G. Cooper; B.Sc., Ph.D.(Tor.)

John M. Dealy; B.S.(Kansas), M.S.E., Ph.D.(Mich.), Eng.

Musa R. Kamal; B.S.(III.), M.S., Ph.D.(Carn. Mell), Eng.

Richard J. Munz; B.A.Sc.(Wat.), Ph.D.(McG.), Eng.

W.J. Murray Douglas; B.Sc.(Qu.), M.S.E., Ph.D.(Mich.)

Juan H. Vera; Ing.Quim.(UTE, Chile), M.Sc.(Calif., Berk.), Dr.Ing.(USM, Chile)

Professors

Sylvain Coulombe; B.Sc., M.Sc.A.(Sher.), Ph.D.(McG.) (*Gerald HatcMcG.), Eng.*

Emeritus Pr

CHEE 681	(1)	Laboratory Safety 1
CHEE 682	(1)	Laboratory Safety 2
CHEE 687	(2)	Research Skills and Ethics

Complementary Courses (10 credits)

4 credits from the following:

CHEE 611	(4)	Heat and Mass Transfer
CHEE 621	(4)	Thermodynamics
CHEE 631	(4)	Foundations of Fluid Mechanics
CHEE 641	(4)	Chemical Reaction Engineering
CHEE 651	(4)	Advanced Biochemical Engineering
CHEE 662	(4)	Computational Methods
CHEE 672	(4)	Process Dynamics and Control

A minimum of 3 credits of Chemical Engineering courses at the 500, 600, or 700 level.

Any remaining complementary course credit requirements may be fulfilled by completing Chemical Engineering or other Engineering or Science courses at the 500, 600, or 700 level.

Master of Engineering (M.Eng.) Chemical Engineering (Non-Thesis) (45 credits)

Data analysis course: (3 credits)

AEMA 611	(3)	Experimental Designs 1
CIVE 555	(3)	Environmental Data Analysis
PSYC 650	(3)	Advanced Statistics 1

Toxicology: (3 credits)

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

Water pollution engineering: (4 credits)

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

Air pollution engineering: (3 credits)

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

Soil and water quality management: (3 credits)

BREE 533	(3)	Water Quality Management
CIVE 686	(4)	Site Remediation

Environmental impact: (3 credits)

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

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

Environmental policy: (3 credits)

URBP 506	(3)	Environmental Policy and Planning

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

Elective Courses (11 credits)

CHEE 696	(6)	Extended Project

or another Engineering or non-Engineering 500-, 600-, or 700-level course subject to approval.

11.4.8 Doctor of Philosophy (Ph.D.) Chemical Engineering

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.

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Required Courses

CHEE 681	(1)	Laboratory Safety 1
CHEE 682	(1)	Laboratory Safety 2
CHEE 687	(2)	Research Skills and Ethics
CHEE 795	(0)	Ph.D. Thesis Proposal
CHEE 796	(0)	Ph.D. Proposal Defence
CHEE 797	(0)	Ph.D. Seminar

Complementary Courses

(6-12 credits)

6-8 credits of Chemical Engineering courses (two courses) at the 500, 600, or 700 level.

12 credits (three courses) from the following list must be taken during the M.Eng. and/or Ph.D. program:

CHEE 611	(4)	Heat and Mass Transfer
CHEE 621	(4)	Thermodynamics
CHEE 631	(4)	Foundations of Fluid Mechanics
CHEE 641	(4)	Chemical Reaction Engineering
CHEE 651	(4)	Advanced Biochemical Engineering
CHEE 662	(4)	Computational Methods
CHEE 672	(4)	Process Dynamics and Control

* Note: The number of credits taken will depend on how many of these courses have been taken during the M.Eng. program. Three courses from the above list must be taken during the M.Eng.and/or Ph.D. program. If not taken during the M.Eng. program, they must be taken during the Ph.D. program.

11.5 Civil Engineering and Applied Mechanics

11.5.1 Location

Department of Civil Engineering and Applied Mechanics
Macdonald Engineering Building, Room 492
817 Sherbrooke Street West
Montreal QC H3A 0C3
Canada
Telephone: 514-398-6858
Fax: 514-398-7361
Email: *gradinfo.civil@mcgill.ca*
Website: *www.mcgill.ca/civil*

11.5.2 About Civil Engineering and Applied Mechanics

Advanced courses of instruction and laboratory facilities are available for Engineering graduate students who wish to proceed to the degrees of **M.Eng.**

11.5.3.3 Application Dates and Deadlines

Associate Professors

Complementary Courses (17 credits)

A minimum of five courses at the 500 or 600 level, with at least 8 credits at the 600 level.

11.5.7 Master of Engineering (M.Eng.) Civil Engineering (Non-Thesis) (45 credits)

Research Seminar (3 credits)

CIVE 664	(3)	MEng (Non-thesis) Research Seminar

List A: Research Courses

(12-42) credits

A minimum of 12 credits from research courses, from one of the research streams: 1) Infrastructure, 2) Environmental/Hydraulics-Water Resources, and 3) Transportation.

Infrastructure Stream

CIVE 512	(3)	Advanced Civil Engineering Materials
CIVE 602	(4)	Finite Element Analysis
CIVE 603	(4)	Structural Dynamics
CIVE 609	(4)	Risk Engineering
CIVE 623	(4)	Durability of Materials

Environmental/Hydraulics-Water Resources

CIVE 555	(3)	Environmental Data Analysis
CIVE 572	(3)	Computational Hydraulics
CIVE 584	(3)	Groundwater Engineering
CIVE 651	(4)	Theory: Water / Wastewater Treatment
CIVE 677	(4)	Water-Energy Sustainability

Transportation

CIVE 540	(3)	Urban Transportation Planning
CIVE 542	(3)	Transportation Network Analysis
CIVE 584	(3)	Groundwater Engineering
CIVE 651	(4)	Theory: Water / Wastewater Treatment
CIVE 677	(4)	Water-Energy Sustainability

List B: Other Complementary Courses from the Department

0-30 credits

Courses from List A that are not used to fulfill the 15 credits requirement of Research Courses can be used also as complementary courses.

CIVE 520	(3)	Groundwater Hydrology
CIVE 521	(3)	Nanomaterials and the Aquatic Environment
CIVE 527	(3)	Renovation and Preservation: Infrastructure
CIVE 550	(3)	Water Resources Management
CIVE 551	(3)	Environmental Transport Processes
CIVE 557	(3)	Microbiology for Environmental Engineering

CIVE 558	(3)	Biomolecular Techniques for Environmental Engineering
CIVE 561	(3)	Urban Activity, Air Pollution, and Health
CIVE 573	(3)	Hydraulic Structures
CIVE 574	(3)	Fluid Mechanics of Water Pollution
CIVE 577	(3)	River Engineering
CIVE 604	(4)	Theory of Plates and Shells
CIVE 605	(4)	Stability of Structures
CIVE 607	(4)	Advanced Design in Steel
CIVE 612	(4)	Earthquake-Resistant Design
CIVE 614	(4)	Composites for Construction
CIVE 615	(3)	Environmental Engineering Seminar
CIVE 616	(4)	Nonlinear Structural Analysis for Buildings
CIVE 617	(4)	Design and Rating of Highway and Railway Bridges
CIVE 618	(4)	Design in Concrete 1
CIVE 622	(4)	Prestressed Concrete
CIVE 624	(4)	Durability of Structures
CIVE 625	(4)	Condition Assessment of Existing Structures
CIVE 628	(4)	Design of Wood Structures
CIVE 637	(4)	Discrete Choice Modeling in Transportation
CIVE 652	(4)	Biological Treatment: Wastewaters
CIVE 660	(4)	Chemical and Physical Treatment of Waters
CIVE 661	(4)	Modelling of Transportation Emissions
CIVE 663	(4)	Environmental Fate of Organic Chemicals
CIVE 683	(4)	Advanced Foundation Design
CIVE 686	(4)	Site Remediation

Project Courses

0 or 5-15 credits

Credits for a program may vary, depending on the amount of work involved. Project courses are chosen from the following:

CIVE 691	(1)	Research Project 1
CIVE 692	(2)	Research Project 2
CIVE 693	(3)	Research Project 3
CIVE 694	(4)	Research Project 4
CIVE 695	(5)	Research Project 5
CIVE 696	(6)	Research Project 6
CIVE 697	(7)	Research Project 7

Graduate courses from other McGill Engineering Departments are also allowed as complementary courses. A maximum of 1/3 of coursework credits can be taken outside McGill. Approval is required from the Department in both cases.

11.5.8 Master of Engineering (M.Eng.) Civil Engineering (Non-Thesis): Environmental Engineering (45 credits)

The program consists of a minimum of 45 credits, of which, depending on the student's home department, a minimum of 5 and a maximum of 15 may be allotted to the research project. The balance of 30 to 40 credits is earned by coursework. The Department also allows students to complete the program using a minimum of 45 credits of coursework only.

The Environmental Engineering option is administered by the Faculty of Engineering. Further information may be obtained from the Program Coordinator,

11.6.3 Electrical and Computer Engineering Admission Requirements and Application Procedures

11.6.3.1 Admission Requirements

English Proficiency Requirement: 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 documented proof of competency in English. Accepted English language tests and minimum test score requirements can be found on our *website*. Official results must be received before the application deadlines.

GRE: Submission of *GRE* (General Aptitude Test) scores is not mandatory. Applicants who have written the GRE are welcome to submit their scores for consideration.

M.Eng. Degree (Admission Requirements)

The applicant must be the graduate of a recognized university and hold a bachelor's degree or its equivalent, as determined by McGill, in Electrical, Computer, or Software Engineering or a closely related field. An applicant holding a degree in another field of engineering or science will be considered but a Qualifying year may be required to make up any deficiencies. The applicant must have a high academic achievement: a standing equivalent to a **cumulative grade point average (CGPA) of 3.0 out of 4.0, or a GPA of 3.2 out of 4.0 for the last two full-time academic years or equivalent**. Satisfaction of these general requirements does not guarantee admission. Admission to graduate studies is limited and acceptance is on a very competitive basis.

Ph.D. Degree (Admission Requirements)

In addition to satisfying the requirements for the M.Eng. program, candidates must hold a suitable master's degree from a recognized university. The applicant must have a high academic achievement: a standing equivalent to a cumulative grade point average (CGPA) of 3.0 out of 4.0. Satisfaction of these general requirements does not guarantee admission. Admission to graduate studies is limited and acceptance is on a very competitive basis.

11.6.3.2 Application Procedures

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

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

The Department accepts most of its graduate students for September; the chance of acceptance for January is significantly lower.

11.6.3.2.1 Additional Requirements

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

- Area of Research and Applicant Profile Form – available at *www.mcgill.ca/ece/admissions/graduate/apply*
- *GRE* – the General Aptitude Test is optional.

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

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

All supporting documents must be uploaded to the online application system (*uApply*) by the application deadlines.

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

11.6.4 Electrical and Computer Engineering Faculty

Chair
Andrew G. Kirk

Associate Professors

Dennis Giannacopoulos; M.Eng., Ph.D.(McG.)

Roni Khazaka; M.Eng., Ph.D.(Car.) (*on sabbatical 2017–2018*)

Fabrice Labeau; M.S., Ph.D.(Louvain) (*Associate Dean, Faculty Affairs*)

Odile Liboiron-Ladouceur; B.Eng.(McG.), M.Sc., Ph.D.(Col.)

Aditya Mahajan, B.Tech.(Indian IT), M.S., Ph.D.(Mich.), P.Eng.

Muthucumaru Maheswaran; B.Sc.(Peradeniya), M.S.E.E., Ph.D.(Purd.) (*joint appt. with School of Computer Science*)

Steve McFee; B.Eng., Ph.D.(McG.)

Hannah Michalska; B.Sc., M.Sc.(Warsaw), Ph.D.(Lond.)

Sam Musallam; B.Sc., M.Sc., Ph.D.(Tor.)

Derek Nowrouzezahrai; B.Sc.(Wat.), M.Sc., Ph.D.(Tor.)

Milica Popovich; B.Sc.(Colo.), M.Sc., Ph.D.(N'western) (*on sabbatical 2017–2018*)

Ioannis Psaromiligkos; B.Sc.(Patras), M.Sc., Ph.D.(Buffalo)

Michael Rabbat; B.S.(Ill.), M.S.(Rice), Ph.D.(Wisc.) (*William Dawson Scholar*)

Martin Rochette; B.A., M.Eng., Ph.D.(Laval)

Ishiang Shih; M.Eng., Ph.D.(McG.)

Thomas Szkopek; B.A.Sc., M.A.Sc.(Tor.), Ph.D.(Calif.-LA)

Zeljko Zilic; B.Eng.(Zagreb), M.Sc., Ph.D.(Tor.)

Assistant Professors

Sharmistha Bhadra; B.Sc.(New Br.), M.Sc., Ph.D.(Manit.)

Shane McIntosh; B.A.(Comp.)(Guelph), M.Sc., Ph.D.(Qu.)

Brett Meyer; B.S.(Wisc.), M.S., Ph.D.(Carn. Mell), P.Eng. (*on sabbatical 2017–2018*)

Gunter Mussbacher; Ph.D.(Ott.)

Xiaozhe Wang; B.Sc.(Zhejiang); M.Sc.(Cornell); Ph.D.(MIT)

Associate Members

Matthew Adam Dobbs; Ph.D.(Vic., BC)

Gregory Dudek; B.Sc.(Qu.), M.Sc., Ph.D.(Tor.)

Alan C. Evans; M.Sc.(Surrey), Ph.D.(Leeds)

Thesis Courses (28 credits)

ECSE 691	(4)	Thesis Research 1
ECSE 692	(4)	Thesis Research 2
ECSE 693	(4)	Thesis Research 3
ECSE 694	(4)	Thesis Research 4
ECSE 695	(4)	Thesis Research 5
ECSE 696	(4)	Thesis Research 6
ECSE 697	(4)	Thesis Research 7

Students who choose the thesis option must register for all 28 credits during the three terms of residency.

Complementary Courses

18 credits of 500-, 600-, or 700-level courses, of which no more than 6 credits may be outside the Department.*

* Non-departmental courses require Departmental approval. Students may be allowed to take more than 6 credits of non-Departmental courses; a letter of recommendation from their supervisor outlining the reason for such an action is required.

11.6.6 Master of Engineering (M.Eng.) Electrical Engineering (Non-Thesis) (45 credits)

The M.Eng. in Electrical Engineering (project option) involves an internally examined research project in addition to 27 graduate level course credits. The program is oriented more towards professional development than the thesis option. The project is of significantly less scope than a thesis, and includes options such as a technical review, a design project, or a small-scale research project. Undertaking 27 course credits provides students with a very solid background in electrical and computer engineering, both in terms of breadth across the entire field and depth in the area of specialty. Graduates frequently pursue careers in research and development. A part-time program is possible.

Research Project (18 credits)

ECSE 651	(1)	M.Eng. Project 1
ECSE 652	(2)	M.Eng. Project 2
ECSE 653	(3)	M.Eng. Project 3
ECSE 654	(4)	M.Eng. Project 4
ECSE 655	(4)	M.Eng. Project 5
ECSE 656	(4)	M.Eng. Project 6

Students who choose the non-thesis option must register for the project courses during the three required terms of residency.

Complementary Courses (27 credits)

27 credits of 500-, 600-, or 700-level courses, of which no more than 9 credits may be outside the Department.

* Non-departmental courses require Departmental approval. Students may be allowed to take more than 9 credits of non-Departmental courses; a letter of recommendation from their supervisor outlining the reason for such an action is required.

11.6.7 Doctor of Philosophy (Ph.D.) Electrical Engineering

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

ECSE 701	(0)	Ph.D. Qualifying Examination
ECSE 702	(0)	Ph.D. Research Plan Proposal
ECSE 703	(0)	Doctoral Research Seminar

In addition to the successful completion of the required courses above, students must complete the courses prescribed by the student's Supervisory Committee.

11.7 Mechanical Engineering

11.7.1 Location

Department of Mechanical Engineering
Macdonald Engineering Building
817 Sherbrooke Street West, Room MD-270
Montreal QC H3A 0C3
Canada
Telephone: 514-398-8869 or 514-398-6281
Fax: 514-398-7365
Email: *grad.mecheng@mcgill.ca*
Website: *www.mcgill.ca/mecheng/grad*

11.7.2 About Mechanical Engineering

Mechanical engineers are traditionally concerned with the conception, design, implementation, and operation of mechanical systems. Common fields of work include aerospace, energy, manufacturing, machinery, and transportation. Due to the broad nature of the discipline, there is usually a high demand for mechanical engineers with advanced training.

The Department includes more than 30 faculty members and 200 graduate students, and is housed primarily within the recently renovated Macdonald Engineering building. The Department contains state-of-the-art e

section 11.7.9: Master of Science (M.Sc.) Mechanical Engineering (Thesis) (45 credits)

Please consult the Department for more information on this program.

section 11.7.10: Doctor of Philosophy (Ph.D.) Mechanical Engineering

In the Ph.D. program, students are required to demonstrate a significant ne

Admission to graduate studies is competiti

Associate Professors

Andrew J. Higgins; B.Sc.(Ill.), M.S., Ph.D.(Wash.)

Michael Kokkolaras; Dipl.Ing.(TUM), Ph.D.(Rice)

Jozsef Kövecses; M.Sc.(U. Miskolc), Ph.D.(Hung. Acad. Sci.), ing.

Tim Lee; M.S.(Portland St.), Ph.D.(Idaho)

Xinyu Liu; B.Eng., M.Eng.(Harbin), Ph.D.(Tor.)

Rosaire Mongrain; B.Sc., M.Sc.(Montr.), Ph.D.(École Poly., Montr.), ing. (*William Dawson Scholar*)

Laurent Mydlarski; B.Sc.(Wat.), Ph.D.(Cornell)

Siva Nadarajah; B.Sc.(Kansas), M.S., Ph.D.(Stan.)

Evgeny V. Timofeev; M.Sc., Ph.D.(S.T.U. St. Petersburg), Eng., A.F.A.I.A.A.

Srikar T. Vengallatore; B.Tech.(B.H.U), Ph.D.(MIT)

Assistant Professors

Mark Driscoll; B.Eng.(McG.), M.Sc.(Montr.), Ph.D.(École Poly., Montr.), P.Eng.

James R. Forbes; Ph.D.(Tor), B.Eng.(Wat.)

Mathias Legrand; M.Sc., Ph.D.(École Centrale, Nantes)

Jianyu Li; B.Eng.(Zhejiang), M.Sc., Ph.D.(Harv.)

Jovan Nedi ; M.Eng., Ph.D.(Imperial Coll.)

Yaoyao Fiona Zhao; B.Eng.(B.I.T.), M.Eng., Ph.D.(Auck.)

Adjunct Professors

Farbod Alijani

Helmi Attia

Olivier Bertrand

Gilles Bourque

Luca Cortelezzi

Farhang Daneshmand

Mouhab Meshreki

Alireza Najafi-Yazdi

Aditya Paranjape

Peter Radziszewski

Gilles Soulez

Course Lecturers

Marwan Kanaan

Richard Klopp

Alexei Morozov

Amar Sabih

Associate Members

Jake Barralet

Renzo Ceccere

Allen Ehrlicher

Dan Nicolau

Abdolhamid Akbarzadeh Shafaroud

11.7.5 Master of Engineering (M.Eng.) Mechanical Engineering (Thesis) (45 credits)

Applicants who hold an undergraduate degree in a non-Engineering discipline – typically the Physical Sciences – may apply for the M.Sc. (Thesis) program, which is governed by the same regulations as the M.Eng. (Thesis) program.

Thesis Courses (28 credits)

MECH 691*	(3)	M.Eng. Thesis Literature Review
MECH 692	(4)	M.Eng. Thesis Research Proposal
MECH 693	(3)	M.Eng. Thesis Progress Report 1
MECH 694	(6)	M.Eng. Thesis Progress Report 2
MECH 695	(12)	M.Eng. Thesis

* Note: MECH 691 must be taken in the first term of the student's program.

Required Courses

1 credit:

MECH 609	(1)	Seminar

Complementary Courses (16 credits)

A minimum of 16 credits (500, 600, or 700 level) from the F

3. Aerospace Materials and Structures

4. Virtual Environment

Required Courses (9 credits)

MECH 687	(3)	Aerospace Case Studies
MECH 688	(6)	Industrial Stage

Complementary Courses (36 credits)

The other courses, depending on the area of concentration, will be chosen in consultation with an Aerospace Engineering Adviser. A maximum of 3 credits of FACC courses at the 500, 600, or 700 level may be credited toward the degree.

11.7.8 Master of Management (M.M.) Manufacturing Management (Non-Thesis) (56 credits)

This program is currently not offered.

We are in the process of revising the curriculum of the program to enhance its quality and relevance, while keeping the focus still on designing and managing global supply chains for manufacturing and service organizations.

Required Courses (30 credits)

MECH 524	(3)	Computer Integrated Manufacturing
MECH 627	(9)	Manufacturing Industrial Stage
MECH 628	(2)	Manufacturing Case Studies
MECH 629	(1)	Manufacturing Industrial Seminar
MGSC 602	(3)	Strategic Management of Operations
MGSC 603	(3)	Logistics Management
MGSC 605	(3)	Total Quality Management
MGSC 608	(3)	Data Decisions and Models
MGSC 631	(3)	Analysis: Production Operations

Complementary Courses (26 credits)

8 credits from General Business & Management Training

6 credits from General Business & Management

12 credits from Manufacturing & Supply Chain

General Business & Management Training (8 credits)

8 credits from Group A or Group B:

Group A

MGCR 651	(4)	Managing Resources
MGCR 652	(4)	Value Creation

Group B

MGCR 611	(2)	Financial Accounting
MGCR 612	(2)	Organizational Behaviour
MGCR 616	(2)	Marketing
MGCR 641	(2)	Elements of Modern Finance 1

General Business & Management

6 credits from the following:

ACCT 624	(3)	Management Accounting: Planning & Control
INDR 603	(3)	Industrial Relations
ORGB 625	(3)	Managing Organizational Change
ORGB 632	(3)	Managing Teams in Organizations
ORGB 633	(3)	Managerial Negotiations
ORGB 640	(3)	The Art of Leadership
ORGB 685	(3)	Cross Cultural Management

Manufacturing & Supply Chain

12 credits from:

MECH 526	(3)	Manufacturing and the Environment
MECH 528	(3)	Product Design
MECH 529	(3)	Discrete Manufacturing Systems
MGSC 578	(3)	Simulation of Management Systems
MGSC 615	(3)	Procurement and Distribution

11.7.9 Master of Science (M.Sc.) Mechanical Engineering (Thesis) (45 credits)

Applicants who hold an undergraduate degree in a non-Engineering discipline – typically the Physical Sciences – may apply for the M.Sc. (Thesis) program, which is governed by the same regulations as the M.Eng. (Thesis) program.

Thesis Courses (28 credits)

MECH 691*	(3)	M.Eng. Thesis Literature Review
MECH 692	(4)	M.Eng. Thesis Research Proposal
MECH 693	(3)	M.Eng. Thesis Progress Report 1
MECH 694	(6)	M.Eng. Thesis Progress Report 2
MECH 695	(12)	M.Eng. Thesis

* Note: MECH 691 must be completed in the first term of the student's program.

Required Course

1 credit:

MECH 609	(1)	Seminar

Complementary Courses (16 credits)

A minimum of 16 credits (500, 600, or 700 level) from the Faculty of Engineering or Faculty of Science, at least 8 of which must be from within the Faculty of Engineering. FACC courses will not count toward the complementary course credits.

11.7.10 Doctor of Philosophy (Ph.D.) Mechanical Engineering

Candidates normally register for the M.Eng. degree in the first instance. However, in exceptional cases where the research work is proceeding very satisfactorily, or where the equivalent of the M.Eng. degree has been completed at another university, candidates may be permitted to proceed directly to the Ph.D. degree without submitting a master's thesis as long as they have satisfied the course requirements for the M.Eng. degree.

Thesis

A thesis for the doctoral degree must constitute original scholarship and must be a distinct contribution to knowledge. It must show familiarity with previous work in the field and must demonstrate ability to plan and carry out research, organize results, and defend the approach and conclusions in a scholarly manner.

The research presented must meet current standards of the discipline; as well, the thesis must clearly demonstrate ho

- Multiscale Modelling of Materials;
- Electronic and Solar Cell Materials.

Course programs leading to the M.Eng. (Project) degree in Mining or Materials Engineering and the Graduate Diploma in Mining Engineering are also available.

Special programs are available for those holding degrees in subjects other than Materials or Mining Engineering (e.g., Chemical, Civil, or Mechanical Engineering, Chemistry, Physics, Geology).

section 11.8.5: Master of Engineering (M.Eng.) Mining and Materials Engineering (Thesis) (45 credits)

The M.Eng. (Thesis) degree is open to graduates holding the B.Eng. degree or its equivalent in Materials Engineering, Mining Engineering, or other related engineering fields.

section 11.8.6: Master of Science (M.Sc.) Mining and Materials Engineering (Thesis) (45 credits)

The M.Sc. (Thesis) degree is open to graduates holding the B.Sc. degree in Chemistry, Materials Science, Physics, Geology, or related fields.

Direct Transfer from a Master's to a Ph.D. – Students enrolled in a master's program (thesis) may transfer into the Ph.D. program without obtaining a master's degree if they have:

1. an excellent academic standing for their undergraduate degree;
2. been in the master's program for less than 12 months;
3. passed with the minimum CGPA of 3.6 at least three of the required master's courses, and given one seminar with a minimum grade of A-;
4. made good progress with their research;
5. obtained a strong letter of recommendation from their supervisor.

Direct Entry from B.Eng. to Ph.D.

Exceptional B.Eng. and B.Sc. graduates may be admitted directly to the Ph.D. program. The Ph.D. 1 students admitted through this process are required to complete at least four graduate-level courses.

M.Eng. (Project) Degrees

section 11.8.7: Master of Engineering (M.Eng.) Mining and Materials Engineering (Non-Thesis) (45 credits)

The Master of Engineering (Project) program (Materials option) is primarily designed to train people with appropriate engineering or scientific backgrounds to allow them to work effectively in the metals and materials industries. The Master of Engineering (Project) program (Mining option) is primarily designed for graduates from mining engineering programs who have received adequate academic training in modern mining technology, mineral economics, computer programming, and probabilities and statistics.

section 11.8.8: Master of Engineering (M.Eng.) Mining and Materials Engineering (Non-Thesis): Environmental Engineering (45 credits)

This interdepartmental graduate program leads to a master’s degree in Environmental Engineering. The objective of the program is to train environmental professionals at an advanced level. The program is designed for individuals with an undergraduate degree in engineering. This non-thesis degree falls within the M.Eng. and M.Sc. programs, which are offered in the Departments of Bioresource, Chemical, Civil, and Mining and Materials Engineering. The Environmental Engineering program emphasizes interdisciplinary fundamental knowledge, practical perspectives, and awareness of environmental issues through a wide range of technical and non-technical courses offered by collaborating departments and faculties at the University. Students are strongly encouraged to consult with the Graduate Program Director prior to enrolling in the program.

section 11.8.9: Doctor of Philosophy (Ph.D.) Mining and Materials Engineering

Please consult the Department for more information about the Ph.D.

section 11.8.10: Graduate Diploma (Gr. Dip.) Mining Engineering (30 credits)

This program normally requires one academic year of full-time study to complete. Candidates are required to take an integrated group of courses based on their academic background.

Director, Mining Engineering Program

Hani S. Mitri (*on sabbatical Jan. to Dec. 2017*)

Emeritus Professors

James A. Finch; B.Sc.(Birm.), M.Eng., Ph.D.(McG.), Eng., F.C.I.M., F.R.S.C. (*Gerald G. Hatch Emeritus Professor*)

John E. Gruzleski; B.Sc., M.Sc.(Qu.), Ph.D.(Tor.), Eng., F.C.I.M., F.A.S.M. (*Gerald G. Hatch Emeritus Professor*)

John J. Jonas; B.Eng.(McG.), Ph.D.(Cant.), Eng., F.A.S.M., F.R.S.C. (*Henry Birks Emeritus Professor*)

Gordon W. Smith; B.Eng., M.Eng., Ph.D.(McG.), Eng.

Post-Retirement Professor

Frank Mucciardi; B.Eng., M.Eng., Ph.D.(McG.), P.Eng.

Professors

George P. Demopoulos; Dipl.Eng.(NTU Athens), M.Sc., Ph.D.(McG.), Eng., F.C.I.M. (*Gerald G. Hatch Professor*)

Roussos Dimitrakopoulos; B.Sc.(Thessaloniki), M.Sc.(Alta.), Ph.D.(École Poly., Montr.) (*Canada Research Chair I*)

Raynald Gauvin; B.Ing., Ph.D.(Montr.), Eng. (*Henry Birks Professor*)

Roderick I.L. Guthrie; B.Sc., Ph.D.(Lond.), D.I.C., Eng., A.R.S.M., F.C.I.M., F.R.S.C. (*William C. Macdonald Professor*)

Faramarz (Ferri) P. Hassani; B.Sc., Ph.D.(Nott.) (*George Boyd Webster Professor*)

Hani S. Mitri; B.Sc.(Cairo), M.Eng., Ph.D.(McM.), Eng. (*on sabbatical Jan. to Dec. 2017*)

Stephen Yue; B.Sc., Ph.D.(Leeds), P.Eng. (*James McGill Professor*) (*Lorne Trottier Chair in Aerospace Engineering*)

Co-op Program Liaison Officers

Monika Teresa Skonieczny (Mining)

Genevieve Snider (Materials)

11.8.5 Master of Engineering (M.Eng.) Mining and Materials Engineering (Thesis) (45 credits)

Thesis Courses (27 credits)

MIME 690	(6)	Thesis Research 1
MIME 691	(3)	Thesis Research 2
MIME 692	(6)	Thesis Research 3
MIME 693	(3)	Thesis Research 4
MIME 694	(6)	Thesis Research 5
MIME 695	(3)	Thesis Research 6

Required Seminar (6 credits)

MIME 601	(0)	Engineering Laboratory Practice

6 credits from the following courses:

MIME 670	(6)	Research Seminar 1
MIME 672D1*	(3)	Rock Mechanics Seminar
MIME 672D2*	(3)	Rock Mechanics Seminar
MIME 673	(6)	Mining Engineering Seminar

* Note: Students must register for MIME 672D1 and MIME 672D2 in consecutive terms.

Complementary Courses (12 credits)

12 credits at the 500-level or higher selected from within and/or outside the department in consultation with the student's supervisor and/or Advisory Committee.

11.8.6 Master of Science (M.Sc.) Mining and Materials Engineering (Thesis) (45 credits)

Thesis Courses (27 credits)

MIME 690	(6)	Thesis Research 1
MIME 691	(3)	Thesis Research 2
MIME 692	(6)	Thesis Research 3
MIME 693	(3)	Thesis Research 4
MIME 694	(6)	Thesis Research 5
MIME 695	(3)	Thesis Research 6

Required Seminar (6 credits)

MIME 601	(0)	Engineering Laboratory Practice

6 credits from the following courses:

* Note: Students must register for MIME 672D1 and MIME 672D2 in consecutive terms.

MIME 670	(6)	Research Seminar 1
MIME 672D1*	(3)	Rock Mechanics Seminar
MIME 672D2*	(3)	Rock Mechanics Seminar
MIME 673	(6)	Mining Engineering Seminar

Complementary Courses (12 credits)

12 credits at the 500 level or higher from within and/or outside the department in consultation with the student's supervisor and/or Advisory Committee.

11.8.7 Master of Engineering (M.Eng.) Mining and Materials Engineering (Non-Thesis) (45 credits)

Students registered in this program specialize either in Mining Engineering or Materials Engineering.

Research Project (15 credits)

MIME 628	(6)	Mineral Engineering Project 1
MIME 629	(6)	Mineral Engineering Project 2
MIME 634	(3)	Mineral Engineering Project 3

Required Courses (6 credits)

MIME 601	(0)	Engineering Laboratory Practice

AND

6 credits from the following courses:

MIME 670	(6)	Research Seminar 1
MIME 673	(6)	Mining Engineering Seminar

Complementary Courses (24 credits)

12 credits of MIME courses at the 500 level or higher.

12 credits of courses at the 500 level or higher from within and/or outside the department in consultation with the Program Adviser.

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

Toxicology Course

One of the following courses:

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

Water Pollution Engineering Course

One of the following courses:

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

Air Pollution Engineering Course

One of the following courses:

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

Soil and Water Quality Management Course

One of the following courses:

BREE 533	(3)	Water Quality Management
CIVE 686	(4)	Site Remediation

Environmental Impact Course

One of the following courses:

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

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

Environmental Policy Course

URBP 506	(3)	Environmental Policy and Planning

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

Elective Courses (11 credits)

(minimum 11 credits)

Another project course and/or Engineering or non-Engineering 500-, 600-, or 700-lev

11.8.9 Doctor of Philosophy (Ph.D.) Mining and Materials Engineering

A candidate for this degree must pass a minimum of two courses assigned by the Department. These are selected on the basis of the student's previous academic training and research interests. The candidate must also pass a safety training course in the first year of his/her Ph.D. registration. The candidate is required to participate in an appropriate Research Seminar course and is expected to take a preliminary examination within the first year of his/her Ph.D. registration.

The candidate must submit an acceptable thesis based upon successfully completed research and must satisfy the examiners in an oral examination of the thesis.

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.

11.8.10 Graduate Diploma (Gr. Dip.) Mining Engineering (30 credits)

Required Course (6 credits)

MIME 601	(0)	Engineering Laboratory Practice
MIME 673	(6)	Mining Engineering Seminar

Complementary Courses (24 credits)

24 credits of courses at the 500 level or higher selected from within and/or outside the department in consultation with the Program Adviser.

11.9 Urban Planning

11.9.1 Location

School of Urban Planning
Macdonald Harrington Building, Room 400
815 Sherbrooke Street West
Montreal QC H3A 0C2
Canada
Telephone: 514-398-4075
Fax: 514-398-8376
Email: *admissions.planning@mcgill.ca*
WbsiteTm(Email:)Tj0 0 1 rg0 0 1 RG/F2 8.1 Tf0.22wu 0 0 1 444.34.ryTf.y0 0j/F1 8Tf.yt6 0 071.301 550.892 Tr Ph..y0 0jban Plannina

The School’s teaching and research activities pertain primarily to community planning; environmental policy and planning; international development planning; land-use planning and regulation; transportation and infrastructure planning; and urban design. These activities, which are conducted for the purpose of promoting better decision-making and improving human environments, often take place in partnership with other McGill departments (notably Architecture, Civil Engineering, Geography, and Law) and with units at other institutions in Montreal, across Canada, and abroad. The School uses Montreal and its region as its main teaching laboratory.

McGill's School of Urban Planning has a strong track record of contributing to the community and to the profession. It works with civil society as well as with government, at home and abroad, to understand urban challenges and to formulate policies and plans to meet them.

documented proof of competency in oral and written English. By the application deadlines, appropriate exam results must be sent electronically directly from the *TOEFL* (Test of English as a Foreign Language) or *IELTS* (International English Language T

Adjunct Professors

Marc-André Lechasseur; LL.B.(Sher.), LL.M.(Montr.)

Mario Polèse; B.A.(CUNY), M.A., Ph.D.(Penn.)

Ray Tomalty; B.A., M.P.A.(Qu.), Ph.D.(Wat.)

Associate Member

Cameron Charlebois; B.Sc.(Arch.), B.Arch., M.B.A.(McG.)

Instructors

Malaka Ackaoui, Suzanne Doucet, Paul LeCavalier, Martin Wexler

11.9.5 Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis) (66 credits)

The M.U.P. requires two years of study and research including a three-month summer internship in a professional setting. Upon completion of the program, graduates are expected to have acquired basic planning skills, a broad understand of urban issues, and specialized knowledge in a field of their own choice.

Research Project (15 credits)

URBP 630	(3)	Supervised Research Project 1
URBP 631	(6)	Supervised Research Project 2
URBP 632	(6)	Supervised Research Project 3

Required Courses (27 credits)

URBP 609	(3)	Planning Graphics
URBP 612	(3)	History and Theory of Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(3)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 633	(3)	Research Methods for Planners
URBP 635	(3)	Planning Law

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Complementary Courses (18 credits)

Students are encouraged to complete at least one course in each of the four areas of design, environment, housing, and transportation.

Group A

9-18 credits from the following:

ARCH 515	(3)	Sustainable Design
ARCH 517	(3)	Sustainable Residential Development
ARCH 520	(3)	Montreal: Urban Morphology
ARCH 564	(3)	Design for Development
ARCH 566	(3)	Cultural Landscapes Seminar
CIVE 540	(3)	Urban Transportation Planning
CIVE 561	(3)	Urban Activity, Air Pollution, and Health
GEOG 504	(3)	Industrial Restructuring - Geographic Implications

URBP 632	(6)	Supervised Research Project 3

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Required Courses (33 credits)

URBP 505	(3)	Geographic Information Systems
URBP 609	(3)	Planning Graphics
URBP 612	(3)	History and Theory of Planning
URBP 619	(3)	Land Use and Transportation Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(3)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 633	(3)	Research Methods for Planners
URBP 635	(3)	Planning Law

Complementary Courses (12 credits)

Group A

6-12 credits from the following:

CIVE 540	(3)	Urban Transportation Planning
CIVE 561	(3)	Urban Activity, Air Pollution, and Health
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Research Project (15 credits)

URBP 630	(3)	Supervised Research Project 1
URBP 631	(6)	Supervised Research Project 2
URBP 632	(6)	Supervised Research Project 3

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Required Courses (33 credits)

URBP 602	(3)	Issues in Urban Design
URBP 604	(3)	Urban Design Seminar
URBP 609	(3)	Planning Graphics
URBP 612	(3)	History and Theory of Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(3)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 633	(3)	Research Methods for Planners
URBP 635	(3)	Planning Law

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URBP 505	(3)	Geographic Information Systems
URBP 530	(3)	Urban Environmental Planning
URBP 607	(3)	Reading Course: Urban Planning
URBP 617	(3)	Selected Topics 2
URBP 618	(3)	Selected Topics 3
URBP 619	(3)	Land Use and Transportation Planning
URBP 625	(2)	Principles and Practice 2
URBP 626	(2)	Principles and Practice 3
URBP 629	(3)	Cities in a Globalizing World