Faculty of Engineering, including Peter Guo-hua Fu School of Architecture and School of Urban Planning (Graduate)

Programs, Courses and University Regulations

2024-2025

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

1 . McGill University reserves the right to mak

Publication Information

Published by

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

1 Graduate and Postdoctoral Studies

1.1 Administrative Officers

Administrative Officers	
Josephine Nalbantoglu; B.Sc., Ph.D.(McG.)	**Associate Provost (Graduate Education) and Dean (Graduate and Postdoctoral Studies)**
Lorraine Chalifour; B.Sc., Ph.D. (Manit.)	**Associate Dean (Graduate and Postdoctoral Studies)**
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* > *: Graduate Admissions and Application Procedures* for information on:

- Application for admission;
- Admission requirements;
- Application procedures;
- Competency in English; and
- Other information regarding admissions and application procedures for Graduate and Postdoctoral Studies.

- 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

research stage. Individuals who are expecting to spend more than one year are encouraged to obtain formal training (Master's or Ph.D.) through application to a relevant graduate program.

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

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

General Conditions

- The maximum duration is three years.
- The individual must be engaged in full-time research.
- The individual must provide copies of official transcripts/diplomas.
- The individual must have the approval of a McGill professor to supervise the research and of the Unit.
- The individual must have adequate proficiency in English, but is not required to provide official proof of English competency to Enrolment Services.
- The individual must comply with regulations and procedures governing research ethics and safety and obtain the necessary training.
- The individual will be provided access to McGill libraries, email, and required training in research ethics and safety. Any other University services must be purchased (e.g., access to athletic facilities).
- The individual must arrange for basic health insurance coverage prior to arrival at McGill and may be required to provide proof of coverage.

8 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

9 Graduate Student Services and Information

Graduate students are encouraged to refer to *: Student Services and Information* for information on the following topics:

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

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

11 Browse Academic Units & Programs

The programs and courses in the following sections have been approved for the 2024–2025 session as listed.

11.1 Architecture

11.1.1 Location

Peter Guo-hua Fu School of Architecture
Macdonald-Harrington Building
815 Sherbrooke Street West
Montreal QC H3A 0C2
Telephone: 514-398-6700
Website: *mcgill.ca/architecture*

11.1.2 About Peter Guo-hua Fu School of Architecture

M.Arch. Professional (Non-Thesis) and Ph.D. Programs

The Peter Guo-hua Fu School of Architecture at McGill University has a professional Master of Architecture program and a Ph.D. program.

The **M.Arch. Professional** requires the equivalency of the B.Sc. (Arch.) degree for admittance. The M.Arch. Professional program is accredited by the Canadian Architectural Certification Board (CACB) and is recognized as accredited by the *National Council of Architectural Registration Boards* (NCARB) in the U.S.

The **Ph.D. program** is for study beyond the professional degree in architecture. The program has been conceived to respond to the needs of graduates with some professional experience who wishes to acquire more specialized knowledge in architecture. Information concerning the Ph.D. program—the duration of all programs offered, documents required of applicants, etc.—may be obtained at *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. H9.316 301.971 h .s TmCa:e7lF established educational standards.gree programsA arq4l professional education. H9.316

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.

section 11.1.4: Master of Architecture (M.Arch.) Professional (Non-Thesis) (60 credits)

The M.Arch. Professional (Non-Thesis) degree program provides a structured opportunity to explore advanced architectural design, integrating building construction, landscape and urban design, professional practice, sustainable design, and the history and theory of architecture.

section 11.1.5: Doctor of Philosophy (Ph.D.) Architecture

The McGill University Ph.D. in Architecture is a research degree with a thesis. The foundations which are developed through a series of courses taken in the first two years of study. Each student meets regularly with the supervisor in the first year to prepare the thesis proposal (ARCH 700). Three Literature Review preparatory courses (ARCH 721, ARCH 722, ARCH 723) and three (or more) complementary courses are taken. All students also participate in the two Doctoral Pro seminars (ARCH 711, ARCH 712) which include investigations of advanced topics introduced by the instructor(s). By the end of the second year of studies (Ph.D. 3), the student must complete the Comprehensive Examination (ARCH 701) with a formal presentation to their supervisory committee.

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. Finallyestig

Note: Not required by graduates from McGill University B.Sc.(Arch.), Université de Montréal B.Sc.(Arch), Université Laval (B.Sc.Arch.), Toronto Metropolitan University (B.Arch.Sc.), Laurentian University (B.A.S. – Bachelor of Arch. Studies), University of Waterloo (B.Arch.Studies.), University of M123.885 728.5dit

ARCH 678	(3)	Advanced Construction
ARCH 683	(9)	Directed Research Project

Complementary Courses (18 credits)

18 credits chosen from among the following:

ARCH 514	(3)	Community Design Workshop
ARCH 515	(3)	Sustainable Design
ARCH 517	(3)	Sustainable Residential Development
ARCH 525	(3)	Seminar on Analysis and Theory
ARCH 528	(3)	History of Housing
ARCH 531	(3)	Architectural Intentions Vitruvius - Renaissance
ARCH 532	(3)	Origins of Modern Architecture
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 542	(3)	Selected Topics in Architecture 3
ARCH 543	(3)	Selected Topics in Architecture 4
ARCH 562	(3)	Innovative Homes and Communities
ARCH 604	(3)	Urban Design Seminar
ARCH 627	(3)	Research Methods
ARCH 641	(3)	Energy and Environments 1
ARCH 642	(3)	Energy and Environments 2
ARCH 670	(3)	Advanced Landscape Theory
ARCH 675	(3)	Architecture in Global Perspective
ARCH 680	(2)	Field Sketching
ARCH 684	(3)	Contemporary Theory 1
ARCH 685	(3)	Contemporary Theory 2
ARCH 688	(3)	Directed Research 1
ARCH 689	(3)	Directed Research 2
OCC1 625	(3)	Functional Environments
URBP 555	(3)	Real Estate and Planning
URBP 651	(3)	Redesigning Suburban Space

11.1.5 Doctor of Philosophy (Ph.D.) Architecture

The Ph.D. in Architecture is a research degree with a thesis, the foundations for which are developed through a series of courses taken in the first two years of study. Each student meets regularly with the supervisor in the first year to prepare the thesis proposal (ARCH 700). Three Literature Review preparatory courses (ARCH 721, ARCH 722, ARCH 723) and three (or more) complementary courses are taken in the first two years of study. All students also participate in the two Research Seminars (ARCH 711, ARCH 712) to present the research framework and objectives for peer critique. By the end of the second year of studies (Ph.D.-3), the student must complete the Comprehensive Examination (ARCH 701) with a formal presentation to an Advisory Committee.

Thesis

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

Required Courses (15 credits)

ARCH 700	(0)	Thesis Proposal
ARCH 701	(0)	Comprehensive Examination
ARCH 711	(3)	Doctoral Proseminar 1
ARCH 712	(3)	Doctoral Proseminar 2
ARCH 721	(3)	Literature Review 1
ARCH 722	(3)	Literature Review 2
ARCH 723	(3)	Literature Review 3

Complementary Courses (9 credits)

Students must take 9 credits of courses at the 600 or 700 level, selected with the approval of the School.

11.2 Bioengineering

11.2.1 Location

Department of Bioengineering
McConnell Engineering Building, Room 350
3480 University Street
Montreal QC H3A 0E9
Telephone: 514-398-7254
Email: *info.bioeng@mcgill.ca*
Website: *mcgill.ca/bioengineering*

11.2.2 About Bioengineering

The Department of Bioengineering, established in 2012, is the newest department to join McGill University's renowned Faculty of Engineering. McGill researchers from nearly all faculty units, including sev0)yl7Sciences, am(act)Tj1 0 0 1 267j125ly290 0j1 0 v30)

3610 University Street
Montreal QC H3A 0C5
Canada
Telephone: 514-398-4494
Fax: 514-398-6678
Email: *gradcoordinator.chemeng@mcgill.ca*
Website: *mcgill.ca/chemeng*

11.3.2 About Chemical Engineering

The Department offers programs leading to the **Master of Engineering**, **Master of Science**, and the **Doctor of Philosophy** degrees.

The Department's offices and research laboratories are located in the M.H. Wong Building. Collectively, 18 members of the academic staff conduct research programs in almost all areas of modern chemical engineering, drawing upon theoretical, computational, and experimental methodologies. The Department's faculty have been well supported by government programs (e.g., *NSERC*, *FRQNT*, *CIHR*, *CFI*, and *CRC*) and industry through research partnerships and contracts. Our laboratories are equipped with state-of-the-art equipment, and we attract outstanding graduate students from all over the world. Our main current research areas are briefly described below.

Advanced materials and polymers – The Department has an internationally recognized research program in structural, functional, and biological materials, spanning synthesis, characterization, processing, and modelling activities, with strong links to academic, government, and industrial research centres. Areas include plasma processing (e.g., nanofluids, carbon nanotubes, advanced coatings) and polymeric or "soft" materials research (e.g., self-assembling or structured materials; complex fluids; liquid crystals; colloids and soft composites; and novel polymerization methods). Applications of the research are targeted toward the development of next-generation, high-density storage media, functional coatings, electronic devices, composite fluids and "smart" materials, to name but a few.

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 and cell biology) with process engineering, design, and scale-up principles. This is the use of biological systems or living organisms to do practical things and manufacture valuable products such as biohydrogen, drugs, therapeutics, polymers, and surfactants. Biomedical engineering combines the principles of engineering with medicine as well as life sciences and biology. Examples of this include:

- drug delivery methods;
- biomedical devices;
- cardiovascular and other biomechanics;
- biomaterials for applications such as artificial implants; and
- products such as bacteriophages for alternative treatment techniques.

Energy – Energy usage has increased significantly since the steam engine launched the Industrial Revolution. This is due to our ever-growing human population, increased production of consumer goods, and rising use of energy-intensive devices such as automobiles, cell phones, computers, and climate comfort units. Instability in oil production and the inevitable depletion of fossil fuels is forcing scientists to find new resources and develop new technologies to keep pace with elevating energy demands. The Chemical Engineering Department at McGill University has an extensive research effort related to energy including:

- hydrogen production from microbial conversion of waste streams and electrolysis of water;
- hydrogen storage and molecular modelling of hydrogen storage;
- hydrogen fuel cells and solid oxide fuel cells;
- methane recovery, storage, and transportation using gas hydrates;
- oil and gas flow assurance; and
- plasma technology to produce nanomaterials for energy conversion/storage devices.

Environmental engineering – Environmental engineering is the application of science and engineering principles to protect the environment and remediate contaminated sites. Chemical and environmental engineers develop and design processes to provide healthy air, water, and soil. They also develop green products and sustainable processes. Using their background in process engineering, environmental chemistry, earth sciences, and biology, engineers have to meet the current and future challenges in protecting, managing, and restoring the environment. Ongoing research in the area of environmental engineering in our department includes:

- the study of wastewater treatment processes;
- biodegradation of emerging pollutants;
- advanced oxidation processes;
- transport and fate of waterborne contaminants;
- production of alternative fuels;
- environmental nanotechnology for remediation of contaminated soils and waters;
- green chemistry for safer products and processes; and

- development of biosensors for pollutant detection.

Plasma science and engineering – Plasma is often called the fourth state of matter, being the result of raising a gas to such an energy level that it contains conducting particles such as electrons and ions. While most of the universe is in a plasma state, plasmas on Earth are relatively uncommon. Plasma science and engineering research examines the use of the plasma state to produce physical and chemical changes to matter (bulk and surfaces). Plasmas may be in non-equilibrium, a state in which the overall gas is at low temperature and only the electrons are very energetic, or in the equilibrium state, where the temperature of all constituents is essentially equal and may range from thousands to tens of thousands of degrees Kelvin (e.g., the sun's surface is in a plasma state, at a temperature of about 6,000K). Non-equilibrium plasmas are used in such applications as the deposition of coatings and functionalization of surfaces, the treatment of cells, and the treatment of harmful gases and liquids. Thermal plasmas are used in the synthesis of advanced materials such as nanoparticles,

11.3.3.2 Application Procedure

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.

11.3.3.2.1 Additional Requirements

- Reference Letter – Ph.D. applicants must submit two letters of recommendation, one of which should be from their master's research supervisor.

11.3.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Chemical 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 *mcgill.ca/gps/contact/graduate-program*.

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

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

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

11.3.4 Master of Science (M.Sc.) Chemical Engineering (Thesis) (45 credits)

Thesis Courses (31 credits)

CHEE 697	(6)	Thesis Proposal
CHEE 698	(12)	Thesis Research 1
CHEE 699	(13)	Thesis Research 2

Required Courses (4 credits)

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
CHEE 688	(4)	Advanced Materials in Chemical Engineering

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.

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

Research Project

Project (design or research): 6-12 credits.

6 credits must include the following course:

CHEE 695	(6)	Project in Chemical Engineering

Complementary Courses

33-39 credits (a minimum of 18 credits in Chemical Engineering) at the 500, 600, or 700 level.

9 credits must be in an area of concentration.

12 additional courses at the 500, 600, or 700 level.

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

This program is currently not accepting applicants.

Research Project (6 credits)

CHEE 695	(6)	Project in Chemical Engineering

Required Courses (6 credits)

CHEE 591	(3)	Environmental Bioremediation
CIVE 615	(3)	Environmental Engineering Seminar

Complementary Courses (22 credits)

Minimum of 22 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

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

Environmental impact: (3 credits)

GEOG 601	(3)	Advanced Environmental Systems Modelling

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.

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

The Ph.D. in Chemical Engineering focuses on advanced materials and polymers, biomedical engineering and biotechnology, environmental engineering, energy, plasma science and artificial intelligence-assisted design and optimization. The program offers advanced training in fundamentals as well as research methods and techniques, laboratory safety and research ethics.

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 (4 credits)

CHEE 681	(1)	Laboratory Safety 1
CHEE 682	(1)	Laboratory Safety 2
CHEE 687AdvAdved traBiocal Engineering Advanch	(2)	Research Skills and Ethics

- the *TOEFL* (Test of English as a Foreign Language;

Research Project

(0 or 5-15 credits)

The program may include a project or, with Departmental approval, may be completed with courses only.

Required Courses (6 credits)

CHEE 591	(3)	Environmental Bioremediation
CIVE 615	(3)	Environmental Engineering Seminar

Complementary Courses

(24-39 credits)

a minimum of 22 credits chosen from the following:

Data analysis:

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

Toxicology:

OCCH 612	(3)	Principles of Toxicology

Water pollution engineering:

CIVE 651	(4)	Theory: Water / Wastewater Treatment
CIVE 652	(4)	Bioprocesses for Wastewater Resource Recovery
CIVE 660	(4)	Chemical and Physical Treatment of Waters

Air pollution engineering:

MECH 534	(3)	Air Pollution Engineering

Soil and water quality management:

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

Environmental impact:

GEOG 601	(3)	Advanced Environmental Systems Modelling

Environmental policy

URBP 506	(3)	Environmental Policy and Planning

Elective Courses

Also, 0-15 credits of graduate courses from an approved list of courses from the Faculties of Engineering, Agricultural and Environmental Sciences, Law, Management; Departments of Atmospheric and Oceanic Sciences, Biology, Chemistry, Earth and Planetary Sciences, Economics, Epidemiology and Biostatistics, Geography, Occupational Health, Political Science, School of Religious Studies, Sociology, and Bieler School of Environment.

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

The MEng Non-Thesis program aims to provide a more professional orientation to graduate students. The main features of this degree program are:

A minimum of 15 credits selected from a list of research oriented courses

A maximum of 30 credits with emphasis on expertise (specialty area) for professional practice.

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 Construction Materials

Environmental/Hydraulics-Water Resources

CIVE 555	(3)	Environmental Data Analysis
CIVE 572	(3)	Computational Hydraulics
CIVE 584	(3)	Mechanics of Groundwater Flow
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 560	(3)	Transportation Safety and Design
CIVE 609	(4)	Risk Engineering

List B: Other Complementar

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)	Bridge Engineering
CIVE 618	(4)	Design in Concrete 1
CIVE 622	(4)	Prestressed Concrete
CIVE 625	(4)	Condition Assessment of Existing Structures
CIVE 628	(4)	Advanced Design of Wood Buildings
CIVE 637	(4)	Discrete Choice Modeling in Transportation
CIVE 652	(4)	Bioprocesses for Wastewater Resource Recovery
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.

11.4.7 Doctor of Philosophy (Ph.D.) Civil 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 ho

CIVE 701	(0)	Ph.D. Comprehensive Examination
CIVE 702	(0)	Ph.D. Research Proposal

Complementary Courses

6-8 credits at the 500 or 600 level taken from the Department of Civil Engineering.

11.5 Electrical and Computer Engineering

11.5.1 Location

Department of Electrical and Computer Engineering
McConnell Engineering Building, Room 602
3480 University Street
Montreal QC H3A 0E9
Telephone: 514-398-7344 or 514-398-1406
Email: *grad.ece@mcgill.ca*
Website: *mcgill.ca/ece*

11.5.2 About Electrical and Computer Engineering

The Department offers programs of graduate studies leading to a degree of **Master of Science** (thesis), **Master of Engineering** (non-thesis/course-based), or **Doctor of Philosophy**.

The research interests and facilities of the Department are very extensive, involving more than 45 faculty members and 350 postgraduate students. The major activities are divided into the following groups:

- Bioelectrical Engineering
- Telecommunications and Signal Processing
- Systems and Control
- Integrated Circuits and Systems
- Nano-Electronic Devices and Materials
- Photonic Systems
- Computational Electromagnetics
- Power Engineering
- Intelligent Systems
- Software Engineering

The Department is equipped with state-of-the-art experimental laboratories and there are numerous multidisciplinary research projects, so students are provided with an ideal environment to develop new technologies, discover novel phenomena, and design revolutionary devices.

Research Facilities

The Department has extensive laboratory facilities for all its main research areas. In addition, McGill University often collaborates with other institutions for teaching and research.

- The *Centre for Intelligent Machines* (CIM) is an interdisciplinary research group focussed on intelligent systems. Its laboratories include research in the domains of robotics, systems and control, computer vision, medical imaging, computer graphics, and machine learning.
- Telecommunications laboratories focus their work on signal processing, broadband communications, and networking; these laboratories form part of the *Centre for Systems, Technologies and Applications for Radiofrequency and Communications* (STARaCOM), a McGill University Research Centre devoted to fostering innovation in the area of communications systems and technologies via advanced research and training of highly qualified personnel.
- The *Integrated Microsystems Laboratory* (iML) supports research in FPGAs, MEMS, micro- and nano-systems, VLSI architectures for digital communications and signal processing, mixed signal, RF, and microwave integrated circuits and components, simulation of integrated circuits and microsystems, integrated antennas, design for testability, reconfigurable computing, high-speed circuits, and packaging.
- Antenna and microwave research, and optical fibre and integrated optics research are carried out in a fully equipped facility.
- The *Photonics Systems* Group includes experimental laboratories with high-speed test and measurement equipment and optoelectronics; tunable, high power, and pulsed lasers; extensive optics and optomechanics supporting research in telecommunications for advance probing stations; signal processing, nonlinear optics, RF photonics, optical processors for computing and AI, and biosensing.

- Molecular beam epitaxy infrastructure. This infrastructure can grow wafer-scale group-III nitride epilayers and nanostructures for both

11.5.3 Electrical and Computer Engineering Admission Requirements and Application Procedures

11.5.3.1 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.

Master's 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 highly competitive.

Ph.D. Degree Admission Requirements

In addition to satisfying the requirements for the Master's 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 highly competitive.

11.5.3.2 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.

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

11.5.3.2.1 Additional Requirements

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

- Area of Research and Applicant Profile Form – available at *mcgill.ca/ece/admissions/graduate/apply;*
- Area of Interest and Profile Form (M.Eng. course-based program) – available at *mcgill.ca/ece/admissions/graduate/apply*;
- *GRE* – the General Aptitude Test is optional.

11.5.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of 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 *mcgill.ca/gps/contact/graduate-program*.

Application Opening Dates	Application Deadlines		
All Applicants	**Non-Canadian citizens (Incl. Special, Visiting, and Exchange)**	**Canadian Citizens/Perm. Residents of Canada (Incl. Special, Visiting, and Exchange)**	**Current McGill Students (Any Citizenship)**

intensive research under the supervision of researchers who are leaders in their field. The program is an ideal preparation for a Ph.D. degree or an industrial research career.

The M.Sc. Thesis program must be completed on a full-time basis in no more than three years. The following requirements must be met:

Thesis Courses (27 credits)

ECSE 691	(4)	Thesis Research 1
ECSE 692	(4)	Thesis Research 2
ECSE 693	(4)	Thesis Research 3

11.6 Mechanical Engineering

11.6.1 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: *mcgill.ca/mecheng/grad*

11.6.2 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 experimental facilities (including a major wind tunnel facility) and has extensive computational facilities. Professors within the Department collaborate widely with professors in other units, often through research centres including the Centre for Intelligent Machines (CIM); the McGill Institute for Advanced Materials (MIAM); and the Montreal Neurological Institute and Hospital (MNI). The research interests within the Department are very broad and fall largely within the following seven areas:

Vibrations, acoustics, and fluid–structure interaction.

Programs Offered

The Department offers programs of study leading to the M.Sc. and Ph.D. degrees in Mechanical Engineering. Both M.Sc. (Thesis) and M.Eng. (Non-Thesis) programs are offered.

There are several options for completing master's degrees that do not involve the completion of a thesis. The M.Eng. (Non-Thesis) program has more extensive course requirements and will appeal to students who desire to gain both a broad understanding of subjects within Mechanical Engineering as well as in-depth information in a specific area. Other non-thesis master's degree options are described below.

section 11.6.6: Master of Science (M.Sc.) Mechanical Engineering (Thesis) (45 credits)

M.Sc. is a research program requiring a minimum of 45 credits to be distributed as follo

In the case of all programs, applicants must have successfully completed their prior degree(s) with a minimum CGPA equivalent to 3.3 on a scale of 4.0.
Satisfaction of these minimum requirements does not guarantee admission. Applicants to graduate studies whose mother tongue cngue cngue cngue cnnas6e sturiq2mpl

3. Aerospace Materials and Structures

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.

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

The M.Sc. in Mechanical Engineering is a research-oriented program that focuses on planning and conducting research as well as organizing and presenting research results, supervised by one or more professors who are experts in the field.

Thesis Courses (28 credits)

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

11.6.7 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 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

MECH 700	(0)	Ph.D. Literature Review
MECH 701	(0)	Ph.D. Thesis Proposal
		Ph.D. Comprehensive Preliminary Oral Examination

11.7 Mining and Materials Engineering

11.7.1 Location

Department of Mining and Materials Engineering
M.H. Wong Building
3610 University Street
Montreal QC H3A 0C5
Canada
Email: *barbara.hanley@mcgill.ca*
Website: *mcgill.ca/minmat*

Mining Engineering
Telephone: 514-398-2215
Fax: 514-398-7099

Materials Engineering
Telephone: 514-398-4383
Fax: 514-398-4492

11.7.2 About Mining and Materials Engineering

Mining Engineering

- Geomechanics
- Mining Environments
- Strategic Mine Planning and Optimization
- Stochastic Modelling
- Operations Research
- Rock Mechanics
- Mine Safety
- Mine Ventilation
- Renewable Energy
- Mineral Economics
- Materials Handling
- Environmental Engineering

Materials Engineering

- Process Metallurgy
- Computational Thermodynamics
- Effluent and Waste Treatment
- Mineral Processing
- Metal Casting and CFD Modelling
- Surface Engineering and Coatings
- Additive Manufacturing and Powder Metallurgy
- Ceramics
- Electron Microscopy
- Automotive and Aerospace Materials
- Biomaterials
- Nanomaterials and Nanoelectronic Materials
- Multiscale Modelling of Materials
- Electronic and Solar Cell Materials
- Environmental Engineering

Research Degrees

section 11.7.4: Master of Science (M.Sc.) Materials Engineering (Thesis) (45 credits)

Please consult the Department for more information about the M.Sc. Materials Engineering (Thesis) program.

section 11.7.5: Master of Science (M.Sc.) Mining Engineering (Thesis) (45 credits)

Please consult the Department for more information about the M.Sc. Mining Engineering (Thesis) program.

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 11.7.6: Master of Engineering (M.Eng.) Materials Engineering (Non-Thesis) (45 credits)

Please consult the Department for more information about the M.Eng. Materials Engineering (Project) program.

section 11.7.7: Master of Engineering (M.Eng.) Materials Engineering (Non-Thesis): Environmental Engineering (45 credits)

Please consult the Department for more information about the M.Eng. Materials Engineering (Non-Thesis) program.

section 11.7.8: Master of Engineering (M.Eng.) Mining Engineering (Non-Thesis) (45 credits)

Please consult the Department for more information about the M.Eng. Mining Engineering (Project) program.

section 11.7.9: Master of Engineering (M.Eng.) Mining Engineering (Non-Thesis): Environmental Engineering (45 credits)

Please consult the Department for more information about the M.Eng. Mining Engineering (Non-Thesis) program.

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

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

section 11.7.11: Doctor of Philosophy (Ph.D.) Mining Engineering

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

section 11.7.12: 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.

11.7.3 Mining and Materials Engineering Admission Requirements and Application Procedures

11.7.3.1 Admission Requirements

The **Graduate Diploma in Mining Engineering** is open to graduates with suitable academic standing in any branch of engineering or science. It is designed to provide a sound technical mining engineering background to candidates intending to work in the minerals industry.

The **M.Sc. (Thesis)** degree is open to graduates holding the B.Eng. degree or its equivalent in Materials Engineering, Mining Engineering or other related engineering fields.; or B.Sc. degree in Chemistry, Materials Science, Physics, Geology, or related fields.

The **Master of Engineering (Project) (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. Industrial experience is favourably viewed for entrance into the program, but is not considered a necessity.

The **Master of Engineering (Project) (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. Students without this academic training must complete a Qualifying term. Industrial experience is favourably viewed for entrance into the program, but is not considered a necessity.

The Master of Engineering (Project) (Environmental Engineering option) is also offered.

Ph.D. degree applicants may either be "directly transferred" from the M.Eng. or M.Sc. program (see below) or hold an acceptable master's degree in Materials Engineering, Mining Engineering, or other related fields, or under exceptional circumstances may be admitted directly from the bachelor's degree. In the latter case they are admitted to Ph.D. 1 as opposed to those holding a master's degree, who are admitted to Ph.D. 2.

11.7.3.2 Application Procedures

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

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

11.7.3.3 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 Mining and Materials 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 *mcgill.ca/gps/contact/graduate-program*.

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

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

11.7.4 Master of Science (M.Sc.) Materials Engineering (Thesis) (45 credits)

The M.Sc. in Materials Engineering (Thesis) is a research-oriented program that focuses on research skills and knowledge of materials engineering through coursework and a research thesis under the supervision of a Faculty member (professor). Emphasis is placed on research methods, as well as fundamentals. As such, the program is the more suitable option for those whose primary interest is research. The M.Sc. (Thesis) is for candidates with a Bachelor's degree in Engineering or from a discipline relevant to materials engineering.

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 Courses (9 credits)

MIME 601	(0)	Engineering Laboratory Practice
MIME 610D1	(1.5)	Master's Foundation Course
MIME 610D2	(1.5)	Master's Foundation Course
MIME 670	(6)	Research Seminar 1

Complementary Courses (9 credits)

9 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.

11.7.5 Master of Science (M.Sc.) Mining Engineering (Thesis) (45 credits)

The M.Sc. in Mining Engineering focuses on both fundamental and applied research. A two- to three-semester independent research project, leading to a thesis, is undertaken in any research area of mining science, engineering or technology, as well as closely related fields.

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 Courses (6 credits)

MIME 601	(0)	Engineering Laboratory Practice

6 credits from:

MIME 673	(6)	Mining Engineering Seminar

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.

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

The Master of Engineering in Materials Engineering: Non-Thesis program is primarily designed to train people with appropriate engineering or scientific background to allow them to work effectively in the materials industries.

Research Project (15 credits)

MIME 680	(6)	Materials Engineering Project 1
MIME 681	(6)	Materials Engineering Project 2
MIME 682	(3)	Materials Engineering Project 3

Required Courses (6 credits)

MIME 601	(0)	Engineering Laboratory Practice
MIME 670	(6)	Research Seminar 1

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.

11.7.7 Master of Engineering (M.Eng.) Materials Engineering (Non-Thesis): Environmental Engineering (45 credits)

This interdepartmental graduate option leads to a Master of Engineering (M.Eng.) Materials Engineering: Non-Thesis-Environmental Engineering. The objective of the option is to train environmental professionals at an advanced level. The program is designed for individuals with an undergraduate degree in engineering. The Environmental Engineering option 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.

Research Project (6 credits)

MIME 680	(6)	Materials Engineering Project 1

Required Courses (6 credits)

CHEE 591	(3)	Environmental Bioremediation
CIVE 615	(3)	Environmental Engineering Seminar

Complementary Courses (22 credits)

(minimum 22 credits)

Data Analysis Course

One of the following courses:

AEMA 611	(3)	Experimental Designs 1
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)	Bioprocesses for Wastewater Resource Recovery
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:

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-level course subject to approval of the Department.

The relevant Project course in Materials Engineering is the following:

MIME 681	(6)	Materials Engineering Project 2

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

The Master of Engineering in Mining: Non-Thesis program 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.

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
MIME 673	(6)	Mining Engineering Seminar

Complementary (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.

11.7.9 Master of Engineering (M.Eng.) Mining Engineering (Non-Thesis): Environmental Engineering (45 credits)

Students are strongly encouraged to consult with the Graduate Program Director prior to enrolling in the program.

Research Project (6 credits)

MIME 628	(6)	Mineral Engineering Project 1

Required Courses (6 credits)

CHEE 591	(3)	Environmental Bioremediation
CIVE 615	(3)	Environmental Engineering Seminar

Complementary Courses (22 credits)

(minimum 22 credits)

Data Analysis Course

3 credits from the following:

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

Toxicology Course

3 credits from the following:

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

Water Pollution Engineering Course

4 credits from the following:

CIVE 651	(4)	Theory: Water / Wastewater Treatment
CIVE 652	(4)	Bioprocesses for Wastewater Resource Recovery
CIVE 660	(4)	Chemical and Physical Treatment of Waters

Air Pollution Engineering Course

3 credits from the following:

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

Soil and Water Quality Management Course

3-4 credits from the following:

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

Environmental Impact Course

3 credits from the following:

GEOG 601	(3)	Advanced Environmental Systems Modelling

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

Environmental Policy Course

3 credits from the following:

URBP 506	(3)	Environmental Policy and Planning

or 3 credits approved at the 500-, 600-, or 700-level alternative.

Elective Courses (10-11 credits)

Another project course and/or Engineering or non-Engineering 500-, 600-, or 700-level course subject to approval of the Department.

The relevant Project course in Mining Engineering is the following:

MIME 629	(6)	Mineral Engineering Project 2

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

Candidates for this degree must complete a minimum of two lecture courses assigned by the Department,

selected on the basis of previous academic training and research interests. Candidates must also pass a safety training course, participate in an appropriate Research Seminar course, and take a preliminary examination within their first year of Ph.D. study.

The candidate must submit an ar..k

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.

Complementary Courses (18 credits)

Students will take 12 to 18 credits from courses in one or two streams:

Stream 1 - Sustainable Processes and Manufacturing

CHEE 511	(3)	Catalysis for Sustainable Fuels and Chemicals
CHEE 521*	(3)	Nanomaterials and the Aquatic Environment
CIVE 521*	(3)	Nanomaterials and the Aquatic Environment
CIVE 663	(4)	Environmental Fate of Organic Chemicals
		Water-Energy Sustainability

section 11.9.4: Master of Science (M.Sc.) Urban Planning, Policy and Design (Thesis) (45 credits)

The M.Sc. in Urban Planning, Policy and Design (Thesis) is centred on an independent research thesis. Original research on an urban issue of interest with implications for planning, policy or design will be conducted. The program focuses on critical skills in research, analysis, and interpretation that are applicable in both academia and practice.

The Master of Science (M.Sc.) in Urban Planning, Policy and Design is a thesis-based program. The three-term program of study provides students with a strong understanding of urban dynamics and assists them in developing and carrying out their research. Prospective students propose a topic for an independent research project supervised by a faculty member in the School. Students in the program develop, initiate, and complete the research project over 16 months. Supporting coursework is in planning history and theory, methods, research design, and topics relevant to the student's research.

Further information on the M.Sc. is available at *mcgill.ca/urbanplanning/programs*.

section 11.9.5: Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis) (60 credits)

The Master of Urban Planning (M.U.P.) program is a tw

An explanation of your motivation for pursuing the M.Sc. de

Complementary Courses (12 credits)

3 credits selected from the following research methods courses:

URBP 505	(3)	Geographic Information Systems
URBP 608	(3)	Advanced GIS Applications
URBP 633	(3)	Research Methods for Planners
URBP 640	(1)	Introduction to Planning Statistics
URBP 641	(1)	Reading the Urban Landscape
URBP 642	(1)	Introduction to Planning Data
URBP 643	(1)	Selected Geographic Information Systems Applications
URBP 644	(1)	Multivariate Statistics
URBP 645	(1)	Social Research Methods 1
URBP 646	(1)	Social Research Methods 2
URBP 647	(1)	Selected Methods in Planning 1
URBP 648	(1)	Selected Methods in Planning 2

Note: Students may also take research methods courses at the 500 or 600 level in other academic units at McGill or another Montreal university

URBP 649	(1)	Visual and Spatial Methods
URBP 651	(3)	Redesigning Suburban Space
URBP 656	(3)	Urban Innovation and Creativity

Group B

0-9 credits from the following:

0-9 credits at the 500 or 600 level of coursework offered by any academic unit at McGill or at another Montreal university, with the approval of the School, if they help students to develop an in-depth knowledge of one or more subject areas in the field of planning, with the approval of the School. Choices usually include courses in real-estate analysis, urban geography, sociology, anthropology, law, politics, and environmental science. Students must confirm prior to registration that the selected course(s) can be counted toward the M.U.P. degree.

11.9.6 Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis): Transportation Planning (60 credits)

The Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis); Transportation Planning option enables students to specialize in this field as part of their course of study for the Master of Urban Planning degree (M.U.P.). Studio courses, an internship, and a final project involve real-life applications and research.

Required Courses (49 credits)

URBP 505	(3)	Geographic Information Systems
URBP 609	(1)	Visual Communication 1
URBP 610	(1)	Visual Communication 2
URBP 611	(1)	Data Visualization for Planning
URBP 612	(3)	History and Theory of Planning
URBP 619	(4)	Land Use and Transport Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(6)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 628	(0)	Practical Experience
URBP 630	(3)	Supervised Research Project 1

URBP 536	(2)	Current Issues in Transportation 1
URBP 537	(2)	Current Issues in Transportation 2
URBP 608	(3)	Advanced GIS Applications
URBP 620	(4)	Transport Economics
URBP 643	(1)	Selected Geographic Information Systems Applications

Group B

0-6 credits

0-6 credits of coursework at the 500 or 600 level offered by any offered by any academic unit at McGill or another Montreal university, with the approval of the School, if they help students to develop an in-depth knowledge of one or more subject areas in the field of planning. Choices usually include courses in real-estate analysis, urban geography, sociology, anthropology, law, politics, and environmental science. Students must confirm prior to registration that the selected course(s) can be counted toward the M.U.P. degree.

11.9.7 Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis): Urban Development and Urban Design (60 credits)

The concentration in Urban Development and Urban Design aims to produce graduates who are skilled in analysis and design for development in existing (sub)urban landscapes and urbanizing contexts, whether in North America or elsewhere. A series of courses on urban design, real estate, the politics of development, and urban governance enhance the core curriculum of the professionally-accredited M.U.P. program. Additional courses address innovative approaches to urban development, contemporary urban form, community-based design, globalization and development, and the adaptive redesign of suburban contexts, in addition to enduring topics such as housing, public space, cultural landscapes, and environmental planning. Students seeking to specialize in Urban Development and Urban Design apply at the end of their first year of study; admission into the concentration is based on performance in the first year of study and demonstration of spatial literacy, numeric competency, skills in graphic communication, and understanding of complex development processes.

Required Courses (45 credits)

URBP 553	(3)	Urban Governance
URBP 609	(1)	Visual Communication 1
URBP 610	(1)	Visual Communication 2
URBP 611	(1)	Data Visualization for Planning
URBP 612	(3)	History and Theory of Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(6)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 628	(0)	Practical Experience
URBP 630	(3)	Supervised Research Project 1
URBP 631	(3)	Supervised Research Project 2
URBP 632	(6)	Supervised Research Project 3
URBP 635	(3)	Planning Law
URBP 640	(1)	Introduction to Planning Statistics
URBP 641	(1)	Reading the Urban Landscape
URBP 642	(1)	Introduction to Planning Data

Complementary Courses (15 credits)

Group A

9-15 credits from the following:

URBP 505	(3)	Geographic Information Systems
URBP 555	(3)	Real Estate and Planning
URBP 557	(3)	Rethinking Zoning

URBP 604	(3)	Urban Design Seminar
URBP 620	(4)	Transport Economics
URBP 629	(3)	Planning Theory and Practice in a Globalizing World
URBP 651	(3)	Redesigning Suburban Space
URBP 656	(3)	Urban Innovation and Creativity

Group B (0-6 credits)

0-6 credits from the following or other 500 or 600 level courses (see note below):

ARCH 515	(3)	Sustainable Design
GEOG 525	(3)	Asian Cities in the 21st Century
URBP 501	(2)	Principles and Practice 1
URBP 503	(3)	Public Transport: Planning and Operations
URBP 504	(3)	Planning for Active Transportation
URBP 506	(3)	Environmental Policy and Planning
URBP 514	(3)	Community Design Workshop
URBP 530	(3)	Urban Infrastructure and Services in International Context
URBP 541	(1)	Selected Topics in Planning
URBP 542	(1)	Selected Topics in Visual Analysis
URBP 543	(3)	Special Topics
URBP 556	(3)	Urban Economy: A Spatial Perspective
URBP 607	(3)	Reading Course: Urban Planning
URBP 616	(3)	Selected Topics 1
URBP 617	(3)	Selected Topics 2
URBP 618	(3)	Selected Topics 3
URBP 619	(4)	Land Use and Transport Planning
URBP 625	(2)	Principles and Practice 2
URBP 626	(2)	Principles and Practice 3
URBP 643	(1)	Selected Geographic Information Systems Applications
URBP 644	(1)	Multivariate Statistics
URBP 645	(1)	Social Research Methods 1
URBP 646	(1)	Social Research Methods 2
URBP 647	(1)	Selected Methods in Planning 1
URBP 648	(1)	Selected Methods in Planning 2
URBP 649	(1)	Visual and Spatial Methods

Students may also take courses at the 500 or 600 level in any academic unit at McGill or at another Montreal university, subject to the approval of the School.

11.9.8 Doctor of Philosophy (Ph.D.) Urban Planning, Policy and Design

The Doctor of Philosophy in Urban Planning, Policy and Design aims to prepare students for interdisciplinary research and teaching on the management of urban development as well as for leadership in the design and evaluation of urban policies and plans for cities in North America and the world. The program will focus on five identified areas of urban planning (land use planning and urban design; environmental planning; transportation planning; international development planning; real estate and economic development). Students are expected to spend the first two years of study taking courses, preparing for their comprehensive examination and writing their dissertation proposal. The remaining two (or more) years are spent conducting research and writing a thesis.

Required Courses (9 credits)

Every student must take courses worth at least 18 credits. Only one reading course can be included in this minimum requirement. The