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

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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.

Program Requirements

- 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.

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

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

3. Appointment, Funding, Letter of Agreement

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

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

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

iv. Postdocs with full responsibility for teaching a course should be compensated over and above their postdoctoral funding as course lecturers. This applies to all postdocs, except those for whom teaching is part of the award.

v. The amount of research, teaching, or other tasks that postdocs engage in over and above postdoctoral activities should conform to the regulations for postdocs specified by the Canadian research council of their discipline or the collective agreement. This applies to all postdocs, including those whose funding does not come from the Canadian research councils.

4. Privileges

i. Postdocs have the same pertinent rights as the ones granted to McGill students under *mcgill.ca/students/srr*, and those granted by the policies listed at *mcgill.ca/secretariat/policies-and-regulations*.

ii. Postdocs have full graduate student borrowing privileges in McGill libraries through their identity card.

iii. As a general rule, postdocs may take courses for credit as Special Students following the admissions procedures outlined at *mcgill.ca/gradapplicants/apply/prepare/visiting*. *Tuition and other charges* will apply.

iv. Postdocs may be listed in the McGill directory.

v. Access to sports facilities may be purchased on a monthly basis through McGill Athletics and Recreation.

vi. Postdoctoral Fellows and Scholars are mandatory members of the Post-Graduate Students' Society (PGSS) and an annual association fee is automatically charged.

vii. Postdocs are permitted membership in the Faculty Club; an annual fee will be charged for this membership.

viii. Postdocs are encouraged to participate in Professional Development Workshops provided by Graduate and Postdoctoral Studies, and Teaching and Learning services. These sessions are usually free of charge.

ix. Postdocs have access to the services provided by the Ombudsperson.

x. Postdocs may enrol as part-time students in the second language written and spoken English/French courses offered by the School of Continuing Studies/French Language Centre. Postdocs will be charged tuition for these courses. International Postdocs may be required to obtain a CAQ and a Study Permit.

xi. Access to student services is granted to non-unionized postdocs, who are charStudies/Fren1.693 s.

- 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 follo

Master’s degree programs may consist of a pre-professional under

and the referee must indicate their position and full contact information at the institution. Please refer to *mcgill.ca/gradapplicants/apply/prepare/checklist/documents*.

- Once accepted to the M.Arch. Professional program, students will benefit from faculty expertise within the School in the areas of History and Theory of Architecture; Cultural Landscape Studies; Affordable and Sustainable Housing; Computation and Fabrication; High-performance Visualization; Minimum Cost Housing; Gender, Sexuality, and Space; Design and Health; Urban Design; Landscape Urbanism;

Required Courses

ARCH 627	(3)	Research Methods
ARCH 630J1	(1)	Research Symposium
ARCH 630J2	(1)	Research Symposium
ARCH 630J3	(1)	Research Symposium
ARCH 694	(3)	Thesis Preparation
ARCH 695	(6)	Detailed Research Proposal
ARCH 696	(18)	Thesis Submission

Complementary Courses (12 credits)

12 credits selected from the following:

ARCH 515	(3)	Sustainable Design
ARCH 517	(3)	Sustainable Residential Development
ARCH 604	(3)	Urban Design Seminar
ARCH 626	(3)	Critical Design Strategies
ARCH 635	(3)	Selected Topics in Housing 1
ARCH 641	(3)	Energy and Environments 1
ARCH 642	(3)	Energy and Environments 2
ARCH 651	(3)	Architectural History and Theory Seminar 1
ARCH 652	(3)	Architectural History and Theory Seminar 2
ARCH 653	(3)	Architectural History and Theory Seminar 3
ARCH 654	(3)	Architectural History and Theory Seminar 4
ARCH 670	(3)	Advanced Landscape Theory
ARCH 675	(3)	Architecture in Global Perspective
ARCH 684	(3)	Contemporary Theory 1
ARCH 685	(3)	Contemporary Theory 2

Other courses at the 500-level or higher, inside or outside the School, if relevant to the program of study, can be approved by the student's supervisor and Graduate Program Director.

11.1.5 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. A strategic focus on design methodology, innovative research, and self-directed inquiry, supported by the advanced media and modeling technologies and other resources required to carry out architectural research and creative practice.

Required Courses (42 credits)

ARCH 672	(9)	Architectural Design Studio 1
ARCH 673	(9)	Architectural Design Studio 2
ARCH 674	(3)	Professional Practice 1
ARCH 676	(9)	Advanced Architectural Design
ARCH 678	(3)	Advanced Construction
ARCH 683	(9)	Directed Research Project

Complementary Courses (18 credits)

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 seven Canada Research Chairs and many colleagues in the Faculties of Medicine and Health Sciences, Science, and Agricultural and Environmental Sciences, are actively involved in various areas of bioengineering. Within our Department, faculty members conduct research in three major fields:

- Biological materials and mechanics
- Biomolecular and cellular engineering
- Biomedical, diagnostics, and high throughput screening

11.2.3 Graduate Studies

Graduate study in Bioengineering is available through the Biological and Biomedical Engineering (BBME) graduate programs, offered jointly by the Department of Bioengineering (Faculty of Engineering) and the Department of Biomedical Engineering (Faculty of Medicine and Health Sciences). Biological and Biomedical Engineering is a broad, interdisciplinary field that involves the application of engineering, the physical sciences, biological sciences, and computer science to medicine and the life sciences. McGill's BBME programs offer unsurpassed opportunities for multidisciplinary research with internationally renowned scientists.

Please consult the *: Biological and Biomedical Engineering* and the *Biological and Biomedical Engineering website* for further information on this program.

11.3 Chemical Engineering

11.3.1 Location

Department of Chemical Engineering
M.H. Wong Building
3610 University Street
Montreal QC H3A 0C5
Canada
Telephone: 514-398-4494
Fax: 514-398-6678

programs in
faculty have been well suppo
contracts. Our laboratories are equipped with st
current research areas are briefly described below.

Advanced materials and polymers – The Department has an internationally recognized research program in structural, functional
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 eneraste/1 0 0 1 such as automo340791 Tw1 0 1.69 comp(The Dep97(Biomedical engineering and 293 4m(gy

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, carbon nanotubes, and coatings, as well as in the treatment of toxic and persistent wastes and metallurgical processing. Both thermal and non-thermal plasmas are currently used and studied in the McGill *Catalytic and Plasma Process Engineering Laboratory*, which forms one of the founding groups of the Plasma-Québec Centre.

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

The M.Eng. in Chemical Engineering (Thesis) is a research-oriented degree that allows the candidates to refine their skills by expanding their knowledge of chemical engineering through coursework and a research thesis under the supervision of a Faculty member (professor). The M.Eng. (Thesis) program offers advanced training in not only fundamentals but also research methods and is, therefore, the more suitable option for those whose primary interest is research. Graduates of this degree either pursue a Ph.D. or work in industry.

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

The M.Eng. in Chemical Engineering (Non-Thesis) is a course-oriented degree, which includes a short project completed under the supervision of a Faculty member (professor). Through the program, graduate students can advance their knowledge in various chemical engineering disciplines through coursework and technical training.

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

This program is currently not offered.

The M.Eng. in Chemical Engineering (Non-Thesis) – Environmental Engineering is a specialized version of the M.Eng. in Chemical Engineering (Non-Thesis). This inter-departmental 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 perspective and awareness of environmental issues. It is a course-oriented degree, which includes prescribed courses related to environmental engineering and a short project completed under the supervision of a Faculty member (professor). Graduate students can specialize in environmental engineering through this program offered in collaboration with the Bieler School of Environment.

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

The Ph.D. is a research degree requiring few courses and an extensive thesis, conducted under the supervision of a Faculty member (professor), that makes a distinct contribution to knowledge. The Ph.D. program prepares candidates for a career in teaching, research, and/or development and graduates are expected to have acquired autonomy in conducting research. McGill also offers various workshops that provide general, transitional, and professional skills development opportunities, preparing candidates for various career options following the Ph.D.

11.3.3 Chemical Engineering Admission Requirements and Application Procedures

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

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11.4 Civil Engineering

11.4.1 Location

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

11.4.2 About Civil Engineering

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

Graduate studies and research are at present being conducted in the fields of structures; infrastructure rehabilitation; risk engineering; fluid mechanics and hydraulics; materials engineering; soil behaviour.962 TmLocationaianics a1581 lation

- the *TOEFL* (Test of English as a F

Research Pr

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

Required Courses

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 Microgg335 1 0 1diso9 1 6 0 1 115.666 119(emunications)Tj0 G0 g/F1 8.1 264.r66 1191 010 e*

- 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 photonic/optoelectronic and electronic devices.
- The *Computational Electromagnetics Laboratory* provides tools for numerical analysis, visualization, interface design, and knowledge-based system development.
- For the microwave characterization research, one section of the laboratory hosts dielectric measurement probe in for the low- to high-gigahertz range.
- Additionally, access to a complete range of commercial multi-physics simulation, design, and optimization software is available. The Power Engineering lab also has experimental facilities for the characterization of magnetic and small dynamometer for electrical machine measurements.
- There is also a well-equipped laboratory for power electronics and power systems research (*http://www.power.ece.mcgill.ca/*).
- Computing infrastructure for software engineering research is also available.

The Department has extensive computer facilities. Most research machines are networked, providing access to a vast array of hardware and software. In addition, McGill University is linked to the *Centre de recherche informatique de Montréal* (CRIM) and the University Computing Centre.

There are several other universities in Montreal offering graduate-level engineering degrees: Concordia University; *l'Université de Montréal* and its affiliated school of engineering; *Polytechnique Montréal*; *l'Université du Québec*, which includes *l'École de technologies supérieure (ETS)*; and *l'Institut national de la recherche scientifique (INRS)*.

The proximity of these schools to McGill University ensures that a rich array of courses is available to suit individual needs. McGill also collaborates on

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

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
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 27 credits during the three terms of residency.

Complementary Courses (18 credits)

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.

11.5.5 Master of Engineering (M.Eng.) Electrical Engineering (Non-Thesis): Applied Artificial Intelligence (45 credits)

The Master of Engineering in Electrical Engineering; Non-Thesis - Applied Artificial Intelligence is a professional program of 45 credits. The program provides the foundation for applications of Artificial Intelligence (AI) techniques and experience building an AI system in various fields of interest. The program may be completed on a part-time basis.

Required Courses (14 credits)

ECSE 551	(4)	Machine Learning for Engineers
ECSE 552	(4)	Deep Learning
ECSE 679D1	(3)	Project in Applied Artificial Intelligence
ECSE 679D2	(3)	Project in Applied Artificial Intelligence

Complementary Courses

(18-24 credits)

Group A: Artificial Intelligence Focused

6-8 credits from the following:

ECSE 526	(3)	Artificial Intelligence
ECSE 555	(4)	Advanced Topics in Artificial Intelligence
ECSE 556	(4)	Machine Learning in Network Biology
ECSE 557	(3)	Introduction to Ethics of Intelligent Systems
ECSE 626	(4)	Statistical Computer Vision
ECSE 683	(4)	Topics in Vision and Robotics

Group B: Mathematical Foundations of Artificial Intelligence

3-4 credits from the following:

COMP 540	(4)	Matrix Computations
ECSE 500	(3)	Mathematical Foundations of Systems

Linear Systems

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.

11.6 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:

- Aerodynamics and fluid mechanics
- Biomechanics
- Combustion and energy systems
- Design and manufacturing
- Dynamics and control
- Materials and structures
- Vibrations, acoustics, and fluid-structure

Within these areas, specific topics of research are given in the following:

Aerodynamics and Fluid Mechanics

Experimental fluid mechanics and aerodynamics, aeroelasticity, and aeroacoustics; theoretical fluid mechanics; turbulence; mixing in turbulent flows; fluid flow control; fluid–structure interactions; computational fluid dynamics, multidisciplinary optimization, and computer flow visualization; heat transfer; combustion, shock wave physics, energetic materials, high-speed reacting flows, hypersonic propulsion, and alternative fuels.

Biomechanics

Biomechanics, biomaterials, blood and respiratory flows, mechanics of soft tissues, cardiovascular devices, image processing for medical diagnostics, and voice production.

Combustion and Energy Systems

Combustion, shock wave physics, heat transfer, and compressible gas dynamics.

Design and Manufacturing

Design theory and methodology, design optimization; biomimetics; machine tools and systems, manufacturing processes, and management and control; micro/nano machining; and wear and comminution processes.

Dynamics and Control

Multibody systems, legged and wheeled vehicles, compliant mechanisms, and kinematic geometry; tethered systems, lighter-than-air craft, and underwater vehicles; spacecraft dynamics and space robotics; modelling and simulation; fluid–structure interactions, nonlinear and chaotic dynamics; dynamics of bladed assemblies.

Materials and Structures

Composite materials: structural design, analysis, manufacturing, and processing; micro/nano mechanics; MEMS/NEMS; adaptronic structures; thermomechanics, wave propagation, and computational mechanics.

Vibrations, Acoustics, and Fluid–Structure

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.

11.6.3 Mechanical Engineering Admission Requirements and Application Procedures

11.6.3.1 Admission Requirements

The general rules of Graduate and Postdoctoral Studies apply. Candidates who come from other institutions are expected to have an academic background equivalent to the undergraduate curriculum in mechanical engineering at McGill or to make up any deficiencies in a Qualifying year.

Applicants to the M.Sc. (Thesis) program must hold an undergraduate degree (or equivalent) in Engineering or a degree in Physical, Math, or Computer Sciences.

Applicants to the M.Eng. (Non-Thesis) program must hold an undergraduate degree (or equivalent) in Mechanical Engineering.

Applicants to the M.Eng. (Aerospace) program must hold an undergraduate degree (or equivalent) in Engineering. Applicants must be proficient in French.

Applicants to the Ph.D. program must have successfully completed a master's degree program (or equivalent) in Engineering or the Physical Sciences. In exceptional circumstances, students with outstanding performance at the bachelor's level may be offered direct entry into the Ph.D. program (Ph.D. 1).

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 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 official results of either a *TOEFL* or an *IELTS* test. The minimum score required is 92 for the Internet-based TOEFL test, with each component score not less than 20, or a minimum overall band of 7.0 on the IELTS test.

11.6.3.2 Application Procedures

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

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

Please consult *mcgill.ca/mecheng/grad* for further details on required application documents.

11.6.3.2.1 Additional Requirements

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

- two official referee letters
- Personal statement—one page
- Curriculum vitae—please include a list of publications, if relevant

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 Mechanical Engineering and may be revised at any time. Applicants must verify all deadlines and additional documentation requirements well in advance on the Mechanical Engineering's website at *mcgill.ca/mecheng/grad/admission/date*.

Information on application procedures and 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.

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

The Master of Engineering in Mechanical Engineering; Non-Thesis program is a course-based program of 45 credits. The program provides a solid background in mechanical engineering, both in terms of breadth across the entire field and depth in the area of specialty.

Research Project (13 credits)

MECH 603	(9)	M. Eng. Project 1
MECH 604	(3)	M. Eng. Project 2
MECH 609	(1)	Seminar

Note: Industrial liaison is encouraged in these courses taken near the end of the program.

Required Courses (16 credits)

MECH 605	(4)	Applied Mathematics 1
MECH 610	(4)	Fundamentals of Fluid Dynamics
MECH 632	(4)	Advanced Mechanics of Materials

MECH 642	(4)	Advanced Dynamics

Complementary Courses (16 credits)

A minimum of 16 credits (500, 600, or 700 level) from the Faculty of Engineering may be selected by the student, based on interest and the choice of area of concentration. Courses at the graduate level from other faculties may also be taken, with prior approval from the student's project supervisor and the Graduate Program Director. A maximum of 3 credits of FACC courses at the 500, 600, or 700 level may be credited toward the degree.

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

The M.Eng. Aerospace Degree is offered to the students who wish to specialize in the general area of aerospace engineering. This degree is given in conjunction with Concordia University, Polytechnique de Montréal, Université Laval, Université de Sherbrooke, and École de Technologie Supérieure. Students registered at McGill are required to take two courses from two other institutions.

Depending on their background, students would specialize in one of the three areas:

1. Aeronautics and Space Engineering

2. Avionics and Control

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
MECH 702	(0)	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 11.7.12: 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 mo78.8eell1 67.52 2510 is alailedlding Di.am that focuses on research skills and kno

Master's Foundation Course

Environmental Impact Course

One of the following courses:

GEOG 601	(3)	Advanced Environmental Systems Modelling

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-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	(1)	Mining Engineering Seminar

Complementary (24 credits)

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

12 credits of courses at the 500 lev

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 592

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

SEAD 550	(3)	Decision-Making for Sustainability in Engineering and Design
SEAD 660	(3)	Strategies for Sustainability
SEAD 670	(5)	Collaborative Design for Sustainability

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
CIVE 677	(4)	Water-Energy Sustainability
MECH 534	(3)	Air Pollution Engineering
MECH 560	(3)	Eco-design and Product Life Cycle Assessment
MIME 511	(3)	Advanced Subsurface Ventilation and Air Conditioning
MIME 588	(3)	Reliability Analysis of Mining Systems
URBP 506	(3)	Environmental Policy and Planning

* Students can take only one of CHEE 521 or CIVE 521

Stream 2 - Renewable Energy and Energy Efficiency

CHEE 511	(3)	Catalysis for Sustainable Fuels and Chemicals
CIVE 677	(4)	Water-Energy Sustainability
ECSE 562	(4)	Low-Carbon Power Generation Engineering
MECH 534	(3)	Air Pollution Engineering

Stream 3 - Sustainable Urban Development

ARCH 515	(3)	Sustainable Design
ARCH 517	(3)	Sustainable Residential Development
ARCH 564	(3)	Design for Development
MECH 534	(3)	Air Pollution Engineering
URBP 504	(3)	Planning for Active Transportation
URBP 551	(3)	Urban Design and Planning
URBP 620	(4)	Transport Economics
URBP 651	(3)	Redesigning Suburban Space

Stream 4 - Sustainable Infrastructure

CIVE 623	(4)	Durability of Construction Materials
CIVE 629	(4)	Sustainable Design: Water and Wastewater Facilities
CIVE 652	(4)	Bioprocesses for Wastewater Resource Recovery
SEAD 515	(3)	Climate Change Adaptation and Engineering Infrastructure
URBP 620	(4)	Transport Economics
URBP 651	(3)	Redesigning Suburban Space

Up to 6 credits from the following:

BIEN 520	(3)	High Throughput Bioanalytical Devices
BREE 518	(3)	Ecological Engineering
BREE 520	(3)	Food, Fibre and Fuel Elements
CHEE 541	(3)	Electrochemical Engineering
CHEE 543	(3)	Plasma Engineering
CIVE 550	(3)	Water Resources Management
ECSE 507	(3)	Optimization and Optimal Control
MECH 535	(3)	Turbomachinery and Propulsion
MECH 559	(3)	Engineering Systems Optimization
MIME 556	(3)	Sustainable Materials Processing
SEAD 600	(3)	Sustainability Research 1
SEAD 602	(3)	Sustainability Research 2
URBP 619	(4)	Land Use and Transport Planning

NOTE: * Students must find a supervisor from a McGill engineering, urban planning or architecture program before registering for SEAD 600 and SEAD 602, subject to approval by the program director.

NOTE: Other unlisted 500 level or higher courses taught at McGill may be permitted, subject to approval by the program director.

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*
Website: *mcgill.ca/urbanplanning*

11.9.2 About Urban Planning

Urban planning is the set of processes by which a communities shape their environments to meet their needs and to realize their aspirations for the future. Urban planning is also the profession of those who facilitate this process. While the practice of planning is as old as the cities themselves, the profession of urban planning is only about a century old. In the late 19th and early 20th centuries, architects, landscape architects, engineers, government reformers, lawyers, public health specialists, and others joined forces to tackle the serious social and environmental problems of the industrial city. They created new techniques and institutions to improve living conditions and decision-making processes, with an eye to improving cities in terms of health, safety, efficiency, equity, beauty, identity, etc. Today, people who enter the profession come from diverse backgrounds as well, including the design professions, engineering and applied sciences, environmental and social studies, and other fields. Their chief task is to reinvent tools, procedures, and processes to meet new challenges

in making metropolitan areas socially, economically, and environmentally resilient and just. A key feature of planning education is learning to view issues in a multidisciplinary way, to manage processes of collaboration and of conflict, and to generate equitable and efficient solutions to complex problems of growth and development.

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 two-year course of study that attracts students from Quebec, Canada, the U.S., and overseas. It is recognized by the Ordre des urbanistes du Québec (OUQ) and the Canadian Institute of Planners (CIP). Graduates may become full members of the OUQ and other provincial planning associations by completing their respective internship and examination requirements.

The core program provides a general education in spatial planning in its functional, environmental, and social dimensions. Formal specializations are available in Transportation Planning and Urban Development & Urban Design. Further information concerning these concentrations is available at mcgill.ca/urbanplanning/programs. In all cases, electives, the summer internship, and the Supervised Research Project allow for individual concentration on a particular topic.

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

The Transportation Planning concentration enables students to specialize in this field as part of their course of study for the M.U.P. de

- A current version of your curriculum vitae.
- A statement of your research objectives, not exceeding two pages, including:
    - An explanation of your motivation for pursuing the M.Sc. degree in Urban Planning, Policy, and Design;
    - A clearly-articulated but concise discussion of your research interests, proposed topic, and methods, with citations; and
    - The identification of potential faculty supervisors for your research.
- Two letters of recommendation, at least one of which must be from a current or past professor.
- Proof of competency in oral and written English for applicants whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone

URBP 690	(18)	Thesis Submission

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 tak

URBP 641	(1)	Reading the Urban Landscape
URBP 642	(1)	Introduction to Planning Data

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
CIVE 540	(3)	Urban Transportation Planning
CIVE 561	(3)	Greenhouse Gas Emissions
GEOG 504	(3)	Advanced Economic Geography
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 505	(3)	Geographic Information Systems
URBP 506	(3)	Environmental Policy and Planning
URBP 514	(3)	Community Design Workshop
URBP 530	(3)	Urban Infrastructure and Services in International Context
URBP 536	(2)	Current Issues in Transportation 1
URBP 537	(2)	Current Issues in Transportation 2
URBP 541	(1)	Selected Topics in Planning
URBP 542	(1)	Selected Topics in Visual Analysis
URBP 543	(3)	Special Topics
URBP 553	(3)	Urban Governance
URBP 555	(3)	Real Estate and Planning
URBP 556	(3)	Urban Economy: A Spatial Perspective
URBP 557	(3)	Rethinking Zoning
URBP 604	(3)	Urban Design Seminar
URBP 607	(3)	Reading Course: Urban Planning
URBP 608	(3)	Advanced GIS Applications
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 620	(4)	Transport Economics
URBP 625	(2)	Principles and Practice 2
URBP 626	(2)	Principles and Practice 3
URBP 629	(3)	Planning Theory and Practice in a Globalizing World
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
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.

Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis):.P

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 tw