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

Programs, Courses and University Regulations

2018-2019

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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Montreal, Quebec, H3A 0C8
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McGill University reserves the right to make changes to the information contained in this publication - including correcting errors, altering fees, schedules of admission and credit requirements, and revising or cancelling particular courses or programs - without prior notification.

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

3 Important Dates

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

4 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.

5 Program Requirements

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

- Master's Degrees
- Doctoral Degrees
- Ad Personam Programs (Thesis Option Only)
- Coursework for Graduate Programs, Diplomas, and Certificates

6 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 important information regarding admissions and application procedures for Graduate and Postdoctoral Studies.

7 Fellowships, Awards, and Assistantships

Please refer to *University Regulations & Resources* > *Graduate* > *: Fellowships, Awards, and Assistantships* for information and contact information regarding fellowships, awards, and assistantships in Graduate and Postdoctoral Studies.

8 Postdoctoral Research

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

8.1 Postdocs

Postdocs are recent graduates with a Ph.D. or equivalent (i.e., Medical Specialist Diploma) engaged by a member of the University's academic staff, including Adjunct Professors, to assist him/her in research.

Postdocs must be appointed by their department and registered with Enrolment Services in order to have access to University facilities (library, computer, etc.).

8.2 Guidelines and Policy for Academic Units on Postdoctoral Education

The general guidelines listed below are meant to encourage units to examine their policies and procedures to support postdoctoral education. Every unit hosting Postdocs should have explicitly stated policies and procedures for the provision of postdoctoral education as well as established means for informing Postdocs of policies, procedures, and privileges (e.g., orientation sessions, handbooks, etc.), as well as mechanisms for addressing complaints. Academic units should ensure that their policies, procedures and privileges are consistent with these guidelines and the Charter of Students' Rights. For their part, Postdocs are responsible for informing themselves of policies, procedures, and privileges.

1. **Definition and Status**

   i. Postdoctoral status will be recognized by the University in accordance with Quebec provincial regulations. Persons may only be registered with postdoctoral status for a period of up to five years from the date they were awarded a Ph.D. or equivalent degree. Time allocated to parental or health leave is added to this period of time. Leaves for other reasons, including vacation leave, do not extend the term. Postdocs must do research under the supervision of a McGill professor, including Adjunct Professors, who is a member of McGill's academic staff qualified in the discipline in which training is being provided and with the abilities to fulfil responsibilities as a supervisor of the research and as a mentor for career development. They are expected to be engaged primarily in research with minimal teaching or other responsibilities.

2. **Registration**

   i. Postdocs must be registered annually with the University through Enrolment Services. Initial registration will require an original or notarized copy of the Ph.D. diploma. Registration will be limited to persons who fulfil the definition above and for whom there is an assurance of appropriate funding and where the unit can provide assurance of the necessary resources to permit postdoctoral education.

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

3. **Appointment, Pay, Agreement of Conditions**

   i. Appointments may not exceed your registration eligibility status.

   ii. In order to be registered as a Postdoc, you must be assured of financial support other than from personal means during your stay at McGill University, equivalent to the minimal stipend requirement set by the University in accordance with guidelines issued by federal and provincial research granting agencies. There are no provisions for paid parental leave unless this is stipulated in the regulations of a funding agency outside the University.

   iii. At the outset of a postdoctoral appointment, a written Letter of Agreement for Postdoctoral Education should be drawn up and signed by the Postdoc, the supervisor, and the department head or delegate (see template Letter of Agreement and supporting document—*Commitments of Postdoctoral Scholars and Supervisors*—available at *www.mcgill.ca/gps/postdocs/fellows/responsibilities*). This should stipulate, for example, the purpose of the postdoctoral appointment (research training and the advancement of knowledge), the duration of the fellowship/financial support, the modality of pay, the work space, travel funds, and expectations and compensation for teaching and student research supervision. Leaves from postdoctoral education must comply with the Graduate and Postdoctoral Studies Policies for Vacation, Parental/Familial, and Health Leave (see *section 8.3: Vacation Policy for Graduate Students and Postdocs* and *University Regulations & Resources* > *Graduate* > *Regulations* > *Categories of Students* > *: Leave of Absence Status*). Any breach of these conditions may result in grievance procedures or the termination of the postdoctoral appointment.

   iv. Postdocs with full responsibility for teaching a course should be compensated over and above their fellowship at the standard rate paid to lecturers by their department. This applies to all postdocs, except those for whom teaching is part of the award (e.g., Mellon grantees).

   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. 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 *www.mcgill.ca/students/srr*, and those granted by the policies listed at *www.mcgill.ca/secretariat/policies-and-regulations*.

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

   iii. As a rule, Postdocs who are Canadian citizens or who have Permanent Resident status may take courses for credit. Admission to such courses should be sought by submitting application documents directly to the appropriate program by the Postdoc. They must be admitted by the department offering the courses as Special Students. These Postdocs may only be enrolled as part-time students in non-degree granting programs. They will be charged fees for these courses.

   iv. Postdocs may be listed in the McGill directory. The Computing Centre will grant Postdocs email privileges on the same basis as graduate students upon presentation of a valid identity card.

   v. The Department of Athletics will grant Postdocs access to sports facilities upon presentation of their identity card. A fee will be charged on an annual or term basis.

vi. Postdocs are mandatory members of the Post-Graduate Students' Society (PGSS) and an annual association fee is automatically char

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

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

The **M.Arch. (Post-professional)** and the **Ph.D. programs** are for study beyond the professional degree in architecture. These programs have been conceived to respond to the needs of graduates with some professional experience who wish to acquire more specialized knowledge in architecture.

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

Teaching and research in the History and Theory of Architecture program concentrates on the exploration and understanding of the complex connections between history, theory, design, and interdisciplinary concerns, particularly in the areas of philosophy and epistemology. This option is concerned with the reconciliation of ethics and poetics in architectural practice.

The master's curriculum, which in most cases is also a required foundation year for a Ph.D. in the field, is simple in terms of course requirements, but demanding in terms of personal commitment to reading and writing. It is particularly suited to students with a professional background in architecture who want to explore and understand the complex connections between history, theory, and design. A thorough understanding of architecture as a cultural phenomenon, leading to a more serious definition of its true essence as it appears in history, is now regarded as crucial by practitioners and teachers who wish to come to terms with the present predicaments of architecture vis-à-vis the contradictions of the contemporary world.

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

The UDH program enables students who have already completed a professional degree in Architecture to develop specialised skills for contemporary practice in housing, urban design, and the management of human settlements. The 12-month program comprises three consecutive terms of coursework. Intensive seminars held during the first two terms focus on contemporary theory and research methods in urban design and housing. Students take ARCH 603 (Urban Design and Housing Studio) as an applied synthesis of the material discussed in the two core seminars. Complementary coursework rounds out the fall and winter terms along with ARCH 623 (Project Preparation), in which students develop the strategy for a major independent project (ARCH 632, Urban Design and Housing Research Report) to be completed in the summer term.

Ph.D. in Architecture

section 11.1.9: Doctor of Philosophy (Ph.D.) Architecture

Our Ph.D. is a research-based de

- Summary of work experience. A minimum of 16 weeks of work experience is required. Further information and guidelines are provided at *www.mcgill.ca/architecture/programs/professional/workexperience*. Please use the following: *Work Experience Form* [.pdf]*

  

  Note: Your employer's signature is required along with the company business card. We do NOT require the Director's signature.

- Curriculum Vitae
- Applicants are required to upload unofficial transcripts of all univ

- Proof of English language proficiency: 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 oral and written English. Before acceptance, appropriate exam results must be submitted directly from the *TOEFL* (Test of English as a Foreign Language) or *IELTS* (International English Language Testing Systems) Office. An institutional version of the TOEFL is not acceptable. Applications will not be considered if a TOEFL or IELTS test result is not available. For the TOEFL, a minimum overall score of 86 is required on the Internet-based test (iBT; 567 on the paper-based test (PBT)), with each component score (i.e., reading, writing, speaking, listening) not less than 20. (The TOEFL Institution Code for McGill University is 0935.) For the IELTS, a minimum overall band score of 6.5 is required. For further information, please refer to *www.mcgill.ca/gradapplicants/international/apply/proficiency*.

* *These documents ar*

Associate Professors

David Covo; B.Sc.(Arch.), B.Arch.(McG.), F.R.A.I.C., O.A.Q.

Michael Jemtrud; B.A., B.Sc., B.Arch.(Penn. St.), M.Arch.(McG.), M.R.A.I.C.

Nik Luka; B.A.A.(Ryerson), M.Arch.(Laval), Ph.D.(Tor.), M.C.I.P.

Robert Mellin; B.Arch., M.Sc.(Arch.)(Penn.), M.Arch.(McG.), M.Sc., Ph.D.(Penn.), F.R.A.I.C., N.A.A.

Assistant Professors

Salmaan Craig; B.Sc., Eng.D.(Brunel)

David Theodore; B.A., B.Sc.(Arch.), B.Arch., M.Arch.(McG.), Ph.D.(Harv.)

Ipek Türeli; B.Arch.(Istanbul), A.A.Dipl.(A.A.), Ph.D.(Calif., Berk.)

Theodora Vardouli; Dipl.Arch.Eng., M.Sc.(Athens), S.M.Arch.S.(MIT)

Clifford C. F. Wong Professor of Practice

Howard Davies

Professor of Practice

Peter Guo-hua Fu

Adjunct Professors

Julia Gersovitz, Andrew King, Conor Sampson

Course Lecturers

Vedanta Balbahadur, Erika Brandl-Mouton, Clothilde Caillé-Levesque, Morgan Carter, Ricardo L. C[illegible]rie Damme Gor[illegible]Tania Delage, Nancy Dunton, Scott Francisco, Fabrizio Gallanti, Marc Hallé, Edward Houle, Laurent Laframboise[illegible]Kenna, Hubert Pell[illegible]c-André Plourde, François Sabourin, Gilles Saucier, Pieter Sijpkes, Angela Silver

Visiting Critics and Guest Lecturers

Each year, visitors are involved in the teaching of certain courses as critics and le[illegible]ese visitors change from year to year. The following were visitors in 2017:

François Abbott, Caroline Andrieux, Lucie Babin, Tom Balaban, Jean-Phil[illegible]champ, Catherine Bonnier, Keviin Botchar, Sinisha Brdar, David Brown, Georges Bulette, Dale Byrnes, Joe Carter, Aziza Chaouni, Came[illegible]ebois, Azad Chichmanian, Henri Clienge, Tre[illegible]es, Maria Davila, Ioannis Dedes, Aliki Economides, Tom Egli, Raphael Fischler, Jim Fy[illegible]Geitmann, Florence Génèvieve, Alexandre Hame[illegible]n Hanley, Dave Harlander, Susane Havelka, Laurie Hawkinson, Paul Holmquist, Son[illegible]Légaré, Ricard[illegible]ire Lubell, Christopher Macdonald, Jeff Ma, Eric Marosi, Cécile Martin, Paul M[illegible]David Newton, S[illegible] Page, Danny Pearl, Jérôme Picard,

Complementary Courses

13-16 credits

3-6 credits from the following courses:

ARCH 551	(3)	Urban Design and Planning
ARCH 604	(3)	Urban Design Seminar

Complementary Courses

10-13 credits selected as follows:

Group A:

3-13 credits chosen from the following courses:

ARCH 523	(3)	Significant Texts and Buildings
ARCH 525	(3)	Seminar on Analysis and Theory
ARCH 531	(3)	Architectural Intentions Vitruvius - Renaissance
ARCH 532	(3)	Origins of Modern Architecture
ARCH 626	(4)	Critical Design Strategies
ARCH 684	(4)	Contemporary Theory 1
ARCH 685	(4)	Contemporary Theory 2

Group B:

0-10 credits chosen from the following courses:

ARCH 512	(3)	Architectural Modelling
ARCH 514	(4)	Community Design Workshop
ARCH 515	(3)	Sustainable Design
ARCH 520	(3)	Montreal: Urban Morphology
ARCH 521	(3)	Structure of Cities
ARCH 526	(3)	Philosophy of Structure
ARCH 527	(3)	Civic Design
ARCH 528	(3)	History of Housing
ARCH 529	(3)	Housing Theory
ARCH 533	(3)	New Approaches to Architectural History
ARCH 540	(3)	Selected Topics in Architecture 1
ARCH 541	(3)	Selected Topics in Architecture 2
ARCH 622	(4)	Research Methods for Architecture
ARCH 626	(4)	Critical Design Strategies
ARCH 679	(3)	Writing in Architecture
ARCH 684	(4)	Contemporary Theory 1
ARCH 685	(4)	Contemporary Theory 2
URBP 555	(3)	Real Estate and Planning
URBP 651	(3)	Redesigning Suburban Space

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

Elective Courses

0-3 credits

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

Revision, May 2018. End of revision.

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

Revision, May 2018. Start of revision.

The Directed Research concentration is a 60-credit four-term (Fall, Winter, Summer, Fall) program that complements the regular 45-credit three-term concentration with a supervised 12-credit individual research report in the summer term.

other seminars related to their field of study if needed. All students participate in the year-long Research Seminar (ARCH 711D1/D2 and ARCH712D1/D2), taken during the first two years of the program, in which they present their research framework and objectives for peer critique. By the end of the second year of studies (Ph.D. 3), Ph.D students must complete the Comprehensive Examination (ARCH 701) with their 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 (12 credits)

ARCH 700	(0)	Thesis Proposal
ARCH 701	(0)	Comprehensive Examination
	(3)	Doctoral Research Seminar 1

11.2.4 Bioengineering Faculty

Chair

Dan V. Nicolau

Professors

Dan V. Nicolau; B.Eng., M.Eng.(Poly. Univ. Bucharest), M.S.(Acad. Economic Studies, Bucharest), Ph.D.(Poly. Univ. Bucharest)

Amine Kamen; Ph.D.(Mines ParisTech), Ph.D.(École Poly., Montr.)

Sebastian Wachsmann-Hogiu; Dipl.(Poly. Univ. Bucharest), Ph.D.(Humboldt)

Associate Professors

Georgios Mitsis; Dipl.(Nat. Tech., Athens), M.S.(Elect. Eng.), M.S.(Biomed. Eng.), Ph.D.(USC)

Yu (Brandon) Xia; B.Sc.(Peking), Ph.D.(Stan.)

Assistant Professors

Allen Ehrlicher; B.Sc., B.A.(Texas-Austin), M.Sc., Ph.D.(Leipzig)

Adam Hendricks; B.S., M.S.(Virg. Poly. Inst. & State Univ.), Ph.D.(Mich.)

J. Matt Kinsella; B.Sc.(SXU, Chicago), M.S., Ph.D.(Purd.)

Sara Mahshid; B.Sc.(IUST, Tehran), M.Sc., Ph.D.(SUT, Tehran)

11.3 Biological and Biomedical Engineering

11.3.1 Location

Duff Medical Building
3775 University Street, Room 316
Montreal QC H3A 2B4
Canada
Website: *www.mcgill.ca/bbme*

11.3.2 About Biological and Biomedical Engineering

The Biological and Biomedical Engineering (BBME) graduate program is an interfaculty program involving the Department of Bioengineering in the Faculty of Engineering and the Department of Biomedical Engineering in the Faculty of Medicine. The BBME interfaculty program builds on the excellence and high standard of its predecessor graduate program in Biomedical Engineering. This broader interfaculty restructuring supports the growing trend in research universities toward formalized interdisciplinary studies and multifaculty collaboration.

BBME students come from a wide range of backgrounds including engineering, physics, chemistry, biology, and dentistry, among others. The multicultural diversity of our student body is a strength of the program, as networking and collaborative opportunities are vast. Students in BBME haSUT6Tm 0.6488 lhbioate progrn

- medical imaging and image processing;
- micro and nanotechnology and biosensors;
- nanoparticles and cell imaging;
- bioinformatics and computational biology;
- computers in medical education, including interactive 3D models and haptics;
- biological materials and mechanics;
- biomolecular and cellular engineering, and regenerative medicine;
- biomedical, diagnostics, and high throughput screening engineering;
- mechanics of disease;
- tissue engineering, especially concerning 3D and nano-related biological microfluidics devices, such as fungi and cellular traffic;
- biological dynamic devices, from whole-organisms (e.g., bacteria) to nanodevices;
- information processing and storage in biological systems;
- systems and synthetic biology;
- cell mechanisms and the cytoskeleton;
- soft matter physics.

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

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

For more information please consult *www.mcgill.ca/bbme/prospective-students/masters-program*.

section 11.3.6: Doctor of Philosophy (Ph.D.) Biological and Biomedical Engineering

The **Biological and Biomedical Engineering doctoral program** provides students with advanced training in the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. The program will focus on an area of choice while integrating quantitative concepts and engineering tools for the study of natural and life sciences and/or for patient care.

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 Biological and Biomedical Engineering Graduate Program and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*. For additional information, please consult *www.mcgill.ca/bbme/prospective-students/how-apply*.

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

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

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

11.3.4 Biological and Biomedical Engineering Faculty

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

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

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

The Biological and Biomedical Engineering (BBME) Master's program focuses on the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. With its unique multidisciplinary environment, and taking advantage of research collaborations between staff in the Faculties of Medicine, Science, and Engineering. BBME offers thesis-based graduate deW

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

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

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

BMDE 625D2	(3)	Design of Assistive Technologies: Principles and Praxis
BMDE 650	(3)	Advanced Medical Imaging
BMDE 651	(3)	Orthopaedic Engineering
BMDE 652	(3)	Bioinformatics: Proteomics
BMDE 653	(3)	Patents in Biomedical Engineering
BMDE 654	(3)	Biomedical Regulatory Affairs - Medical Devices
BMDE 655	(3)	Biomedical Clinical Trials - Medical Devices
CHEE 561	(3)	Introduction to Soft Tissue Biophysics
CHEE 563	(3)	Biofluids and Cardiovascular Mechanics
CHEE 651	(4)	Advanced Biochemical Engineering
CHEM 571	(3)	Polymer Synthesis
COMP 526	(3)	Probabilistic Reasoning and AI
COMP 546	(4)	Computational Perception
COMP 551	(4)	Applied Machine Learning
COMP 558	(3)	Fundamentals of Computer Vision
COMP 561	(4)	Computational Biology Methods and Research
COMP 652	(4)	Machine Learning
COMP 761	(4)	Advanced Topics Theory 2
DENT 669	(3)	Extracellular Matrix Biology
ECSE 523	(3)	Speech Communications
ECSE 526	(3)	Artificial Intelligence
ECSE 529	(3)	Computer and Biological Vision
ECSE 618	(4)	Haptics
ECSE 626	(4)	Statistical Computer Vision
ECSE 681*	(4)	Colloquium in Electrical Engineering
EPIB 521	(3)	Regression Analysis for Health Sciences
EXMD 609	(3)	Cellular Methods in Medical Research
EXMD 610	(3)	Molecular Methods in Medical Research
FACC 510	(3)	Selected Topics in the Faculty of Engineering 1
MATH 525	(4)	Sampling Theory and Applications
MDPH 607	(3)	Medical Imaging
MDPH 612	(3)	Instrumentation and Computation in Medical Physics
MECH 500*	(3)	Selected Topics in Mechanical Engineering
MECH 548	(3)	Cellular Materials in Natural and Engineering Structures
MECH 553	(3)	Design and Manufacture of Microdevices
MECH 561	(3)	Biomechanics of Musculoskeletal Systems
MECH 562	(3)	Advanced Fluid Mechanics
MECH 563	(3)	Biofluids and Cardiovascular Mechanics
MECH 605	(4)	Applied Mathematics 1
MECH 610	(4)	Fundamentals of Fluid Dynamics
MECH 632	(4)	Advanced Mechanics of Materials
NEUR 603	(3)	Computational Neuroscience
NEUR 630	(3)	Principles of Neuroscience 1

NEUR 631	(3)	Principles of Neuroscience 2
PHGY 502	(3)	Exercise Physiology
PHGY 517	(3)	Artificial Internal Organs
PHGY 518	(3)	Artificial Cells
PHGY 556	(3)	Topics in Systems Neuroscience
PHYS 519	(3)	Advanced Biophysics
PSYT 630	(3)	Statistics for Neurosciences

* When topic is appropriate.

Revision, May 2018. End of revision.

11.3.6 Doctor of Philosophy (Ph.D.) Biological and Biomedical Engineering

The goal of the Biological and Biomedical Engineering Ph.D. program is for students to gain advanced training in the interdisciplinary application of methods, paradigms, technologies, and devices from engineering and the natural sciences to problems in biology, medicine, and the life sciences. The program will focus in an area of choice while integrating quantitative concepts and engineering tools for the study of life sciences and/or for patient care. As part of the Ph.D. requirement, the student will integrate the scientific method, develop critical and deep thinking, and acquire advanced writing and presentation skills that will form the foundation for his/her career. Under the guidance of his/her supervisor, the student will tackle a research challenge and make original contributions to the advancement of science and engineering in an area of Biological and Biomedical Engineering. The program will prepare students for careers in academia, industry, hospitals and government. Students who complete the program will obtain a Doctor of Philosophy in Biological and Biomedical Engineering. The best preparation for this program is a Master's degree in BBME or a related discipline.

Thesis

Thesis

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

Required Course

BBME 701	(0)	Ph.D. Comprehensive Examination

Students must be registered in this course at the time of the Thesis Proposal and Comprehensive Exam Meeting.

Further courses may be required by the supervisor(s) in consultation with the Graduate Program Director, depending on the educational background of individual students.

11.4 Chemical Engineering

11.4.1 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
Email: *gradinfo.chemeng@mcgill.ca*
Website: *www.mcgill.ca/chemeng*

11.4.2 About Chemical Engineering

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

The Department's offices and research laboratories are located in the M.H. Wong Building. Collectively, 17 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 tow

section 11.4.5: Master of Engineering (M.Eng.) 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 11.4.6: 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 11.4.7: 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, Metals 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 McGill School of Environment–71 524gv4gh 46ough the pN47tal8m(vironmen 1 0 0 1 390.411 504.6 T24.04 T2390.411 1 0 ou0aculty membId

Assistant Professors

Corinne Hoesli; B.Sc., B.A.Sc.(Ott.), Ph.D.(Br. Col.), ing.

Jan Kopyscinski; Dipl.Ing.(BTU Cottbus), Dr.Sc.(ETH Zurich)

Christopher Moraes; B.A.Sc., Ph.D.(Tor.)

11.4.5 Master of Engineering (M.Eng.) 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

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.

11.4.6 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.

11.4.7 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
CIVE 652	(4)	Bioprocesses for Wastewater Resource Recovery
CIVE 660	(4)	Chemical and Physical Treatment of Waters

Air pollution engineering: (3 credits)

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

Soil and water quality management: (3 credits)

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

Environmental impact: (3 credits)

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

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

Environmental policy: (3 credits)

URBP 506	(3)	Environmental Policy and Planning

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

Elective Courses (11 credits)

CHEE 696	(6)	Extended Project

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

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

Thesis

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

Required Courses

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

Complementary Courses

(6-12 credits)

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

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

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

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

11.5 Civil Engineering and Applied Mechanics

11.5.1 Location

Department of Civil Engineering and Applied Mechanics
Macdonald Engineering Building, Room 492
817 Sherbrooke Street West
Montreal QC H3A 0C3
Canada

Telephone: 514-398-6858
Fax: 514-398-7361
Email: *gradinfo.civil@mcgill.ca*
Website: *www.mcgill.ca/civil*

11.5.2 About Civil Engineering and Applied Mechanics

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

Graduate studies and research are at present being conducted in the fields of structures and structural mechanics; infrastructure rehabilitation; risk engineering; fluid mechanics and hydraulics; materials engineering; soil behaviour; soil mechanics and foundations; water resources engineering; environmental engineering; and transportation engineering.

M.Eng. in Civil Engineering

The master's degree can be pursued as a research degree (thesis) or as a coursework-based degree (project). The thesis degree is for those who wish to undertake research while the project degree is for those who wish to have a broader and more specialized training in civil engineering.

section 11.5.5: Master of Engineering (M.Eng.) Civil Engineering (Thesis) (45 credits)

Students obtain a deeper understanding of their area of specialty through courses selected with their supervisor. A two- to three-semester independent research project is undertaken in the field of structures and structural materials; infrastructure rehabilitation; risk engineering; fluid mechanics and hydraulics; materials engineering; soil behaviour; soil mechanics and foundations; water resources engineering; environmental engineering; and transportation engineering.

section 11.5.6: Master of Science (M.Sc.) Civil Engineering (Thesis) (45 credits)

Candidates with a bachelor's degree in a discipline other than Engineering, such as Science or Arts, may be accepted into an M.Sc. program in the Department. Such students would typically study in the fluid mechanics, water resources, environmental engineering, or transportation engineering areas, and would follow the thesis option program.

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

This is primarily a coursework degree with the possibility of a small independent research project.

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

This program is offered to students with a university undergraduate degree in engineering who desire graduate education in the environmental engineering field. This non-thesis option is within the context of the existing M.Eng. (project option) programs currently offered in the Departments of Bioresource Engineering (Agricultural and Environmental Sciences); Chemical Engineering; Civil Engineering; and Mining, Metals, and Materials Engineering. This program emphasizes interdisciplinary fundamental knowledge courses, practical applications in diverse environmental contexts, and functional skills needed for solving environmental problems through a wide range of technical and non-technical courses offered by collaborating departments and faculties at the University. Candidates must possess a bachelor's degree in engineering. The Environmental Engineering option is administered by the Faculty of Engineering.

- the *TOEFL* (Test of English as a Foreign Language; preferably the Internet-based test (iBT)); Master's applicants must achieve an overall minimum score of 86 (iBT; or 567 on the paper-based test (PBT)) and Ph.D. applicants must achieve a minimum overall score of 92 (iBT; or 580 on the PBT),

Professors

Subhasis Ghoshal; B.C.E.(Jad.), M.S.(Missouri), Ph.D.(Carn. Mell), P.Eng.

Ghyslaine McClure; B.Ing.(Montr.), S.M.(MIT), Ph.D.(Montr.), Eng.

Denis Mitchell; B.A.Sc., M.A.Sc., Ph.D.(Tor.), F.A.C.I., Eng. (*James McGill Professor*)

Van-Thanh-Van Nguyen; B.M.E.(Nat. IT, Saigon), M.C.E.(A.I.T.), D.A.Sc.(Montr.), Eng.

James Nicell; B.A.Sc., M.A.Sc., Ph.D.(Windsor), P.Eng.; Dean, F

11.5.6 Master of Science (M.Sc.) Civil Engineering (Thesis) (45 credits)

Thesis Courses (27 credits)

CIVE 630	(3)	Thesis Research 1
CIVE 631	(3)	Thesis Research 2
CIVE 632	(3)	Thesis Research 3
CIVE 633	(6)	Thesis Research 4
CIVE 634	(6)	Thesis Research 5
CIVE 635	(6)	Thesis Research 6

Required Course

1 credit:

CIVE 662	(1)	Master's (Thesis) Research Seminar

Complementary Courses (17 credits)

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

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

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

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 Complementary Courses from the Department

0-30 credits

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

CIVE 520	(3)	Groundwater Hydrology
CIVE 521	(3)	Nanomaterials and the Aquatic Environment
CIVE 527	(3)	Renovation and Preservation: Infrastructure
CIVE 550	(3)	Water Resources Management
CIVE 551	(3)	Environmental Transport Processes
CIVE 557	(3)	Microbiology for Environmental Engineering
CIVE 558	(3)	Biomolecular Techniques for Environmental Engineering
CIVE 561	(3)	Urban Activity, Air Pollution, and Health
CIVE 573	(3)	Hydraulic Structures
CIVE 574	(3)	Fluid Mechanics of Water Pollution
CIVE 577	(3)	River Engineering
CIVE 604	(4)	Theory of Plates and Shells
CIVE 605	(4)	Stability of Structures
CIVE 607	(4)	Advanced Design in Steel
CIVE 612	(4)	Earthquake-Resistant Design
CIVE 614	(4)	Composites for Construction
CIVE 615	(3)	Environmental Engineering Seminar
CIVE 616	(4)	Nonlinear Structural Analysis for Buildings
CIVE 617	(4)	Design and Rating of Highway and Railway Bridges
CIVE 618	(4)	Design in Concrete 1
CIVE 622	(4)	Prestressed Concrete
CIVE 624	(4)	Durability of Structures
CIVE 625	(4)	Condition Assessment of Existing Structures
CIVE 628	(4)	Design of Wood Structures
CIVE 637	(4)	Discrete Choice Modeling in Transportation
CIVE 652	(4)	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
	(2)	Research Project 2

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

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, Religious Studies, Sociology, and McGill School of Environment.

11.5.9 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 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.

CIVE 701	(0)	Ph.D. Comprehensive Preliminary Oral Exam

Complementary Courses

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

11.6 Electrical and Computer Engineering

11.6.1 Location

Department of Electrical and Computer Engineering
McConnell Engineering Building, Room 633
3480 University Street
Montreal QC H3A 0E9
Canada
Telephone: 514-398-7344 or 514-398-1406
Fax: 514-398-4470
Email: *grad.ece@mcgill.ca*
Website: *www.mcgill.ca/ece*

11.6.2 About Electrical and Computer Engineering

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

The research interests and facilities of the Department are very extensive, involving more than 50 faculty members and 300 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 laboratories for research in Robotics, Control, and Vision are in the

section 11.6.5: Master of Engineering (M.Eng.) Electrical Engineering (Thesis) (46 credits)

program at McGill University provides students with an opportunity to conduct 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.

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

The Master of Engineering degree (project option) involves graduate-level courses and an internally examined research project. The program is oriented more toward professional development than the thesis option. The project is of significantly less scope than a thesis, and includes options such as a technical review, a design project, or a small-scale research project. Students are provided with a very solid background in electrical and computer engineering, both in terms of breadth across the entire field and depth in the area of specialty. Graduates frequently pursue careers in research and development. A part-time program is possible.

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

The Ph.D. degree recognizes a significant novel research contribution that is described in an externally examined thesis. Students who are admitted to this program normally have a master's degree. Research is conducted under the supervision of a faculty member. The Department provides an excellent environment for conducting research, with supervision by internationally renowned researchers and access to state-of-the-art experimental facilities. Graduates from the program most commonly pursue research and teaching careers in academia or research careers in industrial labs.

11.6.3 Electrical and Computer Engineering Admission Requirements and Application Procedures

11.6.3.1 Admission Requirements

English Proficiency Requirement: Applicants to graduate studies whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone), must submit documented proof of competency in English. Accepted English language tests and minimum test score requirements can be found on our *website*. Official results must be received before the application deadlines.

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

M.Eng. Degree (Admission Requirements)

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

Ph.D. Degree (Admission Requirements)

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

11.6.3.2 Application Procedures

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

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

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

11.6.3.2.1 Additional Requirements

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

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

11.6.3.3 Application Dates and Deadlines

Application opening dates are set by Enrolment Services in consultation with Graduate and Postdoctoral Studies (GPS), while application deadlines are set by the Department of Electrical and Computer Engineering and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill departmental website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

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

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

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

11.6.4 Electrical and Computer Engineering Faculty

Chair

TBA

Associate Chair, Academic

Warren Gross

Associate Chair, Undergraduate Studies

François Bouffard

Associate Chair, Graduate Programs

Odile Liboiron-Ladouceur

Emeritus Professors

Pierre R. Bélanger; B.Eng.(McG.), S.M., Ph.D.(MIT), F.I.E.E.E., Eng.

Maier L. Blostein; B.Eng., M.Eng.(McG.), Ph.D.(Ill.), F.I.E.E.E., Eng.

Clifford H. Champness; M.Sc.(Lond.), Ph.D.(McG.)

Francisco D. Galiana; B.Eng.(McG.), S.M., Ph.D.(MIT), F.I.E.E.E., Eng.

Peter Kabal; B.A.Sc., M.A.Sc., Ph.D.(Tor.)

Martin D. Levine; B.Eng., M.Eng.(McG.), Ph.D.(Lond.), F.C.I.A.R., F.I.E.E.E., Eng.

Boon-Teck Ooi; B.E.(Adel.), S.M.(MIT), Ph.D.(McG.), Eng.

Tomas J.F. Pavlasek; B.Eng., M.Eng., Ph.D.(McG.), Eng.

Nicholas C. Rumin; B.Eng., M.Sc., Ph.D.(McG.), Eng.

Jonathan P. Webb; B.A., Ph.D.(Camb.)

Professors

Tal Arbel; M.Eng., Ph.D.(McG.)

Peter E. Caines; B.A.(Oxf.), D.I.C., Ph.D.(Lond.), F.R.S.C., F.I.E.E.E., F.C.I.A.R., P.Eng. (*James McGill Professor and Macdonald Professor*)

Benoit Champagne; B.Eng., M.Eng.(Montr.), Ph.D.(Tor.)

Lawrence Chen; B.Eng.(McG.), M.A.Sc., Ph.D.(Tor.)

James Clark; B.Sc., Ph.D.(Br. Col.)

Mark Coates; B.Eng.(Adel.), Ph.D.(Camb.)

Jeremy R. Cooperstock; A.Sc.(Br. Col.), M.Sc., Ph.D.(Tor.) (*on sabbatical*)

Frank Ferrie; B.Eng., Ph.D.(McG.)

Warren Gross; B.A.Sc.(Wat.), M.A.Sc., Ph.D.(Tor.)

Professors

Geza Joos; B.Sc.(C'dia), M.Eng., Ph.D.(McG.) (*CRC Chair*)

Andrew G. Kirk; B.Sc.(Brist.), Ph.D.(Lond.), P.Eng. (*James McGill Professor*) (*on sabbatical*)

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

Harry Leib; B.Sc.(Technion), Ph.D.(Tor.)

Tho Le-Ngoc; M.Eng.(McG.), Ph.D.(Ott.), F.I.E.E.E.

David A. Lowther; B.Sc.(Lond.), Ph.D.(C.N.A.A.), F.C.A.E., Eng.

David V. Plant; M.S., Ph.D.(Brown), F.I.E.E.E., F.O.S.A., F.E.I.C., F.C.A.E., P.Eng. (*James McGill Professor*)

Gordon Roberts; B.A.Sc.(Wat.), M.A.Sc., Ph.D.(Tor.), F.I.E.E.E., Eng. (*James McGill Professor*) (*on sabbatical*)

Martin Roch7muCe B.A.S M.Eng., Ph.D.(ML

Associate Members

David Juncker; Ph.D.(Neuchatel)

Nathaniel J. Quitoriano; B.S.(Calif.), Ph.D.(MIT)

Adjunct Professors

Rys Allan Adams, Vamsy Chodavarapu, Tiago H. Falk, Vincent Hayward, Mehrsan Javan-Roshtkhari, Innocent Kamwa, Marthe Kassouf, Zetian Mi, Frederic Nabki, Douglas O'Shaughnessy, Katarzyna Radecka, Richard Rose, Joseph J. Schlesinger, Joshua David Schwartz, Alex Stéphenne, Andraws Swidan, Kenneth D. Wagner, Qunbi Zhuge

11.6.5 Master of Engineering (M.Eng.) Electrical Engineering (Thesis) (46 credits)

The M.Eng. in Electrical Engineering (thesis option) involves 18 graduate level course credits and an externally examined thesis. The program is research oriented and the thesis is expected to involve a thorough examination of a topic of current interest in the research area within the Department. Undertaking this program at McGill University provides students with an opportunity to conduct 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.Eng. Thesis program must be completed on a full-time basis in three years. The following requirements must be met:

Thesis Courses (28 credits)

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

Students who choose the thesis option must re

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

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

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

Thesis

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

Required Courses

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

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

11.7 Mechanical Engineering

11.7.1 Location

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

11.7.2 About Mechanical Engineering

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

The Department includes more than 30 faculty members and 200 graduate students, and is housed primarily within the recently renovated Macdonald Engineering building. The Department contains state-of-the-art experimental facilities (including a major who

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.

Bioengineering

Biomechanics, biomaterials, blood and respiratory flows, mechanics of soft tissues, cardiovascular devices, image processing for medical diagnostics, 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; 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.Eng., M.Sc., and Ph.D. degrees in Mechanical Engineering. Both M.Eng. (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. Two other non-thesis master's degree options are described below.

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

The M.Eng. (Thesis) program requires the completion of technical complementary courses, a seminar course, and a thesis. The thesis involves advanced research supervised by one or more professors who are internationally known in their field. This program prepares students for either an industrial research career or further academic research at the Ph.D. level.

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

Students in this program must complete required courses in addition to several complementary courses and a seminar course. They also complete a project that is less involved than a thesis, and may involve a limited research project or a technical or design study. Graduates of this program are well-prepared for carrying out research and development in industry and may also proceed to further research at the Ph.D. level.

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

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

The aerospace industry is strongly established in Quebec. Representatives of the aerospace industry therefore requested that measures be taken to provide for qualified scientists in aerospace. Five universities offering courses in engineering came together to offer a master's degree program in the field of aeronautics and space technology. This program is offered to students who wish to specialize in these disciplines. The industry's participation is a special feature of this program. The universities and the participating industries, with the cooperation of the Centre of Aerospace Manpower Activities in Quebec (CAMAQ), have formed a Coordinating Committee, 1 8u Tmem(Acti, ha)Tj1 0 0 1 eph

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

4. Virtual Environment

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

This program is currently not offered

The Master in Manufacturing Management (M.M.M.) program attracts business professionals from around the world who wish to pursue a career in the effective management of global operations and supply chain. It is a professionally-oriented graduate program offered jointly through the Faculties of Engineering and Management, aimed at those candidates with engineering or science backgrounds.

In just eleven months of academic studies, M.M.M. students sharpen their expertise in supply chain and operations through an intensive program that includes:

- A challenging curriculum
- Extensive industrial interaction
- Innovative research projects

Additionally, students are exposed to the latest trends and dev

- two official Referee Letters
- Personal Statement – one page
- Curriculum Vitae – please include a list of publications, if relevant

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

Professors

François Barthelat; M.Sc.(Roch.), Ph.D.(N'western)

David L. Frost; B.A.Sc.(Br. Col.), M.S., Ph.D.(Calif. Tech.), P.Eng.

Wagdi G. Habashi; B.Eng., M.Eng.(McG.), Ph.D.(Cornell), ing., F.A.S.M.E., F.A.I.A.A., F.C.A.E., F.R.S.C. (*NSERC; Lockheed Martin; Bell Helicopter Industrial Research Chair*)

Pascal Hubert; B.Eng., M.A.Sc.(École Poly., Montr.), Ph.D.(Br. Col.), ing. (*Warner Graupe Professor*)

Larry B. Lessard; B.Eng.(McG.), M.Sc., Ph.D.(Stan.), ing.

Arun K. Misra; B.Tech.(I.I.T., Kgp.), Ph.D.(Br. Col.), P.Eng., F.A.A.S., F.A.I.A.A., F.C.A.E. (*Thomas Workman Professor of Mechanical Engineering*)

Luc Mongeau; B.Sc., M.Sc.(École Poly., Montr.), Ph.D.(Penn St.), ing. (*Canada Research Chair*)

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

Meyer Nahon; B.Sc.(Qu.), M.Sc.(Tor.), Ph.D.(McG.), ing., A.F.A.I.A.A.

Damiano Pasini; M.Sc.(Pavia), Ph.D.(Brist.), ing.

Inna Sharf; B.A.Sc., Ph.D.(Tor.)

Associate Professors

Jeffrey M. Bergthorson; B.Sc.(Manit.), M.Sc., Ph.D.(Calif. Tech.), P.Eng.

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

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

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

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

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

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

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

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

Assistant Professors

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

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

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

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

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

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

Adjunct Professors

Farbod

Adjunct Professors

Gilles Soulez

Course Lecturers

Marwan Kanaan

Richard Klopp

Alexei Morozov

Amar Sabih

Associate Members

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.

11.7.7 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, École Polytechnique, 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 four areas:

1. Aeronautics and Space Engineering

2. Avionics and Control

3. Aerospace Materials and Structures

4. Virtual Environment

Required Courses (9 credits)

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

Complementary Courses (36 credits)

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

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

This program is currently not offered.

We are in the process of revising the curriculum of the program to enhance its quality and relevance, while k21ess0765s2 6MGSC77.5j1 0 0 1 235.695 6915ace265s2 6Da

General Business & Management Training (8 credits)

8 credits from Group A or Group B:

Group A

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

Group B

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

General Business & Management

6 credits from the following:

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

Manufacturing & Supply Chain

12 credits from:

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

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

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

Thesis Courses (28 credits)

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

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

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

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

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

Research Degrees

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

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

section 11.8.6: Master of Engineering (M.Eng.) Mining Engineering (Thesis) (45 credits)

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

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

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

section 11.8.7: 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 11.8.8: 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.

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

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

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

1. an excellent academic standing for their undergraduate degree;
2. been in the master's program for less than 12 months;

3. passed with the minimum CGPA of 3.6 at least three of the required master's courses, and given one seminar with a minimum grade of A-;
4. made good progress with their research;
5. obtained a strong letter of recommendation from their supervisor.

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

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 follow 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 that are admitted to Ph.D. 2.

11.8.3.2 Application Procedures

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

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

11.8.3.3 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

Post-Retirement Professor

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

Professors

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

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

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

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

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

Hani S. Mitri; B.Sc.(Cairo), M.Eng., Ph.D.(McM.), Eng.

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

Associate Professors

Kirk Bevan; B.Eng.(Western), Ph.D.(Purd.), P.Eng. (*on sabbatical July to Dec. 2018*)

Mathieu Brochu; B.Eng.(Laval), Ph.D.(McG.), Eng. (*Hatch Faculty F*

fundamentals. As such, the program is the more suitable option for those whose primary interest is research. Graduates of this degree either pursue a Ph.D. or work in industry.

Complementary Courses (12 credits)

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

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

** NEW PROGRAM **

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). A specific 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. Graduates of this degree either pursue a Ph.D. or work in industry. The M.Sc. (Thesis) is for candidates with a Bachelor's degree in a relevant discipline other than Engineering, (ex: Science and Arts). Admitted students may be asked to take extra courses depending on their background.

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.

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

** NEW PROGRAM **

The M.Sc. in Mining Engineering (Thesis) develops fundamental knowledge emphasizing practical applications and functional skills needed for solving mining engineering problems. This M.Sc. program is oriented towards individuals who intend to develop a career in mining engineering research. The candidates with a Bachelor's degree in a relevant discipline other than Engineering (ex: Science and Arts) may be accepted into the M.Sc. program.

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 the following:

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

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

Complementary Courses (12 credits)

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

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

** NEW PROGRAM **

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.

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

** NEW PROGRAM **

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

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:

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

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

Environmental Policy Course

URBP 506	(3)	Environmental Policy and Planning

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

Elective Courses (11 credits)

(minimum 11 credits)

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

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

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 (11 credits)

(minimum 10 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

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

** NEW PROGRAM **

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

Thesis

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

Required Courses (9 credits)

Revision, May 2018. Start of revision.

MIME 601	(0)	Engineering Laboratory Practice
MIME 701	(0)	Ph.D. Thesis Research Proposal
MIME 703	(0)	Ph.D. Comprehensive Exam
MIME 710D1	(1.5)	Ph.D. Foundation Course
MIME 710D2	(1.5)	Ph.D. Foundation Course
MIME 771	(6)	Research Seminar 2

Revision, May 2018. End of revision.

Complementary Courses (6 credits)

6 credits of courses at the 500 level or higher, approved by their supervisor.

11.8.14 Doctor of Philosophy (Ph.D.) Mining Engineering

** NEW PROGRAM **

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.

Thesis

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

Required Courses (6 credits)

MIME 601	(0)	Engineering Laboratory Practice
MIME 701	(0)	Ph.D. Thesis Research Proposal
MIME 776	(6)	Research Seminar 3

Complementary Courses (6 credits)

6 credits of courses at the 500 level or higher, approved by their supervisor.

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

Required Course (6 credits)

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

Complementary Courses (24 credits)

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

11.9 Urban Planning

11.9.1 Location

School of Urban Planning
Macdonald Harrington Building, Room 400
815 Sherbrooke Street West
Montreal QC H3A 0C2
Canada
Telephone: 514-398-4075
Fax: 514-398-8376
Email: *admissions.planning@mcgill.ca*
Website: *www.mcgill.ca/urbanplanning*

11.9.2 About Urban Planning

Urban planning is the process by which a community shapes its environment to meet its needs and realize its aspirations. 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 Urban Planning profession 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 cg32 462.44w7GW

	Application Opening Dates		Application Deadlines	
Summer Term:	N/A	N/A	N/A	N/A

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

11.9.4 Urban Planning Faculty

Director

Richard Shearmur

Emeritus Professors

David Farley; B.Arch.(McG.), M.Arch., M.C.P.(Harv.)

Jane Matthews-Glenn; B.A., LL.B.(Qu.), D. en droit(Stras.)

Post-Retirement Professor

David Brown; B.A.(Bishop's), M.U.P.(McG.), Ph.D.(Sheff.)

Professors

Ahmed Elgeneidy; B.A.A., M.Arch.(Alexandria), Ph.D.(Port. St.)

Richard Shearmur; B.A.(Camb.), M.U.P.(McG.), Ph.D.(Montr.)

Associate Professors

Madhav G. Badami; B.Tech., M.S.(IIT, Madras) M.E.Des.(Calg.), Ph.D.(Br. Col.) (*joint appt. with McGill School of Environment*)

Lisa Bornstein; B.Sc.(Calif., Berk.), M.R.P.(Cornell), Ph.D.(Calif., Berk.)

Raphaël Fischler; B.Eng.(Eindhoven), M.Sc., M.C.P.(MIT), Ph.D.(Calif., Berk.)

Nik Luka; B.A.A.(Ryerson), M.Arch.(Laval), Ph.D.(Tor.) (*joint appt. with School of Architecture*)

Assistant Professor

David Wachsmuth; B.A.(McG.), M.Sc.(Tor.), Ph.D.(NYU)

Adjunct Professors

Jayne Engle; B.Sc.(Eastern Univ., Penn.), M.B.A.(Temple), M.U.R.P.(Pitt.), Ph.D.(McG.)

Nilson Espino; B.Arch.(Catolica Santa Maria La Antigua), M.Sc.(Ariz.), Ph.D.(Rice)

Murtaza Haider; B.Sc.(NWFP UET-Pesh.), M.A.Sc., Ph.D.(Tor.)

Paul LeCavalier; B.Sc., M.U.P.(McG.), M.R.P.(Wat.)

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

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

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

Associate Member

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

Instructors

Malaka Ackaoui, Julian Agyeman, Suzanne Doucet, Gorka Espiau, Martin Wexler

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

Revision, May 2018. Start of revision.

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

Research Project (15 credits)

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

Required Courses (27 credits)

URBP 609	(1)	Planning Graphics 1
URBP 610	(1)	Planning Graphics 2
URBP 611	(1)	Planning Graphics 3
URBP 612	(3)	History and Theory of Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(3)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 635	(3)	Planning Law
URBP 641	(1)	Reading the Urban Landscape
URBP 642	(1)	Introduction to Planning Data
URBP 643	(1)	Introduction to Geographic Information Systems

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Complementary Courses (18 credits)

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

Group A

9-18 credits from the following:

ARCH 515	(3)	Sustainable Design
ARCH 517	(3)	Sustainable Residential Development
ARCH 520	(3)	Montreal: Urban Morphology
ARCH 564	(3)	Design for Development
ARCH 566	(3)	Cultural Landscapes Seminar
CIVE 540	(3)	Urban Transportation Planning
CIVE 561	(3)	Urban Activity, Air Pollution, and Health
GEOG 504	(3)	Advanced Economic Geography
GEOG 525	(3)	Asian Cities in the 21st Century
URBP 501	(2)	Principles and Practice 1
URBP 504	(3)	Planning for Active Transportation
URBP 505	(3)	Geographic Information Systems
URBP 506	(3)	Environmental Policy and Planning
URBP 507*	(3)	Planning and Infrastructure
URBP 514	(4)	Community Design Workshop
URBP 519*	(6)	Sustainable Development Plans
URBP 520*	(3)	Globalization: Planning and Change

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 551	(3)	Urban Design and Planning
URBP 553	(3)	Urban Governance
URBP 555	(3)	Real Estate and Planning
URBP 556	(3)	Urban Economy: A Spatial Perspective
URBP 604	(3)	Urban Design Seminar
URBP 608	(3)	Advanced GIS Applications
URBP 616	(3)	Selected Topics 1
949 521ol1	(3)	Selected Topics 2

Research Project (15 credits)

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

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Required Courses (33 credits)

URBP 505	(3)	Geographic Information Systems
URBP 609	(1)	Planning Graphics 1
URBP 610	(1)	Planning Graphics 2
URBP 611	(1)	Planning Graphics 3
URBP 612	(3)	History and Theory of Planning
URBP 619	(3)	Land Use and Transportation Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(3)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 635	(3)	Planning Law
URBP 641	(1)	Reading the Urban Landscape
URBP 642	(1)	Introduction to Planning Data
URBP 643	(1)	Introduction to Geographic Information Systems

Complementary Courses (12 credits)

Group A

6-12 credits from the following:

CIVE 540	(3)	Urban Transportation Planning
CIVE 561	(3)	Urban Activity, Air Pollution, and Health
CIVE 637	(4)	Discrete Choice Modeling in Transportation
CIVE 661	(4)	Modelling of Transportation Emissions
URBP 504	(3)	Planning for Active Transportation
URBP 506	(3)	Environmental Policy and Planning
URBP 536	(2)	Current Issues in Transportation 1
URBP 537	(2)	Current Issues in Transportation 2
URBP 608	(3)	Advanced GIS Applications
URBP 620	(3)	Transportation Economics

Group B

0-6 credits

Students may take up to 6 credits of coursework at the 500 or 600-level 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, sociolgy, 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.

Revision, May 2018. End of revision.

11.9.7 Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis): Urban Development and Urban Design (66 credits)

Revision, May 2018. Start of revision.

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.

Research Project (15 credits)

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

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Required Courses (30 credits)

URBP 551	(3)	Urban Design and Planning
URBP 609	(1)	Planning Graphics 1
URBP 610	(1)	Planning Graphics 2
URBP 611	(1)	Planning Graphics 3
URBP 612	(3)	History and Theory of Planning
URBP 622	(6)	Planning Studio 1
URBP 623	(3)	Planning Studio 2
URBP 624	(6)	Planning Studio 3
URBP 635	(3)	Planning Law
URBP 641	(1)	Reading the Urban Landscape
URBP 642	(1)	Introduction to Planning Data
URBP 643	(1)	Introduction to Geographic Information Systems

Complementary Courses (15 credits)

A minimum of 9 credits are selected from Group A; the remaining credits can be selected from Group A or Group B as indicated below.

Group A (9-12 credits)

At least 9 credits (three courses) from the following:

URBP 553	(3)	Urban Governance
URBP 555	(3)	Real Estate and Planning
URBP 557	(3)	The City in History
URBP 604	(3)	Urban Design Seminar

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
ARCH 517	(3)	Sustainable Residential Development
ARCH 521	(3)	Structure of Cities
ARCH 564	(3)	Design for Development
ARCH 566	(3)	Cultural Landscapes Seminar
GEOG 525	(3)	Asian Cities in the 21st Century
URBP 501	(2)	Principles and Practice 1
URBP 504	(3)	Planning for Active Transportation
URBP 506	(3)	Environmental Policy and Planning
URBP 514	(4)	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 616	(3)	Selected Topics 1
URBP 617	(3)	Selected Topics 2
URBP 618	(3)	Selected Topics 3
URBP 619	(3)	Land Use and Transportation Planning
URBP 625	(2)	Principles and Practice 2
URBP 626	(2)	Principles and Practice 3
URBP 629	(3)	Cities in a Globalizing World
URBP 641	(1)	Reading the Urban Landscape
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
		Urban Innov