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

Programs, Courses and University Regulations

2016-2017

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

1. McGill University reserves the right to make changes to the information contained in this online publication - including correcting errors, altering fees, schedules of admission, and credit requirements, and revising or cancelling particular courses or programs - without prior notice.
2. In the interpretation of academic regulations, the Senate is the final authority.
3. Students are responsible for informing themselves of the University's procedures, policies and regulations, and the specific requirements associated with the degree, diploma, or certificate sought.
4. All students registered at McGill University are considered to have agreed to act in accordance with the University procedures, policies and regulations.
5. Although advice is readily available on request, the responsibility of selecting the appropriate courses for graduation must ultimately rest with the student.
6. 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.
7. The academic publication year begins at the start of the Fall semester and extends through to the end of the Winter semester of any given year. Students who begin study at any point within this period are governed by the regulations in the publication which came into effect at the start of the Fall semester.
8. Notwithstanding any other provision of the publication, it is expressly understood by all students that McGill University accepts no responsibility to provide any course of instruction, program or class, residential or other services including the normal range of academic, residential and/or other services in circumstances of utility interruptions, fire, flood, strikes, work stoppages, labour disputes, war, insurrection, the operation of law or acts of God or any other cause (whether similar or dissimilar to those enumerated) which reasonably prevent their provision.

Note: Throughout this publication, "you" refers to students newly admitted, readmitted or returning to McGill.

Publication Information

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

1 Dean's Welcome

To Graduate Students and Postdoctoral Fellows:

I am extremely pleased to welcome you to McGill University. Graduate and Postdoctoral Studies (GPS) collaborates with the Faculties and other administrative and academic units to provide strategic leadership and vision for graduate teaching, supervision, and research across our over 400 graduate programs. GPS also oversees quality assurance in admissions and registration, the disbursement of graduate fellowships, support for postdoctoral fellows, and facilitates graduate degree completion, including the examination of theses. GPS has partnered with Enrolment Services to manage the admission and registration of graduate students and postdoctoral fellows and to offer streamlined services in a one-stop location at *Service Point*.

McGill is a student-centred research institution that places singular importance upon the quality of graduate education and postdoctoral training. As Dean of Graduate and Postdoctoral Studies, I work closely with the Faculties, central administration, graduate students, professors, researchers, and postdoctoral fellows to provide a supportive, stimulating, and enriching academic environment for all graduate students and postdoctoral fellows.

McGill is one of Canada's most intensive research universities, ranked 24th by *QS World University Rankings 2015*. We recognize that these successes come not only from our outstanding faculty members, but also from the quality of our graduate students and postdoctoral fellows—a community into which we are very happy to welcome you.

I invite you to join us in advancing this heritage of excellence at McGill.

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

2 Graduate and Postdoctoral Studies

2.1 Administrative Officers

Administrative Officers	
Josephine Nalbantoglu; B.Sc., Ph.D. (McG.)	**Dean (Graduate and Postdoctoral Studies)**
Robin Beech; B.Sc.(Nott.), Ph.D.(Edin.)	**Associate Dean (Graduate and Postdoctoral Studies)**
France Bouthillier; B.Ed., C.Admin.(UQAM), M.B.S.I.(Montr.), Ph.D.(Tor.) (*on sabbatical 2016–2017*)	**Associate Dean (Graduate and Postdoctoral Studies)**
Patricia G. Kirkpatrick; B.A.(McG.), M.Th.(Lond.), D.Phil.(Oxf.), D.D.(MDTC) (*Interim*)	**Associate Dean (Graduate and Postdoctoral Studies)**
Jean-Jacques Lebrun; B.Sc.(La Roche-sur-Yon), M.Sc.(Rennes), Ph.D.(Paris V)	**Associate Dean (Graduate and Postdoctoral Studies)**
Elisa Pylkkanen; B.A., M.A.(McG.)	**Director (Graduate and Postdoctoral Studies)**

2.2 Location

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Montreal QC H3A 0G4
Telephone: 514-398-3990
Fax: 514-398-6283
Email: *servicepoint@mcgill.ca*
Website: *www.mcgill.ca/gps*

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

2.3 General Statement Concerning Higher Degrees

Graduate and Postdoctoral Studies (GPS) oversees all programs leading to graduate diplomas, certificates, and higher degrees, with the exception of some programs in the School of Continuing Studies. It is responsible for admission policies, the supervision of graduate students' work, and for recommending to Senate those who may receive the degrees, diplomas, and certificates.

3 Important Dates 2016–2017

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

4 Graduate Studies at a Glance

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

5 Program Requirements

5.1 Master's Degrees

Residence Requirements – Master's Degrees

Refers to the number of terms (or years) students must be registered on a full-time basis to complete their program. Students are NOT permitted to graduate until they have fulfilled the residence requirement (or paid the corresponding fees) in their program.

- The following master's programs have a **minimum** residence requirement of **three full-time terms**: M.Arch., M.A., M.Eng., LL.M., M.Mus. (**except** M.Mus. in Sound Recording), M.Sc., M.S.W., M.Sc.A. (**except** M.Sc.A. in Communication Sciences and Disorders).
- The following master's programs have a **minimum** residence requirement of **four full-time terms**: M.I.St.; M.Mus. in Sound Recording; M.U.P.; M.A. (60 credits – Counselling Psychology – thesis; 78 credits – Educational Psychology); M.A. Teaching and Learning – Non-Thesis; M.Sc.A. in Communication Sciences and Disorders; S.T.M., Religious Studies.
- The residence requirement for the master's program in Education (M.Ed.); Information Studies (M.I.St.); Management (M.B.A.); Religious Studies (S.T.M.); M.A. Counselling Psychology – Non-Thesis; M.A. Teaching and Learning – Non-Thesis; M.Sc. in Public Health – Non-Thesis; M.Sc.A. Nursing; M.Sc.A. Occupational Therapy; M.Sc.A. Physical Therapy; and students in part-time programs is determined on a per course basis. Residence requirements are fulfilled when students complete all course requirements in their respective programs.
- For master's programs structured as Course, Project, or Non-Thesis options where the program is pursued on a part-time basis, residence requirements are normally fulfilled when students complete all course requirements in their respective programs (minimum 45 credits or a minimum of three full-time terms) and pay the fees accordingly.

These designated periods of residence represent minimum time requirements. There is no guarantee that the work for the degree can be completed in this time. Students must register for such additional terms as are needed to complete the program.

Coursework – Master's Degrees

Program requirements are outlined in the relevant departmental sections of the Graduate and Postdoctoral Studies *eCalendar*.

The minimum credit requirement for any thesis or non-thesis master’s degree at McGill is 45 credits.

Non-thesis degrees normally specify the course program which the candidate must follow.

The department concerned will examine the student's previous training and then decide which of the available courses in the area of specialization or related fields are required to bring the candidate to the proper level for the master's degree. Due account will be taken of relevant graduate level courses passed at any recognized university or at McGill.

The candidate is required to pass, with a grade of B- or better, all those courses that have been designated by the department as forming a part of the program, including additional requirements.

Students taking courses at another university must obtain a minimum grade of B- (65%) if the course is to be credited toward their McGill degree. In the cases where only a letter grade is used, a B- is the minimum passing grade and no equivalent percentage will be considered. In the cases where only a percentage grade is used, 65% is the minimum passing grade.

As a rule, no more than one-third of the formal coursework (excluding thesis, project, stage, or internship) of a McGill master's degree can be credited with courses from another university or degree (for example, courses taken before admission to the McGill degree, or courses taken through the IUT agreement during the McGill degree, if permitted).

Normally, if courses completed elsewhere or at McGill prior to admission to the McGill master's degree were not used to complete a degree, they could be credited toward the McGill degree, keeping in mind the one-third rule as described above. These would be entered as exemptions with credit at the time of admission.

If the courses completed elsewhere or at McGill prior to admission were used to complete a degree, exemptions may be granted without credit, i.e. the exempted course(s) must be replaced by other graduate course(s) at McGill. No double counting is allowed unless, exceptionally, the department offering the Master's degree permits it and the degree has an overall credit requirement greater than 45 credits. In other words, instances where exemptions with credit may be granted will be limited to the credit amount beyond the minimum of 45 credits for a McGill master's degree. The one-third rule as described above continues to apply.

Research and Thesis – Master's Degrees

All candidates for a research degree must present a thesis based on their own research. The total number of credits allotted to the thesis in any master's program must not be less than 24. The title of the thesis and names of examiners must be forwarded on a *Nomination of Examiners and Thesis Submission* form, available at *www.mcgill.ca/gps/thesis/guidelines/initial-submission*, in accordance with the dates on *www.mcgill.ca/importantdates*, through the Chair of the department concerned at the same time that the thesis is submitted to Graduate and Postdoctoral Studies. A thesis for the master's degree, while not necessarily requiring an exhaustive review of work in the particular field of study, or a great deal of original scholarship, must show familiarity with previous work in the field and must demonstrate the ability to carry out research and to organize results, all of which must be presented in good literate style. The thesis will not normally exceed 100 pages; in some disciplines, shorter texts are preferred. Guidelines and deadlines are available at *www.mcgill.ca/gps/thesis/guidelines*.

Language Requirements – Master's Degrees

Many master's degree programs do not include language requirements, but candidates who intend to proceed to a doctoral degree should take note of any language requirements and are strongly advised to take the examinations in at least one language while working for the master's degree.

5.2 Doctoral Degrees

Residence Requirements – Doctoral

Refers to the numbers of terms (or years) students must be registered on a full-time basis to complete their program. Students are not permitted to graduate until they have fulfilled the residence requirement (or paid the corresponding fees) in their program.

Candidates entering Ph.D. 1 must follow a program of at least three years' residency at the University; this is a minimum requirement, and there is no guarantee that the work of the degree can be completed in this time, but students are expected to complete within the maximum specified period. Only exceptional candidates holding a bachelor's degree will be considered for direct admission to Ph.D. 1 level.

It is required that candidates spend the greater part of each summer working on their theses, and those who do not do so are unlikely to complete a satisfactory thesis in the prescribed minimum time (see *section 8.3: Vacation Policy for Graduate Students and Postdocs*).

A student who has obtained a master's degree at McGill University or at an approved institution in a relevant subject and is proceeding to a Ph.D. degree will, on the recommendation of the department, be admitted to Ph.D. 2; in this case, the residency requirement for the program is two years.

In the doctoral program, students must be registered on a full-time basis for one more year after completion of the residency (i.e., Ph.D. 4 year) before continuing as Additional Session students until completion of the program.

Note: The master's degree must have been awarded before initial registration in the doctoral program; otherwise, the admission level will be at Ph.D. 1 and residency will be extended to three years. Once the level of admission is approved, it will not be changed after obtaining the master's degree if the date falls after registration in the program. If a previous awarded degree is a condition of admission, it must be fulfilled before registration in another program.

As a rule, no more than one-third of the McGill program formal coursework can be credited with courses from another university.

Comprehensive Examinations – Doctoral

The majority of doctoral programs at McGill require candidates to pass a comprehensive examination or set of examinations or equivalent, such as qualifying examinations, preliminary examinations, candidacy papers, comprehensive evaluations, thesis proposals, etc. The results of this examination determine whether or not students will be permitted to continue in their programs. The methods adopted for examination and evaluation and the areas to be examined are specified by departmental regulations and approved by Graduate and Postdoctoral Studies. It is the responsibility of students to inform themselves of these details. For more information, see *University Regulations and Resources* > *Graduate* > *Guidelines and Policies* > *: Ph.D. Comprehensives Policy*.

Language Requirements – Doctoral

Many graduate departments in the Faculties of Agricultural and Environmental Sciences, Education, Engineering, Management, Medicine, and Science do not require a language examination. Students should inquire in their departments if there are any such requirements, or whether any other requirements have been substituted for those relating to languages.

Graduate departments in the Faculties of Arts, Music, and Religious Studies usually require proficiency in one or two languages other than English. In all cases, **students should consult departmental regulations concerning language requirements**.

Language requirements for the Ph.D. degree are met through demonstrated reading knowledge. The usual languages are French, German, or Russian, but in particular instances another language may be necessary.

All language requirements must be fulfilled and the grades reported **before** submission of the thesis to GPS (Thesis section).

Students must contact their departments to make arrangements to take the Language Reading Proficiency Examinations. Students may, however, demonstrate competence by a pass standing in two undergraduate language courses taken at McGill (see departmental regulations).

Candidates are advised to discharge their language requirements as early in their program as possible.

Students expecting to enrol in Professional Corporations in the province of Quebec are advised to become fluent in both spoken and written French.

French language courses are available at the French Language Centre. The teaching is intensive and class sizes are kept small. While undergraduate students are given preference, graduate students who are certain they can devote sufficient time to the work may enrol.

Thesis – Doctoral

The thesis for the Ph.D. degree must display original scholarship expressed in good literate style and must be a distinct contribution to knowledge. **Formal notice of a thesis title and names of examiners must be submitted to the Thesis section of GPS on the *Nomination of Examiners and Thesis Submission* form, available at *www.mcgill.ca/gps/thesis/guidelines/initial-submission*, in accordance with the dates on *www.mcgill.ca/importantdates*, at the same time as the thesis is submitted**. The list of examiners must be approved by the Department Chair, the supervisor and the student. The Thesis section of GPS should be notified of any subsequent change of title as early as possible. Guidelines and deadlines are available at *www.mcgill.ca/gps/thesis/guidelines*.

Special regulations for the Ph.D. degree in particular departments are stated in the entries of those departments.

Thesis Oral Examination – Doctoral

After the thesis has been received and approved, a final oral examination is held on the subject of the thesis and subjects intimately related to it. This is conducted in the presence of a Committee of at least five members presided over by a Pro-Dean nominated by Graduate and Postdoctoral Studies. The Chair of the candidate's department and the Thesis Supervisor are regularly invited to be members of the Committee; at least one member of the Committee is appointed from outside the candidate's department. Guidelines are available at *www.mcgill.ca/gps/thesis/guidelines*.

5.3 Ad Personam Programs (Thesis Option Only)

In very rare circumstances, an applicant who wishes to engage in Master's (thesis option only) or Ph.D. studies of an interdisciplinary nature involving joint supervision by two departments, each of which is authorized by the Government of Quebec to offer its own graduate programs, may be admitted to an *Ad Personam* program. For more information, see *www.mcgill.ca/gradapplicants/programs* and contact the relevant department.

5.4 Coursework for Graduate Programs, Diplomas, and Certificates

Upper-level undergraduate courses (excluding 500-level) may not be considered for degrees, diplomas, and certificates unless they are already listed as required courses in the approved program description. If an upper-level undergraduate course (excluding 500 level) is taken by a graduate student, it must come as a recommendation from the Graduate Program Director in the department. The recommendation must state if the undergraduate course is an additional requirement for the program (must obtain B- or better) or if the course is extra to the program (will be flagged as such on the record and fees will be charged). See document at *www.mcgill.ca/gps/students/registration#coursereg*.

English and French language courses offered by the French Language Centre (Faculty of Arts) or the School of Continuing Studies may not be taken for coursework credits toward a graduate program.

All substitutions for coursework in graduate programs, diplomas, and certificates must be approved by GPS.

Courses taken at other institutions to be part of the requirements of a program of study must be approved by GPS before registration. Double counting is not permitted.

6 Graduate Admissions and Application Procedures

Please refer to *University Regulations and 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 and 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 and 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 in the *Handbook on Student Rights and Responsibilities* ("Green Book"), available at *www.mcgill.ca/secretariat/policies/students*.

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

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

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

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

x. Access to student services and athletic services are available to the Postdoc on an opt-in basis. Fees are applicable.

5. Responsibilities

i. Postdocs are subject to the responsibilities outlined in the *Handbook on Student Rights and Responsibilities* ("Green Book"), available at *www.mcgill.ca/secretariat/policies/students*.

ii. Each academic unit hosting Postdocs should clearly identify Postdocs' needs and the means by which they will be met by the unit.

iii. Each academic unit should assess the availability of research supervision facilities, office space, and research funding before recruiting Postdocs.

iv. Some examples of responsibilities of the department are:

- to verify the Postdoc's eligibility period for registration;
- to provide Postdocs with departmental policy and procedures that pertain to them;
- to oversee the registration and appointment of Postdocs;
- to assign departmental personnel (e.g., Postdoc coordinator and Graduate Program Director) the responsibility for Postdocs;
- to oversee and sign off on the Letter of Agreement for Postdoctoral Education;
- to ensure that each Postdoc has a supervisor, lab and/or office space, access to research operating costs and necessary equipment;
- to include Postdocs in departmental career and placement opportunities;
- to refer Postdocs to the appropriate University policies and personnel for the resolution of conflict that may arise between a Postdoc and a supervisor.

v. Some examples of responsibilities of the supervisor are:

- to uphold and transmit to their Postdocs the highest professional standards of research and/or scholarship;
- to provide research guidance;
- to meet regularly with their Postdocs;
- to provide feedback on research submitted by the Postdocs;
- to clarify expectations regarding intellectual property rights in accordance with the University's policy;
- to provide mentorship for career development;
- to prepare, sign, and adhere to a Letter of Agreement for Postdoctoral Education.

vi. Some examples of responsibilities of Postdocs are:

- to inform themselves of and adhere to the University's policies and/or regulations for Postdocs for leaves, for research, and for student conduct as outlined in the *Handbook on Student Rights and Responsibilities* and the Graduate and Postdoctoral Studies *University Regulations and Resources*;
- to submit a complete file for registration to Enrolment Services;
- to sign and adhere to their Letter of Agreement for Postdoctoral Education;
- to communicate regularly with their supervisor;
- to inform their supervisor of their absences.

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

- to register Postdocs;
- to provide an appeal mechanism in cases of conflict;
- to provide documented policies and procedures to Postdocs;
- to provide Postdocs with the necessary information on McGill University student services.

Approved by Senate, April 2000; revised May 2014

8.3 Vacation Policy for Graduate Students and Postdocs

Graduate students and Postdocs should normally be entitled to vacation leave equivalent to university holidays and an additional total of fifteen (15) working days in the year. Funded students and Postdocs with fellowships and research grant stipends taking additional vacation leave may have their funding reduced accordingly.

Council of FGSR April 23, 1999

8.4 Leave of Absence for Health and Parental/Familial Reasons

A leave of absence may be granted for maternity or parental reasons or for health reasons (see *University Regulations and Resources* > *Graduate* > *: Leave of Absence Status*).

Such a leave must be requested on a term-by-term basis and may be granted for a period of up to 52 weeks. For a maternity or parental leave, the eligibility period of a maximum of 52 consecutive weeks is determined based on when the child is born; if the leave is interrupted for one or two terms, the eligibility period cannot be extended. Students and Postdocs must make a request for such a leave in writing to their department and submit a medical certificate. The department shall forward the request to Enrolment Services. See the procedure in *University Regulations and Resources* > *Graduate* > *: Leave of Absence Status*.

Students who have been granted such a leave will have to register for the term(s) in question and their registration will show as “leave of absence” on their record. No tuition fees will be charged for the duration of the authorized leave. Research supervisors are not obligated to remunerate students and Postdocs on leave. A summary table of various leave policies (paid or unpaid) for students and Postdocs paid from the Federal and Quebec Councils through fellowships or research grants is available at *www.mcgill.ca/gps/funding/students-postdocs/accepting-maintaining-awards* under "Leave Policies: Funding Council Leave Policies for Graduate Students and Postdoctoral Fellows."

8.5 Postdoctoral Research Trainees

Eligibility

If your situation does not conform to the Government of Quebec's definition of Postdoctoral Fellow, you may be eligible to attend McGill as a Postdoctoral Research Trainee. While at McGill, you can perform research only (you may not register for courses or engage in clinical practice). Medical specialists who will have clinical exposure and require a training card must register through Postgraduate Medical Education of the Faculty of Medicine—not Graduate and Postdoctoral Studies.

The category of Postdoctoral Research Trainee is for:

Category 1: An individual who has completed requirements for the Doctoral degree or medical specialty, but the degree/certification has not yet been awarded. The individual will subsequently be eligible for registration as a Postdoctoral Fellow.

Category 2: An individual who is not eligible for Postdoctoral Registration according to the Government of Quebec's definition, but is a recipient of an external postdoctoral award from a recognized Canadian funding agency.

Category 3: An individual who holds a professional degree (or equivalent) in a regulated health profession (as defined under CIHR-eligible health profession) and is enrolled in a program of postgraduate medical education at another institution. The individual wishes to conduct the research stage or elective component of his/her program of study at McGill University under the supervision of a McGill professor. The individual will be engaged in full-time research with well-defined objectives, responsibilities, and methods of reporting. The application must be accompanied by a letter of permission from the home institution (signed by the Department Chair, Dean or equivalent) confirming registration in their program and stating the expected duration of the research stage. Individuals who are expecting to spend more than one year are encouraged to obtain formal training (master’s or Ph.D.) through application to a relevant graduate program.

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

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

General Conditions

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

9 Graduate Studies Guidelines and Policies

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

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

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

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

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

11 Browse Academic Units & Programs

The programs and courses in the following sections have been approved for the 2016–2017 session as listed. The Faculty/School reserves the right to introduce changes as may be deemed necessary or desirable at any time throughout the year.

11.1 Architecture

11.1.1 Location

School of Architecture
Macdonald-Harrington Building
815 Sherbrooke Street West
Montreal QC H3A 2K6
Canada
Telephone: 514-398-6700
Fax: 514-398-7372
Website: *www.mcgill.ca/architecture*

11.1.2 About Architecture

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

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

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

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

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

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

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

- Architectural History and Theory
- Cultural Mediations and Technology
- Urban Design and Housing

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

Architectural Certification in Canada

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

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

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

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

Professional Programs

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

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

The Design Studio concentration is a 45-credit three-term (Fall, Winter, and Fall) program based on a design-intensive professional curriculum and centred on the traditional design studio. Students work in a traditional studio format for the first two terms and on a 9-credit terminal design project in the third

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

term. Complementary and elective course offerings are organized to provide flexibility in individual program design and provide opportunities for students to both explore the discipline and develop concentrations in subject areas related to research and design interests.

For further information regarding admission eligibility and requirements, please see: *www.mcgill.ca/architecture/programs/professional*.

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

The Design Studio 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 two-term project-based investigation divided into two parts. The first part is a supervised 12-credit individual research project that leads to a comprehensive research report, and the second is a 9-credit research and design exercise that forms the basis of the terminal design studio in the fourth term. Students registered in this concentration are assigned a faculty adviser in the second term and follow a research-intensive curriculum shaped by complementary and elective courses chosen in consultation with, and approved by, the adviser.

For further information regarding admission eligibility and requirements, please see: *www.mcgill.ca/architecture/programs/professional*.

Post-Professional Programs

The Post-professional master's programs are open to applicants who have a professional degree in architecture. Students holding the McGill B.Arch. (former) or M.Arch. (Professional) (current) degree, or an equivalent professional qualification, with a CGPA of at least 3.0 on a 4.0-point scale, are eligible for admission to the post-professional programs. In special cases, applicants with a degree in a related field may be considered.

The primary requirement for the M.Arch. (Post-professional) degree is 30 credits of coursework, to be completed in the first two terms, and a 15-credit research report (Cultural Mediations and Technology, Urban Design, and Housing) or 15-credit project (Architectural History and Theory) that is completed in the Summer term. The residence requirement for the M.Arch. (Post-professional) degree is three academic terms, making it possible for students to obtain their degree after 12 calendar months in the program.

section 11.1.7: Master of Architecture (M.Arch.); Post-professional (Non-Thesis) — Architectural History and 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) — Cultural Mediations and Technology (45 credits)

Cultural Mediations and Technology is a platform for inquiry into architecture as a mode of cultural production and media environment. Students in this option study architecture using concepts and theories from the history of architecture and from other fields, including social sciences, material culture, visual culture, and media and technology studies. It encourages transdisciplinary research methods for investigations into spatial practices. The option takes a broad view of what counts as architecture, with attention to the varied roles of the architect within such an expanded field.

section 11.1.9: 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 + Housing Studio) as an applied synthesis of the material discussed in the two core seminars. Nine credits of complementary coursework round out the fall and winter terms along with ARCH 623 (Project Preparation), in which students develop the strategy for a major independent project (ARCH 632, Urban Design and Housing Research Report) to be completed in the summer term.

Ph.D. in Architecture

section 11.1.10: Doctor of Philosophy (Ph.D.); Architecture

Our Ph.D. is a research-based degree, with a primary requirement of an original thesis that makes a substantial contribution to knowledge in the field of architecture. The minimum residence requirement is three years. Every year only a few students are accepted into the Ph.D. program, which means that all incoming Ph.D. candidates compete for a place as Ph.D. 2 students. The most qualified students enter into their first research seminar in September.

Doctoral candidates must have their thesis proposal (ARCH 700) approved by their adviser before embarking on their research. A Thesis Advisory Committee is then struck and is responsible for monitoring the student's research. For course ARCH 701, a comprehensive research proposal is required, as well as a demonstration of broad knowledge in the field. Candidates will submit two further reports in formal meetings with the Advisory Committee, who will review the work in progress (ARCH 702 and ARCH 703). The final meeting takes place after the Committee has reviewed the full draft of the

dissertation. If approved, the dissertation will then be submitted in its final form to the Thesis Office. Acceptance of the thesis by the examiners is followed by an oral defence.

11.1.3 Architecture Admission Requirements and Application Procedures

11.1.3.1 Admission Requirements

M.Arch. (Professional) Program (Non-Thesis)

Applicants holding the McGill B.Sc.(Arch.) degree, or equivalent, with a cumulative grade point average (CGPA) of at least 3.0 on a scale of 4.0, are eligible to apply for admission.

M.Arch. (Post-professional) (Non-Thesis)

Applicants holding an accredited professional degree in architecture, or equivalent, with a cumulative grade point average (CGPA) of at least 3.0 on a scale of 4.0, are eligible to apply for admission. In special cases, candidates with a degree in a related field may be considered.

Ph.D.

Candidates with high standing in McGill's M.Arch. (Post-professional), or who hold an equivalent degree from another university, are eligible to apply to this program. Those who do not have an appropriate background in the chosen research area may be recommended for the M.Arch. (Post-professional) program. Candidates who have an adequate background at the post-professional master's level in the proposed area of research will be admitted to Ph.D. 2 with the stipulation of additional courses from the M.Arch. (Post-professional) curriculum, if necessary.

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

11.1.3.2 Application Procedures

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

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

11.1.3.2.1 Additional Requirements

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

Professional Master of Architecture:

- Summary of work experience. A minimum of 16 weeks of work experience is required. Further information and guidelines are provided at *www.mcgill.ca/architecture/bboard/bscmai/workexperience*. Please use the following: *Work Experience 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 universities previously attended (including summer term, exchange term, or study-away term). If you are recommended for admission, you will later be required to supply official transcripts. Transcripts in languages other than English or French must be accompanied by an English or French translation provided by the institution issuing the transcript or by a certified translator. Please refer to *www.mcgill.ca/gradapplicants/apply/ready/submit/upload* and *www.mcgill.ca/gradapplicants/apply/prepare/checklist/documents*
- A total of two (2) confidential letters of reference are required for your application: two (2) from academics OR one (1) from an academic and one (1) from a recent employer. Once you have identified your referees (you must provide a valid institutional email address for each referee), McGill will send them an email asking for a reference in support of your application (Gmail, Yahoo, etc. domains cannot be accepted). Additionally, uploaded letters must be on university or company/business stationery and the referee must indicate his/her position and full contact information at the institution. Please refer to *www.mcgill.ca/gradapplicants/apply/prepare/checklist/documents*
- Once accepted to the M.Arch. (Professional) program (Design Studio [DST]), students interested in the Design Studio-Directed Research option will need to provide a two-page (maximum) research statement in early Fall of the first term indicating their general area of interest, their understanding of this area of study, faculty expertise, and research intention in terms of topic and project-based investigation. Specific references to expertise within the School are encouraged (e.g., History and Theory of Architecture; Cultural Landscape Studies; Affordable and Sustainable Housing; Computation and Fabrication; High-performance Visualization; Minimum Cost Housing; Gender, Sexuality and Space; Design and Health; Urban Design; Landscape Urbanism; Architectural Representation; Urban Agriculture; Vernacular Architecture; Reurbanisation)

  Note: Applicants to the M.Arch.(Professional) Design Studio option do not need to provide a research statement.

- Completed *Program Comparison Chart**

  Note: Not required by B.Sc.(Arch.) graduates from McGill University.

- Course calendar descriptions of previous college and/or university studies must be submitted in addition to the Program Comparison Chart

Note: Not required by B.Sc.(Arch.) graduates from McGill University.

- A comprehensive e-portfolio (pdf format, max. 15 MB, due no later than January 15) that may include the following: selected work from all previous design studios; examples of project work from other courses; examples of freehand drawing and sketching; examples of professional work: sketches, drawings, images of models, photographs of built work (professional work includes work carried out while employed in architects' offices, as well as personal projects; please identify the architect(s) and your own roles in each project illustrated)

Note: Please indicate, where applicable, if a project is an individual or group project.

Post-professional programs:

M.Arch. (Post-professional) and Ph.D.

- Curriculum Vitae
- Applicants are required to upload unofficial transcripts of all universities previously attended. If you are recommended for admission you will later be required to supply official transcripts. Transcripts in languages other than English or French must be accompanied by an English or French translation provided by the institution issuing the transcript or by a certified translator. Please refer to *www.mcgill.ca/gradapplicants/apply/ready/submit/upload* and *www.mcgill.ca/gradapplicants/apply/prepare/checklist/documents*
- Two confidential letters of reference are required for your application. Once you have identified your referees (you must provide a valid institutional email address for each referee), McGill will send them an email asking for a reference in support of your application (Gmail, Yahoo, etc. domains cannot be accepted). Additionally, uploaded letters must be on university or company/business stationery and the referee must indicate his/her position and full contact information at the institution. Please refer to *www.mcgill.ca/gradapplicants/apply/prepare/checklist/documents*
- Statement of research interest / Post-professional M.Arch. applicants: a one-page statement of research objectives indicating the option chosen and the reasons for that choice. Applicants should include a clear description of their research interest, as well as a brief explanation of why they wish to study at McGill University's School of Architecture. **OR**, Research proposal / Ph.D. applicants: a four-page research proposal, as well as a detailed explanation of why and with whom they wish to study at McGill University's School of Architecture
- A digital portfolio (PDF format) of not more than 15 MB must be submitted containing at least five examples of the applicant's work. Doctoral applicants should submit evidence of research accomplishments, which could, in some cases, replace the portfolio requirement.
- Writing sample / Post-professional M.Arch. applicants: a recent sample of the applicant's written work, on any topic (not necessarily within the desired field of graduate study) and not necessarily previously submitted for evaluation or publication. **OR**, Written work / Ph.D. applicants: a sample of the applicant's written work, drawn from essays, papers, or other work previously submitted for academic evaluation or publication, and falling within the desired field of graduate study

* *These documents are available in PDF or DOC format on the School of Architecture website.*

11.1.3.3 Application Deadlines

The application deadlines listed here are set by the School of Architecture 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*.

Canadian	International	Special	Exchange/Visiting
Fall: Jan. 15	Fall: Jan. 15	Fall: May 1 (M.Arch. (Professional) only)	Fall: May 1 (M.Arch. (Professional) only)
Winter: N/A	Winter: N/A	Winter: Sept. 1 (M.Arch. (Professional) only)	Winter: Sept. 1 (M.Arch. (Professional) only)
Summer: N/A	Summer: N/A	Summer: N/A	Summer: 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.

11.1.4 Architecture Faculty

Director

Martin Bressani

Graduate Program Directors

Robert Mellin (*Post-professional program*)

David Covo (*Professional program*)

Emeritus Professors

Bruce Anderson; B.Arch.(McG.), M.Arch.(Harv.), F.R.A.I.C., O.A.Q.

Derek Drummond; B.Arch.(McG.), F.R.A.I.C., O.A.Q., O.A.A. (*William C. Macdonald Emeritus Professor of Architecture*)

Adrian Sheppard; B.Arch.(McG.), M.Arch.(Yale), A.A.P.P.Q., F.R.A.I.C., O.A.Q.

Radoslav Zuk; B.Arch.(McG.), M.Arch.(MIT), D.Sc.(U.A.A.), F.R.A.I.C., O.A.Q., O.A.A.

Professors

Annmarie Adams; B.A.(McG.), M.Arch., Ph.D.(Calif., Berk.), M.R.A.I.C. (*William C. Macdonald Professor of Architecture*)

Vikram Bhatt; N.Dip. Arch.(Ahmed.), M.Arch.(McG.), M.R.A.I.C.

Martin Bressani; B.Sc.(Arch.), B.Arch.(McG.), M.Sc.(Arch.)(MIT), D.E.A., Docteur(Paris IV), O.A.Q.

Avi Friedman; B.Arch.(Technion), M.Arch.(McG.), Ph.D.(Montr.), O.A.Q., I.A.A.

Alberto Pérez-Gómez; Dipl.Eng.Arch.(Nat. Pol. Inst. Mexico), M.A., Ph.D.(Essex), M.R.A.I.C. (*Saidye Rosner Bronfman Professor of Architectural History*)

Associate Professors

Ricardo L. Castro; B.Arch.(Los Andes, Col.), M.Arch., M.A.(Ore.), F.R.A.I.C.

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.

Aaron Sprecher; B.Arch.(Bezalel), M.Arch.(Calif.-LA).

Assistant Professors

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.)

Adjunct Professors

Howard Davies, Julia Gersovitz, Andrew King, Conor Sampson

Course Lecturers

Vedanta Balbahadur, Erika Brandl-Mouton, Clothilde Caillé-Levesque, Yves de Fontenay, Nancy Dunton, Fabrizio Gallanti, Eric Gauthier, Marc Hallé, Edward Houle, Laurent Laframboise, Hubert Pelletier, Marc-André Plourde, Pierina Saia, Pieter Sijpkes, Angela Silver

Visiting Critics and Guest Lecturers

Each year, visitors are involved in the teaching of certain courses as critics and lecturers. These visitors change from year to year. The following were visitors in 2015:

Tiphaine Abenia, Gavin Affleck, Chandler Ahrens, Ronnie Araya, Manon Asselin, George Baird, Tom Balaban, Giovanna Borasi, Kevin Botchar, Georges Boulette, Sinisha Brdar, Brian Brush, Andrew Butler, Trevor Butler, Stephane Chevalier, Azad Chichmanian, Jean-Pierre Chupin, Christina Contandriopoulos, Andrew Curtis, Jamie Dabner, Matt Daubach, Trevor Davies, Talia Dorsey, Jean-Maxime Dufresne, Mary Jean Eastman, David Edgars, Tom Egli, Viviane Ehrensberger, Andrew Forster, Maxime-Alexis Frappier, Simon Glew, Erica Goldstein, Paul Guenther, Susane Havelka, Mimi Hoang, Timothy Hyde, Hans Ibelings, Chris Ilg, Hal Ingberg, Jayne Kelley, Stephan Kowal, Michel Langevin, Emmanuelle Lapointe, Michel Lauzon, Jonathan Lessard, Carole Levesque, Jing Liu, Leslie Lok, Jeff Ma, Andrea MacElwee, Vouli Mamfredis, Cecile Martin, Eric Marosi, John McMinn, Mélanie Mignault, Shawn Moscovitch, Shaheen Namvary, Son Nguyen, Mark Poddubiuk, Stephane Pratte, Sheldon Reich, Joan Renaud, Sophie Robitaille, Lia Ruccolo, Barry Sampson, Roxanne Sayegh, Samantha Christine Scheider, Peter Sealy, Lola Sheppard, John Shnier, Malkit Shoshan, Inderbir Riar Singh, Angeliki Sioli, Lars Spuybroek, Cliff Stendel, Rebecca Taylor, Alanna Thain, David Wees, Dan Wood, Sasa Zivkovic

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

This concentration is a 45-credit, three-term (Fall, Winter, and Fall) program based on a design-intensive professional curriculum and centred on the design studio. Students work in a traditional studio format for the first two terms and with individual advisers in the terminal design project course in the third (Fall) term. Complementary and elective courses are organized to provide flexibility in individual program design and create opportunities to both explore the discipline and focus on subject areas related to research and design interests.

Required Courses (32 credits)

ARCH 550	(3)	Urban Planning and Development
ARCH 672	(6)	Architectural Design 1
ARCH 673	(6)	Architectural Design 2
ARCH 674	(3)	Professional Practice 1
ARCH 677	(9)	Architectural Design 3
ARCH 678	(3)	Advanced Construction
ARCH 680	(2)	Field Sketching

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)	Critical Writing
ARCH 626	(4)	Critical Design Strategies
ARCH 679	(3)	Writing in Architecture
ARCH 684	(4)	Contemporary Theory 1
ARCH 685	(4)	Contemporary Theory 2

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.

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

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

Required Courses (48 credits)

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

Complementary Courses

(9-12 credits)

Group A:

3-12 credits chosen from the following courses:

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

Group B:

0-9 credits chosen from the following courses:

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

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

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

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

Elective Courses

(0-3 credits)

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

11.1.7 Master of Architecture (M.Arch.); Post-professional (Non-Thesis) — Architectural History and Theory (45 credits)

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

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

Research Project (15 credits)

ARCH 624	(15)	History and Theory Project

Required Courses (27 credits)

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

Elective Course (3 credits)

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

11.1.8 Master of Architecture (M.Arch.); Post-professional (Non-Thesis) — Cultural Mediations and Technology (45 credits)

Drawing on methods in philosophy, media studies, cultural landscapes, vernacular architecture studies, and material culture, students in this option study the ways in which we conceptualize and realize the built world. How are architectural practices mediated by their broader contexts?

This option capitalizes on the expertise of the architect-researcher to move freely between art and science and between content-based and empirical research, and to facilitate robust interdisciplinary teams of engineers, technologists, media artists, and social scientists to understand, explain, and create today's built environments.

Research Report (15 credits)

ARCH 629	(15)	Cultural Mediations and Technology Research Report

Required Courses (15 credits)

ARCH 623	(3)	Project Preparation
ARCH 627	(4)	Research Methods for Architects
ARCH 684	(4)	Contemporary Theory 1
ARCH 685	(4)	Contemporary Theory 2

Complementary Courses (15 credits)

15 credits of courses at the 500 level or higher, approved by an adviser.

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

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

Research Report (15 credits)

ARCH 632	(15)	Urban Design and Housing Research Report

Required Courses (21 credits)

ARCH 602	(4)	Housing Seminar
ARCH 603	(6)	Urban Design and Housing Studio
ARCH 604	(4)	Urban Design Seminar
ARCH 623	(3)	Project Preparation

ARCH 627	(4)	Research Methods for Architects

Group A Complementary Courses (9 credits)

6-9 credits from the following:

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

Group B Complementary Courses

0-3 credits from any courses at the 500 level or higher, approved by an adviser.

11.1.10 Doctor of Philosophy (Ph.D.); Architecture

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

ARCH 700	(0)	Dissertation Proposal
ARCH 701	(0)	Final Dissertation Proposal and Literature Review
ARCH 702	(0)	Dissertation Progress Report 1
ARCH 703	(0)	Dissertation Progress Report 2

11.2 Bioengineering

11.2.1 Location

Department of Bioengineering
Macdonald Engineering Building, Room 270
817 Sherbrooke Street West
Montreal QC H3A 0C3
Telephone: 514-398-7254
Email: *info.bioeng@mcgill.ca*
Website: *www.mcgill.ca/bioengineering*

11.2.2 About Bioengineering

The Department of Bioengineering, established in 2012, is the newest department to join McGill University's renowned Faculty of Engineering. McGill researchers from nearly all faculty units, including seven Canada Research Chairs and many colleagues in the Faculties of Medicine, Science, and Agricultural and Environmental Sciences, are actively involved in various areas of bioengineering. Within our Department, faculty members conduct research in three major fields:

- Biological materials and mechanics

- Biomolecular and cellular engineering
- Biomedical, diagnostics, and high throughput screening

11.2.3 Graduate Studies

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

Please refer to *section 11.3: Biological and Biomedical Engineering* for further information on these programs.

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.)

Associate Professor

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.)

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

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 a new interfaculty program involving the Department of Bioengineering in the Faculty of Engineering and the Department of Biomedical Engineering in the Faculty of Medicine. The new BBME interfaculty program builds on the excellence and high standard of its predecessor graduate program in Biomedical Engineering. This broader interfaculty restructuration 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 have supervisors associated with the program whose home departments will be spread primarily across the Faculties of Engineering and Medicine.

As scientists unravel the molecular and physiological mechanisms of biology, attempt to reverse-engineer naturally occurring biological solutions, devices, and procedures, or develop increasingly advanced technologies to transform patient care, graduates from the BBME program are poised to play a critical role in shaping our global future.

Please consult our *website* for additional information.

Research Domains

Our faculty members are particularly active in research related to the development of quantitative analysis tools and instruments for biological and biomedical research. The ultimate goal is the pursuit of answers to biological and medical questions. Ongoing biological and biomedical engineering research at McGill includes:

- signal analysis, including brain (EEG), muscles (EMG), eyes (EOG), respiration, and mass spectrometry;
- systems analysis, including neuromuscular control, and oculomotor and vestibular control;
- experimental and computational biomechanics, including orthopedic and auditory mechanics;
- biomaterials, including artificial cells;
- 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, 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 goal of the Biological and Biomedical Engineering doctoral program is to provide 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. 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 future 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. Through independent research and thesis writing, 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.

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

11.3.3 Biological and Biomedical Engineering Admission Requirements and Application Procedures

11.3.3.1 Admission Requirements

For up-to-date admission requirements, please consult *www.mcgill.ca/bbme/prospective-students/how-apply* and *University Regulations and Resources > Graduate > Graduate Admissions and Application Procedures > : Admission Requirements (Minimum Requirements to be Considered for Admission)*.

11.3.3.2 Application Procedures

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

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

Please address enquiries directly to *info.bbme@mcgill.ca*.

11.3.3.3 Application Deadlines

The application deadlines listed here 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*.

Canadian	International	Special/Exchange/Visiting
Fall: Feb. 1	Fall: Feb. 1	Fall: Same as Canadian/International
Winter: Nov. 10	Winter: Sept. 10	Winter: Same as Canadian/International
Summer: N/A	Summer: N/A	Summer: N/A

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

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

11.3.4 Biological and Biomedical Engineering Faculty

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

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

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

** NEW PROGRAM **

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

Thesis Courses (24 credits)

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

Required Courses (3 credits)

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

Complementary Courses (18 credits)

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

3 credits from BMDE and 3 credits from BIEN

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)	Nanoparticles in the Medical Sciences
BIEN 520	(3)	High Throughput Bioanalytical Devices
BIEN 530	(3)	Imaging and Bioanalytical Instrumentation
BIEN 550	(3)	Biomolecular Devices
BIEN 560	(3)	Biosensors
BMDE 502	(3)	BME Modelling and Identification
BMDE 503	(3)	Biomedical Instrumentation
BMDE 509	(3)	Quantitative Analysis and Modelling of Cellular Processes
BMDE 512	(3)	Finite-Element Modelling in Biomedical Engineering
BMDE 519	(3)	Biomedical Signals and Systems
BMDE 610	(3)	Functional Neuroimaging Fusion

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

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

MDPH 611	(2)	Medical Electronics
MDPH 612	(2)	Computers in Medical Imaging
MECH 500*	(3)	Selected Topics in Mechanical Engineering
MECH 561	(3)	Biomechanics of Musculoskeletal Systems
PHGY 517	(3)	Artificial Internal Organs
PHGY 518	(3)	Artificial Cells

* When topic is appropriate.

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

** NEW PROGRAM **

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 700	()

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@mccgill.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 toward the development of next-generation, high-density storage media, functional coatings, electronic devices, composite fluids and "smart" materials, to name but a few.

Biomedical engineering and biotechnology – The majority of professors in the Department are involved with biological engineering. This is a very broad research area that includes biotechnology and biomedical engineering. Biotechnology is an integrated approach of combining life sciences (e.g., biochemistry and cell biology) with process engineering, design, and scale-up principles. This is the use of biological systems or living organisms to do practical things and manufacture valuable products such as biohydrogen, drugs, therapeutics, polymers, and surfactants. Biomedical engineering combines the principles of engineering with medicine as well as life sciences and biology. Examples of this include:

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

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

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

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

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

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

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.

section 11.4.8: Doctor of Philosophy (Ph.D.); Chemical Engineering

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

11.4.3 Chemical Engineering Admission Requirements and Application Procedures

11.4.3.1 Admission Requirements

Admission to graduate studies requires a minimum CGPA of 3.0/4.0 (or equivalent) for the complete bachelor's program, or a minimum GPA of 3.2/4.0 (or equivalent) in the last two years of full-time studies in an undergraduate program. 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 achieve a minimum *TOEFL* score of 90 on the Internet-based test (iBT), with each component score not less than 20, prior to admission.

M.Eng. (Thesis), M.Eng. (Non-Thesis)

Admission requires a bachelor's degree (or equivalent) in engineering or science disciplines.

Ph.D.

Admission requires a master's degree (or equivalent) from a recognized university. Students in the Department's M.Eng. (Thesis) program may petition to transfer to the Ph.D. program after one year without submitting the master's thesis following a formal "fast-track" procedure. At their request, applicants (without a master's degree) with exceptionally high Academic Standing and outstanding research potential will be considered for direct admission to the Ph.D. program.

11.4.3.2 Application Procedure

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

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

11.4.3.2.1 Additional Requirements

- Reference Letter – Ph.D. applicants must submit a letter of recommendation from their master's research supervisor.

11.4.3.3 Application Deadlines

The application deadlines listed here are set by graduate departments, and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill academic unit's website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

Canadian	International	Special/Exchange/Visiting
Fall: Jan. 15	Fall: Jan. 15	Fall: Jan. 15
Winter: Oct. 15	Winter: Sept. 10	Winter: Same as Canadian/International
Summer: Jan. 15	Summer: Jan. 15	Summer: Jan. 15

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

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

11.4.4 Chemical Engineering Faculty

Chair

Sylvain Coulombe

Emeritus Professors

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

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

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

Professors

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

Sasha Omanovic; Dipl.Ing., Ph.D.(Zagreb), P.Eng. (*Hydro-Quebec Nano-Engineering Scholar*)

Alejandro D. Rey; B.Ch.E.(CCNY), Ph.D.(Calif.), F.R.S.C. (*James McGill Professor*)

Nathalie Tufenkji; B.Eng.(McG.), M.Sc., Ph.D.(Yale), ing. (*CRC-Tier II*)

Associate Professors

Dimitrios Berk; B.Sc.(Bosphorus), M.E.Sc.(W. Ont.), Ph.D.(Calg.), P.Eng.

Jeff Gostick; B.Eng.(Ryerson), M.A.Sc., Ph.D.(Wat.)

Reghan James Hill; B.E.(Auck.), Ph.D.(Cornell)

Anne-Marie Kietzig; Dipl.Ing.(TU Berlin), Ph.D.(Br. Col.)

Richard L. Leask; B.A.Sc., M.A.Sc.(Wat.), Ph.D.(Tor.), P.Eng. (*William Dawson Scholar*)

Milan Maric; B.Eng.Mgt.(McM.), Ph.D.(Minn.), P.Eng.

Jean-Luc Meunier; D.Ing.(E.P.F.L.), M.Sc., Ph.D.(I.N.R.S.), Eng.

Phillip Servio; B.A.Sc., Ph.D.(Br. Col.)

Viviane Yargeau; B.Ch.E., M.Sc.A., Ph.D.(Sher.), Eng.

Assistant Professors

P.-Luc Girard-Lauriault; B.Sc.(Montr.), Ph.D.(École Poly., Montr.)

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

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

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

Post-Retirement

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

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)	Biological Treatment: Wastewaters
CIVE 660	(4)	Chemical and Physical Treatment of Waters

Air pollution engineering: (3 credits)

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

Soil and water quality management: (3 credits)

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

Environmental impact: (3 credits)

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

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

Environmental policy: (3 credits)

URBP 506	(3)	Environmental Policy and Planning

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

Elective Courses (11 credits)

CHEE 696	(6)	Extended Project

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

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

Thesis

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

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 a small independent 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.

Further information may be obtained from the Program Coordinator, Department of Civil Engineering and Applied Mechanics.

section 11.5.9: Doctor of Philosophy (Ph.D.); Civil Engineering

Research can be 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.

11.5.3 Civil Engineering and Applied Mechanics Admission Requirements and Application Procedures

11.5.3.1 Admission Requirements

The general rules of Graduate and Postdoctoral Studies apply and are detailed in *University Regulations and Resources* > *Graduate* > *: Graduate Admissions and Application Procedures*. The minimum academic standard for admission is a cumulative grade point average (CGPA) of 3.0/4.0 in a recognized program. Alternatively, an equivalent grade point average of no less than 3.2/4.0 over the last two years of the program will be accepted.

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 write either:

- 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 (or 567 on the paper-based test (PBT)) and Ph.D. applicants must achieve a minimum overall score of 92 (or 580 on the PBT), with a minimum score of 20 for each component (i.e., Writing, Reading, Speaking, Listening); **or**
- the *IELTS* (International English Language Testing System); Master's applicants must achieve a minimum band score of 6.5, and Ph.D. applicants must achieve a minimum band score of 7 in order to apply.

Test results reach McGill approximately eight weeks after the test is taken; please note that it is the student's responsibility to make the necessary arrangements with the examining board to write the test in his/her country of residence. Full information and registration forms may be obtained by consulting the *TOEFL* or the *IELTS* websites.

You must meet **both** of these requirements to be eligible to apply. Meeting minimum requirements does not guarantee admission.

11.5.3.2 Application Procedures

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

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

11.5.3.3 Application Deadlines

The application deadlines listed here are set by the Department of Civil Engineering and Applied Mechanics and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill academic unit's website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

Canadian	International	Special/Exchange/Visiting
Fall: Jan. 15	Fall: Jan. 15	Fall: Jan. 15
Winter: Oct. 15	Winter: Sept. 10	Winter: Sept. 10
Summer: N/A	Summer: N/A	Summer: 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.

11.5.4 Civil Engineering and Applied Mechanics Faculty

Chair

Van-Thanh-Van Nguyen

Associate Chair

Yixin Shao

Emeritus Professors

Philip J. Harris; B.Sc.(Manit.), M.Eng., Ph.D.(McG.), F.E.I.C., F.C.S.C.E., Eng.

M. Saeed Mirza; M.S., B.Eng.(Karachi), M.Eng., Ph.D.(McG.), F.E.I.C., F.C.S.C.E., F.A.C.I., Hon. F.I.E.P., Eng.

Stuart B. Savage; B.Eng.(McG.), M.S.Eng.(Cal. Tech.), Ph.D.(McG.), F.R.S.C.

Professors

Vincent H. Chu; B.S.Eng.(Taiwan), M.A.Sc.(Tor.), Ph.D.(MIT), 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.(Vietnam), 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, Faculty of Engineering

A. Patrick S. Selvadurai; M.S.(Stan.), D.I.C., Ph.D., D.Sc.(Nott.), F.R.S.C., F.E.I.C., F.I.M.A., F.C.S.C.E., P.Eng., C.Math. (*William Scott Professor of Civil Engineering, James McGill Professor*)

Suresh C. Shrivastava; B.Sc.(Eng.)(Vikram), M.C.E.(Del.), Sc.D.(Col.), Eng.

Associate Professors

Andrew J. Boyd; B.Sc.Eng.(New Br.), M.A.Sc.(Tor.), Ph.D.(Br. Col.), P.Eng., F.A.C.I.

Luc E. Chouinard; B.Ing., M.Ing.(Montr.), B.C.L.(McG.), Sc.D.(MIT), Eng.

Dominic Frigon; B.Sc., M.Sc.(McG.), Ph.D.(Ill.-Urbana-Champaign), L.L.E.

Associate Professors

Susan J. Gaskin; B.Sc.(Eng.)(Qu.), Ph.D.(Cant.), Eng.

Ronald Gehr; B.Sc.(Eng.)(Witw.), M.A.Sc., Ph.D.(Tor.), P.Eng., F.C.S.C.E.

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

Mohamed A. Meguid; B.Sc.(Cairo), M.Sc., Ph.D.(W. Ont.), P.Eng; Associate Dean, Undergraduate Education

Luis Miranda-Moreno; B.Sc., M.Eng.(Mexico), Ph.D.(Wat.)

Colin Rogers; B.A.Sc., M.A.Sc.(Wat.), Ph.D.(Syd.), P.Eng.

Yixin Shao; B.Sc., M.S.(Tongji), Ph.D.(N'western), P.Eng., F.A.C.I.

Assistant Professors

Jinxia Liu; BE/ME(Tianjin), ME(Rensselaer Poly.), Ph.D.(Purd.)

Omid M. Rouhani; B.Sc., M.Sc.(Sharif Univ. of Technology), M.Sc., Ph.D.(Calif., Davis)

Adjunct Professors

Sofia Babarutsi, Paul Rodrigue, William Taylor

11.5.5 Master of Engineering (M.Eng.); 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)	Masters Research Seminar

Complementary Courses (17 credits)

(minimum 17 credits)

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

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)	Masters 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)

Research Project

(5-15 credits)

Credit for the project may vary between 5 and 15 credits, depending on the amount of work involved. Project courses are chosen from the following:

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

Complementary Courses

(30-40 credits)

A minimum of 30 credits at the 500 or 600 level, with at least 8 credits at the 600 level.

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

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

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

Research Project

(0 or 5-15 credits)

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

Required Courses (6 credits)

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

Complementary Courses

(24-39 credits)

a minimum of 22 credits chosen from the following:

Data analysis:

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

Toxicology:

OCCH 612	(3)	Principles of Toxicology

Water pollution engineering:

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

Air pollution engineering:

MECH 534	(3)	Air Pollution Engineering

Soil and water quality management:

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

Environmental impact:

GEOG 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 *Centre for Intelligent Machines* (CIM).
- Telecommunications laboratories focus their work on signal processing, broadband communications, and networking; these laboratories form part of the *Centre for Advanced Systems and Communications* (SYTACom), a McGill University Research Centre devoted to fostering innovation in the area of communications systems and technologies via advanced research and training of highly qualified personnel.
- The *Integrated Microsystems Laboratory* (iML) supports research in FPGAs, MEMS, micro- and nano-systems, VLSI architectures for digital communications and signal processing, mixed signal, RF, and microwave integrated circuits and components, simulation of integrated circuits and microsystems, integrated antennas, design for testability, reconfigurable computing, high-speed circuits, and packaging.
- Antenna and microwave research, and optical fibre and integrated optics research are carried out in a fully equipped facility.
- The *Photonics Systems* laboratory includes continuous wave and femtosecond Ti: Sapphire lasers, diode lasers, extensive optics and optomechanics, and sophisticated electronic and imaging equipment.
- Solid state facilities include measurement equipment for magnetic and electric properties of materials, vacuum deposition, and RF sputtering systems.
- The *Computational Electromagnetics Laboratory* provides tools for numerical analysis, visualization, interface design, and knowledge-based system development.
- There is also a well-equipped laboratory for power electronics and power systems research.

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

There are three other universities in Montreal: Concordia University is the other English-language university; *l'Université de Montréal*, and its affiliated school of engineering, *l'École Polytechnique*, is the largest francophone university; *l'Université du Québec* has a campus in Montreal and in major towns throughout the province.

The proximity of these schools to McGill University ensures that a rich array of courses is available to suit individual needs. McGill also collaborates on research projects with many organizations such as *l'Institut de recherche d'Hydro-Québec* (IREQ) and *l'Institut national de la recherche scientifique* (INRS).

Financial Support

Graduate Assistantships: The Department awards several graduate assistantships to qualified full-time graduate students. These are normally funded from research grants or contracts awarded to individual faculty members. In return, the graduate assistant is expected to perform research-related tasks assigned

by the professor from whose grant the assistantship is paid. A good part, but not necessarily all, of this work can be used for preparing a thesis. There is no special application form for graduate assistantships; all applicants who indicate a need for support on their application forms will be considered.

Teaching Assistantships: Graduate students, with the approval of their supervisors, may also undertake teaching assistantships for additional remuneration. These are awarded at the beginning of the term. The Department can make no prior commitments.

Graduate students can also receive financial aid through fellowships, loans, or bursaries. For more information, please refer to *www.mcgill.ca/gps/funding/students-postdocs*, or contact:

Graduate and Postdoctoral Studies, McGill University
James Administration Building, Room 400
845 Sherbrooke Street West
Montreal QC H3A 0G4

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

The Master of Engineering degree (thesis option) involves graduate-level courses and an externally examined thesis. This 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.

section 11.6.6: Master of Engineering (M.Eng.); Electrical Engineering (Thesis) — Computational Science and Engineering (47 credits)

This program is currently under review and may not be offered. Please inquire.

section 11.6.7: 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 11.6.8: 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 and 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 Deadlines

The application deadlines listed here are set by the Electrical and Computer Engineering Department and may be revised at any time. Applicants must verify all deadlines and documentation requirements well in advance on the appropriate McGill academic unit's website; please consult the list at *www.mcgill.ca/gps/contact/graduate-program*.

Canadian	International	Special/Exchange/Visiting
Fall: Jan. 15	Fall: Jan. 15	Fall: Jan. 15
Winter: Oct. 15	Winter: Sept. 1	Winter: Same as Canadian/International
Summer: N/A	Summer: N/A	Summer: N/A

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

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

11.6.4 Electrical and Computer Engineering Faculty

Chair

Andrew G. Kirk

Associate Chair, Academic

Roni Khazaka

Associate Chair, Undergraduate Studies

Jonathan P. Webb

Associate Chair, Graduate Programs

Milica Popovich

Emeritus Professors

Eric L. Adler; B.Sc.(Lond.), M.A.Sc.(Tor.), Ph.D.(McG.), F.I.E.E.E., Eng.

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.)

Lorne Mason; M.Eng., Ph.D.(Sask.)

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.

Professors

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.)

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

Warren Gross; B.A.Sc.(Wat.), M.A.Sc., Ph.D.(Tor.) (*on sabbatical 2016–2017*)

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

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

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

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

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

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

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.

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

Dániel Varró; M.Sc., Ph.D.(BME)

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

Associate Professors

Tal Arbel; M.Eng., Ph.D.(McG.) (*on sabbatical 2016–2017*)

Jan Bajcsy; B.Sc.(Harv.), M.Eng., Ph.D.(Princ.)

François Bouffard; B.Eng., Ph.D.(McG.)

Benoit Boulet; B.Sc.(Laval), M.Eng.(McG.), Ph.D.(Tor.) (*William Dawson Scholar*) (*Associate Dean, Research & Innovation*)

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

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

Mourad El-Gamal; B.Sc.(Cairo), M.Sc.(Nashville), Ph.D.(McG.) (*William Dawson Scholar*)

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

Roni Khazaka; M.Eng., Ph.D.(Car.)

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

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

Aditya Mahajan, B.Tech.(Indian IT), M.S., Ph.D.(Mich.), P.Eng. (*on sabbatical 2016–2017*)

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

Zetian Mi; B.A.Sc.(Beijing), M.Sc.(Iowa), Ph.D.(Mich.) (*William Dawson Scholar*)

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

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

Milica Popovich; B.Sc.(Colo.), M.Sc., Ph.D.(N'western)

Ioannis Psaromiligkos; B.Sc.(Patras), M.Sc., Ph.D.(Buffalo) (*on sabbatical 2016–2017*)

Michael Rabbat; B.S.(Ill.), M.S.(Rice), Ph.D.(Wisc.)

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

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

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

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

Assistant Professors

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

Brett Meyer; B.S.(Wisc.), M.S., Ph.D.(Carn. Mell), P.Eng.

Gunter Mussbacher; Ph.D.(Ott.)

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

Associate Members

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

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

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

William R. Funnell; M.Eng., Ph.D.(McG.)

Henrietta L. Galiana; M.Eng., Ph.D.(McG.)

David Juncker; Ph.D.(Neuchatel)

Robert E. Kearney; M.Eng., Ph.D.(McG.)

Muthucumaru Maheswaran; B.Sc.(Peradeniya), M.S.E.E., Ph.D.(Purd.)

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, Frederic Nabki, Douglas O'Shaughnessy, Katarzyna Radecka, 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 register for all 28 credits during the three terms of residency.

Complementary Courses

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

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

11.6.6 Master of Engineering (M.Eng.); Electrical Engineering (Thesis) — Computational Science and Engineering (47 credits)

This program is under review and currently not offered.

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

Required Course (1 credit)

ECSE 670D1	(.5)	Computational Science Engineering Seminar
ECSE 670D2	(.5)	Computational Science Engineering Seminar

Complementary Courses (18 credits)

(minimum 18 credits)

Six courses at the graduate level (500 or above) are required (minimum 18 credits), with a grade of B- or better. Two courses (minimum 6 credits) from List A, and two courses (minimum 6 credits) from List B. At least two of the courses taken from Lists A and B must be from outside the Department of Electrical and Computer Engineering.

List A: Scientific Computer Courses

CIVE 602	(4)	Finite Element Analysis
COMP 522	(4)	Modelling and Simulation
COMP 540	(3)	Matrix Computations
COMP 566	(3)	Discrete Optimization 1
MATH 578	(4)	Numerical Analysis 1
MATH 579	(4)	Numerical Differential Equations

List B: Applications and Specialized Methods Courses

ATOC 512	(3)	Atmospheric and Oceanic Dynamics
ATOC 513	(3)	Waves and Stability
ATOC 515	(3)	Turbulence in Atmosphere and Oceans
CIVE 514	(3)	Structural Mechanics
CIVE 572	(3)	Computational Hydraulics
CIVE 603	(4)	Structural Dynamics
COMP 557	(3)	Fundamentals of Computer Graphics
COMP 558	(3)	Fundamentals of Computer Vision
COMP 567	(3)	Discrete Optimization 2
COMP 621	(4)	Program Analysis and Transformations
COMP 642	(4)	Numerical Estimation Methods
COMP 767	(4)	Advanced Topics: Applications 2
ECSE 507	(3)	Optimization and Optimal Control
ECSE 532	(3)	Computer Graphics
ECSE 547	(3)	Finite Elements in Electrical Engineering
ECSE 549	(3)	Expert Systems in Electrical Design

MATH 555	(4)	Fluid Dynamics
MATH 560	(4)	Optimization
MATH 761	(4)	Advanced Topics in Applied Mathematics 1
MECH 533	(3)	Subsonic Aerodynamics
MECH 537	(3)	High-Speed Aerodynamics
MECH 538	(3)	Unsteady Aerodynamics
MECH 539	(3)	Computational Aerodynamics
MECH 541	(3)	Kinematic Synthesis
MECH 572	(3)	Introduction to Robotics
MECH 573	(3)	Mechanics of Robotic Systems
MECH 576	()	
MECH 577	(3)	Optimum Design
MECH 610	(4)	Fundamentals of Fluid Dynamics
MECH 620	(4)	Advanced Computational Aerodynamics
MECH 632	(4)	Advanced Mechanics of Materials
MECH 642	(4)	Advanced Dynamics
MECH 650	(4)	Fundamentals of Heat Transfer
MECH 654	(4)	Compt. Fluid Flow and Heat Transfer

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

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

Research Project (18 credits)

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

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

Complementary Courses (27 credits)

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

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

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

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

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

Aerodynamics and fluid mechanics

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

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 16 credits 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 (Thesis) — Computational Science and Engineering (46 credits)

For students who would like to concentrate on computational work for their research, the M.Eng. (Thesis) – Computational Science and Engineering (CSE) option is available. CSE is a rapidly growing multidisciplinary area with connections to the sciences, engineering, mathematics, and computer science. CSE focuses on the development of problem-solving methodologies and robust tools for the solution of scientific and engineering problems. In this program, students choose their complementary courses from within a list of scientific computing courses and courses that involve applications and specialized methods.

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

Students in this program must complete required courses in addition to 16 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 11.7.8: 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, CIMGAS, to arrange for industrial internships and case study courses for the students and to implement specific program developments to meet the needs of the industry.

The M.Eng. (Aerospace) program requires a minimum of 45 credits, including an "Industrial Stage" (i.e., engineering work in an aerospace industry) of four months. Enrolment is limited to the number of industrial stages available, so admission to the program is typically quite competitive. While intended to be a full-time program, the M.Eng. Aerospace program may be completed on a part-time basis over a maximum of five years. By the time of completion of the program, graduates are extremely well-prepared to enter into a career in the aerospace industry.

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

section 11.7.9: Master of Management (M.M.); Manufacturing Management (Non-Thesis) (56 credits)

This program is currently not offered

section 11.7.9: Master of Management (M.M.); Manufacturing Management (Non-Thesis) (56 credits)

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 developments in management and participate in professional development seminars to leverage their communication and leadership skills. After less than one year of studies, participants complete a paid work term at an industrial location. This is a unique opportunity to work on a real-world project with an M.M.M. partner company in North America.

section 11.7.10: Master of Science (M.Sc.); Mechanical Engineering (Thesis) (45 credits)

Please consult the Department for more information on this program.

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

In the Ph.D. program, students are required to demonstrate a significant new contribution to their field of research, as documented in an externally reviewed thesis. The research is carried out under the supervision of professors who are leaders in their field. Since research in Mechanical Engineering is often interdisciplinary in nature, it is common for Ph.D. students to have a co-supervisor in addition to their principle supervisor. Graduates from this program typically proceed to careers in research in either industrial or academic environments.

11.7.3 Mechanical Engineering Admission Requirements and Application Procedures

11.7.3.1 Admission Requirements

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

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

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

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

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

In the case of all programs, applicants must have successfully completed their prior degree(s) with a minimum CGPA equivalent to 3.3 on a scale of 4.0. Satisfaction of these minimum requirements does not guarantee admission. Applicants to graduate studies whose mother tongue is not English, and who have not completed an undergraduate or graduate degree from a recognized foreign institution where English is the language of instruction or from a recognized Canadian institution (anglophone or francophone), must submit official results of either a *TOEFL* or an *IELTS* test. The minimum score required is 92 for the Internet-based TOEFL test, with each component score not less than 20, or a minimum overall band of 7.0 on the IELTS test.

11.7.3.2 Application Procedures

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

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

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

11.7.3.2.1 Additional Requirements

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

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

11.7.3.3 Application Deadlines

The application deadlines listed here 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*.

Canadian	International	Special/Exchange/Visiting
Fall: Jan. 15	Fall: Jan. 15	Fall: Jan. 15
Winter: Oct. 15	Winter: Sept. 1	Winter: Same as Canadian/International
Summer: N/A	Summer: N/A	Summer: N/A

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

11.7.4 Mechanical Engineering Faculty

Chair

Luc Mongeau

Associate Chair (Curriculum Affairs)

David L. Frost

Associate Chair (Undergraduate Affairs)

Tim Lee

Associate Chair (Graduate Affairs)

Meyer Nahon

Director, M.Eng. Aerospace Program

Mathias Legrand

Emeritus Professors

Abdul M. Ahmed; B.Sc.(Dhaka), Ph.D.(McG.), ing. (*Thomas Workman Emeritus Professor of Mechanical Engineering*)

Romuald Knystautas; B.Eng., M.Eng., Ph.D.(McG.), ing.

Dan F. Mateescu; M.Eng.(Poli. U. Buch.), Ph.D.(Rom. Acad. Sci.), Doctor Honoris Causa(Poli. U. Buch.), A.F.A.I.A.A., F.C.A.S.I.

Michael P. Païdoussis; B.Eng.(McG.), Ph.D.(Camb.), ing., F.I. Mech.E., F.A.S.M.E., F.A.A.M., F.C.S.M.E., F.R.S.C., F.C.A.E. (*Thomas Workman Emeritus Professor of Mechanical Engineering*)

Stuart J. Price; B.Sc., Ph.D.(Brist.), P.Eng.

Associate Professors (Post-Retirement)

Vince Thomson; B.Sc.(Windsor), Ph.D.(McM.)

Paul J. Zsombor-Murray; B.Eng., M.Eng., Ph.D.(McG.), ing., F.C.S.M.E.

Professors

Marco Amabili; M.Sc.(Ancona), Ph.D.(Bologna), F.A.S.M.E. (*Canada Research Chair*)

Jorge Angeles; B.Sc., M.Sc.(UNAM Mexico), Ph.D.(Stan.), Eng., F.A.S.M.E., F.C.S.M.E., F.C.A.E., F.R.S.C. (*James McGill Professor*)

Bantwal R. Baliga; B.Tech.(I.I.T. Kanpur), M.Sc.(Case West.), Ph.D.(Minn.)

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*)

John H.S. Lee; B.Eng.(McG.), M.Sc.(MIT), Ph.D.(McG.), ing., F.R.S.C., F.C.A.E.

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*)

Professors

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

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

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

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

David L. Frost; B.A.Sc.(Br. Col.), M.S., 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)

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

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

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

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

Srikar T. Vengallatore; B.Tech.(B.H.U), Ph.D.(MIT) (*Canada Research Chair*)

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)

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

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

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

Adjunct Professors

Farbod Alijani

Helmi Attia

Olivier Bertrand

Gilles Bourque

Luca Cortelezzi

Farhang Daneshmand

Mouhab Meshreki

Alireza Najafi-Yazdi

Aditya Paranjape

Peter Radziszewski

Gilles Soulez

Course Lecturers

Marwan Kanaan

Richard Klopp

Sudarshan Martins

Course Lecturers

Alexei Morozov

Amar Sabih

Josef Slanik

Associate Members

Renzo Ceccere

Allen Ehrlicher

Dan Nicolau

Abdolhamid Akbarzadeh Shafaroud

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

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

Thesis Courses (28 credits)

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

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

Required Courses

1 credit:

MECH 609	(1)	Seminar

Complementary Courses (16 credits)

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

11.7.6 Master of Engineering (M.Eng.); Mechanical Engineering (Thesis) — Computational Science and Engineering (46 credits)

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 complete in the first term of the student's program.

Required Courses (2 credits)

MECH 609	(1)	Seminar
MECH 669	(1)	Computational Science Engineering Seminar

Complementary Courses (16 credits)

A minimum of 16 credits (500 level or above), at least 8 of which must be from within the Faculty of Engineering. Two courses (minimum 6 credits) from List A, and two courses (minimum 6 credits) from List B. At least two of the courses taken from Lists A and B must be from outside the Department of Mechanical Engineering. FACC courses will not count toward the complementary course credits.

List A - Scientific Computing Courses:

CIVE 602	(4)	Finite Element Analysis
COMP 522	(4)	Modelling and Simulation
COMP 540	(3)	Matrix Computations
COMP 566	(3)	Discrete Optimization 1
MATH 578	(4)	Numerical Analysis 1
MATH 579	(4)	Numerical Differential Equations

List B - Applications and Specialized Methods Courses:

ATOC 512	(3)	Atmospheric and Oceanic Dynamics
ATOC 513	(3)	Waves and Stability
ATOC 515	(3)	Turbulence in Atmosphere and Oceans
CIVE 572	(3)	Computational Hydraulics
CIVE 603	(4)	Structural Dynamics
COMP 557	(3)	Fundamentals of Computer Graphics
COMP 558	(3)	Fundamentals of Computer Vision
COMP 567	(3)	Discrete Optimization 2
COMP 621	(4)	Program Analysis and Transformations
COMP 642	(4)	Numerical Estimation Methods
COMP 767	(4)	Advanced Topics: Applications 2
ECSE 507	(3)	Optimization and Optimal Control
ECSE 532	(3)	Computer Graphics
ECSE 547	(3)	Finite Elements in Electrical Engineering
ECSE 549	(3)	Expert Systems in Electrical Design
MATH 555	(4)	Fluid Dynamics
MATH 560	(4)	Optimization
MATH 761	(4)	Advanced Topics in Applied Mathematics 1
MECH 533	(3)	Subsonic Aerodynamics
MECH 537	(3)	High-Speed Aerodynamics
MECH 538	(3)	Unsteady Aerodynamics
MECH 539	(3)	Computational Aerodynamics
MECH 541	(3)	Kinematic Synthesis
MECH 572	(3)	Introduction to Robotics
MECH 573	(3)	Mechanics of Robotic Systems
MECH 576	()	
MECH 577	(3)	Optimum Design
MECH 610	(4)	Fundamentals of Fluid Dynamics
MECH 620	(4)	Advanced Computational Aerodynamics

MECH 632	(4)	Advanced Mechanics of Materials
MECH 642	(4)	Advanced Dynamics
MECH 650	(4)	Fundamentals of Heat Transfer
MECH 654	(4)	Compt. Fluid Flow and Heat Transfer

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

Research Project (13 credits)

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

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

Required Courses (16 credits)

MECH 605	(4)	Applied Mathematics 1
MECH 610	(4)	Fundamentals of Fluid Dynamics
MECH 632	(4)	Advanced Mechanics of Materials
MECH 642	(4)	Advanced Dynamics

Complementary Courses (16 credits)

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

11.7.8 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.

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

This program is currently not offered.

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

Required Courses (30 credits)

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

Complementary Courses (26 credits)

8 credits from General Business & Management Training

6 credits from General Business & Management

12 credits from Manufacturing & Supply Chain

General Business & Management Training (8 credits)

8 credits from Group A or Group B:

Group A

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

Group B

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

General Business & Management

6 credits from the following:

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

Manufacturing & Supply Chain

12 credits from:

MECH 526	(3)	Manufacturing and the Environment
MECH 528	(3)	Product Design

MECH 529	(3)	Discrete Manufacturing Systems
MGSC 578	(3)	Simulation of Management Systems
MGSC 615	(3)	Procurement and Distribution

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

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

Thesis Courses (28 credits)

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

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

Required Course

1 credit:

MECH 609	(1)	Seminar

Complementary Courses (16 credits)

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

11.7.11 Doctor of Philosophy (Ph.D.); Mechanical Engineering

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

Thesis

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

Required Courses

MECH 700	(0)	Ph.D. Literature Review
MECH 701	(0)	Ph.D. Thesis Proposal
MECH 702	(0)	Ph.D. Comprehensive Preliminary Oral Examination

11.8 Mining and Materials Engineering

11.8.1 Location

Department of Mining and Materials Engineering
M.H. Wong Building
3610 University Street

Montreal QC H3A 0C5
Canada
Email: *barbara.hanley@mcgill.ca*
Website: *www.mcgill.ca/minmat*

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

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

11.8.2 About Mining and Materials Engineering

Graduate programs leading to **M.Eng.**, **M.Sc.**, and **Ph.D.** research degrees are available in the areas of:

- Geomechanics;
- Mining Environments;
- Strategic Mine Planning and Optimization;
- Stochastic Modelling;
- Operations Research;
- Mineral Economics;
- Materials Handling;
- Process Metallurgy;
- Computational Thermodynamics;
- Hydrometallurgy;
- Effluent and Waste Treatment;
- Mineral Processing;
- Metal Casting and CFD Modelling;
- Surface Engineering;
- Composites;
- Ceramics;
- Electron Microscopy;
- Automotive and Aerospace Materials;
- Biomaterials;
- Nanomaterials;
- Nanoelectronic Materials;
- Multiscale Modelling of Materials;
- Electronic and Solar Cell Materials.

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

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

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

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

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

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

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

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

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

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

M.Eng. (Project) Degrees

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

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

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

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

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

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

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

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

11.8.3 Mining and Materials Engineering Admission Requirements and Application Procedures

11.8.3.1 Admission Requirements

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

The **M.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.

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

The **Master of Engineering (Project) (Materials option)** is primarily designed to train people with appropriate engineering or scientific backgrounds to allow them to work effectively in the metals and materials industries. Industrial experience is favourably viewed for entrance into the program, but is not considered a necessity.

The **Master of Engineering (Project) (Mining option)** is primarily designed for graduates from mining engineering programs who have received adequate academic training in modern mining technology, mineral economics, computer programming, and probabilities and statistics. Students without this academic training must 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 and Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* for detailed application procedures.

11.8.3.3 Application Deadlines

The application deadlines listed here 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 *www.mcgill.ca/gps/contact/graduate-program*.

Canadian	International	Special/Exchange/Visiting
Fall: Jan. 15	Fall: Jan. 15	Fall: Jan. 15
Winter: Oct. 15	Winter: Sept. 1	Winter: Same as Canadian/International
Summer: Jan. 15	Summer: Jan. 15	Summer: Jan. 15

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

11.8.4 Mining and Materials Engineering Faculty

Department Chair

George P. Demopoulos

Associate Chair, Student Affairs

Richard Chromik

Associate Chair & Graduate Program Director

Mathieu Brochu

Graduate Program Coordinator

Barbara Hanley

Director, Mining Engineering Program

Hani S. Mitri (*on sabbatical as of Jan. 2017*)

Emeritus Professors

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

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

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

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

Professors

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

Roussos Dimitrakopoulos; B.Sc.(Thessaloniki), M.Sc.(Alta.), Ph.D.(École Poly., Montr.) (*Canada Research Chair I*) (*on sabbatical as of Jan. 2017*)

Raynald Gauvin; B.Ing., Ph.D.(Montr.), Eng. (*on sabbatical as of Sept. 2016*)

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

Faramarz (Ferri) P. Hassani; B.Sc., Ph.D.(Nott.), C.Eng.(U.K. Reg.) (*George Boyd Webster Professor*)

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

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

Associate Professors

Mathieu Brochu; B.Eng.(Laval), Ph.D.(McG.) (*Canada Research Chair II*) (*Hatch Faculty Fellow*)

Marta Cerruti; B.Sc., Ph.D., Laurea in Chemistry(Torino) (*on sabbatical as of Jan. 2017*)

Richard Chromik; B.Sc.(Penn. St.), M.Sc., Ph.D.(SUNY/Binghamton) (*Hatch Faculty Fellow*)

Mainul Hasan; B.Eng.(Dhaka), M.Eng.(Dhahran), Ph.D.(McG.)

Associate Professors

In-Ho Jung; B.Sc.(POSTECH), Ph.D.(École Poly., Montr.) (*William Dawson Scholar*)

Mustafa Kumral; B.Eng.(Hacettepe), M.Eng.(Cukurova), Ph.D.(Leeds)

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

Showan Nazhat; B.Eng., M.Sc., Ph.D.(Lond.)

Mihriban Pekguleryuz; B.Sc., M.Eng.(Flor.), Ph.D.(McG.)

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

Kristian Waters; M.Eng., M.Sc.(UMIST), Ph.D.(Birm.) (*on sabbatical as of Sept. 2016*)

Assistant Professors

Kirk Bevan; Ph.D.(Purd.)

Agus Pulung Sasmito; B.Eng.(Univ. Gadjah Mada), Ph.D.(NUS), Mech. Eng.

Jun Song; M.Sc., Ph.D.(Princ.)

Adjunct Professors

Bruno Benedetti, Mostafa Benzaazoua, Marc Bétournay, Robin A.L. Drew, Michel Gamache, Abdelbaset Guerfi, Bryn Harris, Robert Harrison, Ahmad Hemami, Arun Mujumdar, Jan Nesset, Marco Quirion, Denis Thibodeau, Karim Zaghib

Faculty Lecturer

Florence Paray; B.Eng.(CSP), M.Eng., Ph.D.(McG.)

Course Lecturers

Yves Buro

Marco Quirion

Shahe Shnorhokian

Co-op Program Liaison Officers

Monika Teresa Skonieczny (Mining)

Genevieve Snider (Materials)

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

Thesis Courses (27 credits)

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

Required Seminar (6 credits)

MIME 601	(0)	Engineering Laboratory Practice

6 credits from the following courses:

MIME 670	(6)	Research Seminar 1
MIME 672D1*	(3)	Rock Mechanics Seminar

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

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

Complementary Courses (12 credits)

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

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

Thesis Courses (27 credits)

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

Required Seminar (6 credits)

MIME 601	(0)	Engineering Laboratory Practice

6 credits from the following courses:

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

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

Complementary Courses (12 credits)

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

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

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

Research Project (15 credits)

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

Required Courses (6 credits)

MIME 601	(0)	Engineering Laboratory Practice

AND

6 credits from the following courses:

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

Complementary Courses (24 credits)

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

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

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

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

Research Project (6 credits)

MIME 628	(6)	Mineral Engineering Project 1

Required Courses (6 credits)

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

Complementary Courses (22 credits)

(minimum 22 credits)

Data Analysis Course

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)	Biological Treatment: Wastewaters
CIVE 660	(4)	Chemical and Physical Treatment of Waters

Air Pollution Engineering Course

One of the following courses:

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

Soil and Water Quality Management Course

One of the following courses:

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

Environmental Impact Course

One of the following courses:

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

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

Environmental Policy Course

URBP 506	(3)	Environmental Policy and Planning

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

Elective Courses (11 credits)

(minimum 11 credits)

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

The relevant Project course in Mining and Materials Engineering is the following:

MIME 629	(6)	Mineral Engineering Project 2

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

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

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

Thesis

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

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

Required Course (6 credits)

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

Complementary Courses (24 credits)

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

11.9 Urban Planning

11.9.1 Location

School of Urban Planning
Macdonald Harrington Building, Room 400
815 Sherbrooke Street West
Montreal QC H3A 0C2
Canada
Telephone: 514-398-4075
Fax: 514-398-8376
Email: *admissions.planning@mcgill.ca*
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 challenge is to reinvent tools and procedures to meet new challenges in making cities socially, economically and environmentally sustainable. A key feature of planning education is learning to view issues in a multidisciplinary way, to manage processes of collaboration and of conflict, and to generate equitable and efficient solutions to complex problems of urban development.

McGill University was the first institution in Canada to offer a full-time planning program starting in 1947. In 1972, the School of Urban Planning was created as a separate academic unit within the Faculty of Engineering. It shares a heritage building with the School of Architecture, right on the main open space of McGill's Downtown campus. The primary objective of the **Master of Urban Planning** program is to educate professional urban planners for leadership in the public, private, and not-for-profit sectors. We rely in large part on project-based learning. The program also puts great emphasis on students doing policy-relevant research.

The School prepares doctoral students for high-level research and teaching positions. The **doctoral program** is an *Ad hoc* program—in which students are subject to the University's regulations in terms of supervision and progress—that welcomes a small number of students, both local and international, who hold a master's degree and apply on the basis of their own research interests. Prospective applicants should consult *www.mcgill.ca/urbanplanning*.

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

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

Master of Urban Planning (M.U.P.) Program

The Master of Urban Planning (M.U.P.) program is a two-year course of study that attracts students from Quebec, Canada, the U.S., and overseas. It is recognized by the *Ordre des urbanistes du Québec* (OUQ) and the *Canadian Institute of Planners* (CIP). Graduates may become full members of the OUQ and other provincial planning associations by completing their respective internship and examination requirements. Similar requirements must be met for admission to the *American Institute of Certified Planners* (AICP) and other such organizations.

The M.U.P. program was designed with a strong emphasis on project-based learning, in particular through practical work done in teams in three planning studios. Approximately half of the curriculum is devoted to required courses that teach basic knowledge and skills in urban planning; the other half enables students to select courses or research projects that match their particular interests. Students participate actively in professors' research programs or define their individual research objectives, sometimes with their own research funding from major agencies (e.g., *SSHRC*, *NSERC*, *FQRSC*, *FQRNT*).

The core program provides a general education in spatial planning in its functional, environmental, and social dimensions. A formal specialization is available in **Transportation Planning**. M.U.P. students in the core program may also participate in the **Barbados Field Study Semester**, which focuses on global environmental issues. Further information concerning these concentrations is available at *www.mcgill.ca/urbanplanning/programs*. Students wishing to specialize in urban development and design, as in other subfields of planning, can do so within the core program. In all cases, electives, the summer internship, and the Supervised Research Project allow for individual concentration on a particular topic.

Graduates of the M.U.P. program work as planners, designers and policy analysts, as researchers, advocates and mediators, and they do so at various levels of government, in civil-society organizations, and with private consulting firms. Although their area of expertise varies, they devote their efforts in increasing numbers to sustainable development in its environmental, social, and economic dimensions.

Ph.D. (*Ad Hoc*)

The School of Urban Planning also offers the possibility of enrolling in a Ph.D. program managed under university regulations. Students can be admitted directly into the program if they hold a master's degree. Exceptional students from the M.U.P. program can be admitted into the program as well. The Ph.D. program requires the equivalent of a year of course work and a year of preparation for examinations on the student's field(s) of specialization and dissertation proposal. Work on the dissertation, which may be a monograph or a series of articles, takes two or more additional years.

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

The M.U.P. program requires two years of study, 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 understanding of urban issues, and specialized knowledge in a field of their own choice.

section 11.9.6: Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis) – Transportation Planning (66 credits)

The Transportation Planning concentration enables students to specialize in this field as part of their course of study for the M.U.P. degree. A number of core courses and electives, the summer internship, and the Supervised Research Project must be devoted to the acquisition of skills (including in quantitative analysis) necessary to work as a transportation planner. Admission into the concentration is based on a competitive selection process at the end of the first year of study in the M.U.P. program.

section 11.9.7: Master of Urban Planning (M.U.P.); Urban Planning (Non-Thesis) – Urban Design (66 credits)

Note: The Urban Design option is under review. A formal option may be available in 2017–2018. Students interested in Urban Development and Design are able to specialize in this field of practice as part of the core M.U.P. program.

11.9.3 Urban Planning Admission Requirements and Application Procedures

11.9.3.1 Admission Requirements

The M.U.P. degree is open to students holding a bachelor's degree or equivalent in Anthropology, Architecture, Economics, Engineering, Environmental Studies, Geography, Law, Management, Political Science, Social Work, Sociology, or Urban Studies. Students from other academic backgrounds may also apply, but should explain in the Personal Statement why they would like to transition into urban planning.

11.9.3.2 Application Procedures

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

See *University Regulations and Resources* > *Graduate* > *Graduate Admissions and Application Procedures* > *: Application Procedures* and *www.mcgill.ca/urbanplanning/how-apply* for detailed application procedures.

11.9.3.2.1 Additional Requirements

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

- Personal Statement (one to two pages)
- Curriculum Vitae
- 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. By the application deadlines, appropriate exam results must be sent electronically directly from the *TOEFL* (Test of English as a Foreign Language) or *IELTS* (International English Language Testing Systems) Office. The minimum requirement for the TOEFL is a score of 100 on the Internet-based test (iBT), with each component score not less than 23. The minimum score for the IELTS test is 7.0, with a score of at least 6.5 for each component.

Awards and Financial Assistance

The Admissions Committee decides the allocation of internal awards for incoming students after the application deadline, and they are allocated, in part, based on merit; no special application is needed to be considered for this funding. Canadian students can also enter the program with a major external fellowship from a government funding agency such as *SSHRC* and *NSERC*. Descriptions of the external awards can be found at *www.mcgill.ca/gps/funding/students-postdocs*.

11.9.3.3 Application Deadlines

The application deadlines listed here are set by the School of Urban Planning 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*.

Canadian	International	Special/Exchange/Visiting
Fall: Jan. 15	Fall: Jan. 15	Fall: Jan. 15

Canadian	International	Special/Exchange/Visiting
Winter: N/A	Winter: N/A	Winter: N/A
Summer: N/A	Summer: N/A	Summer: 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

Lisa Bornstein (*Interim*)

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.)

Professor

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.)

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

Raphaël Fischler; B.Eng.(Eindhoven), M.Sc., M.C.P.(MIT), Ph.D.(Calif., Berk.) (*on sabbatical Jan. 1 to Dec. 31, 2016*)

Nik Luka; B.A.A.(Ryerson), M.Arch.(Laval), Ph.D.(Tor.) (*joint appt. with School of Architecture*) (*on sabbatical Jan. 1 to Aug. 31, 2017*)

Assistant Professor

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

Adjunct Professors

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

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.)

Instructors

Cameron Charlebois, Luc Danielse, Suzanne Doucet, Paul LeCavalier

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

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

Research Project (15 credits)

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

Required Courses (27 credits)

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

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Complementary Courses (18 credits)

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

Group A

9-18 credits from the following:

ARCH 515	(3)	Sustainable Design
ARCH 517	(3)	Sustainable Residential Development
ARCH 520	(3)	Montreal: Urban Morphology
ARCH 564	(3)	Design for Development
ARCH 566	(3)	Cultural Landscapes Seminar
CIVE 540	(3)	Urban Transportation Planning
CIVE 561	(3)	Urban Activity, Air Pollution, and Health
GEOG 504	(3)	Industrial Restructuring - Geographic Implications
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 519*	(6)	Sustainable Development Plans
URBP 520*	(3)	Globalization: Planning and Change
URBP 530	(3)	Urban Environmental Planning
URBP 536	(2)	Current Issues in Transportation 1
URBP 537	(2)	Current Issues in Transportation 2
URBP 551	(3)	Contemporary Metropolitan Landscapes
URBP 556	(3)	Urban Economy: A Spatial Perspective
URBP 604	(3)	Urban Design Seminar 2: Advanced Topics
URBP 608	(3)	Advanced GIS Applications
URBP 619	(3)	Land Use and Transportation Planning
URBP 620	(3)	Transportation Economics
URBP 625	(2)	Principles and Practice 2

URBP 626	(2)	Principles and Practice 3
URBP 629	(3)	Cities in a Globalizing World
URBP 634*	(3)	Planning Water Resources in Barbados
URBP 651	(3)	Redesigning Suburban Space
URBP 656	(3)	Urban Innovation and Creativity

* Courses open only to students enrolled in the Barbados Field Study Semester during the fall term of their second year in the program. With this option, URBP 519 is substituted for URBP 624. Coursework must include URBP 507, URBP 520, and URBP 634. All other requirements for the M.U.P. degree apply.

Group B

0-9 credits from the following:

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

11.9.6 Master of Urban Planning (M.U.P.) Urban Planning (Non-Thesis) – Transportation Planning (66 credits)

The Transportation Planning Option enables students to specialize in this field as part of their course of study for the Master of Urban Planning degree (M.U.P.). Studio courses, an internship, and a final project involve real-life work that prepares students for the professional practice of urban transportation planning. Admission into the concentration is based on a competitive selection process at the end of the first year of study in the M.U.P. program.

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

Complementary Courses (12 credits)

Group A

6-12 credits from the following:

CIVE 540	(3)	Urban Transportation Planning
CIVE 561	(3)	Urban Activity, Air Pollution, and Health

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 six 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.

11.9.7 Master of Urban Planning (M.U.P.); Urban Planning (Non-Thesis) – Urban Design (66 credits)

This program is currently not offered.

The Urban Design concentration in the professionally-accredited M.U.P. degree enables students to specialize in this area of scholarship and professional practice in their second year of studies. Three studio courses, an internship, two intensive seminar courses, and a final Supervised Research Project in Urban Design enable students to prepare for professional practice as urban design specialists skilled in analysis and design development for existing (sub)urban landscapes and newly urbanizing contexts. This option is open to students with a professional and/or undergraduate degree in Architecture, Landscape Architecture, Environmental Design, Urban Planning, or related fields. Qualified applicants are admitted to the core M.U.P. program and then apply to be placed in the concentration at the end of their first year of study. Successful applicants must meet the admission requirements for the core M.U.P. program and also demonstrate visual acuity, spatial literacy, and skills in graphic communication during their first two terms of study.

Research Project (15 credits)

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

Required Internship (6 credits)

URBP 628	(6)	Practical Experience

Required Courses (33 credits)

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

Complementary Courses

9-12 credits from the following including at least one ARCH course and one URBP course:

ARCH 515	(3)	Sustainable Design
ARCH 520	(3)	Montreal: Urban Morphology
ARCH 521	(3)	Structure of Cities
ARCH 527	(3)	Civic Design
ARCH 561	(3)	Affordable Housing Seminar 1
ARCH 562	(3)	Innovative Homes and Communities
ARCH 566	(3)	Cultural Landscapes Seminar
URBP 504	(3)	Planning for Active Transportation
URBP 506	(3)	Environmental Policy and Planning
URBP 530	(3)	Urban Environmental Planning
URBP 616	(3)	Selected Topics 1
URBP 619	(3)	Land Use and Transportation Planning

0-3 credits can be selected from other courses at the 500 or 600 levels in any academic unit at McGill or at another university, subject to the approval of the School.

ARCH 515	(3)	Sustainable Design
ARCH 528	(3)	History of Housing
ARCH 529	(3)	Housing Theory
ARCH 550	(3)	Urban Planning and Development
URBP 501	(2)	Principles and Practice 1
URBP 505	(3)	Geographic Information Systems
URBP 530	(3)	Urban Environmental Planning
URBP 607	(3)	Reading Course: Urban Planning
URBP 617	(3)	Selected Topics 2
URBP 618	(3)	Selected Topics 3
URBP 619	(3)	Land Use and Transportation Planning
URBP 625	(2)	Principles and Practice 2
URBP 626	(2)	Principles and Practice 3
URBP 629	(3)	Cities in a Globalizing World