

# ELECTRICAL AND COMPUTER ENGINEERING

## About Electrical and Computer Engineering

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

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

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

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

## Research Facilities

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

- The Centre for Intelligent Machines (CIM) is an interdisciplinary research group focused on intelligent systems. Its laboratories include research in the domains of robotics, systems and control, computer vision, medical imaging, computer graphics, and machine learning.
- Telecommunications laboratories focus their work on signal processing, broadband communications, and networking; these laboratories form part of the Centre for Systems, Technologies and Applications for Radiofrequency and Communications (STARaCOM), a McGill University Research Centre devoted to fostering innovation in the area of communications systems and technologies via advanced research and training of highly qualified personnel.
- The Integrated Microsystems Laboratory (iML) supports research in FPGAs, MEMS, micro- and nano-systems, VLSI architectures for digital communications and signal processing, mixed signal, RF, and microwave integrated circuits and components, simulation of integrated circuits and microsystems, integrated antennas, design

for testability, reconfigurable computing, high-speed circuits, and packaging.

- Antenna and microwave research, and optical fibre and integrated optics research are carried out in a fully equipped facility.
- The Photonics Systems Group includes experimental laboratories with high-speed test and measurement equipment and optoelectronics; tunable, high power, and pulsed lasers; extensive optics and optomechanics supporting research in telecommunications for advance probing stations; signal processing, nonlinear optics, RF photonics, optical processors for computing and AI, and biosensing.
- Molecular beam epitaxy infrastructure. This infrastructure can grow wafer-scale group-III nitride epilayers and nanostructures for both photonic/optoelectronic and electronic devices.
- The Computational Electromagnetics Laboratory provides tools for numerical analysis, visualization, interface design, and knowledge-based system development.
- For the microwave characterization research, one section of the laboratory hosts dielectric measurement probe in for the low- to high-gigahertz range.
- Additionally, access to a complete range of commercial multi-physics simulation, design, and optimization software is available. The Power Engineering lab also has experimental facilities for the characterization of magnetic and small dynamometer for electrical machine measurements.
- Computing infrastructure for software engineering research is also available.

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

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

The proximity of these schools to McGill University ensures that a rich array of courses is available to suit individual needs. McGill also collaborates on 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 Assistantship:** The Department awards several graduate assistantship 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 assistantship; all applicants who indicate a need for support on their application forms will be considered.

**Teaching Assistantship:** Graduate students, with the approval of their supervisors, may also undertake teaching assistantship 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. More information is available through the Graduate Funding site, or by contacting:

Graduate and Postdoctoral Studies, McGill University  
James Administration Building, Room 400  
845 Sherbrooke Street West  
Montreal QC H3A 0G4  
Website: [mcgill.ca/gps/contact/gps](http://mcgill.ca/gps/contact/gps)

## Electrical and Computer Engineering Admission Requirements and Application Procedures

### Admission Requirements

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

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

### Master's Degree Admission Requirements

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

### Ph.D. Degree Admission Requirements

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

### Application Procedures

McGill's online application form for graduate program candidates is available at [mcgill.ca/gradapplicants/apply](http://mcgill.ca/gradapplicants/apply).

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

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

### Additional Requirements

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

- Area of Interest and Profile Form (M.Eng. course-based program and M.Eng. Applied AI available)
- GRE – the General Aptitude Test is optional.

### Application Dates and Deadlines

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

| Term                | Application Opening Dates for All Applicants | Non-Canadian citizens (Incl. Special, Visiting, and Exchange) Application Deadline | Canadian Citizens/Perm. Residents of Canada (Incl. Special, Visiting, and Exchange) Application Deadline | Current McGill Students (Any Citizenship) Application Deadline |
|---------------------|--|--|--|--|
| <b>Fall Term:</b>   | Sept. 15                                     | Dec. 15  | Dec. 15 <sup>1</sup>   | Dec. 15 <sup>1</sup>   |
| <b>Winter Term:</b> | Feb. 15                                      | Aug. 1   | Oct. 15  | Oct. 15  |
| <b>Summer Term:</b> | N/A  | N/A  | N/A  | N/A  |

1 Domestic applicants who wish to be considered for Faculty of Engineering awards must apply by August 1.

All supporting documents must be uploaded to the online application system by the application deadlines.

## Available Programs

- Electrical Engineering (Non-Thesis) (M.Eng.) (45 credits)
- Electrical Engineering (Non-Thesis): Applied Artificial Intelligence (M.Eng.) (45 credits)
- Electrical Engineering (Ph.D.)
- Electrical Engineering (Thesis) (M.Sc.) (45 credits)

## Program Overview

The **Electrical Engineering Ph.D.** 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.

## Location

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