McMaster
University

Search   Menu

**Faculty of Science**
# School Of Computational Science & Engineering

Home  •  Graduate  •  Handbook

# Handbook

## Purpose Of This Handbook

This handbook contains practical information about graduate studies in the School of Computational Science & Engineering at McMaster University. This information is a brief summary of information that should be helpful for new and returning graduate students.

**Disclaimer**: The Graduate Calendar is the primary authority on the graduate policy. In the event that the advice in this Handbook differs from the Graduate Calendar, the Graduate Calendar prevails.

### Contacts

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## CSE At A Glance

The McMaster School of Computational Science and Engineering is an equal partnership between the Faculties of Science, Engineering, and Business, with outreach to the Faculty of Health Science. The School offers students the opportunity to undertake interdisciplinary research and education programs that leverage McMaster's internationally renowned expertise in computation and its applications in science, engineering and business.

A significant fraction of funding for research at McMaster University comes from industrial support. To the potential graduates, research in any of the Computational Science & Engineering research fields will provide not only in-depth training in topics that require advanced computational skills, but will also expose students to cutting edge, industrially relevant multidisciplinary training. This combination will provide access to the industrial and academic job markets of the future.

# Graduate Study At McMaster University

As a graduate student, there are important university policies and documents you should familiarize yourself with. These can be found at:

- [Graduate Studies Helpful Links](#)

Just as the University has responsibilities to graduate students, they have responsibilities to the University. The student's responsibilities include, but are not limited to; registering annually until graduation, withdrawal, or withdrawal in good standing due to time limit; paying fees as required; complying with the regulations of the School of Graduate Studies as set out in the School of Graduate Studies Calendar.

Where applicable, students are responsible for complying with such conditions as may be laid out in an accepted letter of offer. Students are also responsible for complying with the regulations of the Ontario Council of Graduate Studies, and McMaster University with respect to full-time and part-time status and in particular, for informing the School of Graduate Studies of any change in employment status.

Students are further responsible for informing the School of Graduate Studies, which acts as the official keeper of student records, of any change in personal information such as address name, telephone number, etc. Students are also responsible for reporting through the department any change in student status, course registration, or withdrawal. With regard to research and study, students are responsible for maintaining contact and meeting regularly with the faculty advisor, thesis/project supervisor or supervisory committee, for observing departmental guidelines, and for meeting the deadlines of the department and the School of Graduate Studies.

If there is a problem with supervision, it is the student's responsibility to contact the Director of the School, after reviewing the following information:

- [The General Regulations of the School of Graduate Studies](#)

Students who undertake to write Master's or doctoral theses assume responsibility both for creating drafts of the thesis and for responding to direction from the Supervisory Committee. The student shall have the responsibility to write and ultimately to defend the thesis, and the Supervisory Committee has the responsibility to offer guidance in the course of the endeavour, and to recommend or not recommend the completed thesis for defence.

In order to receive a degree, the student must fulfill all departmental or program requirements and all University regulations, including those of the School of Graduate Studies. Students who have outstanding financial accounts at the end of the academic year will not receive their academic results, diplomas, or transcripts.

Since registration permits access to libraries and certain other academic facilities it also implies a commitment on the part of each graduate student to use such facilities in accordance with applicable rules.

Full-time students are obliged to be on campus, except for vacation periods or authorized off-campus status, for all three terms of the university Year. Any absence of one week or longer from campus, which is not part of the student's vacation entitlement requires the supervisor's approval. Students who absence themselves from campus for more than two weeks require approval from the Director. An absence of more than 4 weeks requires additional permission from the appropriate Associate Dean of Graduate Studies. Students may arrange, through the Department and the Associate Dean of Graduate Studies, to be "full-time off-campus" for periods of up to a year. In cases of unauthorized absence the student will be deemed to have withdrawn voluntarily from graduate study and will have to petition for readmission. No guarantee of readmission or of renewal of financial arrangements can be made.

# Leaves Of Absence

Leaves of absence are normally granted on a term-by-term basis and, whenever possible, should commence at the beginning of a term (i.e., January 1, May 1, or September 1). During the period of a Leave the student cannot expect to be given supervision or be entitled to use the University's facilities. During a Leave of Absence no tuition will be charged nor will the student be eligible for any scholarship support. The length of time for completing the degree and for eligibility for scholarship support will be extended by the duration of the Leave on the resumption of studies. Leaves of Absence affecting Teaching Assistantship duties are covered by the Collective Agreement with Local 3906 (Unit 1) of the Canadian Union of Public employees.

Students should be aware that in the event of Leaves of Absence continuation of the same research project and/or supervisor cannot be guaranteed.

## Reasons For Leaves Of Absence

A Leave of Absence for up to one year is permitted for reasons of illness or for reasons related to family responsibilities such as pregnancy and child rearing.

Students who have successfully completed at least one full year in a graduate program may apply for a Leave of Absence for up to one year for other personal circumstances provided that the student's supervisor and the department support the request.

# Graduate Studies In Computational Science And Engineering

## Course Listing

The complete list of graduate courses in the School of Computational Science and Engineering can be found at

- Graduate Study Courses

Courses offered in a given term are listed on Mosaic.

Graduate students should make their course selection after consulting with their research supervisor.

## Required Course For All Graduate Students

All graduate students must complete and pass SGS 101 – *Academic Research Integrity and Ethics* within the first 12 months after their admission. The purpose of this course is to ensure that the standards and expectations of academic integrity and research ethics are communicated and understood by students

All graduate students are also required to complete and pass SGS 201 – *Accessibility for Ontarians with Disabilities Act (AODA)*, which can be completed online (www.mcmaster.ca/accessibility ).

Students may not graduate or register in subsequent academic year without having successfully completed these courses.

## Computational Science And Engineering Student Symposium Day

The School of Computational Science and Engineering sponsors a student symposium day during which students currently registered in the Masters and Ph.D. programs give presentations about their work. Attendance of all registered Masters and Ph.D. students in the Computational Science and Engineering program is required. Students are also required to present one seminar on the research they have carried out while enrolled in the program.

# Master's Program

The Master's programs emphasize industry-relevant academic research and development. The degree may be earned either with a thesis option (M.A.Sc. when the supervisor is from the Faculty of Engineering and M.Sc. when the supervisor is from the Faculty of Science) or by a project option (M.Eng. when the supervisor is from the Faculty of Engineering and M.Sc. when the supervisor is from the Faculty of Science), to be decided jointly by the candidate and the supervisor and approved by the Director of the School.

The maximum time for completion of the degree is three (3) years from initial registration, 5 years for part-time students.

## M.A.Sc. & M.Sc. Thesis

A candidate for a Master's degree with thesis is required to successfully complete a minimum of four half courses with an average of at least B- and successfully defend a thesis. Two of the four half courses have to be chosen from the three core courses offered by the School. The remaining two half courses are normally chosen from the list of the courses approved by the School. One of the courses may be at the 600-level where appropriate. Additional courses beyond the minimum four may be required by the Director, in consultation with the supervisor. The thesis topic is to be chosen in consultation with the supervisor. The School arranges a series of seminars; candidates are required to attend and participate, and may be required to present their research results as part of this series. Normally, the thesis-based program is completed within 20 months of full time study. It is expected that many students will choose this route towards a Ph.D. degree.

## Master's Thesis

The administration of the Master's thesis defence is the responsibility of the School. The School recommends that the thesis follow the format described by Graduate Studies in their booklet "Guide for the Preparation of Theses". The student is responsible for ensuring that the format satisfies the University requirements. The sequence of events is as follows:

- The student's supervisor provides permission to prepare a thesis. The student is responsible for submitting a thesis, which is reasonably free of grammatical, typographical and technical errors. If the thesis is found to contain an excessive number of errors, it will be returned to the student and the oral examination postponed until a satisfactory thesis has been submitted.
- The student's supervisor(s) and two other faculty members, one from Engineering and one from Science, sit as an examining committee for the candidate. One of the three committee members will act as Chair for the examination committee.
- The committee will be approved by the Director. The Administrator will prepare the appropriate forms and provide them to the Chair of the examination committee.

## M.Eng. & M.Sc. With Project

A candidate for a Master's degree with project is required to successfully complete a minimum of six half courses with an average of at least B- plus a research project. The project is to be decided jointly by the candidate and the supervisor, and approved by the Director. Of the six half courses, three must be the core courses (CSE 700, CSE 701, CSE 702), whereas the remaining three courses may be chosen from those listed by the School, in consultation with the project supervisor. Up to two of the half courses may be at the 600-level. The School arranges a series of seminars; candidates are required to attend and participate, and may be required to present their research results as part of this series. Normally, this option will require 16 months residence. This option is not a preferred qualification for entrance to a Ph.D. program.

Students in the project M.Eng. and M.Sc, program will need to prepare a report on the research topic formulated by the Supervisor. It is expected that most of the reports will be at least 40 pages long (in the McMaster standard thesis format) and will provide an overview of the theoretical background for the problem (including a survey of the state-of-the-art literature) and describe the computational solution of the problem supported with suitable results. The report will be reviewed by the student's Supervisor and one more CSE faculty member from a department different than the Supervisor. After completion of the review, a copy of the project together with the reviews will be forwarded to the Administrator for Departmental files.

## Transfer From M.A.Sc. Or M.Sc. To Ph.D. Without Completion Of Master's Thesis

Students enrolled in the M.A.Sc. and M.Sc. program may be transferred to the Ph.D. program prior to the completion of the Master's degree. Transfer to the Ph.D. without completion of the Masters is intended to expedite the student's progress towards the Ph.D. by not requiring the preparation of the formal Master's thesis and allowing the research carried out during enrollment in the Master's program to be used in the Ph.D. thesis. The expectation for transfer to Ph.D. is that the research progress at the Masters level should be exemplary. The candidate will be expected to have completed a minimum of two (2) half courses with a grade average of B+ or better. The possibility of transfer to Ph.D. should be discussed by the student and the research supervisor early in the Master's program and then the following procedure should be followed:

- After a minimum of 2 complete terms in the Master's program at McMaster students may request in writing to the Director to be transferred to the Ph.D. program.
- The Director will then appoint an Examining Committee comprising of two (2) faculty members, in addition to the student's research supervisor(s).
- The student will provide four (4) copies of a formal written transfer report, which summarizes the student's research work to date, to the School office no later than ten (10) days before the scheduled examination date.

The transfer report is not a thesis and need not follow the Master's thesis preparation requirements since the report will not be kept for archival purposes. The maximum length is 25 single-spaced pages. The transfer report must address the following:

- Definition of the research problem.
- Brief critical review of the relevant literature.
- Summary of the completed work including. The summary must clearly show the Examining Committee some contribution to research.
- Scope of the completed work as a basis for future Ph.D. studies. The emphasis is on research progress and completed work and not on the research plan for the Ph.D.
- The examination will consist of an oral presentation, 20-30 minutes in duration, summarizing the research progress to date. The candidate will then have a session of questioning by the Examining Committee members only.

- The Examining Committee will evaluate the student's course standings, transfer report, oral presentation of the research progress and the answers provided during the examination.

The outcome of the examination is that the School recommends to the Committee on Graduate Admissions and Study one of the following:

1. admission to Ph.D. studies following completion of the requirements of the Master's degree
2. admission to Ph.D. studies without completion of a Master's program
3. admission to Ph.D. studies but with concurrent completion of all requirements for a Master's degree within one calendar year from the date of reclassification
4. refusal of admission to Ph.D. studies

# Ph.D. Program

The general regulations for the Degree Doctor of Philosophy appear earlier in the Calendar. Students with a Master's degree equivalent to the Master's degree with thesis option at the School of Computational Science and Engineering are required to take two 700 level half courses. Students who previously earned a Master's degree at a relevant program are required to take a total of four courses, of which at least three must be at the 700 level. Students entering into the Ph.D. program directly from a bachelor's degree, or transferring into the Ph.D. program without completing the Master's degree are required to take a total of six courses, of which at least four must be at the 700 level.

During their course of study, doctoral candidates will have to pass a Comprehensive Examination of the School. The purpose of this examination is to ensure that the candidate possesses sufficient knowledge and maturity in computational Science and Engineering. The Comprehensive Examination will be given in two parts.

The maximum time for completion of the degree is seven (7) years from initial registration, 8 years for part-time students.

## Supervisory Committee

In accordance with the regulations of the School of Graduate Studies (Sections 1.2.4, 2.6 and 4.5 of the Graduate Calendar), all Ph.D. students will have a Supervisory Committee which should meet at least once every year and provide the student with feedback regarding his/her coursework and research. A report from the meeting must be submitted to the Administrator before August 31. In keeping with the interdisciplinary character of the CSE program, it is expected that at least one member of the Supervisory Committee will be from a different Faculty than the student's Supervisor. If this is not feasible, then this member should be chosen from a different department within the same Faculty. The Director can provide advice on the composition of the Supervisory Committee.

## Composition Of The Examination Committee

The examination committee consists of the student's supervisory committee plus one additional member whose area is relevant to the examination topic. Suggestions for the additional member will be provided by the supervisory committee and approved by the Director. During its initial meeting the examination committee will also determine its Chair.

## Comprehensive Examinations For Ph.D. Students

In agreement with Section 4.3 of the Graduate Calendar, during their course of study doctoral candidates will have to pass a Comprehensive Examination. The purpose of this examination is to ensure that the candidate possesses sufficient knowledge and maturity in computational Science and Engineering. This examination normally takes place between 12 and 20 months, but no later than 24 months, after the start of the program, and is scheduled by the supervisory committee at a mutually convenient time.

The Comprehensive Examination will be in two parts.

Part I will be an oral examination which is designed to test the student's breadth of knowledge, her/his understanding of computational sciences and computational engineering, and to test the student's ability in critical thinking, and her/his ability to synthesize and integrate ideas from within and peripheral to the candidate's research area.

The examination committee will meet to determine the topic related to, but peripheral to the candidate's intended research topic. The choice of topic may be made in consultation with the Director.

Once the candidate receives the topic, he/she will have four weeks to review the state of art on the specified areas, write a maximum 20

page report surveying these areas and identify between 1 and 3 interesting open problems without the aid of any other individual. An official letter is sent to the candidate outlining the proposal topic, examination procedures and guidelines. The oral examination will take place two weeks after submission of the report. The examination will include an oral presentation, not more than 20 minutes in length. This is followed by a question period from the examination committee. The total examination will normally be 2 hours in length, but no more than 3 hours. At the end of Part I an interim form should be returned to the School. This form can be obtained from the Administrator.

Part II will take the form of a written research proposal and an oral examination designed to examine the student's understanding of, and approach to, her/his proposed dissertation research topic. Formulation of the dissertation topic shall be done in consultation with the Supervisor. Both parts of the examination may be repeated once.

The examination committee consists of the student's supervisory committee plus one additional member whose area is relevant to the examination topic. Suggestions for the additional member will be provided by the supervisory committee and approved by the Director. During its initial meeting the examination committee will also determine its Chair.

After completion of both part of the exam, the Comprehensive Examination Results form is to be completed by the Chair and submitted together with the student's report to the Director for approval in accordance with regulations of the School of Graduate Studies. The completed form and report are then submitted to the Administrator who will forward both to Graduate Studies and update the candidate's departmental file.

## Ph.D. Thesis

It is essential that a student submitting a PhD thesis follow the procedures described in the Graduate Calendar. In particular, note that authorization of the Supervisory Committee must be obtained before preparing the final version of the thesis, and that the format of the typed thesis should be exactly as specified in the "Guide for the Preparation of Theses" (linked below). The Supervisory Committee must also approve the final version of the thesis for submission.

Once approved by the Supervisory committee, the thesis is submitted to the School of Graduate Studies, which will then arrange the Oral Thesis Defence and appoint an external examiner, based on recommendations submitted by the Supervisory Committee. It is important that students submit their theses by the appropriate deadline given in the Graduate Calendar in order to be able to graduate at a particular convocation.

Note also that the Oral Defence normally cannot be held between July 1 and the first Monday in September.

Information about preparing the written thesis:

- Completing your Masters degree – Thesis
- Writing your doctoral thesis

Information about the PhD oral defence process:

- PhD Thesis Defence Process

## Travel And Conference Funding

CSE does not provide funding for conference and other travel. Students should discuss other sources of travel funding directly with their supervisors.

## Skills Training And Other Resources

The School of Graduate Studies and the MacPherson Institute offer a wide range of skills training modules and workshops. Topics including Academic writing, academic job search, teaching and many others.

Please try to take advantage of this opportunity to build up your skill set and set yourself up to succeed in your future careers.

- Career and Professional Development
- Teaching & Learning Certificates of Completion Program

The MacPherson Institute also offers opportunities for community engagement:

- [McMaster Children & Youth University](#)

# APPENDICES

- CSE Form: Comprehensive Examination – Part 1
- SGS Form: Comprehensive Results to be Recorded on Graduate Student Transcript
- SGS Form: PhD Supervisory Committee Meeting Report

| Mailing Address | Contact Information | Accessibility |
|---|---|---|
| **School of Computational Science & Engineering**<br>McMaster University<br>Hamilton Hall, Room 218<br>1280 Main Street West<br>Hamilton, Ontario, Canada<br>L8S 4K1 | **Office Hours:**<br>8:30 a.m. – 12:00 p.m.<br>1:00 p.m. – 4:30 p.m.<br>**Telephone:**<br>+1 (905) 525-9140 ext.24116<br>**Email:**<br>cse@mcmaster.ca | If you have an accommodation need for a planned meeting, event, or interview, including alternative formats or communication supports, please e-mail or call us to make the appropriate arrangements. |

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