

# Regulations for the Computer Science Ph.D. Program

Department of Computing and Software  
McMaster University

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## 1 Introduction

This document contains the regulations for the Ph.D. program in Computer Science at McMaster University. It supplements, but does not supersede, the general regulations for Ph.D. programs at McMaster University given in the *School of Graduate Studies Calendar*. Please note that the regulations in this document apply to all students entering the McMaster University Computer Science Ph.D. program in Fall 2008.

Ph.D. students must successfully complete the equivalent of 4 one-term graduate courses, pass both Part I and Part II of the Comprehensive Examination, and successfully defend a Ph.D. thesis.

## 2 Admissions

### 2.1 New admissions

Applicants may be admitted to the Ph.D. program in Computer Science if they have the equivalent of an M.Sc. in Computer Science with at least a B<sup>+</sup> average from McMaster University.

Students with only a bachelor's degree should normally enroll as M.Sc. students in Computer Science. After completing the first year of the Master's program, excellent students can be transferred to the Ph.D. program as regulated in the following subsection.

Outstanding students with at least a master's degree in Mathematics having reasonable Computer Science background may be admitted to the Ph.D. program in Computer Science. Each student's background will be assessed and a program of study designed to ensure appropriate depth and breadth in Computer Science. Depth and breadth of Computer Science knowledge will be tested in a two-part Comprehensive Examination. Exceptional students from other fields will be considered similarly on a case-by-case basis.

### 2.2 Transfer from the Department's Master's programs to the Ph.D. program in Computer Science (without completion of the Master's degree)

Excellent students in the M.Sc. (Computer Science) or in the M.Eng. or M.A.Sc. (Software Engineering) programs may be admitted to the Computer Science Ph.D. program if:

1. The candidate has completed the course requirements of the Master's program with at least an A<sup>-</sup> average.
2. The candidate's course background is appropriate for the Computer Science Ph.D.
3. The candidate has already shown significant progress and maturity in his/her research.
4. The Supervisor fully supports the transfer.
5. The Transfer Committee (see below) approves the transfer.

### Transfer procedures:

1. The student prepares a *Transfer Report* that contains two parts:
  - a) Status report, transcript of courses, and progress in research so far.
  - b) Brief research proposal for Ph.D. studies. (This is not the “thesis proposal” referred to in the Comprehensive Examination section.)
2. A *Transfer Committee* is appointed by the Department Chair or delegate. The purpose of the Transfer Committee is to decide if the student is qualified to transfer to the Ph.D. program and if the transfer is in the best interest of the student. The Transfer Committee Chair is the Computer Science Graduate Advisor. At least three additional members are selected according to the same rules as for the Supervisory Committee (see below). Normally the Transfer Committee, except the Computer Science Graduate Advisor, will act as the Supervisory Committee in case the transfer request is approved.
3. The Admission Authority<sup>1</sup> advises the School of Graduate Studies about honoring the transfer request.
4. A transferring student must complete four courses beyond the Master’s requirements, see Section ??.

### 2.3 Transfer from the Department’s Master’s programs to the Ph.D. program in Computer Science (with concurrent completion of the Master’s degree)

Excellent students in the M.Sc. (Computer Science) or in the M.A.Sc. (Software Engineering) programs may be admitted to the Computer Science Ph.D. program if:

1. The candidate has completed the course requirements of the Master’s program with at least an A<sup>-</sup> average.
2. The candidate’s course background is appropriate for the Computer Science Ph.D.
3. The candidate has already shown significant progress and maturity in his/her research.
4. The candidate is expected to complete the Master’s degree within two months from the date of reclassification.
5. The proposed Ph.D. Supervisor fully supports the transfer.
6. The Admission Authority approves the transfer.

### Transfer procedures:

1. The student, after consultation with the supervisor, notifies the Computer Science Graduate Advisor that he/she wishes to transfer to the Ph.D. program with concurrent completion of the Master’s degree.
2. The supervisor makes a recommendation concerning the transfer.
3. The Admission Authority advises the School of Graduate Studies about honoring the transfer request.
4. A student who does not complete the Master’s degree within two months of the transfer date will lose his/her status as a Ph.D. candidate.

### 2.4 Transfer from the Department’s Master’s programs to the Ph.D. program in Computer Science (at completion of the Master’s degree)

Excellent students completing the M.Sc. (Computer Science) or the M.Eng. or M.A.Sc. (Software Engineering) programs may be admitted to the Computer Science Ph.D. program if:

1. The candidate has completed the course requirements of the Master’s program with at least a B<sup>+</sup> average.
2. The candidate’s course background is appropriate for the Computer Science Ph.D.

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<sup>1</sup>The person or body responsible for making admission recommendations to the School of Graduate Studies.

3. The proposed Ph.D. Supervisor fully supports the transfer (and the Transfer Committee in case of an M.Eng. student).
4. The Admission Authority approves the admission.

#### **Transfer procedures for students in thesis-oriented programs:**

1. When the thesis is ready for defense, the candidate, after consultation with the supervisor, notifies the Computer Science Graduate Advisor that he/she intends to transfer to the Ph.D. program.
2. In addition to their normal function with regard to the Master's thesis defense, each member of the Examination Committee will make a recommendation to the Admission Authority concerning transfer to the Ph.D. program.
3. The Admission Authority advises the School of Graduate Studies about honoring the transfer request.

#### **Transfer procedures for students in the M.Eng. program:**

1. The student prepares a *Transfer Report* that contains two parts:
  - a) Status report, transcript of courses and progress in research so far.
  - b) Brief research proposal for Ph.D. studies. (This is not the "thesis proposal" referred to in the Comprehensive Examination section.)
2. A *Transfer Committee* is appointed by the Department Chair or delegate. The Transfer Committee Chair is the Computer Science Graduate Advisor. At least three additional members are selected according to the same rules as for the Supervisory Committee (see below). Normally the Transfer Committee, except the Computer Science Graduate Advisor, will act as the Supervisory Committee in case the transfer request is approved.
3. The Admission Authority advises the School of Graduate Studies about honoring the transfer request.

### **3 The Supervisory Committee**

As soon as possible, and in any case within the time limit specified in the Timeline section, a Supervisory Committee is appointed by the Department Chair or delegate.

1. The Supervisory Committee consists of at least three faculty members:
  - a. The Supervisor(s).
  - b. At least two additional faculty members, satisfying the following constraints:
    - i. At least one of the additional members must be from the Department.<sup>2</sup>
    - ii. One of the additional members may be from another McMaster department.
    - iii. With permission of the Dean of Graduate Studies, one of the additional members may come from outside McMaster.
2. At least one Committee member must be a regular member of the Department.
3. The external member(s) are experts in the student's area of research.
4. Committee members are proposed by the Supervisor who is responsible for verifying their willingness and availability to serve.
5. The Committee is appointed by the Department Chair or delegate.
6. The Committee must meet at least once a year to monitor the student's grades and progress in research.
7. Additional duties of the Supervisory Committee are outlined in the McMaster Graduate Calendar.

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<sup>2</sup>Associate Members are considered to be *from the Department*.

## 4 Course requirements

Graduate courses in the Dept. of Computing and Software are grouped in three categories, i) Theory of computation and mathematics of computing (**Theory**), ii) Software and its engineering (**Software**), and iii) Computer systems and applications (**Systems**). Categorization of existing courses (See Appendix A).

All students must successfully complete at least 4 one-term graduate courses (beyond those taken for a Master's degree) Computer Science, Software Engineering or other relevant areas, such as Electrical and Computer Engineering or Mathematics. Among the four required courses,

1. At least two (2) Theory courses or two (2) Systems courses
2. At least one (1) course from a category differing from (i)
3. At most one (1) graduate course from outside the department subject to the approval of the students thesis advisor and the graduate advisor
4. At most one (1) 600-level course
5. If requested by the Admission Authority (for candidates not fulfilling all the prescribed requirements for admission), or if the Supervisor identifies a deficiency, a student may be required to take additional courses, usually PUCs<sup>3</sup>, to supplement their education.

In such cases the number of additional courses should normally be at most two, in some very exceptional cases at most four. A PUC may be replaced, when appropriate, by a PGC<sup>4</sup>.

6. The student, with the approval of the Supervisor, proposes the course selection for approval by the Department Chair or delegate.

## 5 Comprehensive Examination

### 5.1 Part I

The Comprehensive Examination consists of two parts. In Part I, Ph.D. candidates must demonstrate “graduate level” understanding of the undergraduate computer science material. There is a separate document describing the examination.

### 5.2 Part II: Thesis Proposal

This part of the Comprehensive Examination is based on the student's thesis proposal. This examination is intended to ensure that the student understands both the theoretical and practical issues in the research area, and that he/she is well prepared to carry out the research described in the thesis proposal.

1. Part II of the Comprehensive Examination is open to the public.
2. The Supervisory Committee serves as the Examination Committee. The Computer Science Graduate Advisor chooses a member of the Supervisory Committee, who is not the supervisor, to be the Chair of the Examination Committee.
3. The student submits his/her written thesis proposal, about 20–30 pages in length, to the Examination Committee four weeks prior to the date of the Examination.
4. The thesis proposal should include a clear definition of the intended research problem(s), a careful survey of previous related work, discussion of the methodology to be used, and a timetable.

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<sup>3</sup>A PUC is a *Prescribed Undergraduate Course* that is required as part of a student's degree.

<sup>4</sup>A PGC is a *Prescribed Graduate Course* that is required as part of a student's degree. A PGC may be a prescribed course that either is included among or is additional to the normal number of required courses.

5. The proposal should demonstrate that successful pursuance of the research will yield a substantial contribution to the body of knowledge of Computer Science.
6. The student presents his/her research plan (at most 20 minutes) and gives answers, by means of oral presentation, to the Committee's questions.
7. The student defends his/her answers and justifies the choice of research topic.
8. The Chair of the Examination Committee should allow time for questions from the public, up to a maximum of 15 minutes.
9. The entire examination typically takes two hours.
10. The Examination Committee will provide critical comments and/or suggestions.
11. The Examination Committee recommends a result to the Computer Science Graduate Committee. The result of the Examination is normally *pass with distinction*, *pass*, or *fail*. In case of failure, the Examination Committee determines whether the student can continue, what actions are needed, and whether re-examination is necessary. The Computer Science Graduate Committee makes a recommendation to the Department based on the Examination Committee's recommendation.

## 6 Ph.D. Thesis and Defense

The Ph.D. Thesis defense will be conducted by the School of Graduate Studies. The student and the Supervisory Committee are referred to the School of Graduate Studies regulations.

1. The Ph.D. thesis in Computer Science must contain sufficient results for at least a refereed publication in a respected journal or prestigious conference proceedings.
2. The external examiner should not be a member of the McMaster faculty and is encouraged to be present at the defense.
3. It is the student's responsibility to present a complete thesis in time.
4. The Supervisory Committee must evaluate the thesis in the shortest possible time, but in any case within a three-month period, and request the necessary improvements.
5. The Supervisory Committee certifies that the thesis is at an appropriate level and that it meets the standards of the thesis requirements.
6. The final version of the thesis must be submitted to the Department's Administrative Coordinator or delegate at least three weeks before the date of the defense. The thesis will then be made available to the faculty members of the Department.

## 7 Timeline

### 7.1 Full-Time Students

1. The Supervisor is named when the student enters the program.
2. Fully funded students having prestigious scholarships from government or international agencies (e.g., NSERC) might be admitted without having a supervisor at admission. In case no supervisor is named at admission, the Computer Science Graduate Advisor acts as nominal supervisor. The actual supervisor must be named not later than 6 months after the student's arrival.<sup>5</sup>
3. As soon as possible, and in any case not later than four months following the student's arrival, the Supervisory Committee is appointed by the Department Chair or delegate.

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<sup>5</sup>For new students, *arrival* means the date of first registration; for students transferring from a Master's program, the date of transfer.

4. Students should normally take at least two one-term courses in each of the first two terms.
5. The required four graduate courses should be successfully completed within 12 months after starting the program. When PUCs are required, the time window might stretch until 16 months.
6. The Comprehensive Examination, both Part I and Part II, must be completed no later than 24 months after the arrival of the student.
7. The thesis should normally be completed and defended within four years after the student enters the program; however, funding may continue beyond four years at the Supervisor's discretion.

## 7.2 Part-Time Students

1. The Supervisor is named when the student enters the program.
2. As soon as possible, and in any case not later than four months following the student's arrival, the Supervisory Committee is appointed by the Department Chair or delegate.
3. Students should normally take at least two one-term courses in each of the first two academic years.
4. The required four graduate courses should be successfully completed within 24 months after starting the program. When PUCs are required, the time window might stretch until 28 months.
5. The Comprehensive Examination, both Part I and Part II, must be completed no later than 36 months after the arrival of the student.
6. Each of the two parts of Part I of the Comprehensive Examination should be taken for the first time no later than 20 months after the arrival of the student.
7. The thesis should normally be completed and defended within six years after the student enters the program.

## A Categorization of Graduate Courses

Graduate courses in the Dept. of Computing and Software are grouped in three categories, Theory of computation and mathematics of computing (**Theory**), Software and its engineering (**Software**), Computer systems and applications (**Systems**). The rationale of the categorization is to train well-rounded graduate students in Computer Science and Software Engineering with sufficient breadth in their knowledge. The categorization roughly follows the ACM Computing Classification System. Note that the following list is subject to changes due to removal and addition of courses.

Category	Courses
Theory	6E03, 6O03, 6TE3, 701, 702, 705, 706, 708, 722, 734, 736, 744, 746, 749, 758, 769, 770, 781
Software	6HC3, 703, 704, 707, 724, 725, 733, 738, 741a 743,, 745, 753, 757, 761, 766
Systems	6WW3, 6F03, 6TB3, 6GA3, 6GC3, 748, 750, 764, 765, 766, 767, 771, 772