2013-2014

The DCS Graduate Student Handbook
Preface

The purpose of this handbook is to describe the degree requirements, financial support, and other matters that concern graduate students in the Department of Computer Science. This handbook is developed over the summer and updated online as needed. Please check this DCS website regularly. Students will be notified by email of significant changes and upcoming deadlines as necessary.

Information about the Department of Computer Science at the University of Toronto, its graduate program admissions, course descriptions and current timetable is available from the Departmental website: http://web.cs.toronto.edu/.

NOTE: The Graduate Program in the Department of Computer Science is a unit within the School of Graduate Studies. The mission of the School of Graduate Studies is to promote university-wide excellence in graduate education and research and to ensure consistency and high standards across the divisions. Sharing responsibility for graduate studies with graduate units and divisions, and operating through a system of collegial governance, consultation, and decanal leadership, SGS defines and administers university-wide regulations for graduate education.

School of Graduate Studies regulations and procedures, some of which are briefly mentioned in this handbook, are available in the SGS Calendar at www.sgs.utoronto.ca.

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Toronto, Ontario Canada M5S 2E4

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July and August 9:00am - 4:30pm

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gradadmissions@cs.toronto.edu
416-978-8762

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Toronto, Ontario M5S 3G4
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<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Session 2013</strong></td>
<td></td>
</tr>
<tr>
<td><strong>M August 5</strong></td>
<td>Civic holiday (University Closed)</td>
</tr>
<tr>
<td><strong>M August 12</strong></td>
<td>Registration for fall session begins (9)</td>
</tr>
<tr>
<td><strong>F August 30</strong></td>
<td>Last date for payment of tuition fees or fee deferral submission for registration without payment due to funding guarantee or major award.</td>
</tr>
<tr>
<td><strong>M September 2</strong></td>
<td>Labour Day (University Closed)</td>
</tr>
<tr>
<td><strong>M September 9</strong></td>
<td>Computer Science graduate courses and seminars begin in the week of September 9</td>
</tr>
<tr>
<td><strong>F September 9</strong></td>
<td>Coursework must be completed and grades submitted for summer session courses and extended courses (4)</td>
</tr>
<tr>
<td><strong>F September 13</strong></td>
<td>Registration for Fall session ends – after this date a late registration fee will be assessed.</td>
</tr>
<tr>
<td><strong>M September 16</strong></td>
<td>Final date to submit final doctoral theses to SGS to avoid fee charges for 2013–2014 (3)</td>
</tr>
<tr>
<td><strong>M September 16</strong></td>
<td>Students who are required to complete modifications to final thesis must register for the fall session in order to do so. A pro-rated fee structure will apply.</td>
</tr>
<tr>
<td><strong>S September 22</strong></td>
<td>Final date to add full-year and fall session courses</td>
</tr>
<tr>
<td><strong>W September 25</strong></td>
<td>Summer session grades available for viewing by students on the Student Web Service</td>
</tr>
<tr>
<td><strong>F October 4</strong></td>
<td>Deadline to submit Breadth Evaluation &amp; Plan of study forms for students who started September 2013</td>
</tr>
<tr>
<td><strong>F October 4</strong></td>
<td>Final date to submit final doctoral thesis for fall convocation</td>
</tr>
<tr>
<td><strong>F October 4</strong></td>
<td>Final date for receipt of degree recommendations and submission of any required theses for master's degrees for fall convocation without fees being charged for the fall session (5)</td>
</tr>
<tr>
<td><strong>M October 14</strong></td>
<td>Thanksgiving Day (University Closed)</td>
</tr>
<tr>
<td><strong>M October 28</strong></td>
<td>Final date to drop fall session full- or half courses without academic penalty (7)</td>
</tr>
<tr>
<td><strong>November</strong></td>
<td>Fall convocation. Fall convocation information and dates are posted at <a href="http://www.convocation.utoronto.ca">www.convocation.utoronto.ca</a></td>
</tr>
<tr>
<td><strong>F November 1</strong></td>
<td>Deadline for students to change immigration status or claim exemption from international student fees for the Fall session.</td>
</tr>
<tr>
<td><strong>F December 6</strong></td>
<td>Last day of classes before winter break</td>
</tr>
<tr>
<td><strong>December</strong></td>
<td>Make up Monday for university closures (Check with Course Instructor)</td>
</tr>
<tr>
<td><strong>M December 23</strong></td>
<td>Winter break begins (Monday, December 24 to Friday January 4 inclusive)</td>
</tr>
</tbody>
</table>
# SESSIONAL DATES 2013/2014

## Winter Session 2014

<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>M January 6</td>
<td>University re-opens&lt;br&gt;Computer Science graduate courses and seminars begin in the week of January 6</td>
</tr>
<tr>
<td>F January 10</td>
<td>Final date for registration of students beginning program in winter session; after this date, a late registration fee will be assessed&lt;br&gt;Coursework must be completed and grades submitted for fall session courses (4)</td>
</tr>
<tr>
<td>W January 15</td>
<td>Final date to submit doctoral theses without fee payment for winter session</td>
</tr>
<tr>
<td>W January 15</td>
<td>Fall session grades available for viewing by students on the Student Web Service</td>
</tr>
<tr>
<td>S January 19</td>
<td>Final date to add winter session courses (4)</td>
</tr>
<tr>
<td>F January 24</td>
<td>Final date for receipt of degree recommendations and submission of any required theses for March or June graduation for master's students without fees being charged for the winter session (5)&lt;br&gt;Final date for all students to request that their degrees be conferred in absentia in March.&lt;br&gt;Final date for students obtaining degrees at June Convocation, coursework must be completed and submitted for full-year and Winter session courses&lt;br&gt;Final Date for submission of degree recommendations and submission of any requires thesis for degrees for June convocation&lt;br&gt;Final date for submission of final doctoral thesis for students whose degrees are to June convocation&lt;br&gt;Final date for degree recommendations of Winter dual registrants for the master's degree to their PhD registration</td>
</tr>
<tr>
<td>M February 17</td>
<td>Family Day (University Closed)</td>
</tr>
<tr>
<td>M Feb 17 – F Feb 21</td>
<td>Reading week (No Classes)</td>
</tr>
<tr>
<td>M February 24</td>
<td>Deadline to submit Breadth Evaluation &amp; Plan of Study forms for students who started January 2014</td>
</tr>
<tr>
<td>M February 24</td>
<td>Final date to drop full-year and winter session courses without academic penalty</td>
</tr>
<tr>
<td>March</td>
<td>March graduation In absentia Information is posted at <a href="http://www.convocation.utoronto.ca">www.convocation.utoronto.ca</a></td>
</tr>
<tr>
<td>April</td>
<td>Last day of winter classes</td>
</tr>
<tr>
<td>F April 4</td>
<td>Make up Monday/ Friday for university closures (Check with Course Instructor)</td>
</tr>
<tr>
<td>R April 17</td>
<td>For students obtaining degrees at June Convocation, coursework must be completed and submitted for full-year and Winter session courses&lt;br&gt;Final Date for submission of degree recommendations and submission of any requires thesis for degrees for June convocation&lt;br&gt;Final date for submission of final doctoral thesis for students whose degrees are to June convocation&lt;br&gt;Final date for degree recommendations of Winter dual registrants for the master's degree to their PhD registration</td>
</tr>
<tr>
<td>F April 18</td>
<td>Good Friday (University Closed)</td>
</tr>
</tbody>
</table>
### SEASONAL DATES 2012/2013

<table>
<thead>
<tr>
<th>Session</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summer Session 2013</strong></td>
<td></td>
</tr>
<tr>
<td><strong>May</strong></td>
<td>For first day of summer classes, consult graduate unit concerned</td>
</tr>
<tr>
<td><strong>F May 2</strong></td>
<td>Final date for registration for May session</td>
</tr>
<tr>
<td><strong>F May 9</strong></td>
<td>Coursework must be completed and grades submitted for full-year and winter</td>
</tr>
<tr>
<td></td>
<td>session courses (except for extended courses)</td>
</tr>
<tr>
<td><strong>S May 11</strong></td>
<td>Final date to enrol in May–June or May–August session courses</td>
</tr>
<tr>
<td><strong>W May 14</strong></td>
<td>Winter session grades available for viewing by students on the Student Web Service</td>
</tr>
<tr>
<td><strong>M May 19</strong></td>
<td>Victoria Day (University Closed)</td>
</tr>
<tr>
<td><strong>F May 30</strong></td>
<td>Final date to drop May–June F section courses without academic penalty (7)</td>
</tr>
<tr>
<td><strong>June</strong></td>
<td>June convocation information and dates are posted at <a href="http://www.convocation.utoronto.ca">www.convocation.utoronto.ca</a></td>
</tr>
<tr>
<td><strong>F June 20</strong></td>
<td>Deadline to submit Breadth Evaluation &amp; Plan of Study forms for students who started May 2014</td>
</tr>
<tr>
<td><strong>F June 20</strong></td>
<td>Final date to enrol in July–August courses (8)</td>
</tr>
<tr>
<td><strong>F June 20</strong></td>
<td>Final date to drop May–August session Y section courses without academic penalty (7)</td>
</tr>
<tr>
<td><strong>T July 1</strong></td>
<td>Canada Day (University Closed)</td>
</tr>
<tr>
<td><strong>F July 18</strong></td>
<td>Final date to drop July–August S section courses without academic penalty (7)</td>
</tr>
<tr>
<td><strong>F July 18</strong></td>
<td>Coursework must be completed and grades submitted for May–June F section courses (7)</td>
</tr>
<tr>
<td><strong>W July 23</strong></td>
<td>Grades for May–June F section courses available for viewing by students on the Student Web Service</td>
</tr>
</tbody>
</table>

1. Graduate students may only enrol in undergraduate courses with the approval of their supervisor or graduate unit. Students are responsible for meeting the deadlines and requirements of the undergraduate course as presented in class and in the undergraduate division's calendar. Graduate students will be graded under the graduate grading scale. Students should consult the appropriate undergraduate calendar for enrollment and dates.

2. The precise dates of commencement of courses are determined by the graduate units; students are urged to contact the relevant graduate units for information. SGS maintains the 13-week graduate instruction period; however, if a course does not fall into the traditional 13-week period, the graduate unit will inform students of important dates and deadlines in the course syllabus. University policy states that the first day of classes in the fall session in all teaching divisions should not be scheduled on the first and second days of Rosh Hashanah (from 1 1/2 hours before sunset on Wednesday, September 4, 2013 to about 1 1/2 hours after sunset on Friday, September 6, 2013) or on Yom Kippur (from about 1 1/2 hours before sunset on Friday, September 13, 2013 to about 1 1/2 hours after sunset on Saturday, September 14, 2013).

3. A final thesis is the corrected, approved version of thesis which is submitted to SGS following the Final Oral Examination.

4. Graduate units may establish earlier deadlines for completion of course work and may prescribe penalties for late completion of work and for failure to complete work, provided that these penalties are announced at the time the instructor makes known to the class the methods by which student performance shall be evaluated.

5. For final dates for completing degree requirements, students should consult their own graduate unit.

6. These are the dates which have been established for undergraduate students in the Faculty of Arts and Science. Not all Faculties offer Reading Week or a November Pause. To find out if your Faculty offers a Reading Week or November Pause, please contact them directly. SGS does not have a Reading Week or November Pause.

7. Graduate units may establish earlier deadlines to add/drop courses but these dates must clearly be communicated to students. Please note that the last date to cancel a course or registration with no academic penalty is not the same as the last date to be eligible for a refund.

8. Students starting their program in the Summer and OISE students are required to register by this date by paying the minimum tuition amount stated in their invoice.

9. Invoices will be available on the SWS (ROSI) by July 15. Most graduate students may make payments, or be eligible to register without payment (i.e., defer their fees), beginning July 15.
The Department

Overview

The Department of Computer Science at the University of Toronto has been a leading international research department for over forty years; it was the first computer science department established in Canada. It is characterized by a breadth of research and teaching interests, and the high quality of its faculty and graduate students. Currently, the department consists of 108 faculty members including a broad array of regular faculty, cross appointed and adjunct faculty, several post-docs, research associates and visitors, 300 graduate students, and 750 undergraduate majors and specialists.

The department is not only responsible for a large number of the computer science Ph.D.’s in Canada, but our graduates are on the faculties of CS departments around the world. In fact, many of our graduates have gone on to serve as chairs of the top CS departments, including those at MIT, University of Washington, and the University of Waterloo. Our graduate students also go on to exciting and successful careers in industry. One is the former vice-president, Development and Marketing of Microsoft and now runs a venture capital company. One has won an Academy Award for his work in animation. One received the ACM Doctoral Dissertation Award for the best computer science Ph.D. thesis in the world. Several others have gone on to run successful start-ups. For example, the idea for BumpTop arose out of the founder’s M.Sc. work when he was a student here. For more details about our alumni, see http://web.cs.toronto.edu/dcs.htm.

Our faculty and graduate students are engaged in cutting-edge investigations at the forefront of the dramatic changes in the development and uses of information and communications technology. We also place great emphasis on exposure to, and direct engagement in, research projects among our undergraduates, integrating inquiry-based learning deeply into our curriculum. Our department covers a broad spectrum of research areas – from the theoretical to the more practical – and our students have the unique opportunity to explore a variety of exciting topics with world-renowned researchers.

We are proud of our deep interdisciplinary connections. Our department has strong ties with other departments and institutes within the University of Toronto and beyond. We collaborate with areas such as Electrical and Computer Engineering (ECE), Psychology, Sociology, Philosophy, Mathematics, Occupational Therapy, and we have adjunct faculty from companies, institutes and universities around the world.

A key focus of teaching and research is currently digital media, a highly interdisciplinary field that calls us to draw from areas as diverse as networking, mobile computing, speech and natural language processing, vision, machine learning, visualization, HCI, knowledge media design and information systems. The Department of Computer Science is a leader in this effort, having been awarded a significant grant by the Canadian Foundation for Innovation for the construction of a Centre for Collaborative Interactive Digital Media.

The Department is housed in three buildings in the center of the university's urban St. George campus. Our eleven research groups are spread across the Sandford Fleming Building, the D.L. Pratt Building, and the Bahen Centre for Information Technology. Being in the heart of Toronto provides our students and faculty with a unique opportunity – we are in one of the most diverse cities in the world, and home to the third-largest ICT sectors in North America.

Administration

The Department of Computer Science is administered by the Chair: Professor Sven Dickison and Vice Chair: Professor Marsha Chechik.

The Graduate Program is administered by the Associate Chair for Graduate Studies, Professor Allan Jepson, and the Interim Graduate Administrator, Ms. Margaret Meaney. They are advised by the Graduate Affairs Committee, consisting of several faculty members and graduate students.
Overview of Graduate Programs

We currently offer two separate streams in our graduate programs, the research stream and the professional masters stream. The research stream leads to M.Sc. and Ph.D. degrees, while the professional stream leads to the Masters of Science in Applied Computing (M.Sc.A.C) degree. The choice here is whether the student is seeking to be trained as a researcher, capable of creating original, internationally recognized, research in Computer Science, or is seeking an understanding of current research and the opportunity to apply it in real-world situations.

Applicants to the research stream are assessed, in part, on their potential to make substantial contributions to research in Computer Science. Students are offered some of the most attractive funding packages in the country, with strong funding guarantees for up to five years that rise with tuition and fee increases, competitive Admissions Awards for incoming students, and significant financial top ups for scholarship holders. In addition, about 15% of graduate students in our research stream choose to take one or more leaves to do separate industrial internships. While these internships are not part of the requirements for the M.Sc. or Ph.D. degrees, they can provide valuable industrial experience and contacts.

Alternatively, the professional masters stream is oriented towards training the next generation of industrial leaders, innovators, and entrepreneurs. Students spend eight months studying with our world class faculty, and then eight months applying their knowledge in an internship. Unlike the research stream, the internship is required for this professional stream. During their internship, the student works together with an industrial partner and a faculty supervisor on applying current research to industrially relevant problems. Our M.Sc.A.C. students have interned with a wide range of companies, including: Chango, eHealth Innovation, FixMo, Google, Guardly, IBM, MDA Space Missions, Medical Technologix, RIM, SecureKey Technologies, Side Effects Software, and Uken Games.

For further information about our application process and program details, visit: http://www.cs.toronto.edu.

We next provide a brief introduction to the different requirements, the different degree programs, and the different admission categories that we have within Computer Science. After this introduction we will provide a rough timeline for progress through each type of degree.

Breadth and Course Requirements

Each program has a course requirement, which specifies the minimum number of half-courses that are required for the degree. For the M.Sc. and Ph.D. programs there are also specific breadth requirements which limit the selection of courses. Breadth requirements are designed to ensure the graduate has a broad and well-balanced knowledge of the field of Computer Science, at the level of graduate study here at the University of Toronto. This reflects the fact that these degrees are masters and doctorates of Computer Science as a whole. Details on these breadth requirements are provided later in this document (p. 18-19). For the M.Sc.A.C. program, students are required to take four half-courses plus two required half-courses.

Student Supervision

Every graduate student will be assigned a supervisor prior to registration. The supervisor advises on course selection, research topic selection, and provides continuing help during the conduct of research. All students are required to consult frequently with their supervisors throughout their graduate studies, to report on their progress and direction and to obtain advice. Occasionally the student-supervisor match is not productive. The student should discuss difficulties or concerns with the current supervisor. In many cases the reason for wanting the change is an issue which might be resolved by talking it out. If no resolution can be found, students who feel a need to change supervisor are welcome to seek advice from the Associate Chair, Graduate Studies.

Degree Programs

Master of Science (M.Sc.)

The M.Sc. degree program consists of four computer science graduate half-courses, which satisfy the M.Sc. breadth requirement, and a major research paper. The major research paper should demonstrate the student’s ability to do independent work in organizing existing concepts and in suggesting and developing new approaches to solving problems in a research area.
Master of Science in Applied Computing (M.Sc.A.C.)
The M.Sc.A.C. program is a sixteen month professional master’s program comprising two terms of coursework (September to December & January to April), and an eight month industrial internship. The program is intended for students with an undergraduate degree in Computer Science or a related discipline who want to expand their academic competence but do not intend to pursue careers in pure research.

Doctor of Philosophy (Ph.D.)
The most important part of doctoral work is original research conducted under the direction of a faculty member. This research will constitute a significant and original contribution to computer science. The results will be presented in a thesis and defended at departmental and graduate school oral examinations. The Ph.D. thesis may build upon the student’s M.Sc. research. The Ph.D. degree program also requires four computer science graduate half-courses and satisfaction of the Ph.D. breadth requirement. Courses taken during a student’s Master’s degree can count towards the breadth requirement. Students who enter into the graduate program from another university may request transfer credit for courses which were not used toward the requirements of another degree, diploma, certificate, or any other qualifications. Students admitted to the PhD Direct program from a Bachelor’s degree will have to complete eight courses, and the selection of these courses must satisfy both the M.Sc. and Ph.D. breadth requirements.

Different Admission Categories
There are four categories of students:

1. M.Sc. Students who have completed a B.Sc. and are enrolled in the M.Sc. program (potentially as a precursor to entering the Ph.D. program).
2. Ph.D. Students who entered the Ph.D. program after having completed their M.Sc. program in our department.
3. Ph.D. with M.Sc. from elsewhere. Students who have completed the M.Sc. degree elsewhere and have entered the Ph.D. program.
4. Ph.D. Direct Entry. Students who have completed a B.Sc. and have entered directly into the Ph.D. program. This group of students will follow the same time line as those in category 1 for the first 17 months and will then follow the timeline for category 2.

Ph.D. Supervisory Committee
Each Ph.D. student must form a supervisory committee which consists of at least three faculty members. The committee will include the student’s supervisor and at least 2 members not supervising the student. The purpose of this committee is both to aid the student by providing timely advice, and to evaluate the student’s progress towards a Ph.D. thesis.

Ph.D. Checkpoints and Progress Monitoring
In order to ensure that Ph.D. students obtain regular and timely feedback from their supervisory committee, the department has a system of roughly annual checkpoints. These checkpoints also provide a mechanism by which the department can monitor student progress through the Ph.D. program and ensure timely completion of the degree.

Timeline for Degree Completion
On the next page we provide an ideal timeline for completion of our graduate degrees.
### TIME LINE CHART FOR DEGREE COMPLETION

<table>
<thead>
<tr>
<th>MONTHS IN PROGRAM</th>
<th>M.Sc.</th>
<th>Ph.D.</th>
<th>Ph.D. with M.Sc. from elsewhere</th>
<th>direct entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROGRAM START</strong></td>
<td>(for students entering the M.Sc. or the Ph.D. program directly from a B.Sc.)</td>
<td>Submit Breadth Evaluation and Plan of Study Form to CS Graduate Office.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td><strong>Formation of Supervisory Committee</strong> for Ph.D. students entering the program directly from a B.Sc.</td>
<td></td>
</tr>
<tr>
<td></td>
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<td><strong>Coursework:</strong> M.Sc. Students should manage their time so that 4 half-credit courses can be completed within 12 months to allow using the remaining 5 months to focus on research and writing the research paper. The grade of each course must be at least B-.</td>
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<td><strong>M.SC. STUDENTS GRADUATING:</strong></td>
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<td><strong>Coursework:</strong></td>
<td>All coursework must be completed with a grade of at least B- for students wishing to complete the M.Sc. degree and graduate.</td>
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<td><strong>Research Paper:</strong></td>
<td>The Research Paper is to be submitted and approved by two readers. Reader reports are to be submitted to the Graduate Office at least two days prior to the SGS deadline.</td>
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<td><strong>M.SC. STUDENTS GRADUATING AND CONTINUING TO PH.D.:</strong></td>
<td>Read the instructions for M.Sc.-Ph.D. Transition Procedure in this handbook.</td>
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<td><strong>PH.D. STUDENTS ADMITTED DIRECTLY FROM A B.SC. DEGREE:</strong></td>
<td>At this point you should complete a research paper and have it approved by two readers in order to be permitted to continue to Checkpoint 1 in the Ph.D. program.</td>
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<td><strong>PH.D. PROGRAM START</strong></td>
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<td><strong>Formation of Supervisory Committee</strong></td>
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<td><strong>CHECKPOINT 1: Oral Presentation of the Research Paper</strong></td>
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<td><strong>CHECKPOINT 3: Research Proposal</strong></td>
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<td><strong>CHECKPOINT 4: Thesis Proposal</strong></td>
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<td><strong>Coursework:</strong> All course work completed with a grade of at least B-.</td>
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<td><strong>Candidacy Achieved:</strong> All degree requirements must be completed, exclusive of research and thesis.</td>
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<td><strong>CHECKPOINT 5: Departmental Thesis Examination</strong></td>
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<td><strong>CHECKPOINT 6: Final Oral Examination at the School of Graduate Studies</strong></td>
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</table>
Degree Program Requirements 2013 – 2014

Master of Science

Expected duration: (based on funding guarantee)
- 17 months.

Course and Breadth requirement
- M.Sc. students are required to take a total of four graduate courses which together satisfy the M.Sc. breadth requirement (details further below).

Supervisor of an M.Sc. Student

To be the primary or sole supervisor of an M.Sc. student a faculty member must hold an associate or full membership in the School of Graduate Studies, with a specific appointment in the Department of Computer Science (i.e., a CS-SGS membership). Faculty with an emeritus appointment in CS-SGS can also supervise M.Sc. students, but require approval from the Graduate Office before taking on any new supervisory role, including the supervision of students transferring from the M.Sc. program to the Ph.D. program. When an M.Sc. student is co-supervised, at least one of the co-supervisors must have an associate, full, or emeritus membership in CS-SGS.

Progress Monitoring
- The primary aim of progress monitoring is to review what you have accomplished and to set up a plan for completion of the degree in consultation with your supervisor.
- All active (not on-leave or lapsed) M.Sc. students are required to submit a Progress Monitoring Report annually.
- Supervisors will review and discuss the report with the student.
- Reports will be reviewed by the graduate office and written feedback will be provided to the student.

Research Paper
- Length: 30 – 60 pages
- Should demonstrate the student’s ability to do independent work in reviewing the relevant literature, identifying a problem in a research area, organizing existing concepts, suggesting and developing new approaches to solving problems in a research area, and reporting the results. The standard for this paper is that it could reasonably be submitted for peer-reviewed publication.

Approval of Research Paper
- Must have the written approval of two readers, one of whom must be the student’s supervisor.
- The second reader must hold an associate, full, or emeritus membership on the graduate faculty at the School of Graduate Studies. The readers will submit their evaluation of the paper to Graduate Office for review and approval by the Associate Chair, Graduate Studies.
- If the research paper is unacceptable to either reader, the reader will provide the student with a list of deficiencies, and the student is given a further opportunity to improve the research paper. After improvement, the research paper is again submitted to two readers; normally they will be the same two readers but in exceptional circumstances, with the approval of the Associate Chair, Graduate Studies, they may be different.

Graduation
- Given the completion of the course and breadth requirements, and approval of the research paper, the graduate office will submit a Recommendation for Degree to SGS and the student’s name will be added to the convocation roster.
- A graduation package will be sent to the student from the Convocation Office regarding convocation dates, tickets, etc.
M.Sc.- Ph.D. Transition Procedure

Our M.Sc. program lasts 17 months. Most M.Sc. students intend to continue on to complete a Ph.D., and below is a description of the procedure that must be followed for such students to make the transition to the Ph.D. program. The process for reviewing your forms and approving your transition to the Ph.D. is based on you having completed all requirements of the M.Sc. program, and that a member of the department (who is qualified under the rules of SGS to supervise Ph.D. students) has agreed to be your Ph.D. supervisor.

Requirements:

The following requirements must be completed to be considered for transition to the Ph.D. program. Forms referenced here are available on the DCS web site under "Your Program" and under the link "Forms".

All program requirements of the M.Sc. must be completed. This includes:

1. All required course work.
2. Breadth requirements.
3. Completion of a research paper that has been read and approved by two faculty members.
4. Submission of signed EVALUATION OF M.SC. RESEARCH PAPER forms from the two readers of your research paper to the graduate office (See notes and transition deadlines below).
5. Submission of a "REQUEST TO TRANSITION FROM M.SC. TO PH.D. PROGRAM IN COMPUTER SCIENCE" form to the Graduate Office.
6. Upon approval for transition, student must complete an SGS admission application and pay the application fee in order to register in the Ph.D. program

Notes:

i. Students continuing to the Ph.D. must ensure that their evaluators complete the section of the EVALUATION OF M.SC. RESEARCH PAPER form (labeled "COMPLETE ONLY IF STUDENT WANTS TO CONTINUE TO THE PH.D. PROGRAM"). Reference letters containing additional comments in support of the Ph.D. application should be included.

ii. If you plan to continue your Ph.D. studies with a new supervisor who was not a reader of your M.Sc. research paper, you will need to have your new supervisor complete the evaluation as well. In this case you will need to submit 3 reader approval forms.

Request to Transition Deadlines:

SGS only allows students to change registration at the start of each academic term.

M.Sc. Summer 2013 Program Start: By October 3, 2014
Approved students will be allowed to transition the Ph.D. program without interruption in their departmental funding. Student may be dually registered as a M.Sc. and Ph.D fall term.

M.Sc Fall 2013 Program Start: By January 25, 2015
Approved students will be allowed to transition the Ph.D. program without interruption in their departmental funding. Student may be dually registered as a M.Sc. and Ph.D in the winter term.

M.Sc. Winter 2014 Program Start: By April 17, 2015
Approved students can begin their Ph.D. May 1st without interruption in their departmental funding.

Dual registration in the Summer term is not permitted.

If you have non-departmental funding (e.g., an external scholarship) this funding might continue depending on the specific rules of the funding source, but any departmental additions (e.g., top-ups) will cease until you can be registered as a Ph.D. student.

Your 43 additional months of departmental funding for the Ph.D. program will start from the time your funding recommences.

If you have taken an SGS approved leave of absence during your M.Sc. program the above deadlines will be extended accordingly.
Master of Science in Applied Computing

Expected duration:
- 16 months

Course Requirement
- CSC2701H – Communication for Computer Scientists
- CSC2702H – Technical Entrepreneurship
- Plus any 4 graduate courses from the Computer Science Department’s broad selection. Students can apply to the MScAC program director for permission to take a graduate course from another department.

Internship
- Students in this program will have a unique opportunity for an eight month internship. Students and industry partners in conjunction with faculty will determine the hands-on internship project. Matches between students and industry will be made from December to April, with internships scheduled to begin May 1st.

Graduation
- Upon completion of all coursework and a successful internship, a Recommendation to Degree will be submitted to the School of Graduate Studies and the student’s name will be added to the convocation roster.
- A graduation package will be sent to the student from the Convocation Office regarding convocation dates, tickets, etc.

This is a professional master’s program that will not qualify students for admission to the Ph.D. program. M.Sc.A.C. students are not eligible for guaranteed research funding from the Department.
Doctor of Philosophy

Expected Duration and Funding
- Admitted from a U. of T. M.Sc. computer science program: 43 months of funding.
- Admitted from a M.Sc. program from elsewhere: This category of students will follow the same time line as those admitted after completing a M.Sc. in the Department of Computer Science at U. of T., with the exception that they will receive 48 months of funding to complete their program.
- Admitted from a B.Sc. degree: 60 months of funding. This category of students must complete a research paper, have that paper approved, and submit 2 letters of recommendation by the end of 17 months. The research paper and recommendation letters are necessary to assess the student's potential for continuing in the Ph.D. program.

Course and Breadth Requirement
- Ph.D. students are required to take a total of four courses which satisfy the Ph.D. breadth requirement (see further below).
- Students admitted to the PhD Direct program from a Bachelor's degree will also have to complete the four courses that count towards the M.Sc. portion of the degree.

Ph.D. Degree Requirements Completion Deadline (Year 3: Candidacy)
- All courses, breadth requirements and the qualifying examination (also known as the depth oral) must be completed by the end of the 3rd year (for the 4-year program) or by the end of the 4th year (for the 5-year program) in order to achieve candidacy.
- Failure to complete these requirements by the deadline will result in denial of registration.
- An extension may be requested for the purpose allowing the student to remain registered while completing degree requirements. An "Extension to Achieve Candidacy" form is available at www.sgs.utoronto.ca. A request for extension requires an explanation for the student's inability to meet the deadline for completion of degree requirements (exclusive of thesis research) and an indication of the amount of work remaining to be done, including a tentative date for completion of the requirements within the next two sessions.
- Upon completion of degree requirements, a nomination for candidacy will be sent to the School of Graduate Studies and the notation "Candidacy Achieved" will appear on the student's transcript.

Thesis
The most important part of doctoral work is original research conducted under the direction of a supervisor. This research must constitute a significant and original contribution to computer science. Results will be presented in a thesis and defended at department and graduate school oral examinations.
Ph.D. Supervisor

To be the primary or sole supervisor of a Ph.D. student a faculty member must hold a full-membership at the School of Graduate Studies, with a specific graduate appointment in the Department of Computer Science (i.e., a CS-SGS membership). Faculty with an emeritus appointment in CS-SGS can also supervise Ph.D. students, but require approval from the Graduate Office before taking on any new supervisory role. When a Ph.D. student is co-supervised, at least one of the co-supervisors must have a full or emeritus membership in CS-SGS.

Supervisory Committee (Ph.D.)

A Ph.D. supervisory committee must consist of at least three faculty members. The committee will include the student's supervisor and at least 2 members not supervising the student. Besides the supervisor, or co-supervisor, the other committee members must all be associate or full members of SGS (although not necessarily with appointments in Computer Science).

In addition, external experts can also serve on a supervisory committee as "advisors" (SGS's term, note that it is not synonymous with "supervisor"). Advisors can take part in all the student's committee meetings with the exceptions that they do not contribute to a quorum, and can attend but not participate in the student's Final Oral Examination. The request for an external expert to serve as an advisor on a Ph.D. committee can be made by e-mail to the Associate Chair, Graduate Studies, gradchair@cs.toronto.edu, accompanied by brief rationale and a C.V.
Progress Monitoring (Ph.D.)

Each year, PhD students submit a progress report indicating:

- checkpoints taken/passed (see description/time line of checkpoints in this handbook)
- courses taken/passed
- activities and progress made on the thesis research
- papers written/submitted/accepted

A faculty committee will review the progress reports and decide whether the progress made is satisfactory or unsatisfactory. Grounds for unsatisfactory progress might be:

- Student is behind with checkpoints with respect to the degree requirements.
- Student is behind in number of required courses for the degree requirements.

Students who receive “unsatisfactory progress” will be informed via a letter from the graduate office which states the reason why the student has received “unsatisfactory progress”. The letter will also provide concrete conditions that the student must meet in order to regain the status of “satisfactory progress”. The student has 6 months to meet these requirements.

A student who receives “unsatisfactory progress” will have to do the following:

Within 3 weeks of receiving the notification:

- Submit to the graduate office a plan of how and when the student will fulfill the conditions for regaining “satisfactory progress”. The plan has to be signed by the student’s supervisor/co-supervisors. The plan has to include a date on which the student will meet with the PhD supervisory committee; this date must be no later than 3 months after the student received the notification of “unsatisfactory progress”.
- Meet and discuss the plan with the Associate Chair of Graduate Studies who approves the plan. If the plan is not approved by the Associate Chair of Graduate Studies, then the student has 1 week to submit a new plan. If the Associate Chair of Graduate Studies does not approve the revised plan, then the Graduate Affairs Committee will decide on the plan that the student has to meet in order to regain “satisfactory progress”.

Within 6 months of receiving the notification:

Submit to the graduate office a progress report indicating whether the conditions for obtaining “satisfactory progress” have been met.
After 6 months of the notification of "unsatisfactory progress":

The Graduate Affairs Committee will review the progress made within the 6 months and decide whether the student receives "satisfactory progress".

If the Graduate Affairs Committee decides that the student did not meet the conditions for regaining "satisfactory progress", they will provide the student with concrete conditions that the student has to meet in order to obtain a status of "satisfactory progress". Students will have 6 months to meet these conditions after which the progress is again reviewed by the Graduate Affairs Committee.

If the Graduate Affairs Committee decides that the student did not meet the new conditions, the department will encourage the student to withdraw; if the student does not withdraw a request for termination of the student’s program will be forwarded to the School of Graduate Studies.

Ph.D. Checkpoints

The purpose of checkpoint monitoring is to ensure that students obtain regular and timely feedback from their supervisory committee. It also provides a mechanism by which the department can monitor student progress through the Ph.D. program and ensure timely completion of the degree.

Combining checkpoint meetings is not acceptable practice. The purpose of each checkpoint is different. Students, supervisors and committee members should be aware of the time line for checkpoints and organize meetings accordingly. If a committee member is absent from a meeting and cannot attend by teleconference, the student should present his/her material to that member individually. The member should then communicate his/her assessment to the supervisor who will subsequently advise the student.

Instructions and regulations about the scheduling of checkpoints, including the Departmental Thesis Defense and Final Oral Examination at SGS, and related forms, can be printed from departmental website or picked up in the grad office.

Formation of the Supervisory Committee

The composition of the committee must be approved by the Associate Chair, Graduate Studies. A form is provided for this purpose. The Graduate Office must be advised immediately of any change of supervisor or committee members. See “Supervisory Committee” in this handbook.

CHECKPOINT 1 - Oral Presentation of the Research Paper:
The first checkpoint is intended to give the student the opportunity to meet with the supervisory committee, present the results of the research paper, or master’s thesis, and seek comments and advice on the research direction the student plans to take.

CHECKPOINT 2 – Qualifying Oral Examination:
The student presents an area of research to the supervisory committee, normally in a closed forum. The purpose of this examination is to assess the student's understanding of the literature in the area of research, as well as preparedness to do research in that area. This involves assimilating the significant research papers on the topic, understanding how they relate to one another, and identifying valid open research questions. The student typically prepares a short written survey of the work in the area, and distributes it to the supervisory committee at least two weeks prior to the examination. The length of the survey should not exceed that appropriate for inclusion in a doctoral thesis in the area. Material written by the candidate for another purpose (for example, the research paper) may be re-used in the survey. The area chosen by the student should be sufficiently broad to contain many potential thesis topics, yet sufficiently narrow that the highly relevant papers number in the tens rather than in the hundreds. The examination typically lasts approximately two hours and begins with a 20 to 30 minute presentation by the candidate. The committee will determine whether the student should proceed to thesis work. They may recommend that the student do more course work or reading.

Candidacy Achieved:
The School of Graduate Studies regulations require that all degree requirements must be complete, except research and thesis, by the end of year 3 for students in a 4-year Ph.D. program and by the end of year 4 for students in a 5-year Ph.D. program. This includes course and breadth requirements and the qualifying examination (depth oral). Upon completion of these requirements, the Graduate Office will submit a nomination for candidacy to the School of Graduate Studies. After approval at SGS the notation “Candidacy Achieved” will appear on the student’s transcript.
CHECKPOINT 3 – Research Proposal:
The student submits a written proposal to the supervisory committee outlining a research plan. The supervisory committee assesses the scope and relevance of the problems the student plans to investigate, and the intended approach to solving them.

CHECKPOINT 4 – Thesis Proposal:
The student submits a written proposal to the supervisory committee outlining the anticipated results of the thesis. The supervisory committee assesses the scope and relevance of the problems the student has solved, and ensures significant content to the proposed thesis. A substantial portion of research should have been successfully completed, and a clear plan for completing the remainder should be included in the document. Material written by the student for other purposes (for example, a conference or journal paper) may be included.

CHECKPOINT 5 – Departmental Thesis Examination:
The student defends the thesis before the supervisory committee. A draft of the thesis should be available to the committee members well in advance of the departmental thesis examination date (3-4 weeks is recommended). Each member of the committee is expected to read the thesis in sufficient detail to form a judgment about its acceptability. The committee may approve the thesis without reservations, approve the thesis on condition that minor modifications be made, or require the student to take another departmental thesis examination.

CHECKPOINT 6 – Final Oral Examination (FOE) at the School of Graduate Studies:
Upon the successful defense of the thesis at the Departmental Thesis Examination, the candidate will be ready to go forward to the Final Oral Examination. **Eight weeks prior** to the proposed date of the examination the student should notify the Graduate Office of the intention to book a Ph.D. Final Oral Examination at the School of Graduate Studies. All forms and instructions are available from the Graduate Office. Full FOE details and regulations can be found on the SGS website.

It is important to allow yourself and the Graduate Office plenty of time to organize the necessary steps and follow the required procedures in setting up your Ph.D. Final Oral Examination. **The School of Graduate studies is under no obligation to find an FOE chair if a minimum of six weeks’ notice is not provided.**

Graduation:
A graduation package will be sent to the student from the Convocation Office regarding convocation dates, tickets, etc.
Graduate Course and Breadth Requirements

The **course requirements** are the minimum number of courses required by a degree program. In order to obtain credit for a course, the student must obtain a mark of B- or higher. Students in both the M.Sc. and Ph.D. programs are required to complete four half courses. Students admitted directly to the Ph.D. from a Bachelor's degree must complete eight half courses.

The **breadth requirements** for our degree programs ensure that students complete courses from a wide range of topics within Computer Science. These requirements are specified in terms of a categorization of courses into different categories of methodology and research area. The methodological and research area categorizations for the current list of graduate courses can be found in Appendixes A and B. For continuing students who have taken courses that are no longer offered, these course categorizations can be found in Appendix C.

**M.Sc. Breadth Requirement**

**METHODOLOGIES**

The Master's degree requires breadth in **methodologies**. Methodologies are core problem-solving approaches/techniques used throughout computer science. Courses are classified according to four broad methodologies, based on their content. The list of courses in each of the four methodologies is given in Appendix A. Courses not on these lists do not qualify for breadth credit, unless this is explicitly noted in the course schedule posted by the Graduate Office.

To satisfy the M.Sc. breadth requirement the student must complete one course from at least three of the four methodology areas. (Often the student chooses to take two courses from one of the methodologies and none from the fourth, although it is also suitable to choose one course from each of the methodologies.) Below are brief descriptions of the four methodological areas.

The Four Methodologies

**Methodology 1: Analysis and Computation in Discrete Models**

The courses in this grouping focus on analysis of and algorithms for discrete mathematical structures, such as graphs, formal logic, and formal models of computation. The grouping includes courses that analyze computational limitations and discrete computation. These courses study and apply techniques from areas like probability, combinatorics, algebra, mathematical programming, and formal logic.

**Methodology 2: Analysis and Computation in Continuous Models**

The courses in this grouping focus on analysis of and algorithms for continuous mathematical models. Topics include the derivation of mathematical models, their properties, and computational techniques for approximating their solution. These courses study and apply techniques from areas like probability and statistics, computer graphics, computer vision, numerical analysis and machine learning.

**Methodology 3: Building Software and Hardware Artifacts**

This grouping includes courses that study the design and implementation of specific software or hardware artifacts. These courses expose students to the challenges in building artifacts such as computer-animated movies, computer-aided design systems, databases, network protocols and devices, and simulations of large scale systems. Courses in this group typically have a significant project component where students build a substantial software or hardware artifact.

**Methodology 4: Human-Centered and Interdisciplinary Computing**

This grouping includes courses that study computational paradigms and methods within human - computer interaction and scientific domains outside traditional computational sciences. These courses typically have a cross-disciplinary component, involving fields such as the life sciences, linguistics, psychology, social sciences, and economics.
Ph.D. Breadth Requirement

RESEARCH AREAS

The Ph.D. also requires breadth in different research areas of Computer Science. Currently our courses are classified into fifteen different research areas aligned with the activities of the various research groups in the department. To satisfy Ph.D. breadth, the student must complete one course from at least four different research areas.

For the case of Ph.D. students who are following on from an M.Sc. degree in our department, these students are required to take a total of four more courses, on top of the four already completed for their M.Sc., from four different research areas. To satisfy the Ph.D. breadth requirement, the eight courses taken over their M.Sc. and Ph.D. must include courses from at least four different research areas and three methodologies. In this sense, courses taken during the student’s M.Sc. are counted both for achieving M.Sc. methodological breadth and for Ph.D. research area breadth.

For the case of Ph.D. students who are entering the program directly from a bachelor's degree, these students are required to take a total of eight courses. These must include courses from at least four different research areas and three methodologies. In this sense, the direct entry Ph.D. program requires both the methodological breadth and the research area breadth.

Students who have either started a graduate degree elsewhere, or completed a Master’s degree elsewhere, are required to submit a Plan of Study and Breadth Assessment form at the beginning of their first term in order for the Graduate Chair to assess which breadth credits can be transferred to their PhD program here.

Time Limit to Degree Completion

The Timeline for Degree Completion defines satisfactory progress through the M.Sc. and Ph.D. program. Failure to make satisfactory progress may result in the withdrawal of departmental privileges, and cessation of departmental funding. There are two time limits. SGS time limits refer to the amount of time a student can register in their program. The departmental deadline refers to the amount of time a student can receive guaranteed funding from the department. The SGS deadline is always longer than that the departmental funding deadline. Students who have serious health problems or personal circumstances that prevent them from making satisfactory progress are entitled to take a leave from graduate studies. Such leave effectively stops the clock for funding and time to degree completion; on return, the student is entitled to resume at the point where they left, without penalty.

The time limits for the four admission categories of students are as follows:

1. M.Sc. Students who have completed a B.Sc. and are enrolled in the M.Sc. program (potentially as a precursor to entering the Ph.D. program). Three years max (SGS), department guarantees 17 months of funding.

2. Ph.D.-Direct Students who have completed a B.Sc. and have entered directly into the Ph.D. program. Seven years max (SGS), department guarantees 60 months of funding. This group of students will follow the same time line as those in category 1 for the first 17 months and then proceed to the Ph.D. time line.

3. Ph.D. Students who entered the Ph.D. program after having completed their M.Sc. program in our department. Six years max (SGS), department guarantees 43 months of funding.

4. Ph.D. with Master’s degree from elsewhere Students who have completed a Master’s degree elsewhere and have entered the Ph.D. program. Six years max (SGS), department guarantees 48 months of funding.
Extension of Time for Completion of Degree Requirements

Master's Students
In exceptional circumstances, a master's student who did not complete all the requirements for the degree within the period specified in the degree regulations may be considered for a maximum of three one-year extensions provided that the graduate unit concerned so approves. The first two extension requests require departmental approvals; the third requires departmental and School of Graduate Studies approvals.

Doctoral Students
In exceptional circumstances, a doctoral student who has not completed all the requirements for the degree within the time limit for doctoral degree is eligible to apply for four one-year extensions. The first two extension requests require graduate unit approvals; the second two require graduate unit and School of Graduate Studies approvals.

To apply for an extension, students must complete the Program Extension Form available at the SGS website and present it to the Computer Science graduate office in BA 4242. The information provided must include the cause(s) for the delay and evidence that the remaining degree requirements may be completed within the period of the extension request. No registration beyond the extension period will be permitted.

Internship
Internship is not a component of the graduate research program in the Department of Computer Science. However, it is recognized as an important experience for graduate students. Internships are a component of the Masters of Applied Computing Degree.

Students must request an official leave of one to three terms for the purpose of doing an internship by completing an SGS Request for Leave of Absence form (www.sgs.toronto.ca, under Forms for Students), and submitting it to the Computer Science Graduate Office with a brief note indicating the benefits (other than financial) of the internship opportunity. The note must be signed by the student and the supervisor.

A student who is planning an internship over the summer are required to submit their Leave of Absence form by the Jan. 31 prior to their leave. For a fall internship, they must submit the form June 30. For an internship in the winter term, the form must be submitted by the previous Oct. 15. In all cases, if there is a substantial reason you are unable to meet the deadline, contact the Graduate Office.

A leave for internship can be taken for one to three terms. Official leaves are granted for an entire term and cannot be prorated to months or weeks. If your internship falls outside of a normal academic term, please consult with the Graduate Office.

Funding: Funding will be put on hold for the duration of the internship leave. You must notify the Graduate Office when you return from leave so that your registration and funding can resume.

What Happens to Scholarships: Check the regulations of any scholarship(s) you are receiving to be sure that the agency will allow a break for work experience and deferral of payments.

NSERC recipients are required to submit the form “Request for Deferment or Interruption of Award” and, in some cases, an NSERC Progress Report as well. The forms are at www.nserc.ca. These documents are to be submitted to the SGS Graduate Awards Office. The NSERC contact at SGS is at 416-978-2150.

OGS does not allow a break for internship unless it is part of the degree requirement. The OGS rule is that students are permitted to work a maximum of 10 hours a week while registered as full-time students. The OGS contact at SGS at 416-978-2205. If you hold an OGS award and wish to do an internship, please contact the Graduate Office for advice.

Tuition Fees: Graduate School tuition fees are assessed on a program basis rather than on the number of courses taken or the number of sessions per year. Students are permitted to pay their program tuition fees in two parts, payable in the Fall and Winter Sessions. Graduate students who have paid tuition for the full year do not, in effect, pay tuition for the summer months but remain registered for that period. When a student takes a leave for any purpose, s/he will not be registered in the program for the duration of the leave.

Funding and Time to Completion of Degree: For SGS approved leaves the remaining funding, the remaining components of your program and the time-to-completion for your degree will be extended by the
amount of time (number of terms) taken for the internship. This is calculated per term and cannot be
prorated by weeks or days.

A break in registration may impact income tax calculations. Also, it may mean that any student loans will be
immediately payable - you should check with your loan agency about repayment regulations. International
students should ensure that they have an appropriate visa that will allow them to not be registered as a
student while they work at an internship.
Financial Support

The Department of Computer Science will ensure that all full-time research degree graduate students receive financial support to at least the basic departmental level, provided that they are making satisfactory progress in their graduate program. M.Sc.A.C. Students do not qualify for guaranteed departmental funding.

M.Sc. Students: 17 months of guaranteed funding.
Ph.D.-Direct Students: 60 months of guaranteed funding.
Ph.D. Students who have completed M.Sc. program in our department: 43 months of guaranteed funding.
Ph.D. with M.Sc. from elsewhere: 48 months of guaranteed funding.

A student who starts our program from a Bachelor’s degree will receive 60 months (5 years) of financial support. Of these 60 months, up to 17 months of support is provided to complete the Masters and 43 months of guaranteed support is provided to complete the Ph.D. Students who enter the Ph.D. program with a Master’s degree from elsewhere will receive 48 months of financial support to complete the Ph.D.

Students and prospective students wishing to obtain financial support must apply for all scholarships, fellowships, and bursaries for which they are eligible. Canadian and permanent resident students should apply to the Canadian and Ontario Government scholarships (NSERC and OGS, see below). Foreign students are expected to apply to their own government and national agencies, and for Government of Canada Scholarships available through the Canadian Embassy in their country. The Ontario Student Aid Program (OSAP) provides interest-free loans.

Students who win a major scholarship are no longer eligible for basic departmental support, since that support will now be provided by their scholarship. To ensure scholarship winners obtain a significant financial reward from their scholarship, the department will pay a top-up for scholarship holders who are within their guaranteed funding period.

Deadlines and procedures for application to all award competitions will be announced by email to all registered students as that information becomes available each year.

Ontario Graduate Scholarships (OGS)

Canadian citizens, permanent residents, or students who have been admitted to Canada on a student visa are eligible. Preference is given to Ontario residents. The call for applications and deadlines will be announced by e-mail to all registered students in late-September. OGS is tenable at any Ontario university. Application forms must be submitted to the Graduate Office of the Department of Computer Science. OGS webpage: https://osap.gov.on.ca/OSAPPortal/en/A-ZListofAid/TCONT003465.html

Natural Sciences and Engineering Research Council (NSERC)

Postgraduate Scholarships (PGS) and Canada Graduate Scholarships (CGS) awards

Canadian citizens and permanent residents are eligible for these scholarships which are tenable at any Canadian university. Award recipients may start their scholarship in May, provided they are able to find a supervisor for the summer period preceding their registration.

NSERC application forms must be submitted to the Graduate Office of the Department of Computer Science. The call for applications and the departmental deadline will be announced by e-mail to all registered students in September. Consult the NSERC webpage www.nserc.gc.ca for further details.
**Department of Computer Science Awards**

The department awards a number of scholarships. All students regardless of their legal status in Canada are eligible. Not all of these scholarships are awarded each year, as the available amount of funds for many of these depends on interest accrued from endowments. A single application for all of these scholarships will be due after NSERC and OGS recipients have been announced in early spring. The award recipients will be selected by the Graduate Affairs Committee.

**Acres Productive Technologies Inc. -- Joseph Yonan Memorial Fellowship**

This scholarship is to be awarded to graduate students with academic excellence and financial need. Eligible students will be drawn from the DCS.

**C.C. Gotlieb (Kelly) Graduate Fellowship in the Department of Computer Science**

To be awarded on the basis of academic merit (research and course work) to an outstanding graduate student in any sub-discipline of Computer Science. Financial need may also be considered.

**Robert E. Lansdale/Okino Computer Graphics Graduate Fellowship in DGP for the Department of Computer Science**

To be awarded to a graduate student in the Department of Computer Science’s Dynamic Graphics Project on the basis of academic merit. Financial need may also be considered.

**Platform Computing Graduate Fellowship in Computer Science**

To be awarded to a graduate student in the Department of Computer Science on the basis of academic merit. Financial need may also be considered.

**Ray Reiter Graduate Award in Computer Science**

To be awarded on the basis of financial need to a graduate student in the area of Artificial Intelligence.

**Monica Ryckman Bursary**

The funds will be used for graduate students who are otherwise without support. Value is variable.

**Alfred B. Lehman Graduate Scholarship in Computer Science**

To be awarded to a graduate student in the Department of Computer Science on the basis of academic merit with preference given to students studying in the area of discrete mathematics, with a special emphasis on combinatorics, graph theory, matroid theory and the theoretical foundations of mathematical programming. Financial need will also be considered.

**Wolfond Scholarship Program in Wireless Information Technology**

To be awarded to graduate students in the Department of Computer Science who are pursuing research in areas related to systems, wireless, networks, HCI and digital media. Awards to be given based on academic merit. The recipients of this scholarship will be known as “Wolfond Fellows”.

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Students in Bahen Atrium
Doctoral Thesis Completion Award (DCA)
This award is intended to help support Ph.D. students who are in their first year beyond the period of
guaranteed funding and whose program cannot be completed within the funded years because of special
features of the research program or because of unforeseen events such as loss of data, obstruction of
access of research materials, etc. The DCA is available to both domestic and international students.
Information and application forms are available at www.sgs.utoronto.ca.

Master’s Tuition Fee Bursary (MTFB)
A limited number of bursaries are available for master’s students for whom the minimum period of
registration (i.e. program length) will have ended by or before either August or December and who have a
small amount of work outstanding for the degree. The value of the bursary is equal to the difference between
one session full-time fee and one session part-time fee. This tuition assistance is provided for only one
session during the academic year. The form is available on the SGS web site, under Student Forms.

Fellowships from Other Agencies
Further details on awards from outside agencies are listed in the calendar of the School of Graduate
Studies.

Ontario Government Loans
The Ontario Student Aid Program (OSAP) provides interest free loans to needy full-time students who are
Canadian citizens or permanent residents. M.Sc.A.C. students are eligible for OSAP funding. For more
information, phone 1-416-978-2190 ext.6285 or email osap.staff@utoronto.ca.

Financial Counseling
Students in financial difficulty may wish to visit a Financial Counselor at the School of Graduate Studies, 63
St. George Street. A counselor can help with budgeting and may have access to various bursaries, grants,
loans, etc. that would be sufficient to get a student through a rough financial situation.
Departmental and University Facilities

Computer Facilities

The Computer Science Laboratory (CS Lab) is the department’s research computing facility. Workstations, servers, and printers for research computing are in abundance throughout the department. Every graduate student is equipped with a research computing desktop, inter-connected via a high-speed network to departmental servers, the university backbone, and the internet. Wired and wireless network access for notebook computers is also available. In addition, there are multiple special-purpose research computing laboratories focusing on specific research areas, such as graphics, databases, computer vision, machine learning, computational linguistics, robotics and distributed systems.

Teaching computing on both the graduate and undergraduate level is supported by the Computing Disciplines Facility (CDF), which operates a number of departmental teaching laboratories at different locations on campus.

Additional computing facilities on campus are also available. A list of central university IT resources is available online at http://www.its.utoronto.ca/.

Library Facilities

The University of Toronto library system is the largest in Canada. It consists of four central libraries and many departmental libraries. Pamphlets describing the library services are available at these locations. The Reader Registration Office is on the main floor of the Robarts Library. Visit the libraries web site at http://www.library.utoronto.ca/home/. The central libraries are:

Gerstein Science Information Centre
7 King's College Circle

Sigmund Samuel Library
9 King's College Circle

Robarts Research Library
(Humanities & Social Science Library)
130 St. George Street

Sandford Fleming Library
(Engineering & Computer Science Library)
10 King's College Circle

Research Skills Course

The department often offers a research skills course. This course is intended to help students develop essential research skills needed to succeed in conducting research, publishing research, and becoming part of the research community. The course is conducted as a Seminar Series on Research and Related Skills for Computer Science Graduate Students. More information will be forthcoming during the Fall term.

English Language and Writing Support

English Language and Writing Support, at the School of Graduate Studies, offers individual consultations, single-session workshops, and free non-credit courses for both native and non-native speakers of English. Information and registration: http://www.sgs.utoronto.ca/informationfor/students/english.

The Graduate Professional Skills (GPS) program

The Graduate Professional Skills (GPS) program is an initiative from the School of Graduate Studies to help research stream (M.Sc., Ph.D.) graduate students become fully prepared for their future.

GPS focuses on skills beyond those conventionally learned within a disciplinary program, skills that may be critical to success in the wide range of careers that graduates enter, both within and outside academe. GPS can help you to communicate effectively, plan and manage your time, be entrepreneurial, understand and apply ethical practices, and work effectively in teams and as leaders.

The GPS consists of a range of optional “ offerings” with a time commitment roughly equivalent to 60 hours of work over the course of a degree. Its successful completion will be recognized by a notation on the student’s university transcript.
University of Toronto Policies
This is not an exhaustive list of U of T policy. For more information visit the School of Graduate Studies Website: http://www.sgs.utoronto.ca/informationfor/students/policy.htm

Intellectual Property Guidelines: Inventions and Patents

Code of Behaviour on Academic Matters
Students in graduate studies are expected to commit to the highest standards of integrity and to understand the importance of protecting and acknowledging intellectual property. For example, it is assumed that they bring to their graduate studies a clear understanding of how to cite references appropriately, thereby avoiding plagiarism. The student’s thinking must be understood as distinct from the sources upon which the student is referring. Two excellent documents entitled How Not to Plagiarize and Deterring Plagiarism (of interest to students and faculty respectively) are available for reference through the SGS website: http://www.sgs.utoronto.ca/governance/policies/academicmisconduct.htm.

U of T Code of Student Conduct
http://www.governingcouncil.utoronto.ca/policies/studentc.htm
No person shall cause another person or persons to fear for their safety or the safety of another person known to them while on the premises of the University of Toronto or in the course of activities sponsored by the University of Toronto or by any of its divisions, or cause another person or persons to be impeded in exercising the freedom to participate reasonably in the programs of the University and in activities in or on the University’s premises, knowing that their conduct will cause such fear, or recklessly as to whether their conduct causes such fear. This protection is extended to all graduate and undergraduate students, all administrative and support staff, all faculty members and all instructors and TA’s.

U of T Policy on Sexual Harassment
http://www.governingcouncil.utoronto.ca/policies/sexual.htm
Preamble to the Policy
Sexual harassment in any situation is reprehensible. In particular, within the University community it fosters a hostile or unfair environment which counteracts the spirit of cooperation and education.

Responsibility shared
All members of the University community share responsibility for bringing about and maintaining an environment free of sexual harassment, but a particular burden is placed on those in positions of academic and administrative authority to attempt to ensure that allegations of sexual harassment which are brought to their attention are dealt with in the appropriate fashion as laid out in this Policy and Procedures.
### Appendix A: COURSE CLASSIFICATION BASED ON METHODOLOGIES

#### Methodology 1: Analysis and Computation in Discrete Models

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC2104</td>
<td>Formal Methods of Program Design (Programming Methodology)</td>
</tr>
<tr>
<td>CSC2108</td>
<td>Automated Verification</td>
</tr>
<tr>
<td>CSC2125</td>
<td>Topics in Software Engineering</td>
</tr>
<tr>
<td>CSC2221</td>
<td>Introduction to the Theory of Distributed Computing</td>
</tr>
<tr>
<td>CSC2226</td>
<td>Topics in Verification</td>
</tr>
<tr>
<td>CSC2401</td>
<td>Introduction to Computational Complexity</td>
</tr>
<tr>
<td>CSC2404</td>
<td>Computability and Logic</td>
</tr>
<tr>
<td>CSC2405</td>
<td>Automata Theory</td>
</tr>
<tr>
<td>CSC2410</td>
<td>Introduction to Graph Theory</td>
</tr>
<tr>
<td>CSC2411</td>
<td>Linear Programming and Combinatorial Optimization</td>
</tr>
<tr>
<td>CSC2413</td>
<td>Combinatorial Methods and Designs</td>
</tr>
<tr>
<td>CSC2414</td>
<td>Topics in Applied Discrete Mathematics</td>
</tr>
<tr>
<td>CSC2415</td>
<td>Advanced Topics in Distributed Computing</td>
</tr>
<tr>
<td>CSC2416</td>
<td>Machine Learning Theory</td>
</tr>
<tr>
<td>CSC2419</td>
<td>Topics in Cryptography</td>
</tr>
<tr>
<td>CSC2420</td>
<td>Algorithm Design, Analysis and Theory</td>
</tr>
<tr>
<td>CSC2421</td>
<td>Topics in Algorithms</td>
</tr>
<tr>
<td>CSC2426</td>
<td>Fundamentals of Cryptography</td>
</tr>
<tr>
<td>CSC2427</td>
<td>Topics in Graph Theory</td>
</tr>
<tr>
<td>CSC2429</td>
<td>Topics in Computational Complexity</td>
</tr>
<tr>
<td>CSC2502</td>
<td>(486) Knowledge Representation and Reasoning</td>
</tr>
<tr>
<td>CSC2506</td>
<td>Probabilistic Learning and Reasoning</td>
</tr>
<tr>
<td>CSC2512</td>
<td>Constraint Satisfaction Problems</td>
</tr>
<tr>
<td>CSC2517</td>
<td>Discrete Mathematical Models of Sentence Structure</td>
</tr>
<tr>
<td>CSC2519</td>
<td>Natural Language Semantics</td>
</tr>
<tr>
<td>CSC2523</td>
<td>Object Modeling and Recognition</td>
</tr>
<tr>
<td>CSC2532</td>
<td>Dynamical Systems and Artificial Intelligence</td>
</tr>
<tr>
<td>CSC2533</td>
<td>Foundations of Knowledge Representation</td>
</tr>
<tr>
<td>CSC2534</td>
<td>Decision Making Under Uncertainty</td>
</tr>
<tr>
<td>CSC2542</td>
<td>Topics in Knowledge Representation and Reasoning</td>
</tr>
<tr>
<td>CSC2601</td>
<td>Topics in Analysis and Computation in Discrete Models</td>
</tr>
</tbody>
</table>

#### Methodology 2: Analysis and Computation in Continuous Models

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC2206</td>
<td>System Modeling and Analysis</td>
</tr>
<tr>
<td>CSC2302</td>
<td>Numerical Solution of Initial Value Problems for Ordinary Differential Equations</td>
</tr>
<tr>
<td>CSC2305</td>
<td>Numerical Methods for Optimization Problems</td>
</tr>
<tr>
<td>CSC2306</td>
<td>(456) High-Performance Scientific Computing</td>
</tr>
<tr>
<td>CSC2307</td>
<td>Numerical Software</td>
</tr>
<tr>
<td>CSC2310</td>
<td>(446) Computational Methods for Partial Differential Equations</td>
</tr>
<tr>
<td>CSC2321</td>
<td>Matrix Calculations</td>
</tr>
<tr>
<td>CSC2322</td>
<td>Boundary Value Problems for Ordinary Differential Equations</td>
</tr>
<tr>
<td>CSC2326</td>
<td>Topics in Numerical Analysis</td>
</tr>
<tr>
<td>CSC2503</td>
<td>(487) Foundations of Computer Vision</td>
</tr>
<tr>
<td>CSC2504</td>
<td>(418) Computer Graphics</td>
</tr>
<tr>
<td>CSC2505</td>
<td>Geometric Representations for Computer Graphics</td>
</tr>
<tr>
<td>CSC2511</td>
<td>(401) Natural Language Computing</td>
</tr>
<tr>
<td>CSC2515</td>
<td>Introduction to Machine Learning</td>
</tr>
</tbody>
</table>
CSC2520 The Computational Lexicon
CSC2521 Topics in Computer Graphics
CSC2522 Advanced Image Synthesis
CSC2529 Computer Animation
CSC2530 Computer Vision for Advanced Digital Photography
CSC2535 Advanced Machine Learning
CSC2539 Topics in Computer Vision
CSC2541 Topics in Machine Learning
CSC2545 Kernel Methods and Support Vector Machines
CSC2562 Topics in Analysis and Computation in Continuous Models

Methodology 3: Building Software and Hardware Artifacts

CSC2107 (488) Compilers and Interpreters
CSC2203 Packet Switch and Network Architectures
CSC2208 Advanced Operating Systems
CSC2209 (458) Computer Networks
CSC2227 Topics in the Design & Implementation of Operating Systems
CSC2228 Topics in Mobile and Pervasive Computing
CSC2229 Topics in Computer Networks
CSC2231 Special Topics in Computer Systems
CSC2232 Topics in Computer System Performance and Reliability
CSC2508 Advanced Database Management Systems
CSC2525 Research Topics in Data Management Systems
CSC2531 Advanced Topics in Data Management Systems
CSC2543 Research Topics in XML Retrieval
CSC2544 Web Searching and Mining
CSC2603 Topics In Building Software and Hardware Artifacts

Methodology 4: Human-Centered and Interdisciplinary Computing

CSC2106 Requirements Engineering
CSC2130 Empirical Research Methods in Software Engineering
CSC2417 Algorithms for Genome Sequence Analysis
CSC2418 Computational Structural Biology
CSC2431 Topics in computational Molecular Biology
CSC2501 (485) Computational Linguistics
CSC2514 (428) Human-Computer Interaction
CSC2518 Spoken Language Processing
CSC2524 Topics in Interactive Computing
CSC2526 HCI: Topics in Ubiquitous Computing
CSC2527 (454) The Business of Software
CSC2536 Computer Supported Cooperative Work
CSC2604 Topics in Human-Centred and Interdisciplinary Computing

No breadth:

CSC2699 Special Reading Course in Computer Science
Appendix B: COURSE CLASSIFICATION BASED ON RESEARCH AREAS

Research Area 1: Algorithms and Discrete Math
CSC2410 Introduction to Graph Theory
CSC2411 Linear Programming and Combinatorial Optimization
CSC2413 Combinatorial Methods and Designs
CSC2414 Topics in Applied Discrete Mathematics
CSC2420 Algorithm Design, Analysis and Theory
CSC2421 Topics in Algorithms
CSC2427 Topics in Graph Theory

Research Area 2: Complexity and Cryptography
CSC2401 Introduction to Computational Complexity
CSC2404 (438) Computability and Logic
CSC2405 (448) Automata Theory
CSC2416 Machine Learning Theory
CSC2419 Topics in Cryptography
CSC2426 Fundamentals of Cryptography
CSC2429 Topics in Computational Complexity

Research Area 3: Computational Biology
CSC2417 Algorithms for Genome Sequence Analysis
CSC2418 Computational Structural Biology
CSC2431 Topics in computational Molecular Biology

Research Area 4: Computational Linguistics
CSC2501 (485) Computational Linguistics
CSC2511 (401) Natural Language Computing
CSC2517 Discrete Mathematical Models of Sentence Structure
CSC2518 Spoken Language Processing
CSC2519 Natural Language Semantics
CSC2520 The Computational Lexicon
CSC2528 Advanced Computational Linguistics
CSC2540 Cognitive Linguistics

Research Area 5: Computer Graphics
CSC2504 (418) Computer Graphics
CSC2505 Geometric Representations for Computer Graphics
CSC2521 Topics in Computer Graphics
CSC2522 Advanced Image Synthesis
CSC2529 Computer Animation
CSC2530 Computer Vision for Advanced Digital Photography

Research Area 6: Computer Systems and Networks
CSC2203 Packet Switch and Network Architectures
CSC2206 System Modeling and Analysis
CSC2208 (469) Advanced Operating Systems
CSC2209 (458) Computer Networks
CSC2227 Topics in the Design & Implementation of Operating Systems
CSC2228 Topics in Mobile and Pervasive Computing
CSC2229 Topics in Computer Networks
CSC2231 Special Topics in Computer Systems
CSC2232 Topics in Computer System Performance and Reliability

Research Area 7: Computer Vision
CSC2503 Foundations of Computer Vision
CSC2523 Object Modeling and Recognition
CSC2539 Topics in Computer Vision

Research Area 8: Database Systems
CSC2508 Advanced Database Management Systems
CSC2510 Topics in Information Systems
CSC2525 Research Topics in Data Management
CSC2531 Advanced Topics in Data Management Systems
CSC2543 Research Topics in XML Retrieval
CSC2544 Web Searching and Mining

Research Area 9: Distributed Computing
CSC2221 Introduction to the Theory of Distributed Computing
CSC2415 Advanced Topics in Distributed Computing

Research Area 10: Human-Computer Interaction
CSC2514 Human-Computer Interaction
CSC2526 HCI: Topics in Ubiquitous Computing
CSC2527 The Business of Software
CSC2536 Computer Supported Cooperative Work

Research Area 11: Knowledge Representation
CSC2502 Knowledge Representation and Reasoning
CSC2512 Constraint Satisfaction Problems
CSC2532 Dynamical Systems and Artificial Intelligence
CSC2533 Foundations of Knowledge Representation

CSC2542 Topics in Knowledge Representation and Reasoning

Research Area 12: Machine Learning
CSC2506 Probabilistic Learning and Reasoning
CSC2515 Introduction to Machine Learning
CSC2535 Advanced Machine Learning
CSC2541 Topics in Machine Learning
CSC2545 Kernel Methods and Support Vector Machines

Research Area 13: Scientific Computation and Numerical Analysis
CSC2302 Numerical Solution of Initial Value Problems for Ordinary Differential Equations
CSC2305 Numerical Methods for Optimization Problems
CSC2306 High-Performance Scientific Computing
CSC2307 Numerical Software
CSC2310 Computational Methods for Partial Differential Equations
CSC2321 Matrix Calculations
CSC2322 Boundary Value Problems for Ordinary Differential Equations
CSC2326 Topics in Numerical Analysis
Research Area 14: Software Engineering

CSC2104 (465) Formal Methods of Program Design (Programming Methodology)
CSC2106 Requirements Engineering
CSC2107 (488) Compilers and Interpreters
CSC2108 Automated Verification
CSC2125 Topics in Software Engineering
CSC2130 Empirical Research Methods in Software Engineering
CSC2226 Topics in Verification

Research Area 15: Interdisciplinary Computer Science

CSC2534 Decision Making Under Uncertainty
CSC2602 Topics in Analysis and Computation in Continuous Models
CSC2604 (Winter 2014 version only) Topics in Human-Centred and Interdisciplinary Computing: Systems Thinking for Global Problems

No breadth:
CSC2699 Special Reading Course in Computer Science

Appendix C: COURSES NO LONGER OFFERED AS OF 2011-2012

CSC2402 Methodology Re: Interactability
CSC2406 Triple Systems
CSC2408
CSC2409
CSC2412 Computer Algebra
CSC2422 Reasoning about Knowledge
CSC2423 Finite Model Theory and Descriptive Complexity
CSC2428 Logic and Automata
CSC2103 Software Arch & Design
CSC2105 Software Engineering
CSC2122 Language and Compiler Design
CSC2123 Managing the Software Organization
CSC2124 Topics in Programming Languages
CSC2199 Special Reading Course in Programming
CSC2204 Advanced Operating Systems
CSC2205 Performance in Distributed Operating Systems
CSC2207 Topics in Computer Organization
CSC2211 No current course title found
CSC2225 Structure and Correctness in Operating Systems
CSC2299 Special Reading Course in Computer Systems
CSC2499 Special Reading Course in Theoretical Aspects of Computer Science
CSC2500 Artificial Intelligence
CSC2507 Conceptual Modeling
CSC2509 Data Management Systems
CSC2537 Hypermedia
CSC2538 Topics in Foundations of Databases
CSC2599 Special Reading Course in Computer Applications
CSC3111 Software Application
CSC3110 Topics in Cryptography
CSC2304
CSC2308 Numerical Methods for Nonlinear Equations
CSC2309
CSC2311
CSC2312 The Design and Assessment of Numerical Algorithms
CSC2324 Advanced Methods for Partial Differential Equations
CSC2399 Special Reading Course in Numerical Computation