Graduate Student Handbook
2007-2008

Applied and Discrete Mathematics
Artificial Intelligence
Computational Biology
Computer Graphics
Computer Systems and Networks
Database Systems
Human Computer Interaction
Numerical Analysis
Programming Languages and Methodologies
Software Engineering
Theory of Computation

Computer Science
UNIVERSITY OF TORONTO
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.

Information about graduate program admissions, course descriptions and timetable, as well as undergraduate programs is available from the Departmental website: http://www.cs.toronto.edu/DCS/index.html

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Web: www.cs.toronto.edu

Other web sites of interest:
School of Graduate Studies       www.sgs.utoronto.ca
Electrical & Computer Engineering www.ece.utoronto.ca
Mathematics                     www.math.utoronto.ca
Mechanical & Industrial Engineering www.mie.utoronto.ca
Faculty of Information Studies   www.fis.utoronto.ca
University of Toronto           www.utoronto.ca
Table of Contents

GRADUATE OFFICE CONTACT INFORMATION: ................................................................. 1
ACADEMIC DEADLINES ...................................................................................................... 3
THE DEPARTMENT .............................................................................................................. 4
  OVERVIEW .................................................................................................................... 4
  ADMINISTRATION ......................................................................................................... 4
  COMPUTER FACILITIES ............................................................................................. 5
  LIBRARY FACILITIES ................................................................................................. 5
  INVENTIONS AND PATENTS ....................................................................................... 5
  INTELLECTUAL PROPERTY GUIDELINES ............................................................... 5
  PLAGIARISM ................................................................................................................ 5
THE GRADUATE PROGRAM ................................................................................................. 6
  STUDENT CATEGORIES ............................................................................................... 6
  DEGREE STUDENT ...................................................................................................... 6
  SPECIAL STUDENT .................................................................................................... 6
  PART-TIME M.Sc. PROGRAM ...................................................................................... 6
  RESIDENCY .................................................................................................................. 6
  DEGREE REQUIREMENTS .......................................................................................... 6
  STUDENT SUPERVISION ............................................................................................ 6
  FEES PAYMENT AND REGISTRATION ..................................................................... 7
  PROGRAM CHANGES (ADD/DROP COURSES AND PROGRAM WITHDRAWAL) ... 7
  SCIENTIFIC WRITING COURSE .............................................................................. 7
  RESEARCH SKILLS COURSE .................................................................................... 8
  ENGLISH LANGUAGE AND WRITING SUPPORT .................................................. 8
  LEAVE FOR MEDICAL OR PERSONAL REASONS .................................................. 8
  EXCHANGE PROGRAMS ............................................................................................ 8
MASTER OF SCIENCE ...................................................................................................... 9
  SATISFACTORY PROGRESS (M.Sc.) .......................................................................... 9
  PROGRESS MONITORING (M.Sc.) ............................................................................ 9
  PROCEEDING TO THE PH.D. PROGRAM AFTER COMPLETION OF THE M.Sc. .... 10
DOCTOR OF PHILOSOPHY ............................................................................................... 11
  SATISFACTORY PROGRESS (Ph.D.) ......................................................................... 11
  SUPERVISING COMMITTEE MEETINGS (Ph.D.) ...................................................... 11
  PROGRESS MONITORING (Ph.D.) ......................................................................... 11
  PH.D. DEGREE REQUIREMENTS COMPLETION DEADLINE (YEAR 3) ................. 12
  INTERNSHIP .............................................................................................................. 12
TIMELINE TO DEGREE COMPLETION ...................................................................... 13
  MASTER’S DEGREE TIMELINE ................................................................................ 13
  PH.D. CHECKPOINTS AND DEGREE TIMELINE .................................................... 13
FINANCIAL SUPPORT .................................................................................................... 15
  CANADA GRADUATE SCHOLARSHIPS (CGS) AND NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL (NSERC) POSTGRADUATE SCHOLARSHIPS (PGS) .................................................. 15
  ONTARIO GRADUATE SCHOLARSHIPS (OGS) ....................................................... 15
  DEPARTMENT OF COMPUTER SCIENCE AWARDS ............................................... 15
  DOCTORAL THESIS COMPLETION GRANT ............................................................ 16
  MASTER’S TUITION FEE BURSARY ....................................................................... 16
  FELLOWSHIPS FROM OTHER AGENCIES ............................................................... 16
  ONTARIO GOVERNMENT LOANS ........................................................................... 16
BREADTH GROUPS AND AREAS .................................................................................... 17
COURSE NUMBERING .................................................................................................... 17
# ACADEMIC DEADLINES

## 2007

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>August</td>
<td>6</td>
<td>Civic Holiday</td>
</tr>
<tr>
<td>August</td>
<td>13</td>
<td>Registration for September session begins.</td>
</tr>
<tr>
<td>August</td>
<td>31</td>
<td>Last date for payment of tuition fees to meet registration deadline.</td>
</tr>
<tr>
<td>September</td>
<td>3</td>
<td>Labour Day. University closed.</td>
</tr>
<tr>
<td>September</td>
<td>10</td>
<td>Most formal graduate courses and seminars begin in the week of September 10.</td>
</tr>
<tr>
<td>September</td>
<td>14</td>
<td>Registration for September session ends; after this date, a late registration fee will be assessed.</td>
</tr>
<tr>
<td>September</td>
<td>17</td>
<td>Final date to submit Ph.D. theses to SGS to avoid fee charges for 2007-08.</td>
</tr>
<tr>
<td>September</td>
<td>21</td>
<td>Coursework must be completed and grades submitted for summer session courses and extended courses.</td>
</tr>
<tr>
<td>September</td>
<td>26</td>
<td>Summer Session grades available for viewing by students on the Student Web Service.</td>
</tr>
<tr>
<td>October</td>
<td>5</td>
<td>Final date for receipt of degree recommendations and submission of any required theses for master's degrees for Fall Convocation.</td>
</tr>
<tr>
<td>October</td>
<td>5</td>
<td>Final date to submit final Ph.D. thesis for Fall Convocation.</td>
</tr>
<tr>
<td>October</td>
<td>5</td>
<td>Final date to add full-year and September session courses.</td>
</tr>
<tr>
<td>October</td>
<td>8</td>
<td>Thanksgiving Day. University closed.</td>
</tr>
<tr>
<td>November</td>
<td>2</td>
<td>Final date to drop September session full or half courses without academic penalty.</td>
</tr>
<tr>
<td>November</td>
<td></td>
<td>Fall Convocation Information and Dates are posted at: <a href="http://www.utoronto.ca/convocation">www.utoronto.ca/convocation</a>.</td>
</tr>
<tr>
<td>December</td>
<td></td>
<td>Last day of classes before Winter break, consult the course instructor.</td>
</tr>
</tbody>
</table>

## 2008

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>7</td>
<td>Most formal graduate courses and seminars begin in the week of January 7.</td>
</tr>
<tr>
<td>January</td>
<td>11</td>
<td>Final date for registration of students beginning program in January session; after this date, a late registration fee will be assessed.</td>
</tr>
<tr>
<td>January</td>
<td>15</td>
<td>Final date to submit Ph.D. theses without fee payment for January session.</td>
</tr>
<tr>
<td>January</td>
<td>18</td>
<td>Coursework must be completed and grades submitted for September session courses.</td>
</tr>
<tr>
<td>January</td>
<td>18</td>
<td>Final date to add January session courses.</td>
</tr>
<tr>
<td>January</td>
<td>23</td>
<td>September session grades available for viewing by students on the Student Web Service.</td>
</tr>
<tr>
<td>January</td>
<td>31</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 January session.</td>
</tr>
<tr>
<td>January</td>
<td>31</td>
<td>Final date for all students to request that their degrees be conferred <strong>in absentia</strong> in March.</td>
</tr>
<tr>
<td>January</td>
<td>31</td>
<td>September dual registrants must be recommended for master's degree by this date to maintain their PhD registration.</td>
</tr>
<tr>
<td>February</td>
<td>29</td>
<td>Final date to drop full-year or January session courses without academic penalty.</td>
</tr>
<tr>
<td>March</td>
<td>21</td>
<td>Good Friday. University closed.</td>
</tr>
<tr>
<td>March</td>
<td>25</td>
<td>For students obtaining degrees at June Convocation, course work must be completed and grades submitted for full-year and January session courses.</td>
</tr>
<tr>
<td>April</td>
<td>25</td>
<td>Final date for receipt of degree recommendations and submission of any required theses for master's degrees for June Convocation.</td>
</tr>
<tr>
<td>April</td>
<td>25</td>
<td>Final date for submission of final Ph.D. thesis for students whose degrees are to be conferred at the June Convocation.</td>
</tr>
<tr>
<td>April</td>
<td>25</td>
<td>Final date for degree recommendations of January dual registrants for the master's degree to maintain their Ph.D. registration.</td>
</tr>
<tr>
<td>May</td>
<td>9</td>
<td>For first day of summer classes, consult graduate unit concerned.</td>
</tr>
<tr>
<td>May</td>
<td>16</td>
<td>Final date to enroll in May-June or May-August session courses.</td>
</tr>
<tr>
<td>May</td>
<td>16</td>
<td>Course work must be completed and grades submitted for full-year and January session courses.</td>
</tr>
<tr>
<td>May</td>
<td>19</td>
<td>Victoria Day. University closed.</td>
</tr>
<tr>
<td>May</td>
<td>21</td>
<td>January Session grades available for viewing by students on the Student Web Service.</td>
</tr>
</tbody>
</table>
The Department

Overview
The Department of Computer Science at the University of Toronto 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. In our most recent departmental evaluation in 1998, the department was rated as the foremost Canadian computer science department and among the best in North America. Currently, the department consists of 115 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 3,200 undergraduate majors and specialists.

The department is responsible for a large number of the computer science Ph.D.’s in Canada. Graduates of our department are now on the faculties of most Canadian universities (Alberta, UBC, Carleton, Calgary, Dalhousie, McGill, Memorial, Montreal, New Brunswick, Quebec, Queen’s, Ryerson, Saskatchewan, Simon Fraser, St. Mary’s, Toronto, Waterloo, Victoria, Western Ontario, York), as well as on the faculties of many leading universities throughout the world. Five of those who took positions in the United States have received the U.S. Presidential Young Investigator Award. Our graduate students 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.

The department is supported with research grants from a number of sources including the Natural Sciences and Engineering Research Council (NSERC), the Institute for Robotics and Intelligent Systems (IRIS), the Communications and Information Technology Ontario (CITO), and the Bell University Labs.

Our department has strong ties with other departments, particularly Electrical and Computer Engineering. The establishment of the Computer Systems Research Group (CSRG) has maintained this close cooperation. The Human-Computer Interaction Group has research ties with the Departments of Psychology, Sociology and the Knowledge Media Design Institute (KMDI); the Artificial Intelligence Group has research connections with the Departments of Psychology and Philosophy. Several of our faculty members are cross appointed with other departments, specifically the Departments of Electrical and Computer Engineering, Mathematics, Psychology, Philosophy, Mechanical and Industrial Engineering, the Faculty of Management, and the Faculty of Information Studies.

A large part of the Department is housed the Bahen Centre for Information Technology. This new Centre contains 10 state-of-the-art lecture halls, 14 tutorial/seminar rooms, more than 50 laboratories, plus office, study and meeting spaces. A major three-story atrium runs through the entire Centre, providing the main walkway for pedestrian traffic and a reception and meeting area for visitors and events. The eight-story computer science complex anchors the building’s southern wing while a stand alone pavilion at the building’s entrance is the focal point for electrical and computer engineering and engineering science.

One of the key areas of teaching and research that is undertaken in the new Bahen Centre deals with mobile technology. For example, the Bahen Centre is home to the Department of Computer Science’s new 724 Solutions Laboratory for Wireless Information Technology, made possible by a generous gift from Greg Wolfond, Chairman, 724 Solutions Inc. The 724 Laboratories houses several outstanding researchers each leading teams of graduate students, postdoctoral fellows and professors. This initiative, together with others on mobile technology, allows the University to become a world leader in wireless information technology, research and training, providing outstanding collaborative opportunities for industry, and reinforces Toronto as a major international wireless and mobile IT centre.

Administration
The Department of Computer Science is administered by the Chair: Professor Craig Boutilier; Vice Chair: Professor Hector Levesque; Associate Chair, Undergraduate Studies: Diane Horton and Associate Chair. Graduate Studies: Professor Richard Zemel.

The Graduate Program is administered by Professor Zemel and the Graduate Office Staff. They are advised by the Graduate Affairs Committee, consisting of several faculty members and graduate students. Graduate Affairs Committee meetings are open to all faculty and graduate students in the department, except when a confidential matter is being discussed.
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, interconnected 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.ic.utoronto.ca/infotech.htm.

Library Facilities
The University of Toronto library system is the largest in Canada. It consists of four central libraries and many departmental libraries. 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)
  10 St. George Street

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

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.

Inventions and Patents
The University of Toronto has an interest in any invention which results from research supported by funds or utilizing facilities administered by the University, whether such invention be made by a graduate student or a University employee, and reserves the right to require such student or employee to assign part or all of the right in any such invention to the University.

The Inventions Policy has two basic objectives: first, to encourage the public interest in the development of inventions made in the course of University activities and to maximize opportunities for commercial success, and second, to secure to both the inventor and to the University a share in the proceeds of inventions developed with use of University facilities.

Note that publication (which may even include oral disclosure) of the technical details of an invention prior to making application for a patent may prevent patenting of the invention. The Chair and Secretary of the Inventions Committee are available to give advice in such matters or to arrange obtaining advice from a patent agent.

For more information, refer to Office of Research Administration handbook Information: Research Policies and Procedures, section IX, Inventions Policy and Procedures, http://www.research.utoronto.ca/ipc/ip-inventions.html. Advice may be obtained on matters relating to inventions from the Chair of the Inventions Committee or from the Office of Research Services.

Intellectual Property Guidelines
Students are encouraged to read The University of Toronto Policy on Intellectual Property at http://www.sgs.utoronto.ca/current/policies/intellproperty.asp.

Plagiarism
Plagiarism is a serious offense. Students are encouraged to read How Not to Plagiarize, in the Code of Behaviour on Academic Matters, at http://www.utoronto.ca/writing/plagsep.html.
The Graduate Program

Student Categories
A student is either a degree student (M.Sc. or Ph.D.) or a special student. M.Sc. and special students may be either full-time or part-time; Ph.D. students must be full-time. For the definition of a full-time student see the SGS 2006-2007 Handbook.

Degree Student
A degree student is admitted to a program leading to a degree (M.Sc., Ph.D.).

Special Student
A special student is admitted to individual courses, not to a program leading to a degree. A special student receives grades and an official transcript, the same as a degree student. Admission as a special student requires an undergraduate degree equivalent to a four-year program at the University of Toronto with a standing equivalent to at least B+, and the necessary preparation for the courses to be taken. As a Special Student, at least one of the courses taken must be a graduate course with no undergraduate cross-listing.

Admission as a special student does not guarantee admission as a degree student. Courses taken as a special student may be used to improve one's record for application to a degree program. However, courses taken as a special student cannot be used as part of the course requirement in a degree program. Special students must submit an application for admission for each academic year of study.

Part-Time M.Sc. Program
The M.Sc. program is offered on either a full-time or part-time basis. Admission requirements are the same for part-time and full-time students. Part-time students pay fees according to the schedule set out by the Students Accounts Office at [http://www.fees.utoronto.ca/site4.aspx](http://www.fees.utoronto.ca/site4.aspx). They are not eligible for tax deductions, most fellowships, departmental support, and student visas. A student can change status from full-time to part-time and vice-versa only during the first term (first four months) of the graduate program with permission from the Associate Chair for Graduate Studies. The degree time limit for a part-time master’s program is 5 years.

Residency
There is no direct residency requirement. Taking courses and interacting with a research supervisor are difficult from a distance, and so they impose an indirect residency requirement. A student who has completed all coursework and research may write the final draft of a thesis while working elsewhere. Sometimes opportunities for research at a distant laboratory may form an important part of a student's research. Approval for nonresident graduate studies must be obtained from the Associate Chair for Graduate Studies. Departmental funding and some fellowships require residency.

Degree Requirements
Each of the M.Sc. and PhD degrees requires a specific number of courses, plus an additional substantial paper. The course requirements may be reduced for applicants who have already taken some graduate studies in computer science prior to admission. The courses must satisfy a breadth requirement to ensure a broad and well-balanced understanding of computer science. Only graduate-level courses at the University of Toronto with a B- or higher grade, or equivalent courses, with an equivalent grade, taken elsewhere may be used to satisfy the breadth requirement. Courses taken elsewhere must be approved by the breadth evaluator for the area; cross-listed undergraduate/graduate courses are acceptable if the requirements for the undergraduate and graduate students are the same. Breadth areas are listed on the last page of this handbook. The Ph.D. thesis and M.Sc. research paper report on research work done under supervision on a topic chosen in consultation with the supervisor, and must reach a high standard of exposition.

Student Supervision
Each degree graduate student will be assigned a supervisor upon 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. A student who wishes to change supervisors during their graduate studies should contact the Associate Chair of Graduate Studies.

You are encouraged to read the Graduate Supervision Guidelines for Students, Faculty and Administrators.
Fees Payment and Registration

Graduate Students are responsible for paying their own fees in order to be registered at the beginning of each session. Students who are late with payment of fees must contact the School of Graduate Studies before registering. Students must be registered before attending classes or using University facilities.

Request for Tuition Fee Deferral:
As a student, you may request to defer payment of tuition fees to April 30 under the following conditions.

- You have not exceeded your guaranteed funded period.
- You hold a major scholarship/award.
- You have satisfied all severe admission conditions.
- Your student account does not have an outstanding balance of over $100 from a previous session.

The Tuition Fee Deferral Form can be printed from the SGS website: www.sgs.utoronto.ca/current/studentforms, and should be submitted to the Department of Computer Science Graduate Office before the last date to register.

Program Changes (Add/Drop Courses and Program Withdrawal)

Students may add or drop courses or withdraw from the program by submitting a Program Change Form. The Program Change Form can be printed from the SGS website: www.sgs.utoronto.ca/current/studentforms/. Students requesting to take a course from another department must get permission from that department first.

Adding or Dropping a Course before the deadlines can be done in ROSI (SWS) by the student. After the deadlines the Program Change Form must be submitted to the Graduate Office in the department where the course is being offered. An explanation for failure to drop the course by the deadline must be included with the request. After approval in the department, the Graduate Office staff will submit your request to SGS for approval and processing.

Withdrawal from the program: It is the student’s responsibility to adhere to the deadlines for withdrawal from a program. Students choose to withdraw for various reasons, some of which may be resolved without the necessity to withdraw from the program. Therefore, students are encouraged to speak with their supervisor or the Associate Chair, Graduate Studies before finalizing a request to withdraw from the program.

Scientific Writing Course

The Computer Science Department sponsors a ten-week intensive writing course for graduate students, organized in three-hour sessions. Dates when the course will be offered will be announced by email to all registered students. There are two sections: one for advanced speakers of English and the other for second language students. The material covered is the same, but in the second language cohort the pace accommodates those with less familiarity with English.

This hands-on course is designed to help students develop fluency, clarity, and accuracy in their written work and oral presentations. The goal is to enable students to perceive and correct errors on their own so the thesis supervisor is not burdened with extensive revision. Accordingly, every class includes a grammar and style lesson, illustrated with excerpts from the professional literature to put the material in context. The material is adapted to the conventions of scientific writing. Students are expected to learn the information and apply it to the weekly assignment. The course consists of weekly assignments, two larger assignments to be completed over the ten weeks, and an oral presentation.

This course has proved successful; those who take it seriously make substantial progress. Because writing is learned by practice, the ultimate goal is for each student to develop a substantial portfolio of written work over the ten weeks.
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. See more information at http://www.cs.toronto.edu/dcs.current-grad-skills.html.

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. While the single-session workshops function on a drop-in basis, courses require registration, and consultations require an appointment. See detailed information and how to register at http://www.sgs.utoronto.ca/english/.

Leave for Medical or Personal Reasons
Graduate students may apply for a one-session to three-session leave for serious health issues or personal circumstances or parental leave which temporarily make it impossible to continue in the program. Once on leave students will not be registered nor will they be required to pay fees for this period. Students on leave may not make demands upon the resources of the University, attend courses or expect advice from their supervisor. Students on leave will not be eligible to receive University of Toronto fellowship support, and in the case of other graduate student awards, the regulations of the particular granting agency apply. Further details are available in the SGS Calendar at www.sgs.utoronto.ca.

Exchange Programs
The Department of Computer Science participates in exchange programs with several universities, including Johannes Kepler (Linz), Humboldt (Berlin), Stuttgart, Luigi Bocconi (Milan), Grenoble, Rouen, Paris, Nice, Jean Moulin, Lyon, Kyoto, Hong Kong University of Science and Technology, Chinese University of Hong Kong, West Indies, Chile (Santiago), National Technical University of Singapore, UBC (Vancouver), McGill (Montréal), Université de Montréal. Students may spend up to a year of their studies at an exchange university, with the approval of their supervisor and the Associate Chair for Graduate Studies. Courses taken there will be accepted for credit as part of the program here. Students will be assigned supervisors for their research while they are there. Fluency in the language of the exchange university is required.
**Master of Science**

Effective September 2007, the M.Sc. degree requires a research paper instead of a thesis. Students who start their programs in September 2007 will follow this format. Students who started their programs prior to September 2007 may choose whether to submit a thesis or a research paper to complete their degree.

The Master of Science (M.Sc.) degree program is designed to be completed in 17 months. This program requires completion of five computer science graduate half-courses and a research paper of 30 - 60 pages. If the student has taken a graduate course for credit that did not count toward a previous degree, it may be used to reduce the number of required courses for the M.Sc. This course credit can be obtained by submitting a Course Reduction Form to the Graduate Office.

The courses must satisfy a breadth requirement to ensure a broad and well-balanced knowledge of computer science. Courses are divided into 3 groups and each group further subdivided into more specialized areas. The graduate courses taken as part of the M.Sc. requirements must include at least one course from each of the 3 groups and must also include courses from at least 3 different areas. With the permission of their supervisor and the Associate Chair, Graduate Studies, students are welcome to take up to 2 graduate courses in related disciplines from graduate units outside of the department if breadth requirements are met by the remaining department courses.

The research paper 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.

The final research paper must have the written approval of two readers. The student's supervisor is normally one of the readers. The readers must be approved by the Associate Chair, Graduate Studies prior to submission of the research paper. 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.

**Satisfactory Progress (M.Sc.)**

The Timeline for Degree Completion, below, defines satisfactory progress through the M.Sc. program. Failure to make satisfactory progress may result in the withdrawal of departmental privileges and cessation of departmental funding. Students who have serious health problems or personal circumstances that prevent them from making satisfactory progress are entitled to request a leave from graduate studies (see above, ‘Leave for Medical or Personal Reasons’). Such leave effectively stops the clock for funding and time to completion; upon return, the student is entitled to resume at the point where they left, without penalty.

Students with extenuating circumstances which have the potential to result in a failed course should consult with their Supervisor as soon as the problem is identified. Failing grades in two courses may result in termination from the program.

**Progress Monitoring (M.Sc.)**

M.Sc. students will complete a Progress Report every four months. Deadline dates will be announced during the year. The primary aim is to review what you have accomplished in the past four months, and set up a plan for the following four months, in consultation with your supervisor. The Progress Monitoring Committee will meet periodically to review these reports.
Proceeding to the Ph.D. Program After Completion of the M.Sc.

All requirements of the M.Sc. must be completed by mid-January at the latest. This includes approval of the research paper by the two readers, as well as course requirements. The exact deadline will be announced during the term.

In addition, two letters of recommendation must be submitted to the Graduate Office. The two letter-writers can be, but do not have to be, the readers of the research paper.

Applications to proceed to the Ph.D. program will be accepted before January. Deadlines for these early applications will also be announced during the term.

Students who plan to transition are strongly encouraged to defer their fee payments in September.

Beginning in September 2007, students who wish to start their Ph.D. program immediately after completing the M.Sc. program will be required to complete the SGS online application and pay the application fee.
Doctor of Philosophy

Students entering the Ph.D. program with a Master's degree must complete 4 half-courses, and a thesis. Direct-entry Ph.D. students must complete nine half-courses, and a thesis.

The courses must satisfy a breadth requirement to ensure a broad and well-balanced knowledge of computer science. The graduate courses taken as part of the Ph.D. requirements must include courses from each of the 3 groups and must also include courses from at least 6 different areas. With the permission of their supervisor and the Associate Chair, Graduate Studies, students are welcome to take up to 3 graduate courses in related disciplines from graduate units outside of the department, if breadth requirements are met by the remaining department courses. Students who transfer 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.

The most important part of doctoral work is original research conducted under the direction of a faculty member. This research must constitute a significant and original contribution to computer science. The results must be presented in a thesis and defended at department and graduate school oral examinations.

Satisfactory Progress (Ph.D.)

The Timeline for Degree Completion, below, defines satisfactory progress through the Ph.D. program. Failure to make satisfactory progress may result in the withdrawal of departmental privileges, and cessation of departmental funding. 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.

Supervisory Committee Meetings (Ph.D.)

A Ph.D. supervisory committee must consist of at least three faculty members with full membership at SGS. At least 2 members must not be supervising the student. Two of the three must be departmental representatives. This must equal a total point calculation of 2 based on the following table.

<table>
<thead>
<tr>
<th>Departmental representation calculation:</th>
<th>1</th>
<th>A regular DCS faculty member (with a 50% or greater budgetary appointment in DCS, for whom DCS is the home department)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.5</td>
<td>Faculty with cross-appointments in DCS, with full-membership at SGS</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Adjunct faculty</td>
</tr>
</tbody>
</table>

For example, a typical Ph.D. supervisory committee may be composed of: 2 regular DCS faculty members and 1 adjunct; or, 1 regular faculty member plus 2 cross-appointed faculty.

Other faculty members (adjuncts) and distinguished individuals from industry may serve as advisors, attend supervisory committee meetings, and consult with the student in their areas of expertise, and they may attend and participate but they will not be permitted to be voting members on a Ph.D. Final Oral Examination.

The Vice-Dean at SGS will approve only a committee consisting of 5 voting members, including the external examiner.

Progress Monitoring (Ph.D.)

The School of Graduate Studies regulations state that all Ph.D. students are required to meet with their Supervisory Committee at least once a year to assess the student’s progress in the program and to provide advice on future work. The committee submits a report detailing its observations of the student’s progress and its recommendations, as well as monitoring timely completion of checkpoints. The student will be given the opportunity to respond to the committee’s report/recommendations and to append a response to the committee’s report. Copies of the report shall be given to the student and filed with the department.

The primary aim of progress monitoring is to ensure that the supervisory committee and student are interacting appropriately. Ph.D. students will complete a Progress Report every year. The due date will be announced during the year. The Progress Monitoring Committee will review these annual reports.
Ph.D. Degree Requirements Completion Deadline (Year 3)

A student enrolled in the Ph.D. program must have completed, by the end of the third year of registration as a Ph.D. student, all degree requirements exclusive of thesis research. This includes course requirements and the departmental qualifying examination. Failure to complete these requirements by the end of the third year will result in denial of future registration. The department may grant an extension for completion of degree requirements. To obtain an extension you must complete the form “Request for Program Extension”, available on the SGS web site (www.sgs.utoronto.ca). The request for extension requires an explanation for the failure to complete degree requirements (exclusive of thesis research) to date. You will need to indicate the amount of work remaining to be done and a tentative timeline for completion of the requirements within the next two sessions. Upon completion of the Ph.D. Requirements Exclusive of Thesis Research, the student will be admitted to candidacy and a notation will be put on the transcript.

Internship

Internship is not a component of the graduate program in the Department of Computer Science. However, it is recognized as an important experience for graduate students.

Students may request an official leave for one term for the purpose of doing an internship by completing an SGS Request for Leave of Absence form and submitting it to the Computer Science Graduate Office. The form is available at [http://www.sgs.utoronto.ca/gradadmin/studentservicesforms/](http://www.sgs.utoronto.ca/gradadmin/studentservicesforms/).

**Funding:** Funding will be put on hold for the duration of the 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](http://www.nserc.ca). These documents should be sent to the School of Graduate Studies, Fellowships & Loans Office. The NSERC contact at SGS is Shelley Eisner, 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 is Angela Ho, 416-978-2205.

**Tuition Fees:** There will be no refund of tuition fees. Graduate School 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.

**Note:** The following may apply to some students. 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.

**Time to Completion of Degree:** 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 (one term) taken for the internship. This is calculated per term and cannot be prorated by weeks or days.

Any questions in this regard should be directed to Julie Weedmark in the Graduate Office at julie@cs.toronto.edu.
Timeline to Degree Completion

Students who have not completed a M.Sc. degree elsewhere generally complete an M.Sc. before entering the Ph.D. program.

Students entering directly into the Ph.D. program following completion of a M.Sc. degree elsewhere should subtract 12 months from the Ph.D. degree timeline dates below.

<table>
<thead>
<tr>
<th>MONTHS IN PROGRAM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 month</td>
<td>Submit completed Breadth Evaluation and Plan of Study Form, including request for course reduction.</td>
</tr>
<tr>
<td>4 months</td>
<td>Coursework: Complete 2-3 courses with a grade of at least B-.</td>
</tr>
<tr>
<td>8 months</td>
<td>Coursework: Complete 4-5 courses with a grade of at least B-.</td>
</tr>
<tr>
<td>13 - 16 months</td>
<td>Application to the PhD Program: Read “Proceeding to the Ph.D. Program After Completion of the M.Sc.” (above)</td>
</tr>
<tr>
<td>17 months</td>
<td>Coursework: All coursework must be completed with a grade of at least B- for students wishing to complete the M.Sc. degree and graduate.</td>
</tr>
<tr>
<td></td>
<td>Research Paper: The Research Paper is to be submitted and approved by two readers. Reader reports to be submitted to the Graduate Office. The Graduate Office will complete a Recommendation for Degree and submit it to SGS.</td>
</tr>
<tr>
<td></td>
<td>Students will either complete the M.Sc. degree and graduate, or continue to the PhD program.</td>
</tr>
</tbody>
</table>

PH.D. CHECKPOINTS AND DEGREE TIMELINE

<table>
<thead>
<tr>
<th>MONTHS IN PROGRAM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 months</td>
<td>CHECKPOINT 1: Oral Presentation of the Research Paper: This 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.</td>
</tr>
<tr>
<td>30 months</td>
<td>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</td>
</tr>
</tbody>
</table>
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.

| 36 months | Coursework: Complete 4 courses, beyond M.Sc. coursework, with a grade of at least B- |
| Admissions to Candidacy: The Graduate Office will send a request to the School of Graduate Studies for students who have completed all required course work and the Qualifying Examination. The notation “Admitted to Candidacy” will appear on the student’s transcript. |

| 39 months | 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. |

| 48 months | 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 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. |

| 60 months | 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. 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 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. At least 8 weeks prior to the proposed date of the examination the student should notify the Graduate Office of the intention to book a PhD Final Oral Examination at the School of Graduate Studies. All forms and instructions are available on the DCS internal web page or in the Graduate Office. The regulations for the Conduct of a Ph.D. Final Oral Examination are on the SGS web site. 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. |

Instructions and regulations about the scheduling of any checkpoints, including the Departmental Examination and Final Oral Examination, can be printed from DCSWeb.
Financial Support
The Department of Computer Science will ensure that all full-time degree graduate students receive financial support to at least the basic departmental level, provided that they are making satisfactory progress in their graduate program.

A student who starts our program from a Bachelors degree will receive five years (i.e., 60 months) of financial support. Of these five years, up to 17 months of support is provided to complete the Masters and the remainder of the 60 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 Governments (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 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. However, to ensure scholarship winners obtain a significant financial reward from their scholarship, the department will supply some funding for scholarship holders in the form a top-up award. The size of this top-up award is calculated by a formula detailed in the document “DCS Top-Up Policy,” available on the DCS web site.

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.

Canada Graduate Scholarships (CGS) and Natural Sciences and Engineering Research Council (NSERC) Postgraduate Scholarships (PGS)
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 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.

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. As well, 60 scholarships will be awarded to students who have been admitted to Canada with a student visa. The call for applications and departmental deadlines will be announced by e-mail to all registered students in September. OGS is tenable at any Ontario university. OGS forms must be submitted to the Graduate Office of the Department of Computer Science. Consult the OGS webpage: http://osap.gov.on.ca/eng/not_secure/OGS.htm 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, with the exception of the OGSST. Not all of these scholarships are awarded each year, as the available amount of funds for many of these depend on interest from endowments. A single application for all of these scholarships will be due after NSERC and OGS recipients have been announced in early spring. A call for applications will be sent out by the Graduate Office in June. 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. Typically one award worth $5,000 will be given annually.
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.

Ontario Graduate Scholarship Science and Technology (OGSST)
Applications will be accepted from Canadian citizens or permanent residents. The Ontario Graduate Scholarship in Science and Technology (OGSST) program is designed to encourage excellence in graduate studies in science and technology. The program is supported through funds provided by the province of Ontario and by funds raised by the University of Toronto from the private sector. The Computer Science Department has three scholarships each worth $15,000 available annually for distribution.

Doctoral Thesis Completion Grant
Full-time Ph.D. students in the 5th and/or 6th year of their program are eligible to apply for the Doctoral Thesis Completion Grant. Application is made directly at the School of Graduate Studies. In 2007-2008 the value of the grant is $2944 for domestic students, and $3933 for international students. Application forms are available at http://www.sgs.utoronto.ca/gradadmin/studentservicesforms/.

Master’s Tuition Fee Bursary
A limited number of bursaries are available for master’s students whose 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 given 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. For more information, phone 1-416-978-2190 ext.6285 or email osap.staff@utoronto.ca.
Breadth Groups and Areas

For the purpose of satisfying breadth requirements, graduate courses in computer science are divided into three groups, which are subdivided into eight areas, as follows:

**Group I**
- Area (a): Programming Languages & Methodology
- Area (b): Systems: Hardware & Software

**Group II**
- Area (a): Numerical Analysis & Scientific Computation
- Area (b): Computational Complexity
- Area (c): Applied Discrete Mathematics

**Group III**
- Area (a): Artificial Intelligence
- Area (b): Computer Graphics & Human-Computer Interaction
- Area (c): Information Systems

Course Numbering

Graduate Computer Science course numbers consist of four digits which may be interpreted as follows:

**First Digit:**
- 2—No Information
  (Before 1968, when computer science was part of the mathematics department, the first digit 2 identified computer science courses. Mathematics graduate course start with the digit 1.)

**Second Digit:**
- 1—Programming: Languages & Methodology
- 2—Systems: Hardware & Software
- 3—Numerical Analysis & Scientific Computation
- 4—Computational Complexity; Applied Discrete Mathematics
- 5—Artificial Intelligence, Computer Graphics, Human-Computer Interaction, Information Systems
- 6—Project Courses

**Third Digit:**
- 0—Introductory, General
- 1—Intermediate
- 2—Intermediate
- 3—Advanced, Specialized

**Suffix:**
- H—Semester long course, 4 months
  (Runs from September - December or January - April)

Please consult the department webpage for a full listing of courses.