

Information for Graduate Students and Advisors of Graduate Students

Graduate Program in Computer Science

University of Minnesota
2011-2012

INTRODUCTION

This handbook is intended to be a focal point of information for computer science graduate students and their advisors. Its users are expected to be familiar with the contents of the *Class Schedule*, *Handbook for Graduate Assistants* and *Graduate School Bulletin*, including both the general material and that specifically pertaining to the Computer Science Program. Many of the Graduate School required forms are referred to throughout this document, and a list of them is given in Appendix A. Departmental forms are also covered, and a list of them is included as well. There is also valuable information about the graduate faculty, their research interests, and current research facilities on the web (<http://www.cs.umn.edu>).

This document is addressed to students already admitted to the Graduate Program in Computer Science. While information in it may interest those applying for admission, it is not intended to present any information directly pertinent to the admissions process. Every effort has been made to present this material in a straightforward and accurate manner. Any minor errors or ambiguities will not affect the actual rules and processes of the Graduate School and the Program.

DIRECTOR OF GRADUATE STUDIES (DGS)

The Director of Graduate Studies, referred to as the DGS, oversees all aspects of graduate studies. Professor Victoria Interrante will be the DGS for this academic year.

The Department of Computer Science and Engineering's office is located in Keller Hall, Room 4-196. All departmental forms mentioned in this handbook can be obtained there or on line at <http://www.cs.umn.edu/resources/forms/index.php>. All forms that are to be signed by the DGS should be given to Georganne Tolaas via the receptionist in this office. The DGS will send the forms to the Graduate School on your behalf.

As the DGS handles the activities of a large number of graduate students, the DGS can see students on matters concerning the graduate program by appointment only. Make appointments through Georganne Tolaas at 625-1592. The DGS's general office hours are used only for instructional purposes pertaining directly to the DGS's classes. If you have an urgent request, please contact the DGS via electronic mail (e-mail address is dgs@cs.umn.edu).

ADVISING

When you first arrive on campus, the DGS is officially your advisor, unless you were assigned an advisor at the time of admission. After taking some courses in your area of interest, attending seminars, and individual discussion, you will become acquainted with some of the faculty. Then you will be able to choose an advisor for your plan B project, plan A thesis, or doctoral dissertation. Senior and Affiliate Senior members of the C.S. Graduate Faculty may advise both MS and PhD students. Members/Advising of the C.S. Graduate Faculty may advise MS students and co-advise PhD students in conjunction with a senior member. Remember that the advisor-advisee relationship is a mutual one and your advisor must also agree to advise you. If the faculty member of your choice agrees, then you will inform the DGS of this with the departmental form ("Declaration of Advisor") signed by your new advisor. You can change advisors again if you wish, and this must be indicated to the DGS using the same form. However in this case both the new and the previous advisor must sign to acknowledge the change. All PhD students should have a research advisor chosen by the end of their first year. Since the majority of MS students do the Plan C, which is coursework without a research project or thesis, they are not required to have a research advisor. Any questions they have can be directed to the DGS or Graduate Coordinator. For those who do decide to do Plan A or Plan B, they should have a research advisor chosen by the beginning of their second year.

REGISTRATION

Graduate student registration occurs at the beginning of the registration period for each semester. The day that you register is determined by your last name and will change each semester. You can check your registration queue by going to onestop.umn.edu and clicking on “When to register” which is located on the right hand side. If the class is closed you may sign up on the waiting list.

Students are required to register no later than the end of the second week of the semester. Cancel/Add deadlines, change of grading options and refund deadlines are all available at onestop.umn.edu. No registration changes are permitted after the last day of instruction.

The details of registering for classes can be found in the *Class Schedule* for each semester on the Web at <http://onestop.umn.edu/onestop/index.html>.

Graduate students must register each fall and spring semester to maintain their active status. Students who need to register only to maintain active status may register for Grad 999, which is a no-fee, no-credit option. International students must check with the International Student and Scholars Services office to see if there are any restrictions or additional paperwork needed to register for this course or any reduced course load. Registration for Grad 999 will be reviewed periodically to guarantee that students are still making acceptable progress towards their degree. Those students who have not registered in each semester but wish to return must apply for readmission. Prior admission is not a guarantee for readmission. Those readmitted may be required to take additional classes and/or examinations to complete their degree. They may also be required to retake courses and/or examinations (such as the WPE or prelim oral).

DEGREE REQUIREMENTS

MASTER OF SCIENCE DEGREE (M.S.)

An M.S. degree requires at least 31 total credits. There are three options to the M.S. degree; Plan A thesis, Plan B project and Plan C course work. Students electing plan A must have at least 22 course credits and 10 thesis credits. Students choosing the plan B method must register for their plan B project using the Plan B course number (#8760). Thesis credits are not accepted for a plan B M.S. degree. The Plan C requirements are described in more detail below but it is essentially a coursework master's that includes project work at a significant level done within the confines of one or two courses. Students must have an advisor if they wish to do Plan A or Plan B but no advisor is required for the Plan C.

Of the required class credits for any plan, at least 16 of them must be Computer Science Program courses including 3 breadth courses and one credit of the CS Colloquium. See [One Stop](#) for a listing of courses. All credits must be 5000 level or above, and at least 3 of the total credits must be a regular 8000 level CS course. For Plan B students, the course CSci 8760 Plan B project, is in addition to the required 3 credits of a 8000 level course. Plan C students must take two regular 8000 level courses. It is required that these 8000-level credits be Department of Computer Science course credits. At least 6 credits, in a related field, must be from outside the department. Requirements for a minor are established by each program so if a student desires to declare a minor, those requirements must be met along with the consent of the DGS of the appropriate graduate program.

The Minor Field is defined as a minimum of 6 semester credits of coursework outside CS in a single department of the College of Science and Engineering (e.g., EE, Math, Stat, IEOR, etc.), Management, Cognitive Science and/or other related fields for a designated minor. The minor is awarded by that department and their requirements for a minor must be met in order to qualify for a minor in that field.

The Related Field is defined as a minimum of 6 semester credits of coherent coursework outside CS in a field within the College of Science and Engineering, (e.g., EE, Math, Stat, IEOR, etc.), Management, Cognitive Science and other related fields. These courses should contribute to your research or career goals but need not be from the same department.

One credit of the Computer Science Colloquium is mandatory and must appear on your degree program form. After completion of this credit you must file the departmental form ("Request for Certification of Completion of the Breadth and/or Colloquium Requirements in Computer Science).

You are expected to maintain a GPA of at least 3.25 for all courses listed on your degree program. No course for which you have received a grade below a C- can count towards your degree. There is no foreign language requirement for M.S. degrees.

An M.S. degree must be completed within seven years from the date of the oldest coursework on the degree program, including any transfer credits. A petition may be submitted to the Graduate School to extend this time limit. The Computer Science Program and the Graduate School are both quite strict about extending this limit. Petitions for a second extension are almost never granted.

M.S. Degree Committees

An M.S. degree committee consists of three faculty members who have formal graduate education responsibilities. Two will be from the Computer Science Program (which includes your advisor who is the chair) and one from an outside program. The outside person usually represents the related or minor field. This committee is appointed by the DGS at the time the M.S. degree program is approved. You and your advisor suggest members for your committee by using a departmental form ("Suggested Examining Committee"). Before anyone can be appointed to your committee, you have to contact him/her and obtain approval.

For Plan B programs, the committee serves as a committee for your oral examination. For Plan A programs, the committee serves as a reading committee for your thesis. The committee must approve the thesis as ready for defense and administers the final oral examination. Please notify the Graduate Coordinator when you plan to hold your final oral defense.

Plan C students are not required to defend in front of a degree committee so none is appointed. Instead, the DGS must sign the Final Examination form and return it to the Graduate School to indicate official completion of the degree.

If it becomes necessary to make changes to any committee, you may do this by notifying the [DGS](#) in writing or by email, outlining the change, the reason for it, and any suggestions you may have for revised membership along with the written consent of the new committee member. Your advisor should concur with the change.

Plan A Procedures

When submitting your degree program, you should list the proposed thesis title. Your committee will review your thesis and determine when it is ready for you to schedule your final oral examination. You must notify your advisor and the other members of your committee at least two weeks in advance that the thesis will be delivered on a particular date. All members of the examining committee must then have at least two weeks to read the thesis after it has been delivered. The committee certifies that your thesis is ready for defense by signing a Thesis Reviewer's Report. You obtain this form from the Graduate School and give it to your committee. You may pick up this form any time after your degree program has been approved by the Graduate School by requesting the graduation packet at http://www.grad.umn.edu/current_students/forms/grad_packet/index.html. The same committee will also serve as your final oral committee. You must obtain the form "Examination Report Masters Degree and Certificate of Specialist in Education" from the Graduate School before your final oral examination, which you schedule with your committee members. The committee indicates your performance on this report form. You are then responsible for bringing the form directly over to the Graduate School, 316 Johnston Hall. You must also supply the Graduate School with two unbound copies of your thesis and supply the department with one bound copy, including any changes required by your committee. Check with the Graduate School web site for the requirements on thesis format. Assuming you have passed your final examination, you will then receive your degree.

Plan B Procedures

When you submit your degree program your committee is appointed by the DGS. This is the committee that will serve as your final oral exam committee. The exam will include a presentation of your project and a discussion. The duration of the exam will be approximately one hour. Before the exam you must obtain from the Graduate School the form "Examination Report Masters Degree and Certificate of Specialist in Education" and bring it to the exam. This form is included in the Graduation Packet which can be requested any time after Graduate School has approved your degree program form. You may request this form and your graduation packet at 316 Johnston Hall or at http://www.grad.umn.edu/current_students/forms/grad_packet/index.html. The committee members will indicate their satisfaction or dissatisfaction with your performance by signing the form. You are then responsible for bringing the form directly to the Graduate School, 316 Johnston Hall.

Plan C Procedures

The Plan C for the MS in Computer Science became effective with Summer semester of 2006. The requirements for the M.S. (Plan C) are explained in more detail here:

- Each student must complete 31 credits of graduate-credit coursework, including:
 - 1 credit of CSci Colloquium (CSci 8970 S/N)
 - at least 6 graduate credits from courses outside CSci forming a related field; these courses may be used towards a graduate minor (requirements for graduate minors vary by field and must be reviewed by the DGS of the minor program)
 - at least 16 graduate credits from 5xxx or 8xxx courses with a CSci designator (including courses to fulfill the [breadth requirement](#) as well as 6 credits CSci 8000 level courses).
 - other graduate-level credits to reach a total of at least 31 credits.
- All CSci courses included in the degree program must be taken A-F if the A-F grading basis is offered.
- Students must maintain a minimum GPA of 3.25 on courses appearing in the degree program and no courses with a grade below a C- can be included.
- In addition to the above requirements, students must complete, through their coursework, a total of 100 hours of significant project work, at least one written report, and at least one oral presentation; such work may be completed individually or in group activities:
 - Students are responsible for documenting their completion of these requirements on a Plan C progress tracking form ([doc](#)) ([pdf](#)). The documentation includes instructor certification of the requirements met by the student.
 - Projects are independent research, design, development, theory, or practice activities, completed alone or in groups, and graded for credit by a faculty member authorized to teach courses for graduate credit within a course taken by the student for degree credit. A course project may fulfill either one-half of the requirement (a half-project of 50-99 hours of average expected effort) or the full requirement (a full-project of 100 or more hours of average expected effort). Ordinary assignments where all students in the class complete the same work do not count towards project credit. We define "average expected effort" as the instructor's estimate of the number of hours of effort required per student for a typical graduate student to complete a project earning a grade of B+. It is the instructor's responsibility to indicate in the course syllabus whether the course fulfills project requirements, and if so whether the project is a half-project or a full-project. In typical cases, half-project courses will be 3-credit courses where the project accounts for at least half the course grade; full-project courses will usually be independent or directed study projects taken for 3 credits (CSci 8994 is the preferred course number).
 - Written reports must be at least 2000 words (or several components within the same course totaling at least 2000 words), must report either on a project (as defined above) or on some separate research effort, and may be completed individually or in groups.
 - Oral presentations must be at least 5 minutes long (at least 10 minutes for group presentations), and must present research (the student's or that of others) or project work by the student.
 - For a student to receive credit for a project, report, or oral presentation, the faculty member grading the project must certify the completion of that component (including whether a completed project is a half-project or full-project) and must verify that the student received a grade of B or higher on the component. The student also must receive a grade of B- or higher in the course in which the component was contained.

- Many of our graduate level courses will qualify as Plan C courses and the student should check with the instructor if it is not indicated in the syllabus but seems to contain the requisite research component.

You must submit your degree program form by the end of your third semester. If you have not chosen to do CSci 8994, you probably will not have an advisor and so the DGS will serve as your default advisor. No committee is required for this plan and therefore no exam will be necessary. However the form "Examination Report Masters Degree and Certificate of Specialist in Education" must be submitted to the Computer Science office to be signed by the DGS. This form is included in the Graduation Packet which can be requested any time after Graduate School has approved your degree program form. You may request this form and your graduation packet at 316 Johnston Hall or at http://www.grad.umn.edu/current_students/forms/grad_packet/index.html.

For more information on completion procedures, please see the following web sites: [Master's Plan A \(with thesis\) & Professional Master's of Engineering \(design project option\)](#); [Master's Plan B \(without thesis\)](#); [Master's \(coursework-only option/Plan C\)](#), [Master of Social Work & Professional Master's of Engineering \(coursework-only option\)](#). We also have two documents on our web site with additional [completion](#) and [graduation](#) instructions.

MASTER OF COMPUTER SCIENCE DEGREE (MCS)

Candidates for this degree must complete a minimum of 31 semester credits in graduate courses with a minimum of 16 credits in the major. All major credits must be 5000 level or above, and at least 6 of the total credits must be 8000-level courses. These 8000-level credits must be Department of Computer Science course credits. One credit of the Computer Science Colloquium is mandatory and should be taken before filing a degree program. This credit should be included on the degree program. At least 6 credits, in a related field, must be from outside the department. A related field of at least 6 credits can be used towards a minor, with the consent of the DGS of the appropriate graduate program.

The Minor Field is defined as a minimum of 6 semester credits of coursework outside CS in a single department of the Institute of Technology (e.g., EE, Math, Stat, IEOR, etc.), Management, Cognitive Science and/or other related fields for a designated minor. The minor is awarded by that department and their requirements for a minor must be met in order to qualify for a minor in that field.

The Related Field is defined as a minimum of 6 semester credits of coherent coursework outside CS in a field within the Institute of Technology, Management, Cognitive Science and other related fields. These courses should contribute to your greater understanding of computer science or career goals.

All degree candidates must maintain a GPA above 3.0 after completion of 8 credits. No course for which you have received a grade below a C- can count towards your degree.

Each student needs to satisfy the departmental breadth requirement. However, none of the MS research requirements including the Plan C course project requirements, the Plan B project nor Plan A thesis of the Master of Science degree is required. There is no final oral examination although a Final Examination Report form must be signed by the DGS.

An M.C.S. degree must be completed within seven years from the date of the oldest coursework on the degree program, including any transfer credits. A petition may be submitted to the Graduate School to extend this time limit. The Computer Science Program and the Graduate School are both quite strict about extending this limit. Petitions for a second extension are almost never granted.

PH.D. DEGREE

Although Graduate School has no requirement for total credits on a doctoral degree program, the computer science program requires at least 43 course credits, of which 16 must be Computer Science program courses including 5 breadth courses and one credit of Colloquium which is mandatory. Credits used to obtain a master's degree can be used to obtain a doctoral degree. The Graduate School does require at least 12 credits in a supporting program or in a minor field. A minor must also be approved by the DGS of the program from which the minor is taken. The Graduate School also requires a minimum of 24 thesis credits (to be taken after passing the preliminary oral exam) in addition to course credits. There is no foreign language requirement for doctoral students in the Computer Science program.

The Minor Field is defined as a minimum of 12 semester credits of coursework outside CS in a single department of the College of Science and Engineering (e.g., EE, Math, Stat, IEOR, etc.), Management, Cognitive Science and/or other related fields for a designated minor. The minor is awarded by that department and their requirements for a minor must be

met in order to qualify for a minor in that field. The minor must be declared before passing the Preliminary Oral Examination.

The Supporting Program is defined as a minimum of 12 semester credits of coherent coursework outside CS in a field within the College of Science and Engineering (e.g., EE, Math, Stat, IEOR, etc), Management, Cognitive Science and other related fields. These courses should contribute to your research or career goals.

Your doctoral degree program must be submitted at the same time that you submit your Written Preliminary Examination Report, WPE. The WPE, degree Program form submission and oral preliminary exam should take place in your 4th semester. You will be expected to complete the courses listed on your doctoral degree program with a GPA of at least 3.45. No course for which you have received a grade below a C- can count towards your degree.

All requirements for the PhD degree must be completed by five years from the end of the semester following the semester in which the student passes the preliminary oral examination. A petition may be submitted to the Graduate School to extend this time limit. The Computer Science Program and the Graduate School are both quite strict about extending this limit. Petitions for a second extension are almost never granted.

Background Knowledge Requirement

The concepts covered here are considered to constitute a minimal core body of knowledge with which all PhD graduates of our department should be familiar. These concepts are required prerequisites for many of our graduate classes; students must know these concepts to succeed in these classes.

Background concepts

- **Machine Architecture and Organization.** Covers basic hardware/software components of a computer system, including data representation, machine-level programs, instruction set architecture, processor organization, memory hierarchy, virtual memory, compiling, and linking.
- **Theoretical Foundations.** Must cover *one of* the following two bodies of knowledge:
 - **Algorithms and Data Structures or Formal Languages and Automata Theory.**
 - **Algorithms and Data Structures.** Analysis, data structures, and algorithms, e.g.: basic algorithm analysis (recurrences, asymptotic notation), basic data structures (lists, stacks, queues, heaps, hash tables, (balanced) binary search trees), basic algorithms (sorting, searching, graph traversal, shortest paths, minimum spanning trees).
 - **Formal Languages and Automata Theory.** Logical/mathematical foundations of computer science. Specific topics include formal languages, their correspondence to machine models, lexical analysis, string matching, parsing, decidability, undecidability, limits of computability, and computational complexity.
- **Operating Systems.** Topics include processes/threads, process coordination, interprocess communication, asynchronous events, memory management/file systems.
- **Programming & Software Development.** Topics include: design and analysis of programs, software development tools and methods, debugging, I/O, state machines, exception handling, testing, coding standards, software lifecycle models, requirements analysis.

Satisfying the Background Knowledge Requirement

The Background Knowledge Requirement may be satisfied in five different ways:

1. By passing the GRE Computer Science subject exam with a score in the 90th percentile or higher.
2. By passing an appropriate undergraduate course with a grade of B+ or higher. The appropriate courses at The University of Minnesota are noted below. However, a student may take such courses anywhere, and simply needs to point out on their transcript any qualifying courses. The Director of Graduate Studies is responsible for approving the use of courses to satisfy the background requirement. The relevant UMN courses are:
 - **Machine Architecture and Organization** = CSCI 2021
 - **Theoretical Foundations:**
 - **Algorithms and Data Structures** = CSCI 4041
 - **Formal Languages and Automata Theory** = CSCI 4011
 - **Operating Systems** = CSCI 4061
 - **Programming & Software Development** = CSCI 3081
3. By passing the final exam for the appropriate UMN class with a grade of B+ or higher

4. By passing a graduate course with a grade of B+ or higher for which an appropriate undergraduate course is a clearly defined prerequisite. For example, at the University of Minnesota, CSCI 5421 "Advanced Algorithms and Data Structures" has CSCI 4041 "Algorithms and Data Structures" as a prerequisite. Thus, getting a B+ in 5421 is evidence that a student has adequate background in Algorithms and Data Structures. Students must check with the Director of Graduate Studies to verify that a specific graduate course demonstrates knowledge of a particular background area.

5. By petitioning the Director of Graduate Studies to accept some other experience as evidence of adequate background. For example, a student could have extensive industrial software development experience without having taken a course on software development.

Students must satisfy the background requirement within their first year in the PhD program. If they are not able to do so, they may – with the support of their advisor – petition the Director of Graduate Studies for an extension.

Prerequisite Table – Graduate courses for which background undergraduate courses are substantial prerequisites.

CSci 2021	CSci 4041	CSci 4011	CSci 4061	CSci 3081
5204	5403	5106	5103	5106
	5421	5161	5105	5161
	5461		5211	5801
	5471			
	5481			
	5523			

Written and Oral Preliminary Examination for the Doctorate

The Graduate School requires that all doctoral candidates pass both a Written and Oral Preliminary Exam. The Computer Science faculty have approved a new format for these exams which will be effective beginning with the PhD candidates entering Fall 2009. All PhD students will be requested to take the courses CSci 8001 (Fall) and CSci 8002 (Spring), Introduction to Research in Computer Science I and II. These courses will assist students in developing their research interests and capabilities and prepare them to begin their first major research project or survey paper. This research project paper or survey paper along with an oral exam, will be the basis for evaluating a student's ability to do research. The goal of the Written and Oral Preliminary exams is to serve as an early test of a student's research abilities. It is not a thesis proposal; a separate examination will be required for this purpose.

The Written Report

Different areas and different advisors use different methods and have different expectations of what a student must do to demonstrate research ability. Therefore, we cannot specify precisely what a student's report and oral presentation must include. However, we can offer a few "best practice" examples that would be acceptable in most if not all research areas.

- **Completed research project.** A report on a research project **completed while a graduate student at the University of Minnesota.** This could be a published paper with the student as the major author although further instructions and information will be available when the student is ready to begin.

- **Literature review.** A careful and insightful review of research in the student's specialty. This review should demonstrate a student's understanding of key research topics and methods in the area and show that he or she can identify interesting open research problems and appropriate means to address those problems.

The report should be at least the length of a published conference paper, say 6000-8000 words, or 8-10 pages in the ACM SIG Proceedings format (<http://www.acm.org/sigs/publications/proceedings-templates>).

The Oral Preliminary Exam

Before scheduling the Oral Prelim, students must submit a written report to their examining committee. Once the committee approves that report, the student may schedule the Oral Prelim. Therefore, students should submit their written report to their examining committee at least two months before their preferred Oral Prelim date. The Oral Prelim should be taken as soon as the student is ready. Students **must take** the exam no later than their second year in the PhD program (however, with the support of their advisor, students may petition the Director of Graduate Studies for an extension). Students **must pass** the exam by the end of their third year.

Exam Scope and Format

The student will present the material in the written report. The committee will question the student about that material and directly related material, such as the methods that were used and possible alternative methods, ideas for future work, potential problems and obstacles. The committee is encouraged to probe the student's understanding of *related* material and concepts.

Possible outcomes of the exam

The committee may pass the student or fail the student. If the student fails, the committee may or may not choose to give the student another chance to pass the exam. A student can have at most two chances to pass the Oral Prelim. As stated above, students must pass the exam within three years of entry to the PhD program.

Committee Composition

The Graduate School requires that the committee include three members from the Computer Science graduate faculty and one external member. The student in consultation with her/his advisor, will nominate three members, two internal (including the student's advisor) and one external. The DGS will approve these choices and will appoint one member of the committee from the department's Preliminary Oral Examination committee, selecting a person who is not in the student's research area.

Reminder: the same committee will examine both the written report and the oral exam.

Relationship to a student's M.S. research (Plan A Thesis / Plan B Report)

The same piece of research can be used to satisfy both the MS (Plan A or B) and Oral Prelim requirements. If this is done, there are four possible outcomes of the exam:

- The student can pass both exams.
- The student can fail both exams.
- The student can pass the MS, fail the Oral Prelim, and be given the option to retake the Oral Prelim.
- The student can pass the MS, fail the Oral Prelim, and not be given the option to retake the Oral Prelim.

Preliminary Oral Examination

To formally become a candidate for the Ph.D., you must pass the preliminary oral examination. Once the written report has been approved by your committee, you will be required to file a degree program form with the graduate school. Upon approval of this form (explained below), you will need to schedule your Preliminary Oral Exam with the Graduate School at http://www.grad.umn.edu/current_students/prelimschedule. The Graduate School will send a "Report of Preliminary Oral Examination for Doctoral Candidates" form to the chair of your examining committee. This will only be done if an approved Degree Program and report of passing the WPE are on file with the Graduate School. Your examining committee must vote either unanimously or 3 to 1 to pass you. You also may be 'passed with reservations', in which case the committee will inform you by letter within one week of what is required to remove the reservations. Students who fail the examination may be terminated or may be allowed, upon unanimous recommendation of the committee, to retake the examination, provided the original examining committee conducts the reexamination. No more than one reexamination is allowed.

Thesis Proposal Examination

The Preliminary Oral Exam formerly was seen as a thesis proposal exam. However, under the new format, a separate exam will be required for this purpose. The thesis proposal examination should be taken within 1-2 years after passing the Preliminary Oral Examination. This examination should be organized around a presentation of your thesis proposal, but exam committee members are entitled to test the full range of your expertise to evaluate your preparation for your thesis research and the suitability of your thesis research plan. The committee members for the thesis proposal exam can be the same as the prelim oral exam although the departmental representative can be replaced. The student, in consultation with her/his advisor, should review the committee and notify the graduate student services coordinator of any changes. Committee members may vote to pass, pass with reservations, or fail. At least three passing votes are required to pass the exam. Students who fail the examination may be terminated, or may be allowed, upon unanimous recommendation of the committee, to retake the examination. No more than one reexamination is allowed and must consist of the same committee members. The thesis proposal examination is internally administered; students should obtain a Thesis Proposal Examination Report Form from the DGS assistant prior to the exam and must return the form with all signatures to the DGS assistant within 24 hours of the examination.

Thesis

The Thesis Proposal form must be submitted within two semesters of passing the Preliminary Oral Examination. The thesis title and abstract will be submitted along with the names of your examining committee members. These will usually be the same as the members of your preliminary oral exam and will include your advisor, two other CS graduate faculty members as well as an outside committee member, from your minor area if you have declared one, as provided for by the rules of the Graduate School. Forms for submitting the thesis abstract and title are available on line at http://www.grad.umn.edu/Current_Students/forms/GS63A.PDF.

Once you have completed the thesis and your Thesis Proposal form has been approved, you may request your Graduation Packet, http://www.grad.umn.edu/current_students/forms/grad_packet/index.html. Included in the packet is your "Thesis Reviewer's Report Form" along with the Application for Degree and Commencement Attendance form.

You must give copies of your thesis to all members of your committee. All members of the committee read the thesis, although only those designated as thesis reviewers sign the report that the thesis is ready for defense. You must notify your advisor and the other members of your committee at least two weeks in advance that the thesis will be delivered on a particular date. All members of the examining committee must then have at least two weeks to read the thesis after it has been delivered. The thesis readers sign the Reviewer's Report form to certify that it is ready for defense. The Reviewer's Report form must be submitted back to the Graduate School at least one week before your final oral examination. The readers must decide unanimously that the thesis is ready for defense.

Final Oral

You are responsible for scheduling your thesis defense with the committee members and notifying the Graduate School ([Final Oral Examination Scheduling](#)) at least one week in advance. The Graduate School will send a "Final Oral Examination Report Doctoral Degree" form to the chair of your committee; this will not be your advisor. It is wise if you verify that this form was indeed received by the Chair of your committee. The Department of Computer Science requires all Ph.D. students to hold their final thesis defense within ninety days of obtaining the signatures of all assigned committee members on the "Reviewers Report on the Ph.D. Thesis" form which states that the thesis is ready for defense. Those who fail to take their thesis defense due to scheduling conflicts may take the exam only if they again obtain the signatures of all the committee members within ninety days. In other words, for each signed form, the candidate may have up to ninety days to take the final thesis defense.

The Graduate School has adopted a policy of open public thesis defense for doctoral candidates. This means that your final oral examination is open to the public. To ensure complete openness the Computer Science Program has adopted somewhat more stringent requirements. Once the readers have approved your thesis, one copy must be made available for public perusal, preferably on-line. The availability of this copy, along with the time and place of your thesis defense must be announced in writing and via electronic mail to graduate faculty and students, at least one week in advance. This announcement must contain a one-page descriptive abstract of the thesis to be defended, the name of the advisor and the URL of your thesis.

To schedule your final oral exam you must notify the Graduate Coordinator in the Computer Science Office. The Coordinator will answer any last minute questions you might have, and find a room for you in which to have the exam.

It is important to note that you have only one chance to take the final oral.

The committee of the final oral will complete the "Final Oral Examination Report" form and you must ensure that it goes directly to the Graduate School. To be awarded the degree you must receive no more than one dissenting vote from the total examining committee. You must make all the necessary changes in the text of the thesis before it is bound. You must observe all requirements, including submitting one unbound copy of the thesis with the signature of your advisor to the Graduate School, before your degree can be awarded. You must also supply the department with one bound copy of your thesis. Upon your departure, please remember to submit to the department a change of address, the name of your first employer (after graduation) and return keys you have for your office and/or the labs.

Graduate School has provided a document that outlines the [PhD Completion Procedures](#).

DEGREE PROGRESS

Please refer to the Degree Completion Procedure documents mentioned under the Master's degree and PhD degree above. We believe that a Master's degree can be completed in two years and a doctorate in five years. While we do not hold students precisely to these time periods, students who exceed them by substantial amounts of time without completing their degrees will be asked to explain their lack of progress. The Graduate School has also set time limits,

according to the Graduate School Bulletin "All requirements for the master's degree must be completed and the degree awarded within seven years. The seven-year period begins with the earliest work included on the official degree program, including any transfer work. All requirements for the doctoral degree must be completed and the degree awarded within five calendar years after passing the preliminary oral examination."

Each year, CS PhD students will be required to complete an Annual Review form. This will then be forwarded to a student's research advisor who will then make comments on each student's progress. All forms will be reviewed by the DGS and progress will be compared to the Progress Guidelines presented in Appendix A. Anyone who deviates considerably from these expectations will be contacted by the DGS for possible action.

Students and advisors should select coursework so as to best make orderly and timely progress, always keeping the student's interests and the requirements of their areas of specialization in mind. New students should concentrate on disposing of the breadth requirement and should also focus on courses that will prepare them for research in their chosen area. Of course, the requirement for a supporting program or a minor should also be kept in mind.

BREADTH REQUIREMENT

The purpose of the Breadth Course Requirement is to expose students to diverse Computer Science research topics and methods. PhD students must take a total of five (5) courses that satisfy the following requirements:

- Each of the five courses is in a different **sub-area**.
- The student must take at least one course in each different breadth **area**.
- The student **must** take one course in the Theoretical Foundations sub-area.

PhD students must have an average GPA of 3.45 or higher for the five courses they use to satisfy the Breadth Course Requirement. Students have three (3) years to satisfy this requirement. If students want to take a more advanced course in a sub-area than the listed options – typically, one for which one of the listed options is a prerequisite – they may petition the Director of Graduate Studies to use this course for satisfying the requirement. Students may petition the Director of Graduate Studies to transfer credit for up to two courses to use for satisfying the Breadth Course Requirement.

Master's students (MS and MCS) are required to take three (3) courses, one from each of the areas. Students must maintain an overall GPA of 3.0 for MCS and 3.25 for MS candidates for all courses on their degree program, as well as those used to satisfy the breadth requirement. Substitutions are rarely permitted and transfer courses will not count towards the breadth requirement.

All courses must be taken for graduate credit and on the A-F grading basis.

Breadth Areas

There are three breadth areas:

- **Theory and Algorithms**
- **Architecture, Systems, and Software**
- **Applications**

Each area contains a number of sub-areas, and each sub-area contains a number of courses. Defining sub-areas within areas allows for clustering related courses and for increasing the diversity of the courses a student will take to satisfy the breadth requirement.

Theory and Algorithms

1. Theoretical Foundations (*note: all PhD students **must** take one course in this sub-area*)
 - 5421: Advanced Algorithms & Data Structures
 - 5403: Computational Complexity
 - 5304: Computational Aspects of Matrix Theory
2. Applied Algorithms
 - 5302: Analysis of Numerical Algorithms
 - 5471: Modern Cryptography
 - 5481: Computational Techniques for Genomics
 - 5525: Machine Learning

Architecture, Systems, and Software

1. Programming, Software, Languages, Compilers
 - 5106: Programming Languages

- 5161: Introduction to Compilers
 - 5801: Software Engineering I
2. Systems Software
 - 5103: Operating Systems
 - 5105: Foundations of Modern Operating Systems
 - 5451: Introduction to Parallel Computing: Architectures, Algorithms, and Programming
 - 5708: Architecture and Implementation of Database Management Systems
 3. Architecture
 - 5204: Advanced Computer Architecture
 4. Networking
 - 5211: Data Communications and Computer Networks
 - 5221: Foundations of Advanced Networking
 - 5231: Wireless and Sensor Networks

Applications

1. Intelligent Systems: AI, Robotics, Machine Learning, Vision
 - 5511: Artificial Intelligence
 - 5521: Pattern Recognition
 - 5551: Introduction to Intelligent Robotic Systems
 - 5561: Computer Vision
2. Data Mining and Bioinformatics
 - 5523: Introduction to Data Mining
 - 5461: Functional Genomics, Systems Biology, and Bioinformatics
3. Graphics, Visualization, Human-Computer Interaction, Social Computing
 - 5107: Fundamentals of Computer Graphics 1
 - 5109: Visualization
 - 5115: User Interface Design, Implementation and Evaluation
 - 5125: Collaborative and Social Computing
4. Security
 - 5271: Introduction to Computer Security

DEGREE PROGRAMS FOR MASTER'S & PHD DEGREES

The Graduate School requires each graduate student to file a degree program for each degree for which he/she is a candidate. On the degree program you list the courses that you have taken and those that you plan to take to complete your degree. For Master's degree candidates, this program should be filed during your third semester. Doctoral students are expected to file their programs in the semester in which they submit their WPE report.. Doctoral students who are interested in obtaining a Master's degree in addition to their PhD must file two separate degree programs, one for each degree. Courses used to obtain the MS can be reused for the PhD except for CSci 8760 or MS thesis credits. Your degree program is filled out with the help of your advisor, who then must approve it. If you have a minor stated on your degree program, the DGS of the minor graduate program must also approve it. The degree program then is approved by the DGS in Computer Science and ultimately the Dean of the Graduate School. When approving your degree program, the DGS also appoints your degree committee (see subsequent section). You and your advisor should suggest members of this committee and obtain their agreement to serve on your committee, by using a departmental form ("Suggested Examining Committee"). Please do not write the committee members on the degree program form. Your committee is assigned to you by the DGS and ultimately by the Dean of the Graduate School.

The courses listed on your degree program must only be those that qualify towards degree completion, as explained below. In addition, these courses must generally be relevant to the subject area of your thesis or plan B paper and provide the background and depth normally expected of a student receiving the degree for which you are a candidate. Only 5000 and 8000 level courses will be accepted on your degree program. No courses for which you have received a grade below a C- are allowed to count towards your degree. If CS 5991 or 8991 independent study or CS 5994 or 8994 directed research credits are used, a separate sheet submitted with your degree program must explain the nature of the research or independent study done. Limits will be placed on the number of these credits that can be used on your program. Consult with the DGS before registering for more than one of these courses. All courses taken from the Department of Computer Science and Engineering must be taken A-F, unless they are only offered S-N. Courses in other departments may be taken S-N. The total number of credits taken S-N cannot exceed one third of the total graded course credits in your program.

Information for Graduate Students and Advisors of Graduate Students 2011-2012

Any credits that qualify to be transferred to your program will be approved at the time of degree program submittal. Only the credits transfer, grades do not and do not count towards your GPA. Generally, only credits from schools with comparable graduate degree programs will be approved for transfer. Credits from outside computer science may be approved. Approval must be obtained by your advisor, the DGS, and the Graduate School. Only coursework taken after the student receives a baccalaureate degree qualifies for transfer. All transfer credits must be from courses that offered graduate credit to students at the institutions where they were taken. Work transferred from other institutions must be graduate level (post baccalaureate), have been taken as graduate level work and have been taught by faculty authorized to teach graduate courses. For Master's degree programs at least 60 percent of your coursework must be completed while registered in the Graduate School at Minnesota; therefore no more than 40 percent of Master's degree program credits can be transferred. Part of the transferred credits can be from courses taken while a student had non-degree seeking status at the University of Minnesota. However, you must have registered for those courses using the form 99PRD, Request for Graduate Credit for a non-degree seeking student. Please read carefully the Graduate School Bulletin General Information section for both the Master's & Ph.D. Degrees.

PETITIONS

Once it has been submitted, the degree program must be strictly conformed to. If you need to deviate from it, your degree program can be changed by petition. The petition is a special form provided by the Graduate School (see http://www.grad.umn.edu/current_students/forms/index.html). The petition should contain a revised up-to-date program and must again be approved by your advisor, the DGS, the DGS of the minor field (if you have a formally declared minor) and then the Graduate School. The Graduate School expects that you will provide substantive reasons for program changes. Examples of appropriate reasons are a change of thesis subject matter, courses not being offered, change of committee member, or a change of advisors. Mere convenience is not regarded as a proper reason.

The petition is also used to apply for a time extension. A student desiring a time extension should complete the petition stating a cogent reason why the extension should be granted. Any request for a time extension should be filed before the time limit has expired. Remember the petition has to be signed by your advisor, the DGS of your minor field if you have a minor and the DGS before being sent to the Graduate School for final approval.

COMMENCEMENT ATTENDANCE

MS graduates are required to be completing their last semester of coursework of their approved degree program if they wish to attend commencement ceremonies. Students must obtain DGS approval by filing the Computer Science Commencement Approval form available from the Department office. Filing this form indicates that the MS final oral exam is ready to be scheduled.

MCS graduates are required to be completing the last semester of coursework of their approved degree program if they wish to attend commencement ceremonies. Students must obtain DGS approval by filing the Computer Science Commencement Approval Form available from the Department office.

Ph.D. graduates are required to have filed the "Reviewers Report on the Ph.D. Thesis" form prior to filing the Computer Science Commencement Approval forms available from the Department office. Students are then eligible to attend commencement ceremonies.

Commencement is held once a year at the end of spring semester and is hosted by the College of Science and Engineering in cooperation with several other colleges. Watch your UMN email for the date announcement and the procedure to sign up to attend.

FAILURE TO MEET THE DEADLINE WILL RENDER YOU INELIGIBLE TO ATTEND, EVEN IF YOUR ADVISOR AND DIRECTOR OF GRADUATE STUDIES SIGN THE FORM.

FINANCIAL ASSISTANCE

Teaching Assistantships

The Computer Science and Engineering Graduate Program provides financial support to many of its doctoral students through teaching assistant appointments. The number of such appointments is difficult to predict because of budgetary considerations and variations in enrollment. Unfortunately, not all students applying for such appointments can be accommodated.

New students are awarded teaching assistantships as part of the admissions process. Continuing students may apply in the Spring to be considered for TA positions for the next academic year. Dates when applications for the next year will be accepted will be announced on the grads mailing list, so interested students should [subscribe](#) to that list and watch their mail. Any continuing student who did not apply last Spring is welcome to submit an application for the current academic year anytime during the summer and fall. Such applications will be merged with those submitted the previous spring, and will be considered for any openings that arise during the current academic year. [TA application forms](#) are available online.

Summer Session teaching assistants are selected from among students who have served as teaching assistants in the previous academic year. These students will be notified of summer possibilities during the preceding Spring semester.

Appointments are based on a number of criteria. The primary criteria are:

- Language ability and communication skills. TA applicants must be able to speak and write well, explain CS concepts clearly, relate well to students, etc. Students whose native language is not English must pass the University's English requirements prior to receiving a TA appointment. See the [Center for Teaching and Learning](#) for more information.
- Teaching experience and quality of past TA performance. Students with superior past teaching or TA performance will be given preference in TA appointments.
- Departmental need. Each year there are a few courses for which it is difficult to find qualified TAs. Applicants with demonstrated experience in these courses will be given preference.
- Ph.D. vs. Masters: the department gives preference in TA offers to Ph.D. students. M.S. students are considered if there are no suitably qualified Ph.D. students available. (Students currently in the M.S. program who are in transition to the Ph.D. program are not considered Ph.D. students until the change is officially completed. Moreover, the department usually allows such a change only with strong faculty backing, which usually implies that the involved faculty member(s) will support the student with a research assistantship, rather than having the student rely on a teaching assistantship.) Moreover, MCS students are not eligible for CS&E TA appointments.
- Degree Progress: students making substandard progress have lower priority for TA positions.

More information on the appointment process and criteria can be found in the [TA handbook](#)

Most appointments are for 50% of full time basis; some may be at 25%. A 50% appointment provides a 100% tuition benefit; a 25% appointment gives a 50% tuition benefit. For more detailed information please refer to the [Graduate Assistants Employment page](#). Graduate assistant salaries vary from year to year. For the salary currently in use see the section on salary ranges.

Fifty-percent (or half-time) teaching assistants (TAs) are expected to provide an average of 20 hours per week of service, and twenty-five-percent (or quarter-time) TAs 10 hours. The workload is not constant, being lighter some weeks and heavier others, such as the weeks around examinations. A teaching assistant's specific duties are assigned by the instructor. These may include, among other things, conducting laboratory or recitation sessions, assisting students with laboratory and homework assignments, grading assignments and examinations, and assisting the instructor with the preparation of course materials. In addition, depending on a TA's experience with the course materials or the particular instructor, the TA may be required to attend the lectures and/or do all the assignments.

Teaching assistants must be enrolled for a minimum of six credits each semester, except for doctoral candidates (those who have passed the preliminary oral examination for the Ph.D. degree and have completed all Doctoral thesis credits) who must enroll for a minimum of one credit (CSci 8444). There may be additional registration requirements imposed by sources external to the Graduate School and international students should check with the International Student & Scholar Services office.

International students on F-1 and J-1 visas are not allowed to be employed more than 20 hours per week during the academic year except during vacation periods. This is a regulation of the Immigration and Naturalization Service (INS), not the University of Minnesota. The INS has unequivocally stated that Assistantships are considered employment and are subject to the 20-hour per week rule.

The Computer Science and Engineering Program participates in TA training and orientation programs that are sponsored by the Center for Teaching and Learning of the University of Minnesota. Teaching assistants will be notified if such programs are mandatory. Even when they are optional, students are urged to attend them.

Additional information on teaching assistantships is available in the [TA handbook](#). This includes information on the offer process and criteria that will be useful to prospective TAs, as well as rules and teaching tips that current TAs should know.

Teaching Assistantships Departmental Policy

It is the Department's policy:

1. To limit eligibility for graduate TA appointments to 6 semesters total. This is irrespective of the percentage of appointment. However, summer TA appointments are not included in this count.
2. To make as many 50% appointments as possible for the whole academic year as are consistent with budgetary prudence and the known and confidently anticipated needs of the Department.
3. To make the above appointments before the end of Spring semester of the year preceding the year of appointment.
4. To save at least eight appointments for new students and make the balance from continuing students. New student appointments are made during the admission process, based on merit.
5. To allow new students not appointed to file applications for Spring consideration.
6. To make summer appointments from among students who had an appointment in one of the semesters of the preceding academic year.
7. To minimize the number of combined RA-TA appointments and split assignments.
8. To enforce departmental rules regarding eligibility, total percentage of appointment, and degree progress in an objective manner consistent with the needs of the Department.
9. That the total TA/RA support from all sources not exceed 50% in any semester (including summer sessions) for anyone with a CS TA appointment. Exceptions to this policy can be granted only by the Department Head in advance under extraordinary circumstances.
10. That students who have a record of cheating not be given TA appointments.

Research Assistantships

Computer science graduate students are eligible for appointments to the position of research assistant on various research grants and contracts held by faculty members. Such appointments are recommended by the principal investigators and not by the DGS. Accordingly, students who are interested in being research assistants (RAs) should contact faculty members directly and indicate their interest in working with them on their research. Once a student has demonstrated his/her ability to contribute to the research, the possibility of an appointment can be discussed. However, you should know that most faculty members select research assistants from among their degree advisees and outstanding students in their research seminars. Research assistantships count as part of the total departmental support, and are similar to TA appointments in regards to remission of tuition. The principal investigator determines the duties of each RA.

Research assistants must be enrolled for a minimum of six credits each semester, except for advanced doctoral candidates (those who have passed the preliminary oral examination for the PhD degree and completed all 24 Doctoral thesis credits) who must enroll for a minimum of one credit (CSci 8444 PhD FTE). There may be additional registration requirements imposed by sources external to the Graduate School and international students should check with the International Student & Scholar Services Office.

Salary for Assistantships in C.S. Department

For the 2011-2012 academic year, the salary of teaching and research assistants for the period covering Fall and Spring semesters has been set at \$16,910.40 (\$21.68 per hour).

The Graduate School requires that all RAs/TAs be registered in each Fall and Spring semester during which they hold appointments of at least 12.5%. It also requires that all RAs/TAs be registered for an appropriate number of credits before the end of the second week of classes. RAs/TAs who fail to properly register by this deadline will forfeit their assistantship.

Most appointments are for a 50% of full time; some may be at 25%. The 100% tuition benefit for graduate assistants working an average of 50% time will be the dollar value of the Graduate School's tuition band (\$7,006 per semester for 2011-2012) or the dollar value of the Graduate School's one-credit tuition cost (\$1,167.67 per semester for 2011-2012) depending on your payroll class. For a 25% appointment the tuition waiver will be a 50% waiver of the \$7,006 tuition cost or 50% waiver of the \$1,167.67 tuition cost, again depending on your payroll class. For more detailed information please refer to the [Graduate Assistant Office web page](#). Graduate assistant salaries vary from year to year.

Please also be aware of the policy where all non-refundable fees are your responsibility. If you cancel a class after the 100% refund deadline, you will have to pay the difference. Also if you register for more than 14 credits in any semester, you will be responsible to pay the tuition charged for any credits above 14 credits.

It is the policy of the Department that the total TA/RA support from all sources not exceeds 50% in any semester for anyone with any departmental TA appointment. Violating this policy is grounds for terminating TA appointments. Only the Department Head can grant exceptions to this policy, in advance, under extraordinary circumstances.

Fellowships

College of Engineering and Science Fellowships are available only to new students and are awarded as part of the admissions process. Therefore, these will not be discussed further here. In addition, the Graduate School offers a variety of fellowships of a general nature. Watch the Graduate School and departmental web sites for announcements of these fellowships.

The Program is allowed to nominate a limited number of candidates for dissertation fellowships. There is no guarantee that the Graduate School will award such fellowships to the Program's nominees. Nominees must have passed the preliminary oral examination, have an approved thesis abstract and title on file, and have satisfied a variety of other conditions. Watch your email announcements. Since the application form is quite difficult and requires the cooperation of the advisor and the DGS, potential candidates should consult both with their advisors and the DGS early in the process. Those waiting until the last moment are unlikely to be nominated.

Employment

Because of their special skills, computer science students may be able to obtain appointments from other departments. If a computer science graduate student receives an appointment from another department he/she is subject to the salary rates of that department. The Computer Science Program is not directly involved with such appointments, so if you are interested, you should deal directly with the department or program concerned. However, students with appointments in other departments must inform the DGS of this in a timely manner. Failure to do so can result in a loss of both current and future support from the Computer Science Program.

The CSE Career Center for Science and Engineering also has an Employment Opportunities Program for graduate students. Although this program is open to all CS graduate students, the primary purpose is to help those students who are not financially supported by the department to make themselves known to outside companies that have need for their skills. We hope this coordination/matching service will benefit both our students and potential employers. Details are handled directly by the CSE Career Center for Science and Engineering, Room 50 Lind Hall. Simply stop in and ask to fill out an application or check the web site at <http://cse.umn.edu/services/careercenter/index.php>. Their office will compile your data and send it out to companies that indicate a need for your particular skills. All negotiations after that would be between the student and the company. The CSE Career Center also offers services for alumni.

GENERAL DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING INFORMATION

CSGSA

All computer science graduate students are automatically members of the Computer Science Graduate Student Association (CSGSA). The CSGSA holds regular meetings throughout the school year. These meetings are a forum for graduate students to voice any concerns or ideas they might have about improving the graduate program and graduate student life. The CSGSA also plans several social events throughout the year. The CSGSA has representation on several departmental committees. For more information, please see their web site, http://csgsa.cs.umn.edu/index.php/Main_Page.

Mailboxes and Bulletin Boards

Mailboxes and a copy machine are located in room 4-201 Keller Hall. Access to this room is gained through the use of your U card (see <http://www.cs.umn.edu/academics/graduate/index.php> and click on grad lab access). Mailboxes are available to CS&E graduate students who wish to have one. These mailboxes are for University use only and no personal mail should be sent to the departmental address. All PhD students will be assigned a mailbox as departmental materials are distributed to these mailboxes. Since most University business is directed to your x.500 account, most students have no need for a mailbox. However, if you wish to have one assigned to you, please send an email to cse-desk@cs.umn.edu. All mailboxes will be set up by the 2nd week of the semester.

A good deal of information is posted on the bulletin boards outside of the Department office, 4-192 Keller Hall, and in the mailroom 4-201 Keller Hall.

Keys and Space

All computer science graduate students have access to the graduate students' computer lab and the William Munro Graduate Student Lounge. These facilities are available to graduate students for their research and study. Access is available through use of the student's U card. All CS grad students can gain access by completing the registration found <http://www.cs.umn.edu/academics/graduate/index.php> and click on grad lab access.

Systems Information

All computer science graduate students are entitled to accounts on the departmental machines in the graduate computer labs. All Computer Science graduate students should apply for a CS computer and email account. This form is available in the Department office reception area or on line at http://www.cs.umn.edu/resources/forms/Account_Request_Form.pdf. New students should complete the application form upon arrival.

Information about the departmental computing systems and staff is available on line at <http://www.cs.umn.edu/help/>. All graduate students should subscribe to grads@cs.umn.edu for department announcements. To do this, please go to <http://mailman.cs.umn.edu> and add yourself to the appropriate list.

The Computer Science graduate computer lab is located in room 2-216. For information about what equipment is located in that room, please see <http://www.cs.umn.edu/resources/facilities/labs.php>. All the other laboratories in the EE/CS Building are under the direction of various faculty members. Accounts on equipment in these laboratories must be arranged through the respective professors in charge of each of them.

Useful locations, hours, and phone numbers

Department of Computer Science and Engineering Office

4-192 Keller Hall
200 Union St SE
Minneapolis, MN 55455

8:00-4:30 M-F*
(612) 625-4002
www.cs.umn.edu

Graduate School Office

309 Johnston Hall (Prospective students)
316 Johnston Hall (Previously registered students)
101 Pleasant St SE

9:00-4:00- M-F
(612) 625-3014
(612) 625-3490
www.grad.umn.edu

Graduate Assistant Office

8:00-4:30 M-F

Information for Graduate Students and Advisors of Graduate Students 2011-2012

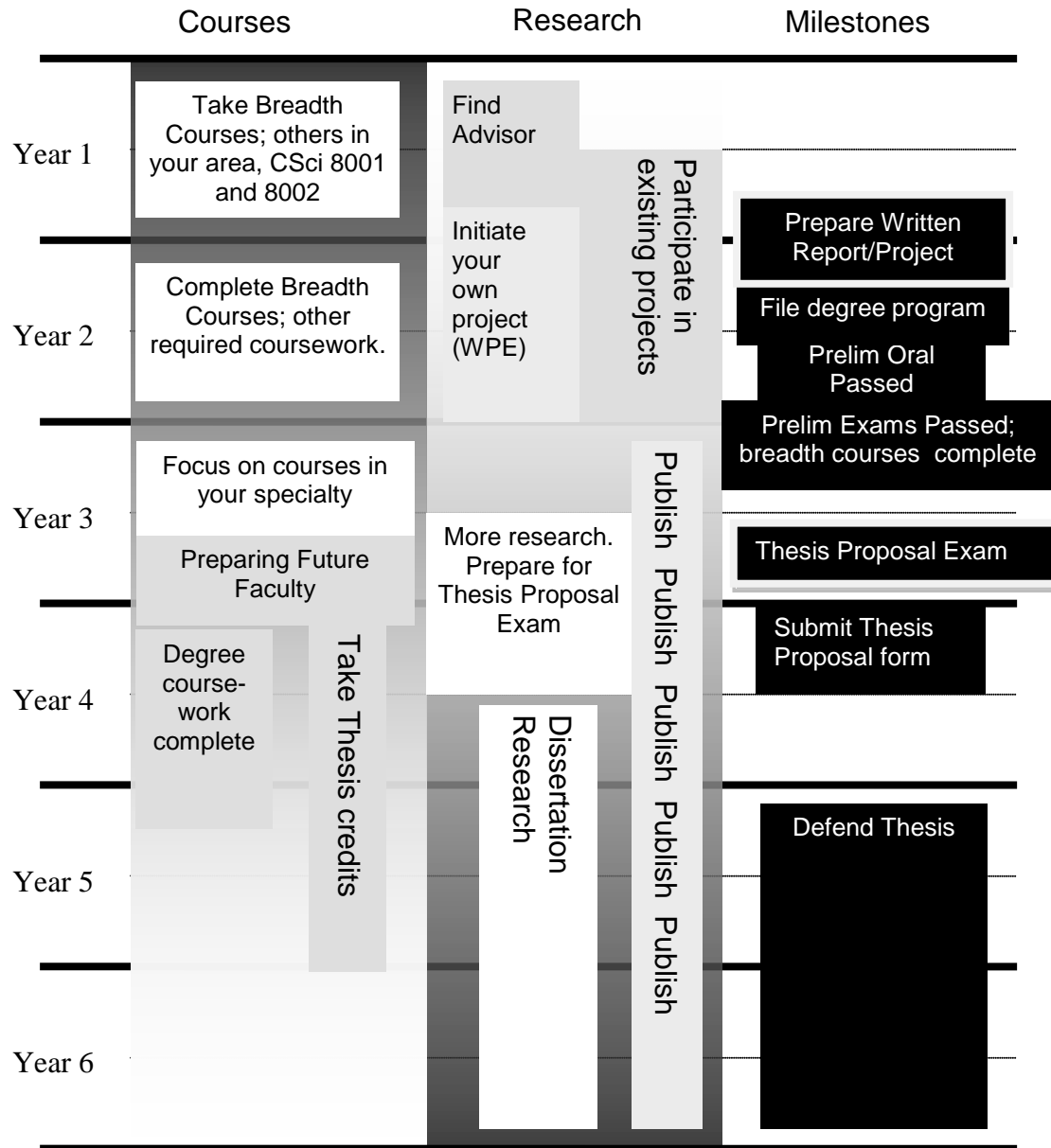
200 Donhowe
319 15th Ave SE
Minneapolis MN 55455

(612) 624-7070
<http://www1.umn.edu/ohr/gae/>

*Hours subject to change

APPENDIX A - Degree Progress Guidelines

Figure 1: SUGGESTED TIMELINE FOR PHD STUDENTS. Note that most of the dates are guidelines, i.e., they are suggested, not required. The requirements for taking and passing the Written and Oral Preliminary Exams are exceptions: you must attempt the exams during your second year and pass it no later than the end of your third year.
**** The time frame from when the Written Report or Paper is submitted to your committee to when you pass your Preliminary Oral Exam should be no more than two months.****



APPENDIX B - Lists of Faculty

The Computer Science and Engineering Faculty and Their Research

Professors

Daniel Boley, Ph.D., Stanford. Numerical linear algebra, data mining, control theory, fault tolerance, robotics.
John Carlis, Ph.D., Minnesota. Database systems.
David Hung-Chuang Du, Ph.D., Washington (Seattle). High-speed networking, multimedia applications, high-performance computing over workstation clusters, database design and CAD for VLSI circuits.
Maria Gini, Doctor of Physics, Milan. Artificial intelligence, robotics, intelligent agents.
Mats Heimdahl, Ph.D., California, Irvine. Software engineering, safety critical systems.
Ravi Janardan, Ph.D., Purdue. Computational geometry, computer-aided design and manufacturing, computer graphics, solid modeling.
George Karypis, Ph.D., Data mining, bio-informatics, parallel processing, CAD, and scientific computing.
Joseph Konstan, Ph.D., California at Berkeley. Human-computer interaction, recommender systems, user interface design, multimedia authoring tools, user interface tools and technology
Vipin Kumar, Ph.D., Maryland. High performance computing, data mining.
Gopalan Nadathur, Ph.D., U of Pennsylvania. Programming language design and implementation, computational logic.
Nikolaos Papanikolopoulos, Ph.D., Carnegie Mellon. Robotics, computer vision, sensors for transportation applications, control, and real-time systems.
John Riedl, Ph.D., Purdue. Collaborative systems, collaborative filtering, information filtering
Yousef Saad, Doctorat, Grenoble (France). Sparse matrix computations, iterative methods, preconditioning methods, parallel computation, matrix eigenvalue problems, nonlinear equations, control theory.
Shashi Shekhar, Ph.D., California at Berkeley. Spatial database, data and knowledge engineering, spatial data mining, GIS
Jaideep Srivastava, Ph.D., California at Berkeley. Databases, multimedia systems, data mining.
Loren Terveen, Ph.D., Texas at Austin, Human-computer interaction, computer supported cooperative work, computer-mediated communication, recommender systems.
Anand Tripathi, Ph.D., Texas at Austin. Distributed and network computing systems, object-oriented programming, fault-tolerant computing.
Pen-Chung Yew, Ph.D., Illinois at Urbana-Champaign. High-performance microprocessor architectures, Multithreaded architectures, parallelizing compilers, dynamic compilation, parallel machine organizations, performance evaluation, parallel discrete event-driven simulations.
Zhi-Li Zhang, Ph.D., Massachusetts. Computer networking, multimedia systems.

Associate Professors

Arindam Banerjee, Ph.D., Texas, Austin, Data mining, machine learning, scalable algorithms for learning.
Abhishek Chandra, Ph.D., UMass @ Amherst, Operating Systems, Computer Networking, Multimedia Systems, and Distributed Systems.
Tian He, Ph.D., University of Virginia, Wireless/mobile communication, sensor networks, real time computing, embedded & distributed systems.
Nicholas Hopper, Ph.D., Carnegie Mellon, Cryptography, automated analysis of cryptographic protocols, computer security, and computational learning theory.
Victoria Interrante, Ph.D., North Carolina at Chapel Hill. Visualization, computer graphics.
Ibrahim Volkan Isler, Ph.D., University of Pennsylvania, Robotics and sensor networks.
Yongdae Kim, Ph.D., USC, Group security, network security.
Gary Meyer, Ph.D., Cornell. Computer graphics, color synthesis and reproduction.
Mohamed Mokbel, Ph.D., Purdue, Database systems, data streaming, query processing algorithms, spatio-temporal database engines
Stergios Roumeliotis, Ph.D., USC. Distributed robotics, autonomous vehicle navigation, sensor networks, fault detection and identification, human- robot interaction.
Paul Schrater, Ph.D., California State University, Long Beach. Human and computer vision, motor control & haptics, statistical inference, pattern recognition & Bayesian networks, virtual reality.
Erik Van Wyk, Ph.D., University of Iowa. Extensible programming languages, applications of temporal logic and model checking in program analysis, algebraic compilers
Jon Weissman, Ph.D., Virginia. Distributed systems, metacomputing, cluster computing, scheduling and resource management, I/O, parallel processing, operating systems, smart environments.
Antonia Zhai, Ph.D., Carnegie Mellon, compiler optimization, computer architecture and pervasive computation

Assistant Professors

Daniel Keefe, Ph.D., Brown University, Interdisciplinary scientific visualization
Rui (Ray) Kuang, Ph.D., Columbia University, Computational Biology, protein structure prediction and protein function analysis, machine learning, discriminative learning, string kernels and network diffusion
Chad Myers, Ph.D., Princeton, Computational biology, functional genomics, machine learning.

Computer Science Faculty with Graduate Education Responsibilities

Computer Science Faculty

- * Arindam Banerjee
- * Daniel Boley
- * John Carlis
- * Abhishek Chandra
- * David Du
- * Maria Gini
- * Tian He
- * Mats Heimdahl
- * Nicholas Hopper
- * Victoria Interrante
- * Ravi Janardan
- * George Karypis
- * Volkan Isler
- * Daniel Keefe
- * Yongdae Kim
- * Joseph Konstan
- * Rui (Ray) Kuang
- * Vipin Kumar
- * Gary Meyer
- * Mohamed Mokbel
- * Chad Myers
- * Gopalan Nadathur
- * Nikolaos Papanikolopoulos
- * John Riedl
- * Stergios Roumeliotis
- * Yousef Saad
- * Paul Schrater
- * Shashi Shekhar
- * Jaideep Srivastava
- * Loren Terveen
- * Anand Tripathi
- * Erik Van Wyk
- * Jon Weissman
- * Pen-Chung Yew
- * Antonia Zhai
- * Zhi-Li Zhang

Graduate Faculty from Other Departments

- * Vladimir S. Cherkassky, Associate Professor of Electrical and Computer Engineering
- Caroline C. Hayes, Associate Professor of Mechanical Engineering
- Paul Johnson, Professor of Management Sciences
- * Daniel J. Kersten, Professor of Psychology
- Larry L. Kinney, Professor of Electrical and Computer Engineering
- * David Lilja, Professor of Electrical and Computer Engineering
- Richard F. Maclin, Associate Professor of Computer Science, Duluth
- Vassilios Morellas, Program Director of Center for Distributed Robotics
- Ted Pedersen, Assistant Professor of Computer Science, Duluth
- Jaijeet Roychowdhury, Associate Professor of Electrical and Computer Engineering
- Martin Saar, Assistant Professor of Earth Sciences/Geology/Geophysics
- * Sachin Sapatnekar, Associate Professor of Electrical and Computer Engineering
- Michael Steinbach, Research Associate of Computer Science and Engineering
- Hudson Turner, Assistant Professor of Computer Science, Duluth
- Michael W. Whalen, Program Director, Computer Science and Engineering

* Denotes senior members of the Computer Science Graduate Faculty.

Note: Senior Members may advise both MS & PhD students.

Members may advise MS students and co-advise PhD students in conjunction with a senior member.