

Graduate Student Guide
(r176)

Department of Computer Science

August 19, 2011

Contents

Preface	iv
1 Introduction	1
1.1 Department Organization	1
1.2 Contact Information	2
1.3 Website	2
2 Non-Academic Policies	3
2.1 UVa Policies	3
2.1.1 Equal Opportunity	3
2.1.2 University Catalog	4
2.1.3 Theses and Dissertations	4
2.1.4 Honor System	4
2.2 Policies	4
2.3 Employment	5
2.3.1 TA Responsibilities	5
2.3.2 RA Responsibilities	6
3 Academic Program	7
3.1 Temporary Advising	8
3.2 Coursework	8
3.2.1 Minimum Credits	8
3.2.2 Required Courses	9
3.3 Research Advisor	9
3.4 Ph.D. Qualifying Examination	10
3.4.1 Committee	10
3.4.2 Breadth	11
3.4.3 Research Proposal	11
3.4.4 Qualifying defense	14
3.4.5 Committee Recommendation	16
3.5 Master's degree	16
3.6 Ph.D. Proposal	16
3.6.1 Committee	16
3.6.2 Proposal Document	17

3.6.3	Oral Presentation	17
3.6.4	Outcomes	18
3.7	Ph.D. Defense	18
3.7.1	Committee	18
3.7.2	Ph.D. Dissertation	19
3.7.3	Seminars	19
3.7.4	Oral Defense	19
3.7.5	Outcomes	20
A	Degree Requirements Checklist	21
A.1	Bachelor's to Ph.D. Timeline	23
A.2	Master's to Ph.D. Timeline	24
	Glossary	25
	Acronyms	27

Preface

This document assembles the policies and requirements of the CS graduate program at the University of Virginia (UVa). It is a guide for graduate students, written and maintained by graduate students. While not an official source of policies, it reflects the best understanding of the existing requirements. Should the requirements stated in other documents change, these changes will be reflected in an updated version of this document, which will be released as soon as possible with the appropriate revisions.

This document was created in response to a request from the faculty to have graduate students assist in the creation of a formal graduate handbook. Over a dozen source documents were referenced, with clarifications and expansions provided by various members of the department (including students, faculty, and staff). The goal of this document is to combine all common policies affecting CS graduate students in a single location. This document will service the graduate students in the interim until the handbook itself is completed and is approved by the faculty.

The content of this document is intended to be a dynamic index of department policies. Although this version of this document presents information without citations, an alternate version with all sources cited is available upon request to the CS Graduate Student Group (CSGSG). In places, there are margin comments that contain additional information about a policy.* A glossary of terms and a list of acronyms used in this document is provided as an appendix. When the glossary contains an entry for a particular term, the first instance of that term is *emphasized* and the term also appears in the document's margin.

We encourage any reader who finds any part of this document to be unclear, incomplete, or inaccurate to contact the CSGSG so that this feedback can be used to benefit the entire department. If you would like to become involved in the maintenance of this document, please email csgsg@cs.virginia.edu.

* Margin comments usually identify open questions or practical but unofficial interpretations of the text.
— lat7h

Chapter 1

Introduction

The department offers three graduate degrees: the Master of Computer Science (M.C.S.) and the Master of Science (M.S.) and the Ph.D. in Computer Science. The M.C.S. degree is a graduate professional degree with an emphasis on coursework and enhances the professional instruction of an undergraduate program by providing students with greater knowledge and deeper understanding of computer science. In contrast, the M.S. degree introduces students to research at the graduate level. This degree provides higher qualifications for employment and prepares students for doctoral studies. The Ph.D. program prepares students for faculty careers at world-class universities and for research positions in leading government or industrial research labs. It is common for a student who obtains a Ph.D. to earn an M.C.S. or M.S. degree along the way although this step is not required. Regardless of the degree track, all graduate students engage in classroom instruction and substantial research.

The instructional program seeks a balance between the established body of knowledge and innovation in computer science. All graduate students are expected to demonstrate breadth of knowledge across four areas: computer systems, software systems, application systems, and theory. Graduate students further their mastery of one area of computer science in depth by taking additional courses in that area and by collaborating with a faculty advisor to publish their research in peer-reviewed conferences and journals.

1.1 Department Organization

While every faculty and staff member of the department plays a part in the graduate experience, four particular roles have significant impact on graduate student life:

Position	Currently serving
Department Chair	Mary Lou Soffa
Director of Graduate Studies	Jack Davidson
Graduate Ombudsman	Wes Weimer
Graduate Secretary	Brenda Perkins

Each student also works closely with a research advisor and frequently interacts with several committees. Advisors and committees are discussed in detail throughout §3.

Department faculty members are divided into tenure-track (or research) faculty and general (or teaching) faculty. General faculty members are not directly involved in the graduate program; thus the term “faculty” refers to tenure-track faculty throughout this document.

1.2 Contact Information

The Computer Science department is located in Rice Hall,* which is part of the School of Engineering and Applied Science (SEAS) within UVa. The mailing and physical address is:

Department of Computer Science
 School of Engineering, University of Virginia
 85 Engineer’s Way, P.O. Box 400740
 Charlottesville, VA 22904-4740

Phone (434) 982-2200
 Fax (434) 982-2214

Graduate students may use the department address for any school-related purposes. Mail sent to the P.O. Box listed above is placed in a mailbox corresponding to the first letter of the student’s last name. Packages delivered by courier services other than the United States Postal Service (e.g., FedEx, UPS, etc.) should be given the physical address (85 Engineer’s Way) rather than the P.O. Box, and may be claimed in the department’s front office.

1.3 Website

The department maintains its web site at <http://www.cs.virginia.edu/>. Current mission and diversity statements, calendars, and other department information are available there. The web site also contains contact information for graduate students, faculty, and staff.

* This information has been updated in anticipation of the imminent move to Rice Hall. Prior to the move, the department is in Olsson Hall at 151 Engineer’s Way.

Chapter 2

Non-Academic Policies

The Department of Computer Science is part of SEAS within UVa. All students are expected to comply with SEAS and UVa policies as defined and published by their respective governing bodies. Some of those policies have been incorporated into the degree requirements detailed in Chapter 3. This chapter summarizes policies that exist beyond those incorporated into our graduate degree programs.

2.1 UVa Policies

The university registrar is responsible for many of the academic policies at UVa. Its website is available at <http://www.virginia.edu/registrar/>.

Academic Calendar

<http://www.virginia.edu/registrar/calendar.html>

Enrollment and Degree Certification

<http://www.virginia.edu/registrar/status.html>

Family Educational Rights and Privacy Act (FERPA)

<http://www.virginia.edu/registrar/privacyact.html>

Student Information System (SIS)

<http://www.virginia.edu/sis/>

Transcripts

<http://www.virginia.edu/registrar/transcript.html>

2.1.1 Equal Opportunity

UVa is committed to equal opportunity and affirmative action. If students feel they have been subject to discriminatory practices they may seek redress through the resources outlined at <http://www.virginia.edu/eop/>.

2.1.2 University Catalog

Students at UVa are subject to the university's academic, financial, and non-academic rules and regulations, as outlined in the "Regulations" chapter of the graduate record at <http://records.ureg.virginia.edu/>. These include policies on tuition and fees; class registration, auditing, and attendance; grievances and redress; graduation and diplomas; military personnel, both veterans and those on active duty; parking and transportation on grounds; legal issues such as copyright, confidentiality, and harassment; and many other topics.

The Graduate Record published online by the university registrar is *not* binding to the university. In particular, the university reserves the right to change any provision or requirement at any time within the student's term of residence.

2.1.3 Theses and Dissertations

All Ph.D. dissertations and Master's theses are printed and bound by Printing and Copying Services. Submission guidelines are maintained online at http://www.virginia.edu/uvaprint/copy_dissertations.html. The CSGSG maintains links to student-generated L^AT_EX style files that satisfy these guidelines at <http://www.cs.virginia.edu/~csgsg/links.php>

2.1.4 Honor System

The UVa Honor System is a prime example of student self-governance within a university. Founded in 1842, the Honor System has flourished for more than 150 years as an entirely student-run system.

Each student is charged with the responsibility to refrain from dishonorable conduct. By today's standards, an honor offense is an intentional act of lying, cheating, or stealing. Students who are found guilty of violating this standard of honor will be asked to leave the university. A more detailed description of the honor system may be found at <http://www.virginia.edu/honor/>.

Professors sometimes request that graded individual assignments be pledged. This means each student should write out and sign the following pledge, posted in most classrooms across grounds:

On my honor, I have neither given nor received help on this assignment.

2.2 Policies

The following SEAS positions are directly relevant to graduate students:

SEAS Personnel	
Associate Dean for Graduate Programs	Kathryn C. Thornton
Employment Services Specialist	Iva Gillet
Graduate Payroll/Financial Aid Administrator	Joan E. Wicks
Graduate Admissions Office	Sara Thacker

Contact information for these people is maintained on SEAS's graduate program website, <http://www.seas.virginia.edu/admin/gradprog.php>. That site also contains links to other information relating to the SEAS graduate program.

SEAS handles some graduate student paperwork, including handling the payment of those students with funding or employment within the department. Students are responsible for ensuring that all relevant paperwork has been filed with the graduate financial aid administrator. A list of documents that must be filed prior to being paid through the university, either as an employee or a grant recipient, may be found at <http://www.seas.virginia.edu/admin/hr/grad/forms.php>.

SEAS maintains a center for diversity in engineering to assist students from underrepresented populations in science, technology, engineering, and mathematics. All students are welcome to utilize these services; more information may be found online at <http://www.seas.virginia.edu/admin/diversity/>.

Additional information on SEAS policy and activities can be found on the SEAS website at <http://www.seas.virginia.edu/>.

2.3 Employment

The typical graduate student is employed by the department, either as a Teaching Assistant (TA) or a Research Assistant (RA). As university employees, TAs and RAs are expected to perform their duties in a prompt and proper manner. Failure to fulfill employment duties may result in various consequences, up to and including dismissal from the graduate program.

While being funded by the department,* a student must not also have outside employment. Full-time graduate students must also not unilaterally accept research internships without prior approval from their advisor.

* Clarification is needed but presumably this extends to students receiving fellowships.
— jmc7tp

2.3.1 TA Responsibilities

TAs are important members of the department's professional teaching staff. Each TA is assigned to assist in the educational goals of one or more course sections. This assignment is typically given by the director of graduate studies early in the semester[†] and is accompanied by an expected number of hours the TA will devote to each course. It is expected that students will enroll in 3 credits of CS 8897 (CS 9897 for students with a Master's degree) each semester in which they are employed as a TA.

[†] Initial assignments are usually available prior to the semester but sometimes change during the first few weeks. — lat7h

Specific TA responsibilities regarding a particular course are assigned by the instructor responsible for that course. Common duties include grading, proctoring laboratory sections, holding office hours and help sessions, attending class, reading instructional materials, completing assignments, answering emails, and tutoring students in need of additional help.[‡] Additional duties directly related to a particular course may be assigned by an instructor. Students concerned that specific duties are inappropriate or off-topic may seek resolution through the instructor, their advisor, or the graduate ombudsman. A TA whose duties require significantly more or less time than their assigned weekly hours should inform the course instructor so that a more appropriate set of duties can be assigned.

Each TA is responsible to obtain a proper understanding of the material presented in the course. TAs without a firm grasp of course concepts should obtain guidance from the instructor or request a change in course assignments from the director of graduate studies when given the course assignment.

TAs are employees and representatives of the department and the university. As such, they should behave with professional courtesy and politeness in all their official communications and activities. This includes handling student questions in a polite, constructive, and accurate manner. Making up an answer, belittling a student, or otherwise hindering education is inappropriate.

As an employee of the university, TAs should be reliable in all their duties. The period of TA employment begins with the beginning of the semester and lasts until the final grades are submitted to the registrar. Non-emergency absences from scheduled duties within that time must be approved by the graduate program director.

UVa maintains a teaching resource center. TAs may find their published information helpful in guiding their interactions with students. These publications are online at <http://trc.virginia.edu/Publications/>.

2.3.2 RA Responsibilities

Students receiving research funding are called RAs. Each RA is assigned to a particular advisor and is given a number of hours each week to devote to that advisor's research program. An RA and an advisor are colleagues in research and the employer-employee relationship is rarely visible as they work together to expand the frontiers of knowledge. However, there are elements of a research program that may not appeal to the RA but still need to be completed. When specific requests are made, students are responsible to devote up to their allotted hours each week to the fulfilling those requests. A student who is concerned that specific duties are inappropriate or off-topic may seek resolution with the advisor, the graduate ombudsman, or the director of graduate studies.

[‡] Email and tutoring duties are common but apparently undocumented elsewhere.

— lat7h

Chapter 3

Academic Program

The typical graduate student accomplishes the following milestones while working on the Ph.D. degree:

1. Select a faculty research advisor;
2. Pass the two portions of the Ph.D. qualifying exam:
 - *Breadth*: take six courses spanning the CS curriculum;
 - *Depth*: propose and defend a 3-credit research project and demonstrate mastery of selected readings related to that project;
3. Propose Ph.D. research through a written and oral outline of planned research activities; and
4. Defend a Ph.D. dissertation, which is a written and oral report of the completed Ph.D. research.

Students also take additional courses and file administrative *forms* throughout the degree program. Details on each step, as well as steps taken by students working on the M.C.S. and M.S. degrees, are outlined later in this chapter.

form

This chapter contains the required elements of a graduate student's career. Unless otherwise noted, the timeline and dates given are for students entering with a bachelor's degree. Differences for students who have a master's degree are indicated separately and summarized in §A.2. Timing is expressed in terms of *major academic semesters*, so for example the "third semester" of a student entering during the summer term is that student's second fall semester. Where specific numbers are given, these are requirements that can only be deferred with approval from the *director of graduate studies*.

major academic semester

director of graduate studies

This chapter contains necessary steps each graduate student must take but should not be mistaken for a complete list of what students are encouraged to do. For example, almost all successful graduate students publish multiple papers, but as these are not subject to formalized rules, they are not mentioned in this chapter. This document makes no effort to enumerate the non-legislated elements of a successful graduate experience at UVa; suggestions may be obtained from each student's advisor.

3.1 Temporary Advising

During orientation (held right before each Fall semester), each student is assigned a temporary advisor to aid in the selection of their first semester courses. The temporary advisor also assists with educational and administrative issues that may arise during the student's first semester but typically does not provide research guidance.

For various reasons, some students do not obtain a temporary advisors during orientation. Such students should contact the director of graduate studies or the department secretary as soon as possible to have one assigned.

3.2 Coursework

All graduate degrees offered by the department require a combination of research and coursework. Each student is required to meet *both* the SEAS-defined minimum number of credits for a graduate degree *and* the department-defined breadth of instruction. These accountings are performed independently; for example, CS 6161 counts as a course towards the minimum to earn a degree and also satisfies the department's theory breadth requirement for passing the Ph.D. qualifying exam (see §3.4.2).

3.2.1 Minimum Credits

**graded
graduate-level**

Students must have a minimum number of *graded, graduate-level* credits. No grade lower than a "C" will be accepted towards satisfying this requirement, and the average of all grades in these courses must be at least a "B". The minimum number of credits depends on the degree sought:

Master of Computer Science 30 credits of graduate coursework, including

- at least 3 credits of research (i.e., CS 7995)
- no more than 6 credits from 5000-level courses
- no more than 12 transfer credits

Master of Science 30 credits of graduate coursework, including

- at least 6 credits of research (i.e., CS 8999)
- no more than 6 credits from 5000-level courses
- no more than 6 transfer credits

72 credits of graduate coursework, including

- at least 24 credits of non-research classes (i.e., not CS 7995, CS 8999, or CS 9999)
- no more than 6 credits from 5000-level courses

No 5000-level courses taught by the CS department may be used to satisfy degree requirements; only 5000-level courses taught by other departments may be used to satisfy the minimum number of credits. SEAS does not limit Ph.D. transfer credit, but all transfer credits must be approved by the student's *curriculum*

curriculum

committee. Students should not assume that transfer courses will be accepted prior to curriculum committee approval. Students may take additional courses beyond those required for graduation.

3.2.2 Required Courses

Every student must take “Computer Science Perspectives” (CS 6190) during their first Fall semester. To satisfy the breadth requirement of the Ph.D. qualifying exam, each student must take the following courses within their first four semesters in the graduate program (three semesters for students entering the department with a master’s degree):

- At least one 4000-level or higher course from each breadth area (see below);*
- At least two 5000-level or higher courses from any of the four breadth areas.†

Each of these courses must be distinct, for a total of six courses. Each of these six courses must be passed with a minimum grade of a “B” (not “B–”), and with a cumulative GPA of at least 3.6. Individual breadth course requirements may be satisfied by transfer credit at the discretion of the student’s curriculum committee.

To earn a graduate degree, a student must take at least one graduate-level *mathematics* course, which must be distinct from the six breadth courses required as part of the Ph.D. qualifying exam (see §3.4.2). The mathematics course requirement may be satisfied by transfer credit at the discretion of the student’s curriculum committee.

Students entering with or earning a Master’s degree prior to their Ph.D. are required to take at least six credit hours of coursework beyond their Master’s coursework.

3.3 Research Advisor

Research advisors provide oversight and mentoring of a student’s entire graduate experience. A student’s research advisor (or simply advisor) is selected during the matching process, which is part of the first-semester CS 6190 course. Students are asked to supply a prioritized list of potential advisors with whom they have discussed research opportunities during the first semester. Similar prioritized lists of students are provided by faculty, and these preferences are used to match each student with a research advisor. Students should complete and file form G104 when they are matched with a research advisor. In cases where it becomes necessary to change research advisors, the student should discuss this potential change with both their current advisor and their new advisor and resubmit form G104.

An advisor’s roll is to guide the student through all phases of the graduate program. At times this includes helping the student through special circumstances not covered by official policies. Students who have concerns that cannot

* 4000-level courses will not satisfy SEAS credit requirements for a graduate degree.

† The number of 5000-level credits accepted for a graduate degree is limited by SEAS (see §3.2.1).

mathematics

graduate ombudsman

be resolved on their own should bring these concerns to their advisor, who will assist them in bringing the matter to a suitable conclusion. Students with concerns about their advisor should contact the *graduate ombudsman* or, if the ombudsman is the student's advisor, the director of graduate studies.

3.4 Ph.D. Qualifying Examination

The Ph.D. qualifying exam is designed to evaluate a student's ability to pursue and to successfully complete Ph.D.-level research. The breadth portion of the exam requires coursework in four major research areas: computer systems, software systems, application systems, and theory. The depth portion of the exam focuses on the student's research potential and requires the student to propose and to complete a semester-long research project guided by their research advisor. The student then prepares a written report and oral defense for evaluation by a faculty committee. The student's committee is responsible for approving both the breadth and depth portions of the qualifying exam.

Each element of the qualifying process has an associated deadline. During periodic reviews of graduate students, the faculty will note any missed deadlines related to the qualifying examination and communicate them to the student in the official progress letter. In the worst case, students who fall too far behind will be asked to leave the program.

3.4.1 Committee

The Ph.D. qualifying exam committee comprises the student's research advisor and three other CS faculty members. Current policy requires that, of the three other CS faculty members, two members are listed in the student's primary research area and one listed under a second area.* Alternative committee compositions may be approved by the director of graduate studies. Form G105 should be filed after a student has formed a qualifying exam committee. Each committee should have an explicit *chair*, who directs meetings procedurally. Any member of the committee, including the advisor, may serve as the chair for the qualifying exam committee. †

For a student entering with a master's degree, the committee should be formed within the first month the student is enrolled. The committee may be formed under a temporary advisor if a research advisor has not yet been selected.

The committee evaluates all aspects of the student's qualifying examination process. They approve the student's course selection for satisfying the breadth portion of the qualifying exam. The committee evaluates the student's qualifying proposal, including the reading list selection. The committee members read and evaluate the student's written report and attend the student's oral defense of qualifying research. Their objective in these duties is to gauge the student's research ability and likelihood of succeeding in the Ph.D. program.

* As each CS faculty member is listed under two areas, all possible combinations of faculty have this characteristic for some research area. Since we do not require that students declare a primary area, this requirement does nothing. — lat7h

chair

† Having the advisor serve as the chair is not recommended because the chair should not be the student's advisor for graduate examination committees (i.e., for the M.C.S. or M.S. degree—see §3.5). — jmc7tp

3.4.2 Breadth

To satisfy the breadth requirement of Ph.D. qualifying exam, each student must take the following within their first four semesters in the graduate program (or within the first three semesters for students entering the department with a master's degree):

- At least one 4000-level or higher course from each breadth area (see below) and
- At least two 5000-level or higher courses from any of the four breadth areas.

Each of these courses must be distinct, for a total of six courses. Each of these six must be passed with a minimum grade of a “B” (not “B–”) and a cumulative GPA of at least 3.6. Individual breadth course requirements may be satisfied by transfer credit at the discretion of the student's curriculum committee.

Areas

The department distinguishes four major areas for research and coursework:

- Computer systems (architecture, operating systems, networks)
- Software systems (programming languages, compilers, software engineering)
- Application systems (graphics, databases, artificial intelligence, etc.)
- Theory (theory, algorithms, security)

Each graduate student is expected to be knowledgeable in all four areas.

Faculty per Breadth Area Every faculty member serves on committees in two of the four breadth areas as outlined in Table 3.1.

Courses per Breadth Area Each course is assigned to one breadth area. The assignment of a *special-topics* course to a breadth area depends on the topic of the course and is handled on a case-by-case basis. The mapping between courses and breadth areas can be found in Table 3.2.

special-topics

3.4.3 Research Proposal

A student's research proposal consists of a written proposal document and a meeting with the student's committee. Together, the document and meeting establish the project expectations. The student must provide the committee with the proposal document at least one week prior to the meeting. The meeting also allows discussion of the student's reading list. The student should prepare a 15-minute presentation to open the meeting with the committee.

Table 3.1: Faculty breadth areas

Faculty	Computer Systems	Software Systems	Application Systems	Theory	Faculty	Computer Systems	Software Systems	Application Systems	Theory
Cohoon		✓		✓	Robins	✓			✓
Davidson	✓	✓			shelat			✓	✓
Evans		✓		✓	Skadron	✓	✓		
Grimshaw	✓	✓			Soffa	✓	✓		
Gurumurthi	✓		✓		Son	✓		✓	
Hazelwood	✓	✓			Stankovic	✓		✓	
Humphrey	✓		✓		Sullivan		✓	✓	
Knight		✓		✓	Weaver	✓		✓	
Lawrence	✓		✓		Weimer		✓		✓
Martin			✓	✓	Whitehouse	✓	✓		
Reynolds		✓	✓		Wulf	✓	✓		

Proposal Document

The student's proposal document should be sufficient for the committee to make a determination about the research quality of the project. It should be between two and five pages in length and contain the following elements:

Abstract An executive summary, no more than half a page long

Motivation What is the problem and why is it important? What is the hypothesis of this research?

Contributions What are the main ideas and why do they matter? In what way are these ideas novel?

Related work What is the relevant prior work and state-of-the-art in this area?

Detailed research plan What specific goals or milestones will be completed during the research project and how will they be implemented, designed, and evaluated? For projects with a significant implementation component, give enough details of the features to be implemented and the experimental setup involved for the committee to judge the feasibility of the proposed work. For projects with a significant formal component, give enough details of the formalisms used (e.g., proposed theorems, proof schemas, and logical frameworks) for the committee to judge the feasibility of the proposed work.

Summary A short summary of the above and potential future work.

Table 3.2: Breadth area of each CS course number. Courses marked “—” do not count toward breadth requirements. Courses marked “?” are best guesses for courses that have not yet been assigned by the quals committee.

Course	Computer Systems	Software Systems	Application Systems	Theory	Course	Computer Systems	Software Systems	Application Systems	Theory
4102				✓	6415	✓			
4240		✓			6444	✓			
4330	✓				6456	✓			
4414	✓				6501	(varies by section)			
4434		✓			6610		✓		
4444	✓				6620		✓		
4457	✓				6750			✓	
4458	✓				6840			✓	
4610		✓			6993	(varies by section)			
4620		✓			7456	?	?		?
4630				✓	7457	✓			
4710			✓		7501	(varies by section)			
4750			✓		7620	✓			
4753			✓		7716			✓	
4810			✓		7882			✓	
4820			✓		7993			—	
4840			✓		7995			—	
5487	✓				8516				?
5501	(varies by section)				8524		?		
5787				✓	8535	?			
5788				?	8545	?			
6160				✓	8561		?		
6161				✓	8575			?	
6190			—		8584			?	
6240		✓			8897			—	
6250		?			8999			—	
6316			✓		9897			—	
6354	✓				9999			—	

The ordering of the sections above may vary depending on the committee's preferences. Most proposals also include a section devoted to the work completed by the student prior to the proposal although this section is not required.

The proposal document is not binding in either direction. However, students should discuss any major deviations with their advisory committees. The proposal document is intended to assist the student in the formalization of the research project and to ensure that the student is not undertaking too much or too little work. If the committee is not satisfied with the proposal, it may request amendments or changes and set appropriate due dates. Typically, the committee will indicate weaknesses in the proposal that must be addressed in the final report and presentation for the student to pass the depth requirement.

Reading List

The qualifying exam proposal should include a reading list that the oral examination may cover. The student and research advisor prepare this reading list, which should be included as an appendix in the proposal document and in the final report.* During the proposal presentation, the *selection* of materials for the reading list may be reviewed and amended. During the report presentation, the student may be questioned about the *content* of each work on that list.

The reading list consists of:

Focus papers A small number (typically two or three) papers representing the state of the art in the area. The student will be expected to know these papers in detail.

Background readings Typically a textbook and one or two book chapters or survey papers, or no textbooks and four or five book chapters or survey papers. The student will be expected to have a firm command of the material covered in these readings, as shown through general understanding and an ability to place the work in context, but will not be questioned about them as closely as on the focus papers.

Related works The proposal (and later project report) bibliography comprises the rest of the reading list. The student should understand the main idea of each such paper, why that paper is cited, and its relevance to the proposed research.

3.4.4 Qualifying defense

The qualifying defense comprises a final project report written by the student and a public oral defense of the research. Students must register for CS 7995 (or CS 9999 for students who already have a master's degree) in the semester they give their qualifying defense.

Report

The report should convey the results of the project and include evidence and arguments that those results are valid. The report should be 10–12 pages long

* No delivery mechanism for the reading list has been specified to date; that is be an appendix is a suggestion original to this document.

— lat7h

using a typical publication format from conferences in the topical field. The exact format and style of the report may vary somewhat across topics but in general will include the following elements

- Presentation of the work's motivation, hypothesis and contributions.
- Placement of the work in the context of prior art.
- An explanation of how the proposed work was carried out. Where applicable, this should provide enough information for the reader to replicate the results.
- Conclusions drawn from the work and a discussion of future research directions that the project suggests.

The report should be self-contained and independent of the corresponding proposal. The report should provide enough context and detail so that a reader of the proposal can readily see how the work fulfills the promises in the proposal.

Oral examination

The student's final presentation to the committee is open to the public. The student must arrange for the *graduate secretary* to publicize the time and date of the final presentation, at least one week prior to the oral examination. The oral examination begins with a 30-minute presentation by the student providing an overview of the research project undertaken by the student. The presentation is followed by questioning from the committee and the general audience. The student should be prepared to answer questions about their depth area in general and their research project in particular. In addition, the student should be

graduate secretary

- able to explain the main idea, conclusions, and relevance of any paper in their report's bibliography. The student is not expected to be completely familiar with every detail of every paper.
- an expert on the focus papers from their reading lists. These papers represent the state-of-the-art in the area, and the student will be held to a higher standard for these papers. Deep questioning regarding them should be expected.
- familiar with the major concepts from the background readings in the reading lists. The student will be expected to demonstrate a firm command of the background readings, as shown through general understanding and an ability to place the work in context, but will not be questioned about them as closely as on the focus papers.

Student are encouraged to provide the committee members with copies of the slides used in the research presentation portion of the oral examination. Slides can be distributed in an electronic form a few days in advance of the presentation or printed out and distributed at the oral examination itself. Providing slides is a courtesy that helps the committee follow the presentation and keep track of their comments.

The student should file forms G107 and G107-CS following the oral examination.

Outcomes

Based on the student's final project report and oral exam, the advisory committee will determine if the student passed the depth portion of the Ph.D. qualifying exam. If the student's performance is not acceptable, the committee may permit a second attempt, in which case the exam must be re-taken within one month. If the university is on holiday during the next month (e.g., the student defends in December), the exam must be retaken within the first month of the next semester. A total of at most two attempts are allowed.

3.4.5 Committee Recommendation

Based on the student's performance on both the breadth and depth components of the qualifying exam, the advisory committee will make a recommendation to the faculty as to whether the student passed the qualifying exam and is therefore recommended to continue into the Ph.D. program. The final decision rests with the entire faculty.

3.5 Master's degree

Passing the qualifying exam, taking a graduate-level mathematics course, and fulfilling SEAS credit requirements is sufficient for earning an M.C.S. degree. Students may opt to obtain an M.S. degree instead by taking six credits of research (CS 8999) and writing a formal thesis instead of completing a research project. At the discretion of the student's Ph.D. qualifying exam committee, the student's oral examination may be accepted in lieu of an M.S. defense.

During the student's third semester, forms G101 and G112 should be filed. Form G113 must be filed by **1 October**, **1 February**, or **1 June** to graduate at the end of the fall, spring, or summer semester, respectively. M.S. students must also file forms G110, the "thesis and dissertation assessment form," as well as form G122. In addition, form G123 should be filed if the student will continue past the master's degree.

3.6 Ph.D. Proposal

Each Ph.D. student must present a dissertation proposal, created under the guidance of the student's advisor. This proposal should be presented prior to performing extensive research, in order to receive early faculty approval of the suitability of the proposed research. Students should file forms G102 and G105 prior to their Ph.D. proposal presentation.

3.6.1 Committee

In most cases, the Ph.D. proposal committee is the same as the Ph.D. defense committee (see §3.7.1). However, other committee compositions are possible

provided the committee contains the student's research advisor, a chair, a *minor representative*, and at least one other person. After the student has assembled a Ph.D. proposal committee, the student should file form G103.

minor representative

3.6.2 Proposal Document

The student's proposal document should clearly and unambiguously convey the scope of the work and the criteria for success. Every proposal should include the following elements:

Abstract An executive summary, no more than half a page long;

Motivation What is the problem and why is it important? What is the hypothesis of this research?

Contributions What are the main ideas and why do they matter? In what way are they novel?

Related work What is the relevant prior work and state-of-the-art in this area? A comprehensive literature review may be included as an appendix, which is not subject to page limitations, although such an appendix is not a substitute for the related work section in the body of the proposal.

Detailed research plan What specifically will be completed during the course of the research and how will it be implemented, designed, and evaluated? For projects with a significant implementation component, give enough details of the features to be implemented and the experimental setup involved so that the committee can evaluate the feasibility of the project. Similarly, for projects with a significant theoretical component, give substantial details of the formalisms used (e.g., proposed theorems, proof schemas, and logical frameworks) for the committee to judge the feasibility of the proposed work.

Summary

Proposals can also include a section devoted to the work completed by the student thus far although this section is not formally required.

Proposal documents should not exceed 15 single-spaced pages.* The bibliography and any appendices (appendices are not required to be read by the student's committee) are not included in this page limit. Proposals should favor brevity over exhaustiveness. Departures from these guidelines must be approved in advance by the student's proposal committee. The written proposal document must be submitted to the committee at least two weeks in advance of the proposal presentation.

*Some faculty members have preferences on formatting details, such as wanting double-spaced text. NSF proposal formatting guidelines are usually a safe default.
— lat7h

3.6.3 Oral Presentation

As a rule of thumb, presentations should not exceed 30 minutes, but should be scheduled for at least 90 minutes to allow for questions and a post-presentation discussion by the committee. The student must bring forms G108 and the "Proposal Assessment Form" to their presentation to be filled out by the committee and filed immediately afterwards.

Students are encouraged to provide the committee members with copies of the slides used in the proposal presentation. Slides can be distributed in an electronic form a few days in advance of the presentation or printed out and distributed at the presentation itself. Providing slides is a courtesy that helps the committee follow the presentation and keep track of their comments.

3.6.4 Outcomes

If the committee decides that the proposal is sufficient they will accept it without changes, communicating any feedback to the student personally. The committee may also decide that formal amendments to the written document are required before the proposal can be accepted. In such a case the committee chair will often “hold the forms” until all committee members have indicated their satisfaction with the updated material.

Once accepted, the proposal is a binding document on the committee. If the student competently carries out the work described therein, the committee will not reject the student’s Ph.D. dissertation on the grounds that too little has been done. It is not binding on the student, who is free to adjust the research plan. However, there is no guarantee that research other than that outlined in the proposal adjusted will be of sufficient depth and quantity to satisfy the Ph.D. requirements.

In the event that a suitable proposal is not presented but the faculty believes the student has sufficient research potential, another research presentation will be scheduled within six months. If a suitable proposal is still not presented, the student is subject to dismissal from the program.

One outcome of the proposal presentation might be* that the student does not have sufficient research potential to complete a dissertation in a timely fashion; in this case the student will be subject to dismissal from the program.

*I personally have never heard of this outcome occurring at the first proposal... — lat7h

3.7 Ph.D. Defense

The dissertation is the result of independent, original research that makes a significant contribution to the student’s field of study. It is expected that the work be of sufficient quality to warrant at least one journal publication.

To receive a graduate degree, students must file form G113 at the start of the semester during which they expect to graduate (i.e., no later than **1 October**, **1 February**, or **1 June**, respectively). To request the Ph.D. defense, a student files form G105.

3.7.1 Committee

The committee for a Ph.D. defense includes the student’s research advisor; chair; minor representative, defined as UVa faculty member not from the CS department; and two other persons, one of whom must be another CS faculty member. It is recommended that one of the committee members be an expert

from outside the university. This committee evaluates the student's Ph.D. dissertation and oral defense. If the student's Ph.D. proposal committee differs from the Ph.D. defense committee, the student must file form G103.

3.7.2 Ph.D. Dissertation

The dissertation should convey the research results and argue that those results are valid and correct. The exact form of the dissertation can vary across topics, but in general a dissertation will include the following elements.

- Presentation of the work's motivation, hypothesis, and contributions.
- Placement of the work in the context of prior art.
- An explanation of how the proposed work was carried out. Where applicable, this should provide enough information for the reader to replicate the results.
- Conclusions drawn from the work and a discussion of future research directions suggested by the project.

A dissertation should be a self-contained document. In particular, it should not assume that the reader has read the corresponding proposal, but it should provide enough context that a reader who has read the proposal can readily understand how the performed work fulfills the promises in the proposal.

The written dissertation document must be submitted to the committee at least two weeks (14 days) in advance of the oral defense. Form G122 contains instructions regarding the dissertation format. Additional formatting requirements are published by Printing and Copying Services (see §2.1.3).

3.7.3 Seminars

Students must present a public colloquium on their ongoing Ph.D. research.* This presentation must occur before the Ph.D. defense. The purpose of this presentation is to provide an opportunity for a more complete presentation of the student's research. This presentation may also be useful practice for students who will be giving a "job talk." The student should obtain the consent of their advisor before scheduling this talk.

* This requirement is vague, and the purpose of the colloquium has not been clarified by the faculty.
— jmc7tp

3.7.4 Oral Defense

The dissertation defense, which is announced publicly, is an oral defense before the student's advisory committee as well as other faculty, students, and anyone else interested in the work. The written dissertation document must have been submitted to the committee at least two weeks (14 days) in advance of the oral defense. Generally, presentations should not exceed 45 minutes, but should be scheduled for at least 120 minutes to allow for audience questions and a post-presentation discussion by the committee.

The student should bring forms G111 and the “Thesis and Dissertation Assessment Form” to the defense so they may be filled out by the committee and submitted immediately afterwards.

Students are encouraged to provide the committee members with copies of the slides used in the oral defense. Slides can be distributed in an electronic form a few days in advance of the presentation or printed out and distributed at the defense itself. Providing slides is a courtesy that helps the committee follow the presentation and keep track of their comments.

3.7.5 Outcomes

Based on the student’s dissertation document and oral exam, the advisory committee will either

- sign the forms indicating the student has earned a Ph.D. degree,
- require formal amendments to the written dissertation and “hold the forms” until they are made,
- specify significant amendments to the dissertation to be followed by a new defense, or
- declare the work unsatisfactory and dismiss the student from the program.

Appendix A

Degree Requirements Checklist

The following timelines are recommendations for completing the various graduate degrees. They are *not* intended to replace the academic policies outlined in §3 but rather to serve as a quick reference for students. In particular, these timelines are intended to be general enough to apply to “typical” graduate students. A particular student’s *advisory* committee may impose slightly different requirements (e.g., the student must take a particular course related to their research).

advisory

Forms may be retrieved from <http://www.seas.virginia.edu/advising/allforms.php> and filed with the department graduate secretary.

The remainder of this section is provided on a separate page in order to be more easily printed in isolation and used for student reference.

A.1 Bachelor's to Ph.D. Timeline

Semester 1

- Take CS 6190 – Computer Science Perspectives
- Take breadth course _____
- Take breadth course _____
- Visit with potential research advisors
- Submit faculty matching form
- File form G104

Semester 2

- Take breadth course _____
- Take breadth course _____
- Visit with potential Ph.D. qualifying exam committee members
- Appoint a Ph.D. qualifying exam committee within first month of semester (form G105)
- Submit qualifying project proposal by end of semester

Semester 3

- Take breadth course _____
- Take breadth course _____
- Enroll in 6 credits of CS 7995 – Supervised Project Research
- Defend qualifying research report by end of semester (form G107)

Semester 4

- Take graduate-level mathematics course _____
- Take graduate-level course _____
- Apply for master's degree (form G113)

Year 3–4

- Submit plan of study (form G102)
- Organize Ph.D. committee (form G103)
- Write and present Ph.D. Proposal (CS 9999) (forms G105, G108, and “Engineering Dissertation Proposal Assessment”)

Year 5–7

- Apply for degree (form G113)
- Write Ph.D. dissertation (CS 9999)
- Present dissertation (CS 9999) (forms G105, G111, G122, and “Engineering Thesis & Dissertation Assessment”)

Table A.1: Breadth and Required Courses

Area	Course ^a	Semester	Grade
Computer Systems			
Software Systems			
Application Systems			
Theory			
Perspectives	CS 6190		
Mathematics			

^a The last two courses in this list must be graduate-level.

A.2 Master's to Ph.D. Timeline

Students entering the Ph.D. program with a Master's degree follow the same timeline as those entering with Bachelor's, with the following exceptions:

- Potentially all coursework requirements may be met via transfer graduate credit (see §3.2). This typically includes most of the breadth course requirements.
- Enroll in CS 9999 instead of CS 7995 for the qualifying research project.
- The first two years of deadlines are advanced by one semester; thus, these requirements become

Semester 1

- Take CS 6190 – Computer Science Perspectives
- Appoint a Ph.D. qualifying exam committee within first month of semester (form G105)
- Submit faculty matching form
- Submit qualifying project proposal by end of semester

Semester 2

- Enroll in at least 3 credits of 9999 – Dissertation
- Defend qualifying research report by end of semester (form G107)

Semester 3

- Complete breadth coursework by end of semester

It is expected that students entering with a Master's degree will be able to complete all elements of their studies more rapidly than students entering with a Bachelor's.

Glossary

committee All committees include the student's research advisor and additional members of the faculty.

advisory Standing committee for the student, typically either the Ph.D. qualifying exam or Ph.D. proposal committee. 21

chair A member of the CS faculty other than the student's research advisor. As an exception, the chair of the qualifying exam committee may be the student's research advisor. 10, 17, 18

curriculum Advisor, chair, at least two other people. This committee evaluates the particular courses the student takes to fulfill degree requirements. The curriculum committee is *not* explicitly appointed: this role is assumed by whatever other committee is active when the student needs its service. 8, 9, 11

minor representative UVa faculty member of a department other than CS. 17, 18

course

graded Letter-grade, including research, excluding pass/fail courses. 8

graduate-level 5000-level or above. 8, 9, 16, 23, 24

mathematics A graduate-level course taught by the Mathematics department or other courses that have significant mathematical content. 9, 16

special-topics Any course whose course number ends with 501. 11

director of graduate studies A member of the faculty who oversees the policies and functioning of the graduate program as a whole. The current director of graduate studies is Jack Davidson. 7, 8, 10

form Listed at <http://www.seas.virginia.edu/advising/allforms.php> and filed with the graduate secretary. Forms typically require signatures from the student, the student's advisor, and often the members of the student's committee. 7, 9, 10, 15–21

graduate ombudsman A member of the faculty assigned to handle graduate student relations. All graduate students are welcome to bring issues to the ombudsman, who aid the student in seeking prompt resolution. The current graduate ombudsman is Wes Weimer. 10

graduate secretary A member of the staff who facilitates the administrative elements of the graduate program. The current graduate secretary is Brenda Perkins. 15

major academic semester The Fall (August through December) and Spring (January through May) semesters. Summer semester is not considered major and is not counted for requirements expressed in numbers of semesters. 7

Acronyms

CS Computer Science. iv, 5, 7, 8, 10, 13, 18

CSGSG CS Graduate Student Group. iv, 4

M.C.S. Master of Computer Science. 1, 7, 8, 10, 16

M.S. Master of Science. 1, 7, 8, 10, 16

Ph.D. Doctor of Philosophy. 1, 4, 7–11, 16–20, 23, 24

RA Research Assistant. 5, 6

SEAS School of Engineering and Applied Science. 2–5, 8, 9, 16

TA Teaching Assistant. 5, 6

UVa the University of Virginia. iv, 2–4, 6, 7, 18