Computer Science @ Virginia Tech

**Graduate Handbook
(Doctorate)**
Department of Computer Science
Virginia Tech, Blacksburg, VA 24061
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Contents

About This Handbook

The Department of Computer Science

The Department of Computer Science at Virginia Tech is poised to become one of the top programs in the country. The number of Ph.D. degrees awarded places us in the top 30 programs in the United States. The resources and facilities for research areas such as human-computer Interaction, bioinformatics, and high-end computing are state-of-the-art, and the growing list of specialized courses provides opportunities for students to concentrate their research and study on the specific aspects of computer science in which they are most interested. Visit our website at *http://www.cs.vt.edu* for more information about the department.

The Graduate Handbook

The purpose of this handbook is to present the policies and procedures of the graduate program in the Department of Computer Science at Virginia Tech. The current version of the handbook is noted on the cover page of the PDF version of the document.

- The PhD section (see *Doctorate (PhD)* on page 6) discusses the doctoral program in the department.
- We offer one graduate certificate in HCI (see *Human-Computer Interaction Certificate* on page 15) and a degree option in BioInformatics (see *Bioinformatics Option* on page 14).
- The last section describes general information relevant to all graduate students in the Computer Science Department.

This handbook is available in a variety of formats. Like good computer scientists, we have specified all content once in a single format and transformed it into multiple formats using some fancy secret magic (see after the table below for more on this). The table below indicates the contents and formats available for your reading pleasure.

Format	Content	Description
Web Handbook	Full Handbook	Contains all the content, describing all degrees offered by the CS department. This is formated to be navigated and used on the web.
PDF Handbook	Full Handbook	Contains all the content, describing all degrees offered by the CS department. This is formated to be printed.
PDF MS Handbook	MS	Contains only the content relevant to the Masters of Science Degree. This is formated to be printed.
PDF PhD Handbook	PHD	Contains only the content relevant to the PhD Degree. This is formated to be printed.
ePub MS Handbook	MS	Contains only the content relevant to the Masters of Science Degree. This is formated to be used in an ePub reader, such as Apple's iBook.
ePub PhD Handbook	PHD	Contains only the content relevant to the PhD Degree. This is formated to be used in an ePub reader, such as Apple's iBook

The secret magic is that the handbook has been broken up into pieces all annotated in DITA (see *http://dita.xml.org* for more information). We use the DITA Open Toolkit (see *https://dita-ot.github.io*) to transform the content into HTML, PDF, and ePub.

Contacts and Roles

All details of the graduate programs are the purview of the **Graduate Program Committee** (GPC). GPC is a a standing committee in the department with participation from faculty members along with a graduate student

representative. The committee meets regularly and deliberates about all graduate program related matters. Every year new members are elected into GPC and the duration of their terms varies according to the size of the committee and other departmental responsibilities. The committee is chaired by the **Graduate Director** (GD), which in our department is the same person as the **Associate Head for Graduate Studies** (AGS). The department also has an **Associate Head for Undergraduate Studies** (AUS) who also interacts with graduate students in certain affairs.

Other personnel play significant role in the day to day operations of the graduate program. The graduate coordinator (GC), initial academic advisor (IAA), academic and research advisor (ARA), and graduate director (AGS) are the key contacts for all matters of graduate studies in Computer Science.

The **Graduate Coordinator** (GC) oversees all day-to-day aspects of the graduate program and serves as an important focal point of contact for all graduate students. The GC's primary responsibility is to respond to questions from students and to keep record of all the different milestones for our graduate degrees. The GC's office is in the main office in the KWII building.

The **Initial Academic Advisor** (IAA) serves as the initial academic advisor to all incoming students till they find a research advisor. This person plays a significant role in the first year of studies for most graduate students. By the end of their first year, students should have identified an advisor.

The **Academic and Research Advisor** (ARA) is responsible for advising a student regarding maters of academic and research progress. The ARA must do a yearly evaluation of each of his/her students and discuss this evaluation with the Graduate Program Committee on Green Thursday. The ARA must be a full-time Virginia Tech faculty position with either a regular, emeritus, or courtesy appointment in the Department of Computer Science, and hold a Ph.D. or equivalent terminal degree. It is the student's responsibility to select an ARA for their work. We do not assign ARA to students.

The **Graduate Director** (GD) addresses program administration related issues, such as design, implementation, and evolution of graduate degrees and approvals of programs of study. In CS, the Graduate Director is the same person as the AGS. The AGS is the chair of the GPC. The AGS also works closely with the department head to make decisions pertaining to course registrations and financial assistance administered by the department (such as teaching assistantships and fellowships). The GC, IAA, and AGS work closely to cover all aspects pertaining to the successful functioning of the graduate program.

As of this writing, the following people occupy the positions mentioned above:

- GD/AGS is Dr. Kirk Cameron (540-231-4238, cameron@vt.edu, *http://www.cs.vt.edu/user/cameron*).
- AUS is Dr. Cal Ribbens (540-231-6262, ribbens@vt.edu, *http://www.cs.vt.edu/user/ribbens*).
- GC is Ms. Sharon Kinder-Potter (540-231-6932, KWII 1105, skpotter@vt.edu).
- IAA is Dr. Sean Arthur (540-231-7538, KWII 2228, arthur@vt.edu, *http://www.cs.vt.edu/user/arthur*).

Graduate Council

The Graduate Council is a student-run organization that pursues the interests of graduate students in the Computer Science Department. Elected members serve on committees that decide policy, curriculum, funding, research, computing resources, and work space allocations. In particular, one member of the graduate council serves on the graduate program committee (GPC). The Graduate Council also sponsors various events to promote the computer science graduate community, administers funds for student travel to conferences and meetings, and provides a mentoring program where current students serve as mentors to incoming graduate students. Students are encouraged to contact the Graduate Council with their concerns at gradcouncil@csgrad.cs.vt.edu.

Paperwork

There are many forms that you will need to deal with as a graduate student. Often these require the signature of two sets of people: (1) your advisory committee members (including your advisor) and (2) the GD, the Department Head, the College Dean, or the Graduate School. The fastest way to get these forms signed is to get the signatures of people in set (1), leave them with the GC, who will see that the appropriate signatures from the set (2) are obtained. If

appropriate, the GC will have you deliver them in person to the Graduate School once completed, but this is usually not necessary.

It is almost never appropriate to send a form directly to the Department Head, even if the form indicates the need for the Department Head's signature. Decisions related to plans of study, admissions, transfers, etc. are always made initially by an advisor and/or the GD and then forwarded to the Department Head for approval. If you send a form directly to the Department Head, you can be sure that you have just slowed down the process.

On occasion you will want to discuss the contents of a form with the GD, in which case a personal meeting or email exchange will be appropriate. If you only need a signature from the GD, it is far more efficient to leave the form with the GC than to try to locate the GD personally.

While the GC will make every effort to obtain the signatures as quickly as possible, sometimes one of the necessary people will be out of the office for several days. So it is important to turn in forms well in advance of any deadline you may be trying to meet.

In addition, there are many dependencies in the forms that students must fill out. For example, international students should have a Plan of Study (see *Plan of Study*) approved before they go on Coop or Internships (see *Internships and Co-ops* on page 22). Also, application for exams require a Plan of Study already on file. It is important that students pay attention to the deadlines and milestones required for their progress. Submitting all forms at once will not get them done any faster and at times it might actually slow down the approval process.

Note: Throughout this document, we refer to "forms" as paper forms that are required to request exams or apply for graduation and other similar milestones. As of this writing, some of these forms have been completely automated with online web-based submissions. The Graduate School is moving towards an all online management of students records, and as such, soon all forms will be online. Clearly, procedures explained here as "collecting signatures" and "deliver forms to CS office" will soon become outdated metaphors of archaic procedures replaced by much simpler automated steps. We will continue to update this document as more of these forms come online. Students are urged to check with the GC and/or the GD if they have any questions as to which is the most up to date procedure to follow.

Degrees and Certificates

The department offers Masters of Science degree (see *Master of Science (MS)*) and a Doctoral degree (see *Doctorate (PhD)* on page 6) in Computer Science. In addition, by satisfying additional requirements, either of these degrees can be awarded with an annotation in the student's transcript with a BioInformatics opion (see *Bioinformatics Option* on page 14). We also have a certificate in Human-Computer Interaction (see *Human-Computer Interaction Certificate* on page 15) available.

Doctorate (PhD)

A student pursuing the Ph.D. degree is expected to exhibit a comprehensive knowledge of a broad cross section of the computer science discipline and to contribute significant new knowledge to the discipline through the research contribution contained in the doctoral dissertation. A PhD student must complete a minimum of 90 credits of graduate study, of which at least 33 must derive from courses. The PhD program is intended to be completed in about five years from entering the graduate program with a BS degree in Computer Science or a related field, or about four years if the student already has an MS degree in Computer Science or a related field. This is possible because students who begin the PhD program already in possession of a Masters may be able to count as many as six courses toward their course requirement (see section *Transfer Credits* on page 20).

To fulfill graduation requirements for the Ph.D. degree, students must satisfy the *breadth* requirement, adhere to an appropriate *credit distribution*, enroll in the *graduate seminar*, comply with the *ethics requirement*, and complete the major milestones for the degree, including the preliminary exam, research and final defense.

Requirements

Breadth Requirements

To encourage Ph.D. graduates to exhibit sufficient breadth of computer science areas, Ph.D. students must take CS courses spanning five (5) different areas. Only CS courses at the 5000 or 6000 level are considered when evaluating the breadth requirement. The available courses and areas are listed in the department website (*http://www.cs.vt.edu/node/7153*).

Graduate Seminar Requirement

All full-time graduate students are required to register for *CS 5944 Graduate Seminar* in their first three semesters of graduate study and to earn a passing grade in these semesters. While it is required you take this course, the credits from this course cannot be used to satisfy course credit requirements toward any of our graduate degrees. Exceptions to the seminar requirement will be considered by GPC on a case-by-case basis - please contact the GD if you would like to petition for an exception. The exceptions are often based on conflict in scheduling of GTA duties and the graduate seminar. Typically the exception approved simply allows the student to skip a semester of CS 5944 with the understanding that the student will still register for it in the following semester.

Ethics Requirement

All graduate students in the Department of Computer Science must statisfy the Graduate School requirements of Resolution 2012-13B. The resolution requires our graduate program to "include a scholarly ethics and integrity component in graduate education." This section describes how such a component is integrated into our graduate programs. This requirement applies to students starting in the Fall 2014 and later.

- All incoming graduate students must participate in a four hour orientation offered by GD. This orientation is done the week before classes start in the Fall and Spring semesters.
- All incoming graduate students must complete the following two courses offered by the Research Division:

1. Responsible Conduct of Research *http://www.research.vt.edu/era/rcr-training-tracker/home*
2. Conflict of Interest Training *http://www.research.vt.edu/conflict-of-interest/training*
- All students are required to take *CS 5944 Graduate Seminar* (1 cr.) three times. The seminar is offered both Fall and Spring semesters. The seminar dedicates at least 3 lectures in the semester to discuss issues of authorship and ethics. In addition, all students in the Graduate Seminar are required to participate in an online community hosted with Piazza where discussions around these topics are carried out throughout the semester.

Students will be required to submit evidence of completion of these milestones in their annual student activity report (see section *Student Activity Reports* on page 17). The annual evaluation of students (see *Green Thursday* on page 18) will determine whether students are complying with the Ethics requirement.

Credit Distribution

The credit distribution table for the Ph.D. degree can be summarized as follows:

Category of courses	Credit Min	Credit Max	Notes
CS courses at 4000 level and above	27		All courses must be in CS, but they cannot include *CS 5984*, *CS 5904*, *CS 5944*, *CS 5994*, or *CS 7994* CS 5894, CS 5904, CS 5944, CS 5994, or CS 7994.
CS courses at 4000 level		3	See the department website for list of approved CS courses that can be taken for graduate credit. The list includes appropriate 4000 courses.
CS 5974 Independent Studies		3	
CS 7994 Research and Dissertation	30		
CS courses at 6000 level	6		
Cognate courses	6	6	Visit the department website for an *approved list of cognate courses*.
Total credits	90		

Note: Each of the lines above must be interpreted as an individual, distinct, constraint so that all constraints have to be simultaneously satisfied. The columns are not meant to "add up", i.e., 27+30+6+6 is obviously not equal to 90.

Additional credit hours may be taken in any category, but do not count toward degree requirements. Substitutions for degree requirements are allowed only under rare or exceptional circumstances. Requests for substitutions must be made to the AGS.

Observe that all CS courses must be at the 5000 level or above with possibly at most one 4000 level included. Furthermore, if a CS 4000 level course is included, it must be from the list of CS 4000 level courses approved for graduate credit (see *http://www.cs.vt.edu/graduate/courses* for a list of available graduate courses). Credits from *CS 5894 Final Examination*, *CS 5944 Graduate Seminar* cannot be used to satisfy any Ph.D. credit requirements. Credits from *CS 5904 Project and Report*, and *CS 7994 Research and Dissertation* cannot be used to satisfy any Ph.D. coursework credit requirements. Observe also the limits on *CS5974* in the above credit distribution table. At least two CS 6000 level courses are required and exactly two cognate courses are required. See the department website for a *list of approved cognate courses*.

Advisors and Advising Committees

All graduate students have access to a faculty advisor who can help with both academic advising (i.e., issues related to getting a degree) and career advising. PhD students, and MS students under the thesis option, should select a faculty member to act as their research and course advisor as early as possible in their academic career and definitely by the time their plan of study is due (see *Plan of Study* on page 17). The advisor must be a full-time Virginia Tech faculty position with either a regular, emeritus, or courtesy appointment in the Department of Computer Science, and hold a Ph.D. or equivalent terminal degree.

In place of a single advisor, PhD students can instead choose two faculty members to serve as co-advisors. In this case, at least one of the co-advisors must be a full-time Virginia Tech faculty position with either a regular, emeritus, or courtesy appointment in the Department of Computer Science, and hold a Ph.D. or equivalent terminal degree. The advisor or co-advisors chair the student's advisory committee.

The composition of a Ph.D. advisory committee must be designed taking into account the following considerations:

- The committee must have at least five members (including the advisor or co-advisors).
- At least four members of the committee must hold a PhD or equivalent terminal degree. Any member without a PhD or equivalent terminal degree must have nationally recognized expertise in their field and have research experience.
- At least three members must hold tenure track or emeritus positions in the Department of Computer Science.
- At least one member of the committee must be from outside the university. Note that outside members must be approved by the Graduate School, see section *Plan of Study* for details.

Ph.D. students who plan to do a thesis but who have not yet selected a research advisor or who need additional academic advising can approach any faculty member on the graduate program committee (GPC) to serve as an interim advisor, and who can serve to provide signatures and other official approvals as required. For most such students, the AGS serves as the de-facto interim advisor.

> **Note:** The department is committed to support some of the travel expenses for an external member to visit campus and attend one of the official graduate exams of a dissertation committee. Note however, that the budget for these situations is limited, there are travel authorizations required before the outside member travels, and other approvals. No honorarium can be paid to the visitors, only travel expenses. Consult the GC before making arrangements for travel.

> **Note:** External members must be pre-approved to serve in university PhD committees. This is a step that the student must complete before filing the Plan of Study. The *policy on external members* is described in the *Graduate School Catalog*. The form needed is available at the *Graduate School forms page* (*direct link*).

PhD Procedural Milestones

Students seeking a PhD must successfully complete four major milestones: the *Qualifying Process* on page 8, the *Preliminary Proposal* on page 11, the *Research Defense* on page 11, and the *Final Defense* on page 12.

These exams must be taken during an academic term in which the student is registered. For the final exam, it is possible to register as a defense-only student, see *Start of Semester Defense Exception* on page 21.

At least two weeks prior to the examination date, the student must schedule a final exam with the Graduate School. The request for the exam is done electronically and must be approved by all members of the advisory committee, the GD, and the Graduate School. The *policy page at the Graduate School* contains more information. The *Graduate School Exam Approval System* also has some help information.

> **Note:** It is worth noting that there are several checks that must be met before the exam can be schedule. A student must have an approved *Plan of Study*, and must not have any holds on his/her account.

> **Note:** DO NOT submit a *Plan of Study* at the same time as you schedule an exam. Your plan of study should be approved (not submitted, but approved) before you request an exam.

Qualifying Process

The PhD qualifying process is completed early in a student's doctoral studies and is the first of four milestones which must be completed successfully to earn the PhD degree. The qualifying process must be completed within 30 months of entering the Ph.D. program. Students who received an M.S. degree in Computer Science at Virginia Tech must complete this stage within 15 months of entering the Ph.D. program. Students entering the Ph.D. program with an M.S. degree from elsewhere can typically complete this stage within 15 months, although they have 30 months to do so. Extensions to these time limits may be negotiated, but extensions are intended to apply to students who take leave from the University, or are part-time students.

It is important to keep in mind that the Ph.D. qualifier is a "process" rather than just an "exam". It involves two components: excellence in breadth and excellence in depth. Breadth is assessed through classwork achievement. Depth is assessed through a combination of research achievement and the results of a qualifying exam (in the student's cognizant area of specialty). A Ph.D. student must demonstrate excellence in both breadth and depth to be considered qualified. The qualifying process is completed once the student completes both components. Note that it is meaningless to "qualify on the breadth" component only.

Excellence in Breadth

This score is assessed on a binary scale (pass/fail). To pass this requirement, a student needs to take CS courses spanning four areas and receive a GPA of at least 3.5 across these four courses. Only 5000-level and above CS courses eligible to be used on a CS graduate plan of study are considered. At least three 5000-level courses must be included. These courses must be graded on an A-F scale (therefore, *CS 5974* cannot be included). Transferred courses are not considered. Note that, among all courses taken at Virginia Tech, the student can choose 4 courses of their interest to satisfy this requirement.

Excellence in Depth

This score is assessed on a points system using two components: research achievement and a qualifying exam. Each component can provide upto 3 points. Out of the total possible 6 points, a student must obtain 3 points to pass the excellence in depth requirement. Note that it is possible to pass the excellence in depth requirement using only one of the two components (i.e., either research achievement or the qualifying exam).

Research achievement score: This score is assessed by the AGS by soliciting input from the faculty regarding a student's research ability. In addition, the student may submit a written description of his or her research achievements. This score will then be assigned based on the individual's research record and the faculty recommendations. Guidelines for scoring:

- 3: Student has a non-trivial publication record. Traditionally, this is publication of at least one paper in a recognized, peer-reviewed conference or journal, and typically with additional submissions or publications. While this might be for work done prior to entering our program, it is expected that some research work (Independent study, GRA, or major volunteer effort) will have been done here. Alternatively, the student has completed a MS thesis in CS at Virginia Tech, or a peer institution, and has submitted at least one paper for publication to a peer reviewed conference or journal. To gain this score, some VT CS faculty member must endorse the student, and be willing to act as PhD advisor.
- 2: Student has demonstrated research ability through satisfactory performance on an Independent Study project, a graduate research assistantship (GRA) assignment, or an equivalent volume of work on a volunteer basis. This might have been done at another university, and there might be minor publications. To gain this score, some VT CS faculty member must endorse the student, and be willing to act as PhD advisor.
- 1: Recommendations from faculty who have personal knowledge of a student's research ability, based on class projects, papers, or presentations, indicate that the student is able to do credible research.
- 0: No evidence of research achievement.

Qualifying exam score: A PhD qualifying examination committee may be formed in any area recognized by the Department (see Appendix G for details). There is at most one committee per area in a given year and is constituted based on student interest (hence, due to insufficient student interest, some areas might not offer qualifying exams in some years). The examination will be either written or oral (or both), with format and procedures as the examination committee sees fit. Students are normally eligible for only one attempt at the exam. See Appendix F for details on the goals of the qualifying exam.

Guidelines for assessing the qualifying exam score are as follows:

- 3: Excellent performance, beyond that normally expected or required for a PhD student.
- 2: Performance appropriate for students preparing to do PhD-level work. Prime factors for assessment include being able to distinguish good work from poor work, and explain why; being able to synthesize the body of work into an assessment of the state-of-the-art on a problem (as indicated by the collection of papers); being able to identify open problems and suggest future work.

- 1: While the student adequately understands the content of the work, the student is deficient in one or more of the factors listed for assessment under score value of 2. A score of 1 is the minimum necessary for an MS-level pass.
- 0: Student's performance is such that the committee considers the student unable to do PhD-level work in Computer Science.

Attempting or using a qualifying exam in a given area to get qualified does not "tie" a student to Ph.D. research in that area. For instance, a student might get qualified using scores from the qualifying exam in the HCI area but might opt to pursue a Ph.D. in the area of algorithms and theory. It is presumed that the student's advisor (and advisory committee) are adequately positioned to judge the suitability of the student's proficiency to undertake Ph.D. research in a given area and the Preliminary Proposal Exam is an opportunity to ascertain the same.

Since the Ph.D. qualifying exams are offered early in the calendar year, the AGS will attempt to assign initial valuations to all who take the exam, and give feedback via email on current standing to those students. If at that point a student has six points, a letter to that effect will be issued automatically. At the end of Spring semester, the AGS will attempt to update those valuations based on Spring grades, again issuing a qualification letter if the student is qualified. Aside from immediately after the exam and at the end of Spring semester, evaluation will only be conducted when initiated by the student. There are two cases where a student will initiate an evaluation. (1) If the student determines that he/she can obtain six points without taking the exam, they should contact the AGS and provide appropriate documentation to support receiving the points. (2) If at some point after the Spring semester evaluation the student feels he/she has a case for six points, they can contact the AGS to do an evaluation. When the qualifier case is clear cut for a given student, the AGS will make an immediate determination. Cases that are not clear cut will be referred to the full committee.

As stated earlier, the PhD qualifying examination also serves as one of the two methods whereby an MS coursework-only option student may pass their MS degree final examination.

In consultation with their advisor, once a student completes the requirements for qualification, the student must submit the Request to be Qualified form, available in the *forms page* of our website.

Constituting the Qualifying Exam Committee: A PhD qualifying examination committee may be formed in any area recognized by the Department . There may only be one committee for any area. A faculty member may serve on at most two committees during a given year. Each year, AGS will appoint a chair for each examination committee from among the volunteers for that semester.

The PhD Qualifying Examination is given during a period spanning the end of Fall semester and the start of Spring semester of each year. During early Fall semester, students interested in taking the exam should discuss potential research areas with faculty members so that examination areas of mutual interest can be discovered. Examination committees must post the reading list for their exam by November 1. The exam is normally administered during January and February, with scores reported to GPC by mid February.

Each examination committee will publish a reading list of 10-20 research papers by November 1. It is not a requirement that the papers broadly cover the area, or be "seminal papers" in the area. A list containing papers with results spanning a wide spectrum in regards to quality and relevance is desirable to gauge the student's ability to judge quality and importance of results. The body of work should serve as a good introduction to one or more aspects of the area, but is also selected in part to serve as a vehicle for the exam. For example, a committee giving an exam in algorithms might choose one year to assign a set of papers on NP-complete problems in bioinformatics. The following year, the papers assigned by that committee might be on a completely different topic.

All students taking the exam in a given year from a given examination committee should be given the same reading list, undergo the same examination process, and be graded using the same criteria.

The exam is meant to probe the student's understanding of the content of the papers, the student's ability to synthesize the content into a meaningful understanding of the issues involved, and from there, the student's ability to determine potential "next step" paths of research (based on the papers assigned). In general, the exam is testing the student's ability to critically analyze the material, make judgments regarding the quality and relevance of the results, as well as deriving ideas for future research directions for the specific subtopic addressed in the papers.

At the end of the examination process, the committee must arrive at a scoring in the range 0 to 3 (integer only), and report this score to the AGS by the deadline.

Preliminary Proposal

The Preliminary Proposal Exam is the second of four milestones to be completed by a PhD student. The Preliminary Proposal Exam serves as the University's required Preliminary Exam. The Preliminary Proposal Exam should occur as early as possible after completing the PhD Qualifying Process. It has a recommended deadline of 12-18 months from completion of the Ph.D. qualification process or M.S. degree, whichever comes second. This and subsequent stages requires that the Ph.D. advisor and advisory committee be constituted.

The Preliminary Proposal Exam is an oral presentation and examination expected to last between one and three hours. The actual conduct, content, and scope of the Preliminary Proposal Exam are under the control of the student's advisory committee. However, the intent of the Preliminary Proposal exam is to assess the student's readiness to begin independent research on the proposed problem. In particular, it seeks to answer two questions:

1. Does the work proposed appear satisfactory to qualify as completing a PhD? This means that the proposed work is not so ambitious as to be implausible for a PhD student, yet is ambitious enough to warrant granting of a PhD if completed.
2. Is the student adequately prepared to do the proposed work? In particular, does the student have an adequate grasp of the current state-of-the-art in the proposed research area? This is likely to be determined in part by a literature review, which should also be useful to the student at the time of writing the dissertation.

It is expected that, to satisfy these objectives, the student will prepare a document and submit it to the committee sufficiently in advance of the exam that the committee members have adequate time to review it. This document will likely consist of (a) a literature review and discussion of relevant work, and (b) a research plan describing the work to be completed and its significance. To whatever extent is reasonable, it is advisable that the document include a timeline for completion and description of any equipment, supplies, or support necessary for successful completion.

Depending on the will of the committee, the Preliminary Proposal Exam may be limited strictly to a presentation and discussion of the document presented by the student. In addition the committee may, but certainly is not obligated to, chose to ask questions to test the student's background knowledge in the relevant areas of Computer Science. Ideally, the student and advisor will discuss and reach an agreement on the format and scope of the exam well in advance. By passing the student's research proposal, the committee is certifying that, if the student does the stated work in a satisfactory manner, it will prove adequate for a dissertation topic. Note that once the Preliminary Proposal Exam has been completed, there is no necessary requirement that the student's final dissertation adhere to the proposal. The student and committee are free to change the direction of the work as it progresses, based on mutual consent, if they deem that appropriate.

The student is considered to have failed the exam if two or more members of the examination committee give negative votes. If performance on the Preliminary Proposal Exam is unsatisfactory, one full semester must lapse (a minimum of 15 weeks) before the administration of a second examination. The Preliminary Proposal Exam cannot be attempted more than twice.

Research Defense

The Research Defense is the third of four milestones that must be completed for the PhD degree. The Research Defense has a recommended deadline of 12-18 months from completion of the Preliminary Proposal Exam, and approximately 3-6 months prior to the Final Defense.

The Research Defense is expected to last one or two hours. The actual conduct, content, and scope of the Research Defense are under the control of the student's advisory committee. The Research Defense should take place once the student has completed most of the work for the dissertation. It is likely that significant writing will yet remain, but no significant problems (other than perhaps mechanical data collection, routine software development, or usability testing) should remain to be solved.

The Research Defense is meant to be an opportunity for the committee to review the key results and verify that a satisfactory body of work appears to have been completed. The committee should understand what has been and what will be accomplished as part of the dissertation, and to agree within itself whether completion of the work as described by the student, or a revision as determined by the committee at the Research Defense, will result in successful completion of the dissertation.

It is expected that the student will prepare a document and submit it to the committee sufficiently in advance of the exam that the committee has sufficient time to review it. If the committee is expected to read and comment on a

significant amount of material then it should be given to the committee two weeks in advance of the meeting. The document will likely consist of a review of the proposed work plan (possibly revised since the time of the Preliminary Exam) for the dissertation, and a description of the student's progress towards completing the plan. Key results and their significance should be presented clearly, but briefly. The document should clearly detail what work remains to be done, and the timeframe for its completion. It is not intended that this document be a draft of the dissertation. For some committees, the document might simply be a list of accomplishments and remaining tasks. The student might also submit to the committee copies of papers published or submitted for publication. It is up to the committee to specify how much information it needs to determine if dissertation work is on track.

The Research Defense will typically be the committee's last major opportunity to review the student's progress and work prior to the Final Defense. As such, any major objections or reservations regarding the research plan and progress should be expressed at the Research Defense. Under normal circumstances the expectation is that, if the work completed at the time of the Research Defense is deemed satisfactory, and if the dissertation is completed in the manner specified at the Research Defense, then the result will be deemed satisfactory at the Final Defense.

Note that the Research Defense plays no official role within the University. The Department requires that students pass the Research Defense in a timely manner to remain in good standing. Aside from this, it is up to the student and the committee to determine the next step should a student be considered by the committee to have failed the Research Defense.

Final Defense

The last of the four stages for the PhD degree is the Final Defense. It has a recommended deadline of 6-9 months from completion of the Research Defense. During this examination the candidate makes an oral presentation of his or her research work and defends the significance and accuracy of this work in response to questions from the student's committee. The committee, in closed session, determines whether the student has successfully completed the examination.

If a student fails the final defense, he/she must wait 6 months before attempting the defense again (Graduate School stipulation). The final defense can be attempted at most twice.

Electronic Theses or Dissertation

Virginia Tech has been a leader in the electronic publication of Thesis and Dissertations. All graduate students must submit their Thesis or Dissertation electronically. The full process is done online using the online system to request graduation and to schedule final defense.

Submitting the thesis to the ETD repository is a pre-requisite for graduation. There is an absolute deadline to submit the ETD if the student desires to participate in commencement, which is usually 2 weeks before the last day of classes.

MS Along the Way

Successful completion of an M.S. degree in computer science is not a pre-requisite to register as a Ph.D. student at Virginia Tech. Upon entering the graduate program, students are classified as M.S. or Ph.D. based on their stated degree objective.

Students on a Ph.D. track can opt to obtain an M.S. during their course of study, i.e., "along the way". They may use either the coursework or thesis option. PhD students who have completed the PhD Qualifier Process and who have a valid Plan of Study that satisfies the PhD requirements quite possibly have all the requirements for the MS Coursework. Nevertheless, if a student has cleared the PhD Qualifier Process and has a valid PhD Plan of Study on file, the courses on that PhD plan of study can be used to fulfill the MS Coursework degree requirements. Note however, that each degree requires its own Plan of Study, a second plan of study must be filed for the MS degree. Almost all of the credits in the PhD plan of study can be used for the MS degree. Check with the GC for more specific details.

Typical Schedule

The table below shows a typical distribution of courses and other responsibilities over the years that is typical for a student to complete a Phd. Note that this assumes the student starts in the Fall. Also of note is that some of the order

of courses shown is a recommendation, not a requirement. For example, whether you take the courses for breadth early in a program of study or later is not of significance.

Year	Fall	Spring
1	• *CS 5944 Graduate Seminar* (1cr) • CS 5xxx (3cr) (Breadth area 1) • CS 5xxx (3cr) (Breadth area 2) **Note:** Recommended that students take the CS5014: Research Methods in Computer Science course early in their studies. **Note:** Student can take upto 1 CS 4xxx. Doing it early in the program is a great way to remove a deficiency. **Note:** Visit several research groups and lab meetings to become acquainted with areas and faculty in department.	• *CS 5944 Graduate Seminar* (1cr) • CS 5xxx (3cr) (Breadth 3) • CS 5xxx (3cr) (Breadth 4) • *CS 7994 Research Dissertation* (5cr) **Note:** Identify area of research interest and initiate conversations with possible Academic and Research Advisor. **Note:** Student submits Student Activity Report in late Spring. **Note:** Department evaluates all graduate students on Green Thursday. **Note:** If a student is going on internship, there might be other requirements to be met in this semester. For example, international students must have a Plan of Study on file before going on internship. Check with the GC for details.
2	• *CS 5944 Graduate Seminar* (1cr) • CS xxxx (3cr) • CS xxxx (3cr) • *CS 7994 Research Dissertation* (5cr) • File a Plan of Study • Register for Qualifying Exam	• CS xxxx (3cr) • CS xxxx (3cr) • *CS 7994 Research Dissertation* (6cr) **Note:** Complete Qualifying Exam in January **Note:** Student submits Student Activity Report in late Spring. **Note:** Department evaluates all graduate students on Green Thursday.
3	• CS xxxx (3cr) • CS xxxx (3cr) • *CS 7994 Research Dissertation* (5cr) **Note:** Complete Qualifying Process	• CS xxxx (3cr) • CS xxxx (3cr) • *CS 7994 Research Dissertation* (6cr) **Note:** Schedule Prelim Exam **Note:** Student submits Student Activity Report in late Spring. **Note:** Department evaluates all graduate students on Green Thursday.
4	• CS xxxx (3cr) • CS xxxx (3cr) • *CS 7994 Research Dissertation* (5cr)	• *CS 7994 Research Dissertation* (6cr) **Note:** Student submits Student Activity Report in late Spring. **Note:** Department evaluates all graduate students on Green Thursday.
5	• *CS 7994 Research Dissertation*	• *CS 7994 Research Dissertation*

Year	Fall	Spring
	📝 **Note:** Schedule Research Defense	📝 **Note:** Student submits Student Activity Report in late Spring.
		📝 **Note:** Department evaluates all graduate students on Green Thursday.
		📝 **Note:** Schedule Final Exam
		📝 **Note:** Apply for Graduation
		📝 **Note:** Conduct Final Exam (defense of thesis)
		📝 **Note:** Submit ETD (no later than 2 weeks after defense date)
		📝 **Note:** Graduate!

Good Standing

Graduate students must remain in "good standing" throughout the period of graduate studies. This means that the student is making satisfactory progress towards the completion of a graduate degree. Each student's progress is reviewed annually by the full department during the *Green Thursday* review and based on the student's *Student Activity Report*. Only students in good standing are normally eligible for funding support administered by the department, i.e., GTAs and fellowships. In extreme cases, students not in good standing will be removed from the graduate program. The GPC will normally provide at least one warning before removing a student, however, in cases where there exists substantial failure to achieve satisfactory progress the student may be removed without prior warning.

A PhD student will typically graduate five years after entering the graduate program (if starting with a BS) or four years after entering the graduate program (if starting with a MS) PhD students retain their good standing by meeting all of the following:

- take a normal course load (12 semester credits) in each term and maintain a B (3.0) average over all courses. Note that while a normal course load is 12 credits, this does not mean that students are expected to take four regular 3-credit courses during any semester. Students should take the number of courses in a given semester appropriate for making good progress toward completing their degree, and add in research hours (*CS 7994*) to bring the total number of credits per semester to 12;
- take any courses assigned as a background deficiency during the earliest possible academic term;
- remove any Incomplete course grade by the end of the next semester in which the student is enrolled;
- complete the PhD qualifying process within 30 months of entering the PhD program;
- have an approved Plan of Study on file within 12 months of passing the Ph.D. qualifying process; and
- pass the preliminary examination within 18 months of passing the PhD qualifying process.

Students who have any doubts about their standing should discuss this with their advisor (or ARA) and/or the GD.

Degree Options and Certificates

Bioinformatics Option

Any CSA degree (M.S. or Ph.D.) may include an option in Bioinformatics. Students receiving the option will have that fact noted on their transcript upon successful graduation. To receive the option, students will take a minimum of seven (7) additional credits beyond those necessary for the CSA degree without the option. These and other requirements as noted next:

- Students receiving the Bioinformatics option must take PPWS 5314 Biological Paradigms for Bioinformatics (3 credits), BCHM 5024 Computational Biochemistry for Bioinformatics (3 credits), and GBCB 5004 Seminar (1 credit). PPWS 5314, BCHM 5024, and GBCB 5004 may not be used both to complete the option and to satisfy CSA degree course requirements. Students who already have background equivalent to PPWS 5314 and/or BCHM 5024 may be permitted to substitute more advanced courses to satisfy this requirement.
- Students receiving the Bioinformatics option must take ONE of STAT 5615 (Statistics in Research), STAT 5616 (Statistics in Research), MATH 5515 (Modeling and Simulation of Biological Systems), or MATH 5516 (Modeling and Simulation of Biological Systems). These courses may also be used to fulfill CSA coursework requirements.
- Students must complete the final exam requirement for their respective CSA degree using a topic suitable for the Bioinformatics option. Students completing a MS thesis or PhD dissertation must receive approval from the AGS for their thesis or dissertation topic to count toward the Bioinformatics option. MS coursework-only students must take GBCB 5874 Problem Solving in Genetics, Bioinformatics, and Computational Biology, and use the final report from this course to satisfy their final exam requirement. In rare cases, the final report from CS5974 Independent Study may be used to satisfy the final exam requirement under the Bioinformatics option if the AGS approves the topic of the report.

Human-Computer Interaction Certificate

A Graduate Certificate in Human-Computer Interaction Program is administered by the Center for Human-Computer Interaction and offered in conjunction with either a master's or doctoral degree in most departments (including computer science).

Master's degree students complete 9 hours and doctoral students 15 hours of coursework for the certificate; at least two of the courses taken must be outside the student's degree program requirements and home department. These courses should be relevant to HCI; those in the following list are especially recommended. If the student writes a thesis or dissertation, it must be related to human-computer interaction. Students can normally fit the requirements for the certificate into their program of graduate study so that the time needed to complete the graduate degree in their basic discipline is not extended by simultaneously pursuing the certificate. Students interested in the Graduate Certificate in Human-Computer Interaction should confer with the certificate administrator prior to submitting a program of study to the Graduate School to ensure that the requirements are met.

Note certificates are signed by the certificate administrator, not by the GD. As of this writing the certificate administrator for HCI is Dr. Scott McCrickard. To obtain the certificate, a student must complete the certificate application form and submit it to the graduate school. There is more information in the CHCI website (*http:// www.hci.vt.edu/certificate.php*).

Course	Title
CS 3724	Introduction to Human-Computer Interaction
CS/ISE 5714	Usability Engineering
CS 5724	Models and Theories of HCI
CS 5734	Computer-Supported Cooperative Work
CS 5754	Virtual Environments
CS 5764	Information Visualization
CS 5774	User Interface Software
CS 6724	Advanced Topics In Human-Computer Interaction
CE 5064	Knowledge-based expert systems
CS 4624	Multimedia, Hypertext, Information Access
EDCI 6664	Advanced Instructional Technology
ESM 4714	Visual Data Analysis and Multimedia

Course	Title
ISE 5604	Human Information Processing
ISE 5605	Human Factors System Design I
ISE 5694	Macroergonomics
ISE 6604	Human Factors of Visual Display Systems
ISE 6614	Human Computer Systems
PSYCH 5354	Information Processing
STS 5424	Computers in Society

Administrivia

Academic Progress

Plan of Study

The Plan of Study is an official University document that serves as a "contract" between the student and the department. It details the degree program (M.S. or Ph.D.; with or without Bioinformatics option; if M.S. whether coursework or thesis), list of courses along with the semesters they have been taken/will be taken, and the advisory committee. Separate plans of study are required for M.S. and Ph.D. degrees.

The student prepares the plan of study in consultation with the advisory committee and submits it to the GC. Once the GD approves it, the plan of study is submitted to the Virginia Tech graduate school for its approval.

A plan of study can be submitted only ONCE for a given degree, but once it is approved, it can be changed by filing a Request for Plan of Study Changes form.

The graduate school encourages that plans of study be submitted as early as possible; As of Aug 2007, it stipulates that plans of study are due by the end of the second academic semester for all Master's students, and are due by the end of the third academic semester for doctoral students.

The department recommends that MS thesis students file a plan of study as soon as they know they will be doing a thesis. MS Coursework students must file their plan of study prior to the beginning of their third semester at Virginia Tech. Ph.D. students should select an advisor within 3 months of passing their Ph.D. qualifier process and have an approved plan of study on file within 12 months of passing their Ph.D. qualifier process.

Plans of Study require a fair amount of processing for approval. The department checks that you meet departmental degree requirement. The graduate school checks for university requirements. In addition, your account is checked to make sure your finances are in order. As a result, the plan of study takes about a month of processing time from the moment you submit a form to the GC until it is finally approved. Be aware that this is a slow process and do not expect it to be approved overnight.

For an experimental online editor for the plan of study, check *https://hosting.cs.vt.edu/gpcstudents/pos/*.

Student Activity Reports

The Graduate School requires that all graduate students receive an annual evaluation of their progress. In the Department of Computer Science, the annual evaluation process is similar in some respects to how faculty are given their annual review. The review process is initiated by each student filling out the Student Activity Report. The report is usually due in the Spring. An email will be sent once the form is available.

All students must file a SAR. However, there are differences depending on your stage in the graduate program:

- If a student is graduating in the Spring semester, the student may only note this on the form have their advisor (ARA) complete the assessment section. The other details are not required.
- Students in their first semester (i.e., started graduate studies in the Spring) will have little to say on the form and need not get an advisor to write an assessment. They still must submit the form.
- All other students must complete the SAR in its entirety.

The SAR form has essentially three parts:

- A listing of academic milestones passed and planned (which serves to give the student self guidance as to whether he or she is on track toward graduation)
- A listing of accomplishments for the year. This also self-guides the student regarding progress for the year.
- A written statement from the student's advisor assessing the student's progress, to be signed by both the advisor and the student.

These SARs serve as a major source of input for assessing rankings for GTA assignments, for graduation awards and other honors. The SAR is extremely important for graduate students who are seeking support from the Department as a GTA or GRA. We use the content of the form, the advisor evaluation, and the subsequent discussion on Green Thursday as a way to assess your progress in the degree. In rare cases, and after discussion at the Green Thursday evaluation, we use the SAR for issuing warning letters or terminating a student from the program for lack of progress.

The assessment from your advisor, which is part of the SAR, is an important tool for you to be sure that you are truly on track with your work.

Green Thursday

The SARs submitted by the graduate students are organized for discussion in an all day meeting of the CS Department faculty. This meeting is call Green Thursday and it takes place during Reading Day in the Spring Semester.

In that meeting, the CS faculty discusses students progress towards degree and evaluates their timely meeting of milestones. The particular case of students that receive a poor evaluation are discussed in more detail. The result is one more evaluation of each student's progress. This final evaluation, together with the advisor evaluation is then shared with the graduate school.

Later in the summer GPC emails to each student a summary of the discussion. For most students, the summary is no different than the assessment of the advisor that was already included in the SAR. For those cases that the assessment differs, a more detail note is shared with the student.

Leave of Absense and Readmission

Graduate students wishing to take some time off (e.g., a semester) of graduate studies must fill and submit a "Leave of Absence Request" Form. Once the leave is approved, the student can resume studies after the break. For leaves of more than one calendar year, a formal re-admission request must be submitted before rejoining VT. Such requests must be submitted in the semester prior to the semester in which studies are to be resumed.

Note that readmission goes through a similar process as when students were first admitted to the program. The admissions committee looks at the students record, and the student's advisor is consulted. Depending on the time away from the program, a student might have to justify 'old' course work at the time of readmission.

Matriculation

Course Registrations

Course Registration

Graduate students can register in courses at the 4000 (senior), 5000 (beginning graduate), and 6000 (advanced graduate) level. See our website for a list of courses available for graduate students. In special cases, when students have been admitted with deficiencies in their computing background, they may be required to take courses at the 2000 (sophomore) or 3000 (junior) level, beyond their regular graduate program requirements. See section *Background Deficiencies* on page 20 for further details.

📝 **Note:** Courses designated as **ONLINE COURSE** are courses available only for students enrolled in the Virginia Tech Masters in Information Technology (*MIT Site*) and thus not available for credits to on campus students.

Students currently enrolled in the graduate program are eligible to pre-register for courses. This normally takes place in October and March. Students are strongly encouraged to take advantage of pre-registration since (a) courses might be cancelled for lack of enrollment if not enough pre-register (especially Spring Semester classes when relatively few new students enter the program) and (b) it is your best opportunity for getting into the courses you want.

After pre-registration, Fall courses are typically locked so that students may not add them online. Courses normally stay locked until after new students entering the program for Fall semester have had a chance to be added. After this time (typically the Friday before classes begin), courses will be opened for add/drop access online.

All CS graduate courses are normally open to CS graduate students only. Non-CS graduate students will be required to supply a written request from their advisor to gain permission to enroll in a CS course.

Deadlines

The deadlines in a typical semester are structured as follows using two parameters: x (the date when classes start) and y (the date when final grades are due). These are approximate guidelines only. The ordinal sequence of events will be maintained although the specific "gaps" may not. To get the authoritative answer, consult the academic calendar available on the main VT website: *http://www.vt.edu* .

Classes start	x	
Add deadline	x + 4 days	
Drop deadline	x + 4 days + 1 month	This is the deadline to drop the course without grade penalty or it appearing on the student's transcript.
Course withdrawal date	y – 2 weeks	Withdrawal at this late stage is granted only under extreme circumstances. Poor performance in the course is not a valid reason to request a withdrawal. The course will appear on the transcript with a "W" grade. See section *Dropping Courses* on page 21 for more information.
Last day of classes	y – 9 days	
Final grades due	y	

Registration for CS5974

Registration for *CS 5974 Independent Study* involves a special procedure. You do not register online for *CS5974 Independent Study*, but instead fill out a request form. The form must be processed by the end of the normal drop/add period in the first week of class. The GD will give additional time for the student and instructor to complete the project description and evaluation criteria if needed, but the registration portion of the form (the first page) needs to be submitted by the end of the drop/add week.Although *CS5974* is technically available for variable credit hours, students will nearly always take it for 3 credits.

Only the *MS Coursework* and *Ph.D.* allow credit toward the degree for *CS5974*.

An Independent Study course requires commitment from a CS professor to sponsor the study, as only CS faculty can serve as instructors for this class. Sometimes a student will wish to work with a faculty member outside the CS Department. A CS graduate student can do an Independent Study under a professor outside the CS department if the following two criteria are met:

• The content is appropriate for credit toward a CS course and can be used in a CS degree.
• A CS faculty member agrees to be the formal sponsor of the course. The person who signs the course approval form as the supervisor of the work must be a CS faculty member. Even though the work is mainly done with another person, the CS faculty member must be the responsible party within our department.

Courseload Expectations and restrictions

Students on GTA or GRA support must have "full-time" enrollment status, and so must enroll for 12 credit hours. While a normal course load is 12 credits, this does not mean that students are expected to take four regular 3-credit courses during any semester. Students should take the number of courses in a given semester appropriate for making good progress toward completing their degree, and add in research hours (CS5994 or CS7994, as appropriate) to bring the total number of credits per semester to 12.

The department restricts the number of regular courses that students may take. These restrictions are motivated by two considerations:

1. What we consider to be a rational workload balancing the need to take courses versus obligations to work and/or expectations to participate in research programs.
2. Protection for other students who might be locked out of courses by those who would hold seats while they "shop" for the subset they actually will keep.

For the purpose of these restrictions, a "regular course" is any (typically 3-credit) course that is eligible for graduate credit, whether given by the CS department or another department. This includes CS5974 Independent Study. It does not include CS5994/7994 Research Hours, 1-credit seminar courses (such as the CS Graduate Seminar), or courses taken for personal interest that do not count for graduate credit (such as GEDI courses). The following courseload restrictions are enforced by the department:

- GTAs and GRAs are limited to at most three regular courses per semester.
- No student may enroll in more than three regular courses until the last day of the normal drop/add period (Friday of the first week of classes).
- Students in the PhD program are limited to two regular courses per semester unless they have permission from their advisor and the GD to take a third course.

Background Deficiencies

The department admits applicants from a variety of backgrounds, who have the potential for completing a CS graduate degree. Students with less than the equivalent of an undergraduate CS minor may have insufficient CS background to immediately undertake graduate courses. Particular background assumed as prerequisites for various graduate courses include object oriented programming, data structures, operating systems, and algorithm analysis. Incoming students might have identified deficiencies upon entering, or if they are concerned that they may have deficient background, should discuss this issue with the GD prior to the start of classes in their first semester. Typically the GD suggests undergraduate courses to make up for the background deficiencies.

Undergraduate courses assigned to overcome background deficiencies must be taken at the earliest possible opportunity to remain in good standing. These courses must be taken for a regular grade (A/F) and cannot be taken pass/fail. Such undergraduate deficiency courses should be listed on the plan of study, however they do not directly count toward satisfying the graduation requirements for any graduate degree in CS.

Transfer Credits

Courses used on a student's plan of study will normally be courses in Computer Science taken at Virginia Tech or designated cognate courses in other departments at Virginia Tech. Students entering our graduate program with credit for courses taken at other universities can apply to have a certain amount of that credit transferred to Virginia Tech and applied to their plans of study here.

In general, the procedure is to first determine an appropriate faculty member who will validate that equivalent credit has been done elsewhere. This is typically a faculty member who teaches a corresponding course here or, if such a course does not exist at Virginia Tech, a faculty member who is most knowledgeable in the cognizant area of the course. Depending on the nature of the course (CS course or cognate course), the appropriate faculty member might be within or outside the CS department. The student presents necessary documentation on the coursework to this faculty member who approves the transfer of credit.

Master's students may transfer a maximum of nine hours (three regular courses). Ph.D. students may transfer a maximum of fifteen hours (five regular courses) to be applied toward a Ph.D. plan of study. (Students who joined prior to Fall 2009 were allowed to transfer upto six regular courses but this number has since been reduced to five, to ensure that not more than 50% of the graded coursework credits for a VT degree originates from elsewhere.)

Courses taken at other universities will normally be approved for use on a plan of study if the course is essentially the same as a Virginia Tech course which can appear on the student's plan of study. Credit for courses that are not essentially the same as a Virginia Tech course might be permitted as a general CS elective at the 5000- or 6000-level. Such courses might be approved within a specific CS area, in which case they would count as a regular course within that area for the purpose of fulfilling breadth requirements. Non-computer science courses that have not been designated as cognate courses will normally be approved for use on a plan of study (again, probably as general electives) if the student's advisor believes that this course is an integral and essential part of a student's plan of study.

A course may be transferred only if it was taken while the student was enrolled as a graduate student. A course may not be transferred if it was used to satisfy requirements for any undergraduate degree. To be eligible for credit, the student must have earned at least a grade of B or its equivalent, and the course must be taken at an accredited graduate institution. We must have on file an official transcript from the institution that shows the course and grade earned.

A student requesting transfer credit must follow this procedure:

- Requests for transfer of credit are typically made during your first semester at Virginia Tech, but can be applied for and approved at any time. For each course you request to be transferred, print a copy of the credit transfer request form.
- Fill out the primary details of the form and attach to the form as much information about the course as possible, such as: a copy of the course syllabus as taught (as opposed to the university or college catalog description, which does not carry enough information); the title and author of the textbook used; a sample graded assignment (preferably the last one in the course, definitely not the first); a copy of the final exam--preferably both the questions and your graded answers (if you do not have the final, please supply the mid-term); URLs to the course website or other online resource. In cases where the course was taken a long time ago and little documentation is available, do the best you can. Transfer credit may be denied if insufficient information is provided to judge the content and level of the course. Take this package to the professor who teaches the course most like the one you wish to transfer and ask the professor to consider your request.
- In many cases the faculty member will give the recommendation immediately on your form, and you can give it to the GC. In cases where documentation is sparse, the faculty member might choose to "interview" you to assess your knowledge in the stated course. If more time and consideration is needed, please leave the form with the faculty member with a request to forward it to the GC. Once the form is received by the GC, the GD typically reviews it and approves it, and the transferred course(s) can then be used on a plan of study.

Dropping Courses

Graduate students wishing to drop a course after the official drop date must obtain the approval of the course instructor and the Associate Department Head. Approvals for late dropping of courses are not guaranteed and are given only under extreme (e.g., life-altering) circumstances.

> **Note:** Poor performance in the course, lack of interest in the course etc. are not valid reasons to request a late drop. The Graduate School will not approve such requests

Section *Course Registrations* on page 18 contains for information about course drop deadline dates in the context of a typical semester. To drop a course after the official drop date, the student must submit a completed Drop-Add form with the Instructor's and the GD's signatures to the GC. It will then be submitted to the graduate school for the Dean's (of the graduate school) signature. If approved, the course will be dropped from the student's schedule.

Start of Semester Defense Exception

The **Start of Semester Defense Exception(SSDE)** (formerly known as Defending Student Status) is a special enrollment category defined by the Graduate School. In their words, it is "for students who have fulfilled all requirements, including advisory committee review and agreement that the thesis or dissertation is ready for defense, and are registering only to take the final oral examination."

The graduate school requires that all students be registered in the semester that they complete their degree. This means that if a student intends to defend in a Fall semester, but could not, he/she would need to register for the following semester (i.e., Spring). However, sometimes a student has finished his/her work (e.g. in the Fall) but is unable to schedule the defense for their thesis or dissertation by the end-of-semester deadline.

To keep the registration expenses to a minimum, the graduate school offers the ability to register for only a "token" credit of 1 hour, rather than normal, full-time credit hours. This type of registration is known as **Start of Semester Defense Exception** and is only available to students who:

- were unable to schedule an examination time with their committee during the last term they were enrolled
- have completed all requirements for the degree, including preparation and having the final copy of their thesis or dissertation reviewed by the advisory committee.

Please read the details of how to qualify and how to schedule a final exam under SSDE on the web at *Graduate School Policies on SSDE* and the *FAQ* page.

Internships and Co-ops

Graduate students can opt to pursue industrial/research internship opportunities, typically during the summer (May-July). These are usually paid opportunities and can serve to supplement a student's academic training at Virginia Tech. The decision to undertake an internship and co-op must be taken in consultation with the advisor, who will ensure that it doesn't interfere with the student's academic progress.

Foreign students are typically limited by their visa status regarding such employment opportunities. In particular, leave of absence for a "coop" or "internship" may only be permitted when it does not interfere with the degree program. The CS Department routinely grants permission for students on student visas to pursue coops and internships during the summer. It almost never grants permission for coursework-only students on student visas to pursue coop or internship during the academic year. MS Thesis and PhD students might be given permission for pursue coop or internship during the academic year only under the extremely rare situation where such coop or internship is required to support that student's research program.

For foreign students, internships and coops are typically categorized as CPT (Curricular Practical Training) for the purpose of immigration classifications. See the graduate school's website (http://graduateschool.vt.edu) for forms and procedures relating to CPT.

Graduation and Commencement

Graduation Procedures

Each semester, the Graduate School publishes a list of deadlines for the necessary steps toward graduation in that semester. Besides finding that schedule at the Graduate School website, the AGS will typically send out the schedule by email at least once during the semester.

The first step in the process toward graduation is to complete an Application for Degree form, via Hokie SPA.

Typically there is a deadline by which you must have completed your final exam requirements if you want to be listed on the commencement bulletin and receive your diploma at commencement. There is a later deadline (in fact, past the end of the semester) by which you must complete all requirements to be considered a graduate in that semester. Be sure to check in advance on the appropriate deadlines so that you know what is expected. They are posted at the Graduate School website.

To graduate, you must first submit an Application for Degree card by the Graduate School's deadline for that semester. You must also complete all defense requirements by the Graduate School's deadlines. For the MS Thesis option and PhD degree, this means holding the final defense and submitting the final documents by the appropriate deadlines. All MS Theses and PhD Dissertations must be submitted to the Electronic Theses and Dissertations system (see the ETD Homepage). If you are using the report from CS5974 Independent Study as the final exam requirement for the MS Coursework-only option, you should submit a copy (electonic or hard-copy) of the report to the AGS by the deadline, and have your course instructor send an email message to the AGS advising whether to accept or reject the report. These reports are not submitted to ETD.

Participation in Commencement Activities

If you are completing a MS thesis or PhD, please tell your faculty advisor well in advance if you plan to attend the graduation ceremony. Part of the ceremony involves "hooding" of the graduate by the faculty member. With the myriad different graduation ceremonies in place (at the department level, college level, and at the university level) most faculty are assigned to attend one or another ceremony, and few are able to go to all ceremonies. Further, faculty paticipating in hooding ceremonies typically must come dressed in regalia. Thus, your advisor needs to know in advance so that he or she can be prepared.

Funding Opportunities

There are several possible sources of funding with or near the University for qualified graduate students. Well over half of CS graduate students are typically funded through departmental fellowships, teaching, or research assistantships. Others were supported elsewhere within the University, or at the nearby Corporate Research Center. The vast majority of students seeking support will find it in one of the following ways:

- **Graduate Teaching Assistantship (GTA)**: The number of GTAs awarded in a given year is difficult to predict and is driven by undergraduate (not graduate) enrollments. A fraction of the GTAs (approximately one-third) are offered to new students. In 2014-2015, stipends started around $1800/month for nine months. Students on assistantships are exempt from tuition and a significant fraction of the costs for a University sponsored healthcare plan are covered.
- **Graduate Research Assistantship (GRA)**: Many faculty have active research programs that include funds for research assistants. Note that GRAs are most commonly awarded to students who have been in the Department for at least one semester. GRAs receive the same stipends, tuition exemption, and healthcare benefits as GTAs.
- **Computer Science Scholars and Pratt Fellowships**: a limited number of exceptional applicants are admitted as CS Scholars or Pratt Fellows, which guarantees them multiple years of support. These positions may include summer support for research as well.
- **University/College-level Fellowships**: Our applicants are eligible to compete for University- and College-level fellowships including the Cunningham Fellowship, Dean's Fellowship, and PhD 2010 Fellowships. These fellowships typically include multiple-year support guarantees, summer research support, and possibly travel or discretionary funds. Some are only available to US citizens and permanent residents.
- **Minority Scholarships**: Virginia Tech provides a number of scholarships for minority students who are US citizens. Contact the CS Department at gradprog@cs.vt.edu for further information about applying to these programs.
- **Other departments and local companies**: Our graduate students are in demand to fill positions in other departments Graduate Research Assistants, or as programmers doing software development and system administration. Typically 10-20 of our students work as GRAs for other departments. There are also a number of software development companies in the Corporate Research Center (CRC) who have interest in hiring our students. Since such companies are located off-campus, these positions are typically not available to foreign nationals on student visas.

MS Thesis and PhD Students who received Departmental support in their first year can normally expect to recieve continued support during the remainder of their course of study (typically 2 years for MS, 4 or 5 years for PhD), so long as their job performance and degree progress is good. PhD students whose job performance is good are normally guaranteed three years of funding once they have passed their PhD Qualifier process. MS Coursework-only students will normally be given assistantships only if funding is available after all qualified Thesis and PhD students have been funded.

GTA applications are accepted twice a year, in November for spring semester and in March for the following academic year. The period for applications is announce via email to the graduate students listserv. Students entering the program in fall or spring are given GTA application forms at the departmental orientation meeting and can submit them immediately. Be aware, however, that the department will have already screened the incoming students and awarded a pool of assistantships at the time admission offers were made. Thus, incoming students for that semester not given an assistantship from this pool generally have lower priority over continuing students for the few remaining positions.

Continuing students must have a minimum GPA of B (3.0) to be eligible for a GTA position. Decisions regarding the award of GTA positions are made by the AUS in consultation with the AGS and the results from previous Green Thursday evaluations. Funding decisions are largely guided by a ranking formula. Students who do not receive initial awards are placed on a waiting list and will be informed of their quartile standing on that list. The list is re-ordered at the end of the semester when new grades and GTA evaluations become available.

Virginia Tech Equal Opportunity/Affirmative Action Statement

Virginia Tech does not discriminate against employees, students, or applicants on the basis of age, color, disability, gender, national origin, political affiliation, race, religion, sexual orientation or veteran status. Discrimination or harassment on any of these bases is prohibited by Policy 1025, "Anti-Discrimination and Harassment Prevention Policy."

The university is subject to Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, the Age Discrimination in Employment Act, the Vietnam Era Veterans' Readjustment Assistant Act of 1974, the Federal Executive Order 11246, Virginia's State Executive Order Number Two, and all other rules and regulations that are applicable.

Those having questions or concerns about Policy 1025, any of these regulations, or related issues should contact:

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Office for Equal Opportunity
336 Burruss Hall (0216)
Blacksburg, VA 24061
(540) 231-7500
TTY: (540) 231-9460
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Graduate Honor Code

The Graduate Honor Code establishes a standard of academic integrity. As such, this code demands a firm adherence to a set of values. In particular, the code is founded on the concept of honesty with respect to the intellectual efforts of oneself and others. Compliance with the Graduate Honor Code requires that all graduate students exercise honesty and ethical behavior in all their academic pursuits here at Virginia Tech, whether these undertakings pertain to study, course work, research, extension, or teaching.

It is recognized that the graduate students have very diverse cultural backgrounds. In light of this, the term ethical behavior is defined as conforming to accepted professional standards of conduct, such as codes of ethics used by professional societies in the United States to regulate the manner in which their professions are practiced. The knowledge and practice of ethical behavior shall be the full responsibility of the student. Graduate students may, however, consult with their major professors, department heads, the International Students Office, or the Graduate School for further information on what is expected of them.

More specifically, all graduate students, while being affiliated with Virginia Tech, shall abide by the standards established by Virginia Tech, as these are described in this Constitution. Graduate students, in accepting admission, indicate their willingness to subscribe to and be governed by the Graduate Honor Code and acknowledge the right of the University to establish policies and procedures and to take disciplinary action (including suspension or expulsion) when such action is warranted. Ignorance shall be no excuse for actions which violate the integrity of the academic community.

The fundamental beliefs underlying and reflected in the Graduate Honor Code are that (1) to trust in a person is a positive force in making a person worthy of trust, (2) to study, perform research, and teach in an environment that is free from the inconveniences and injustices caused by any form of intellectual dishonesty is a right of every graduate student, and (3) to live by an Honor System, which places a positive emphasis on honesty as a means of protecting this right, is consistent with, and a contribution to, the University's quest for truth.

Principles of Community

The "Virginia Tech Principles of Communit"y were affirmed by the board of visitors March 14, 2005, and signed by eight university organizations.

Virginia Tech is a public land-grant university, committed to teaching and learning, research, and outreach to the Commonwealth of Virginia, the nation, and the world community. Learning from the experiences that shape Virginia Tech as an institution, we acknowledge those aspects of our legacy that reflected bias and exclusion. Therefore, we adopt and practice the following principles as fundamental to our on-going efforts to increase access and inclusion and to create a community that nurtures learning and growth for all of its members:

- We affirm the inherent dignity and value of every person and strive to maintain a climate for work and learning based on mutual respect and understanding.
- We affirm the right of each person to express thoughts and opinions freely. We encourage open expression within a climate of civility, sensitivity, and mutual respect.
- We affirm the value of human diversity because it enriches our lives and the University. We acknowledge and respect our differences while affirming our common humanity.
- We reject all forms of prejudice and discrimination, including those based on age, color, disability, gender, national origin, political affiliation, race, religion, sexual orientation, and veteran status. We take individual and collective responsibility for helping to eliminate bias and discrimination and for increasing our own understanding of these issues through education, training, and interaction with others.
- We pledge our collective commitment to these principles in the spirit of the Virginia Tech motto of Ut Prosim (That I May Serve).

Ben J. Davenport Jr., Rector, Board of Visitors
Charles W. Steger, President
W. Samuel Easterling, President, Faculty Senate
Sue Ellen Crocker, President, Staff Senate
Sumeet Bagai, President, Student Government Association
Myrna Callison and Yvette Quintela, Co-Vice Presidents, Graduate Student Assembly
Kimball "Jay" Reynolds, President, Virginia Tech Alumni Association
Ray Plaza, Chair, Commission on Equal Opportunity and Diversity

The Principles of Community are also available in multiple languages. Visit the PoC page at *http://www.diversity.vt.edu/principles-of-community/principles.html*.