THE GRADUATE PROGRAM IN COMPUTER SCIENCE

Effective Fall 2018

Department of Computer Science
226 Atanasoff Hall
Iowa State University
Ames, Iowa 50011-1041 USA
http://www.cs.iastate.edu

TABLE OF CONTENTS

INTRODUCTION AND WELCOME

This document is for graduate students enrolled in Computer Science. It specifies the department's academic requirements. It also covers policies and procedures relevant to graduate student life, and provides other contact information. While this information may be of interest to students applying for admission, this document does not cover the admission process. See the department's web site (http://www.cs.iastate.edu) for information about admissions.

If you are new to Iowa State, welcome! As you will discover, Iowa State University is a major land grant university located in Ames, Iowa. Ames is a pleasant, small, yet cosmopolitan, city with a population of 60,000 (35,000 students). Ames has a vibrant cultural scene, and a secondary school system that ranks one of the best in the United States.

In the department of Computer Science, it is our goal to help you achieve excellence in research and scholarship. The Department of Computer Science has strong, world-renowned research programs with a faculty rich in diversity, breadth and depth of research opportunities. We stress both theoretical and experimental methods for solving fundamental as well as practical problems.

In addition to our department's own laboratories, students can take part in many other research opportunities. These include the Laurence H. Baker Center for Bioinformatics and Computational Biology (BCB), (www.bioinformatics.iastate.edu), the Center for Integrative Animal Genomics (www.ciag.iastate.edu), the Department of Energy's Ames Laboratory (www.external.ameslab.gov), the Information Systems Security Laboratory, (http://www.iac.iastate.edu/IAC/), and the Virtual Reality Applications Center (www.vrac.iastate.edu). The department also participates in interdisciplinary graduate programs in: Bioinformatics and Computational Biology (www.bcb.iastate.edu), Information Assurance (www.iac.iastate.edu/EDU/masters.html), Human Computer Interaction (www.hci.iastate.edu), and Neuroscience (www.neuroscience.iastate.edu). All of these provide a stimulating academic environment that nurtures leading-edge research and innovative education in Computer Science. Students interested in pursuing these opportunities should apply for admission to the respective interdepartmental program as well.

The Department of Computer Science offers a Master of Science (MS) and Doctor of Philosophy (Ph.D.) degree. The first M.S. degree in Computer Science at Iowa State University was awarded in 1959 and the first Ph.D. in 1962. M.S. students typically complete degree requirements in 2 years. Ph.D. students can complete their degree in 4 years. The M.S. graduates of our program typically pursue employment in industry whereas most of the Ph.D. graduates typically take up faculty positions in academia or opportunities in industrial research laboratories.

GRADUATE STUDENT CONTACTS

Graduate Program Coordinator

Mindy Hanna, Graduate Program Coordinator, 225 Atanasoff Hall, mhanna@iastate.edu, 515-294-5779.
First point of contact for all questions related to the graduate program and graduate admissions.

Director of Graduate Education (DOGE)

Dr. Samik Basu, 211 Atanasoff Hall, sbasu@iastate.edu, 515-294-6045

The DOGE oversees all aspects of graduate studies. The DOGE approves various forms for the department. The department's Graduate Committee, comprised of graduate faculty members, is chaired by the DOGE and is responsible for the department's academic policies.

Department Executive Officer

Dr. Gianfranco Ciardo, Chair, 226 Atanasoff Hall, ciardo@iastate.edu, 515-294-4377

Computer Science Graduate Student Organization (CSGSO)

The CSGSO is led by elected graduate students in Computer Science. The organization organizes various supporting events for the graduate students that include mentoring programs for incoming students, research meetings and social gatherings. The officials meet regularly with department executive officer(s) to provide graduate student perspectives on current issues.
https://www.stuorg.iastate.edu/site/csgso/information

GRADUATE PROGRAM OVERVIEW

Graduate degrees obtainable through the Computer Science Department are the M.S. degree (with thesis or creative component options) and the Ph.D.

Degree Requirements

To obtain a degree, students must satisfy two sets of requirements:

a. Graduate College requirements and
b. Computer Science departmental requirements.

The Graduate College requirements are detailed in the following documents.

- *The Graduate College Handbook*
  http://www.grad-college.iastate.edu/publications/gchandbook/homepage.html
- *The Graduate College Thesis Requirements*
  http://www.grad-college.iastate.edu/graduation/

The Computer Science department's requirements are presented in this document. All students are expected to review both the requirements (a) and (b) from the respective documents carefully. Any clarification question should be directed to the graduate program coordinator and/or the DOGE.

Graduate Advisor

Upon admission, each student will be assigned a temporary advisor (faculty member in Computer Science), who will assist with academic matters. Students can also contact graduate program coordinator and/or the DOGE for issues related to graduate studies.

During the first year of study, each student will choose a faculty member[1] (with his or her consent), to be his/her *major professor*. It is not necessary that the student's temporary advisor becomes his/her major professor. The major professor will serve as the primary academic advisor and the chair of the student's program of study (POS) committee (see below). Besides supervising the student's academic program and research, advisor can be of general assistance to the student. Students may consult with their advisors when they have questions, problems, or need help in any matter. *Each student should make an appointment with his/her advisor each semester prior to course registration, to go over his/her plan of study and review his/her academic progress.*

Selecting a major professor is perhaps one of the most important steps in making progress towards graduation. Students should not feel pressured to make a final decision about their future major professor until they have had an opportunity to interact with, and explore research opportunities in several laboratories or research groups. Many faculty members like to know a student reasonably well before they agree to accept the student into their research group. Participation in research seminars, research projects, or courses offered by professors can help both the student and the professor assess compatibility of their research interests, work habits, etc. that are essential for the success of a student-mentor relationship.

When a Computer Science faculty member agrees to serve as a student's major professor, the faculty member is expected to arrange assistantship support for the remainder of the student's degree program, as long as the student remains in good standing and is making good progress towards the degree. Very few professors are able to "guarantee" a specific source of graduate assistantship support for several years. It is important, therefore, for each student to take an active role in discussing future assistantship funding with the major professor. Most students receive support as either a Research Assistant (RA) or a Teaching Assistant (TA), with funding supplied by the

[1] If appropriate, you may have two co-advisors.

major professor and/or the department. In some cases, students receive support from other sources, such as scholarships, training grants, or competitive research assistantships.

Program of Study (POS) and Program of Study Committee

The Program of Study (POS) committee is chaired by the student's advisor (major professor), and formally supervises his/her research; the committee officially approves the student's thesis or dissertation. Details on the composition of this committee vary with the degree, and are described below (under the requirements for MS and PhD degrees). The student's advisor will help choose the members of the POS committee to best suit the student's research. *The POS itself is a plan for what courses the student will take to fulfill the degree requirements*.

The student via Accessplus submits information on the POS committee and the POS courses. The POS committee as well as the DOGE approves the POS for the student electronically after verifying that the student's POS satisfies degree requirements and aligns well with the research area of the student. Both POS and POS committee can be updated on Accessplus, if needed, and will require approval from the DOGE and the (new) POS committee.

SATISFACTORY ACADEMIC PROGRESS

The graduate committee evaluates student progress towards graduation at least once a year. Students and faculty advisor(s) are requested to provide information as required for this purpose. The DOGE communicates any concerns regarding a student's academic progress to the student and his/her faculty advisor(s).

Cases where a student consistently fails to show satisfactory academic progress in two consecutive evaluations will be further discussed with the student's faculty advisor(s). In this case, the student may become ineligible for continued financial support from the department and may become ineligible for further registration as a graduate student in Computer Science. The student can appeal this decision by submitting a written petition, supported by the student's faculty advisor(s), to the graduate committee.

Satisfactory Academic Progress Towards a M.S.

a. Choice of Major Professor to be made by February 1 (or September 1 if admitted in spring) during the first academic year study in the graduate program.
b. Program of Study (POS) Committee and the POS form (listing the courses to be taken) approved by the **end of the second semester**[2] of study in the graduate program.
c. Make appropriate progress toward M.S. degree in a timely fashion.
d. Demonstrate research productivity in terms of publications, technical reports, software development, etc.
e. Minimum GPA of 3.2 during the first year and cumulative GPA of 3.3 or above in courses that appear on the Program of Study. Satisfy all grade requirements (see M.S. degree requirements).

Satisfactory Academic Progress Towards a Ph.D.

a. Choice of Major Professor to be made by May 1 (or December 1 if admitted in spring) during the first academic year of study in the graduate program.
b. Program of Study (POS) Committee and the POS form (listing the courses to be taken) approved by the **beginning of the third semester**[2] of study in the graduate program.
c. Make appropriate progress toward doctoral degree in a timely fashion (see Ph.D. graduation timeline).
d. Demonstrate research productivity in terms of publications, technical reports, software development, etc.
e. Satisfy all grade requirements (see Ph.D. degree requirements)

[2] For students entering the graduate program in the Fall semester, second semester is the Spring of the following year and third semester is Fall of the following year. For students entering the graduate program in the Spring semester, second semester is the Fall of the same year and third semester is the Spring of the following year.

GRADUATE DEGREE REQUIREMENTS

Competency
All graduate students are expected to have adequate undergraduate-level background in the following areas that are essential to Computer Science graduate program.

- Design and Analysis of Algorithms (relevant undergraduate level course at ISU: COMS 311)
- Theory of Computation (relevant undergraduate level course at ISU: COMS 331)
- Programming Languages/Compilers (relevant undergraduate level courses at ISU: COMS 342, COMS 362, COMS 440)
- Computer Architecture/Operating Systems/Networks (relevant undergraduate level courses at ISU: COMS 321, COMS 352, COMS 486)

Students wanting to enroll in any graduate course in the above areas will be required to demonstrate undergraduate-level competency in the corresponding area. This can be achieved by

- Obtaining written approval from a faculty member in ISU Computer Science department; OR
- Taking an appropriate undergraduate course at ISU; OR
- Passing test-out examination of an appropriate undergraduate course at ISU.

Breadth Areas
The following breadth areas will be considered to satisfy certain course-requirements in **M.S. and Ph.D. degree programs in Computer Science**. If the student wants to consider any course that is not listed in a particular area to be considered as part of that area in his/her POS to satisfy breadth-area requirements, then he/she is required to submit a written petition, supported by the student's faculty advisor(s), to the graduate committee.

BREADTH AREAS FOR M.S. NON-THESIS OPTION

- **Theory**: COMS 521, 531, 535, 611, 612, 631, 633, 634
- **Systems**: COMS 554, 561, 581, 586, 587, 652, 661
- **Software**: COMS 509, 510, 512, 515, 541, 635, 641
- **Applications**: COMS 518, 525, 526, 533, 544, 549, 550, 551, 555, 557, 558, 567, 568, 569, 570, 573, 574, 575, 577, 583, 626, 657, 672, 673, 681

BREADTH AREAS FOR M.S. THESIS OPTION AND PH.D.

- **Artificial Intelligence and Machine Learning**: COMS 572, 573, 574, 634, 672, 673.
- **Computer Architecture and Parallel Computing**: COMS 525, 526, 581, 583, 625, 626, 681.
- **Bioinformatics and Computational Biology**: COMS 544, 549, 550, 551, 567, 568, 569, 570, 596.
- **Database and Information Systems**: COMS 561, 562, 661.
- **Distributed Computing, Networks and Operating Systems**: COMS 552, 554, 555, 586, 587, 612, 652, 686.
- **HCI/Graphics and Robotics**: COMS 518, 557, 558, 575, 577, 657
- **Software Engineering and Programming Languages**: COMS 509, 512, 515, 540, 541, 556, 641.
- **Theoretical Foundations, Algorithms and Complexity**: COMS 518, 533, 611, 612, 631, 633

OVERVIEW OF M.S. AND PH.D. REQUIREMENTS

The following table summarizes the credit requirements for M.S. and Ph.D. degrees in Computer Science at ISU.

	M.S. Non-Thesis Option in Computer Science	M.S. Thesis Option in Computer Science	PhD in Computer Science
Required	COMS 511, COMS 552, COMS 540, COMS 572 and COMS 592. *Minimum grade requirement: B- in each required course with A-F letter grade.*	COMS 511, COMS 531, COMS 592. *Minimum grade requirement: B- in each COMS 511 and COMS 531*	
Breadth	At least 3 credits from each of the four areas: Theory, Systems, Software and Application. (refer to breadth area listing for M.S. Non-Thesis) *Pass a test-out examination (if it is offered) for COMS 331 or take COMS 531 (minimum grade requirement for COMS 531: B-)*	At least 3 courses from 2 different Breadth Areas (refer to breadth area listing for M.S. Thesis)	At least 4 courses from 2 different Breadth Areas (refer to breadth area listing for Ph.D.) *Minimum GPA for Core and Breadth Area: 3.0*
Electives (MS)/Area Proficiency (PhD)	At least 6 cr. of Electives (typically courses in COMS at 500-level or above)	At least 9 cr. of Electives (typically courses in COMS at 500-level or above)	At least 9 cr. of Area Proficiency courses (typically courses in COMS at 500-level or above, that align with student's research area).
Research Credits	3 cr. of COMS 599 for M.S. with Creative Component	6 cr. of COMS 699 for M.S. with Thesis	At least 36 cr. of COMS 699 *24 of which must be completed under thesis POSC*
Total Credit	**At least 34 cr.** *Minimum GPA for all courses in POS: 3.0*	**At least 31 cr.** *Minimum GPA for Core and Breadth Area: 3.0*	**At least 72 cr.** *Minimum GPA for Core and Breadth Area: 3.0*
600-level Requirement	POS must include at least 3 cr. of COMS 600-level courses excluding COMS 699 and COMS 610.	POS must include at least 3 cr. of COMS 600-level courses excluding COMS 699 and COMS 610.	POS must include at least 6 cr. of COMS 600-level courses excluding COMS 699 and including at most 3 cr. of COMS 610
	All students must clearly identify the Breadth Areas and the courses in these areas, and the electives (for MS) or area proficiency courses (for PhD). The information should be entered in the "Comments" section in the online POSC submission.		

Details of the requirements are presented in the following sections. Students POS must satisfy these requirements unless otherwise approved by the graduate committee.

COURSE DESCRIPTIONS

Please use the ISU course catalog available at

http://catalog.iastate.edu/collegeofliberalartsandsciences/computerscience/
Schedule of courses in Fall, Spring and Summer semesters are available at http://classes.iastate.edu

REQUIREMENTS FOR THE M.S. DEGREE NON THESIS OPTION

Admission Status: Full admission

Students entering with provisional or restricted admission will be upgraded to full admission once all requirements for full admission have been met.

Formation of POS Committee

It is the responsibility of each M.S. student to find members (especially the major professor(s)) for the POS committee and to complete the POS. The POS committee consists of at least two (2) members of the graduate faculty. The committee must include a major professor from the department of Computer Science.

Course, Creative Component and Credit Requirements

Each student's POS must include at least **34 credits**, including the following:

- **Core Courses (12 cr.)**: COMS 511, COMS 552, COMS 540 and COMS 572.

- **Breadth Requirement (12 cr.)**: At least 3 credits from each of the following areas: Theory, Systems, Software and Application. Refer to breadth area courses for M.S. non-thesis option.

  Students are required to either pass a test-out examination (if it is offered) for COMS 331 or take COMS 531 (minimum grade requirement for COMS 531: B-). If the student takes COMS 531 then it can be used to satisfy the breadth course requirement in the Theory area. If a student takes a course, which is included in multiple breadth areas, then the student can use that course to satisfy the breadth requirement in one of the areas. If a COMS course is not listed as part of any of the breadth areas, students must take permission from DOGE or major professor prior to taking the course and using it to satisfy the breadth requirement.

- **Electives (6 cr.):** At least 6 credits of content-rich courses at the 500-level or above on computing related topics. **Any course that is not listed in Computer Science catalog will require approval of the major professor/temporary advisor prior to registration; otherwise, course will not be counted towards program of study.**

- **Advanced Topics:** The POS must include at least 3 credits of a Computer Science course at the 600-level (excluding COMS 610 and COMS 699). This course can be used to satisfy breadth or elective requirements.

- **Research Colloquia (1 cr.)**: COMS 592. Attend Computer Science Research Colloquia. Write summary reports for at least six colloquium presentations. This course is offered on a satisfactory-failed basis and *is intended for first-year graduate students* in Computer Science to familiarize themselves with research in Computer Science and computing by attending colloquium series and thesis presentations offered by the department.

- **Creative Component (3 cr.):** 3 credits identified as COMS 599 culminating in a formal paper. The paper will be filed with the department as a technical report. (Note that this option is not available if you are admitted as a Ph.D. student or have Ph.D. student status in the department, and opting to get the MS degree.)

  A final oral examination is required. This examination focuses on the thesis or creative component.

Grade Requirements

- A grade of B- or better in each core course.
- An average grade point of 3.0 or above over all the courses.
- A maximum of 2 C's (C, C+) and no grade below a C on the POS.

Research Requirements and Guidelines

Creative Component:

- Creative effort is reflected in 3 credits of COMS 599.
- The topic should be chosen in consultation with the Major Professor. It should be developed in terms of the current literature and written to exhibit the student's understanding of the issues.
- Final papers for creative components should be in a form suitable for publication. Emphasis is placed on clear writing, logical development, and significance of understanding.
- *A copy of the paper should be given to each member of the POS committee two weeks prior to the final oral examination. The abstract of the paper must be submitted to the department at least one week prior to the final oral examination. A completed copy of the paper must be filed with the department and must be submitted as a technical report.*

REQUIREMENTS FOR THE M.S. DEGREE THESIS OPTION

Admission Status: Full admission

Students entering with provisional or restricted admission will be upgraded to full admission once all requirements for full admission have been met.

Formation of POS Committee

It is the responsibility of each M.S. student to find members (especially the major professor(s)) for the POS committee and to complete the POS. The master's POS committee consists of at least three (3) members of the graduate faculty. It must include two members, including the major professor, from the major program. The committee must include member(s) from different fields of emphasis so as to ensure diversity of perspectives.

Course, Research and Credit Requirements

Each student's POS must include at least **31 credits**, but no more than 36 credits, including the following:

- **Core Courses**[3]: COMS 511, COMS 531.

- **Breadth Requirement**: At least three Computer Science graduate courses from at least two distinct breadth areas (9 credits). Refer to breadth area courses for M.S. thesis option and Ph.D.

- **Electives:** At least 9 credits of elective courses. The elective courses must be in Computer Science or other relevant discipline(s). Courses in Computer Science or Computer Engineering must be 500-level or above. Courses in other fields must be (a) available for non-major graduate credit, and (b) 400-level or above (or have POS committee approval). These courses must not include independent study, research, or seminar courses, except that up to three (3) credits of COMS 610 can be counted for this requirement. **Any course that is not listed in Computer Science catalog will require approval of the major professor/temporary advisor prior to registration; otherwise, course will not be counted towards program of study.**

- **Research Colloquia.** (COMS 592, 1 credit). Attend Computer Science Research Colloquia. Write summary reports for at least six colloquium presentations. This course is offered on a satisfactory-failed basis and *is intended for first-year graduate students* in Computer Science to familiarize themselves with research in Computer Science and computing by attending colloquium series and thesis presentations offered by the department.

- **Advanced Topics:** The POS must include at least 3 credits of a Computer Science course at the 600-level (excluding COMS 610 and COMS 699). This course can be used to satisfy breadth or elective requirements.

- **Thesis Option:** 6 credits of research identified as COMS 699 culminating in the preparation of a thesis.

  A final oral examination is required. This examination focuses on the thesis or creative component.

Grade Requirements

- A grade of B- or better in each core course.
- An average grade point of 3.0 or above over all the courses in core and breadth areas.

---

[3] Information Assurance (INFAS) students are only required to take COMS 511 or COMS 531 (but not both)

- A maximum of 2 C's (C, C+) and no grade below a C on the POS.

Research Requirements and Guidelines

Thesis:

- Effort involved should be approximately 6 credit hours (COMS 699).
- A research topic should be chosen in consultation with the major professor. The result of the research must be an original contribution to the field of Computer Science and must include a thorough literature review.
- A thesis must be written in the form prescribed by the Graduate College. *A copy should be given to each member of the POS committee two weeks prior to the final oral examination. The abstract of the thesis must be submitted to the department at least one week prior to the final oral examination.*

REQUIREMENTS FOR THE PH.D. DEGREE

The purpose of the Ph.D. program is to train students to conduct original research in Computer Science. Each student is required to attain knowledge and proficiency commensurate with a leadership role in Computer Science.

Admission Status

Full admission to the Ph.D. program, is a prerequisite for pursuing a Ph.D. degree. Students entering with provisional or restricted admission need to have their status upgraded to full admission upon satisfying all requirements for full admission.

Formation of POS Committee

It is the responsibility of each PhD student to find members (especially the major professor(s)) for the POS committee and to complete the POS. The POS committee for a doctoral program consists of at least five members of the graduate faculty. It must include at least three members, including the major professor, from within the student's major or program. The committee must include member(s) from different fields of emphasis so as to ensure diversity of perspectives.

Course, Research, and Credit Requirements

Each POS must include at least 72 credits in the program-related portion. Up to 36 credits from a student's master's degree can be applied to the POS[4]. Requirements including the following:

- **Core Courses:** COMS 511, COMS 531

- **Breadth Requirement:** At least four Computer Science graduate courses from at least two distinct breadth areas (12 credits) that are different from the student's area of research. If a student takes a course that is listed in multiple breadth areas then the student may count that course to cover only one breadth area.

- **Electives:** Courses in Computer Science or other relevant discipline(s). Courses in Computer Science or Computer Engineering must be 500-level or above. Courses in other fields must be (a) available for non-major graduate credit, and (b) 400-level or above (or have POS committee approval). These courses must not include independent study, research, or seminar courses. A maximum of 17 credit hours of non-Computer Science courses can appear on the POS. **Any course that is not listed in Computer Science catalog will require approval of the major professor/temporary advisor prior to registration; otherwise, course will not be counted towards program of study.**

- **Research**: Minimum of 36 total research credits of which 24 must be completed under the supervision of the POS committee.

- **Research Colloquia.** (COMS 592, 1 Credit). Attend Computer Science Research Colloquia. Write summary reports for at least six colloquium presentations. This course is offered on a satisfactory-failed basis and is intended for first-year graduate students in Computer Science to familiarize themselves with research in Computer Science and computing by attending colloquium series and thesis presentations offered by the department.

---

[4]Master's students should avoid putting more than the required number of credits on their POS to avoid problems with this rule.

Subject to the following restrictions:

- The POS must include at least 6 credits of COMS 600-level courses (excluding COMS 699 and including, at most, 3 credits of COMS 610).
- A maximum of 6 credits of COMS 590, 610 and 690 can appear on the POS.
- PhD students are required to take Statistics 430 unless their POS committee waives this requirement.

Area Proficiency

Demonstrate a high level of proficiency in the chosen area of research. This can be accomplished by attaining a 3.5 GPA in three courses in the student's area, all of which are completed at ISU. **The POS committee is responsible for selecting the courses in the student's area that can be used for this requirement**. (The "student's area" does not have to correspond exactly to one of the areas defined for the breadth requirement.)

Grade Requirement

- A grade of B- or better in each core course.
- An average grade point of 3.0 or above over all the courses in core and breadth areas.
- A minimum overall GPA of 3.5 for all courses in POS
- A minimum GPA of 3.5 in three courses in student's research area (see Area Proficiency requirement above)

Required Examinations

1. **Research Proficiency Exam** (*Advancement to Research Ph.D. Student*): This exam is a research presentation to the POS committee, who will determine whether the student has *demonstrated* the ability to conduct significant research. This usually involves presenting the student's own research work that is publishable in a refereed computer science conference or journal. Papers that have already been published as part of M.S. research in computer science at ISU can be used to satisfy this requirement provided they meet the stated criteria. The examination may, with the approval of the POS committee, be retaken once.

2. **Preliminary Examination** (*Admitted to Candidacy*)**:** This exam is an oral presentation of the student's proposed Ph.D. research, including a description of relevant existing literature and the student's progress to date. Prior to scheduling the Preliminary Examination, each Ph.D. student *must satisfy the Area Proficiency Requirement*. Either phase of the preliminary examination may, with the approval of the POS committee, be retaken once.

3. **Final Oral Examination.** This examination is a defense of the dissertation. The final oral examination cannot be held within 6 months of the preliminary examination.

RESEARCH AND DISSERTATION REQUIREMENT

The most important component of the Ph.D. program is original research, culminating in the preparation of a Ph.D. dissertation. *It is expected that each Ph.D. student's research will also lead to publications in refereed Computer Science conferences, journals, or as a book*. The dissertation must satisfy the graduate college's requirements, see the graduate college's thesis requirements.

Suggested PhD Timeline

PhD students are expected to make timely progress towards graduation following the timeline presented below. Exceptions such as delay in completing steps 4—6 are allowed on approval of the student's major professor. Students are also allowed to complete the steps before the suggested time-steps; for instance, on approval of the student's major professor and POSC, students may complete the steps 4—6 within 4 years.

1.	End of Year 1	Complete Core Course Requirements (COMS 511, COMS 531) Complete Colloquium Requirement (COMS 592) Decide on Major Professor
2.	Start of Year 2	Submit POSC and POS information via Accessplus
3.	End of Year 2	Complete Area Proficiency Requirements (9 cr. in student's area of research)
4.	End of Year 3	Complete Research Proficiency Examination
5.	End of Year 4	Complete Preliminary Examination (*timing of the examination is subject to approval of student's thesis supervisor/major professor*)
6.		Complete Final Defense (dissertation thesis work)

REQUIREMENTS FOR A CO-MAJOR AT THE PH.D. LEVEL

Course, Research, and Credit Requirements

- **Core course**s (6 credits): 511, 531, both with a grade of "B" or higher.
- **Elective courses** – Minimum of 21 credits. This must include one (1) Computer Science graduate course from each of four (4) distinct areas listed in the Ph.D. breadth requirements.
- At least three (3) credits of COMS 610.

Subject to the following restrictions:

- At least 36 credits, including dissertation research credits, must be earned under the supervision of the POS committee.
- The course credits (excluding COMS 590, 610, 690, 699) must add up to at least 36 credits.
- The POS must include at least 6 credits of COMS 600-level courses (excluding 699 and including, at most, three (3) credits of 610)
- A maximum of 6 credits of COMS 590, 610 and 690 can appear on the POS.

Grade requirements for the Ph.D.

No more than two C's (C, C+) and no grade below a C on the POS.

Required Examinations

1. **Research Proficiency Exam** (*Advancement to Research Ph.D. Student*): This exam is a research presentation to the POS committee, who will determine whether the student has *demonstrated* the ability to conduct significant research. This usually involves presenting the student's own research work that is publishable in a refereed computer science conference or journal. Papers that have already been published as part of M.S. research in computer science at ISU can be used to satisfy this requirement provided they meet the stated criteria. The examination may, with the approval of the POS committee, be retaken once.

2. **Preliminary Examination** (*Admitted to Candidacy*)**:** This exam is an oral presentation of the student's proposed Ph.D. research, including a description of relevant existing literature and the student's progress to date. Prior to scheduling the Preliminary Examination, each Ph.D. student *must satisfy the Area Proficiency Requirement*. Either phase of the preliminary examination may, with the approval of the POS committee, be retaken once.

3. **Final Oral Examination.** This examination is a defense of the dissertation. The final oral examination cannot be held within 6 months of the preliminary examination.

Selection of Major Professor and POS

The graduate student will normally select a Major Professor and Co-major Professor graduate faculty member from each department. The POS committee must consist of members from both departments and satisfy the committee requirements as per the graduate college student handbook.

Research and Dissertation Requirement

The most important component of the Ph.D. program is original research, culminating in the preparation of a Ph.D. dissertation. *It is expected that each Ph.D. student's research will also lead to publications in refereed conferences, journals, or as a book*. The dissertation must satisfy the graduate college's requirements, see the graduate college's thesis requirements.

GRADUATE MINOR REQUIREMENTS

Minor Outside Computer Science

Computer Science graduate students may request a minor in another graduate program provided they:

- Receive permission and meet requirements of the minor department.
- Have a minor representative from the minor department on the POS committee
- Receive approval from the POS committee
- Minor must be declared on the POS and listed on all pertinent paperwork.

Minor in Computer Science

Students pursuing graduate degrees in other disciplines can obtain a graduate minor in Computer Science. A graduate minor in Computer Science consists of at least 12 credits chosen from COMS 309, 311, 321, 330, 331, 342, 352, 362, 363, 401, 425, 430, 454, 455, 461, 472, 474, and COMS courses numbered 511 or above. The course selection must also satisfy the following conditions.

- At most one of COMS 321, 330, 362 may be included in the 12-credit minimum.
- At least 3 credits must be chosen from courses at or above the 400 level.
- Excludes COMS 590, 599, 610, 690, & 699.

Any exceptions must be petitioned by the student's POS Committee and approved by the Graduate Committee. When a graduate student chooses a minor in Computer Science, one member of their Program of Study committee must be a faculty member from Computer Science.

POLICIES AND PROCEDURES

Petitions and Exceptions

The graduate committee may approve exceptions to policies regulations. Requests for exceptions must clearly state the rationale for the exception and what alternate procedure will be completed to satisfy the requirements. This must be in writing from the student, approved by the student's POS committee, and submitted to the Graduate Committee representing the departmental graduate faculty.

Returning for a Ph.D.

Students aspiring to return to graduate study for a Ph.D. after having left the graduate program upon receiving their M.S. degree must satisfy the following criteria:

- GPA over 3.5 during their previous graduate study in Computer Science at ISU.
- Recommended to continue for Ph.D. by POS Committee at M.S. Final Defense
- Support of their potential major professor who submitted request to the DOGE.

Teaching assistantship support for students returning for a Ph.D. is not guaranteed.

Switching from Ph.D. to M.S.

Students who are admitted to the Ph.D. program and who later wish to transfer to the M.S. program must make the transfer concomitant with selection of a major professor (before the start of the second year). Students will be financially responsible for their education after the transfer. Transfers after the first year require approval of the CS Graduate Committee.

MS on PhD Track

Students planning to move from the M.S. program in Computer Science at ISU to the PhD program in Computer Science at ISU are required to submit their application via email to csadmissions@iastate.edu (with subject line: "MS to PhD Conversion")

a. Program of Study for M.S. with (unofficial) transcript
b. A short paragraph explaining why the student wants to move to PhD program
c. The student should request the following:
d. his/her major professor to submit a recommendation letter
e. a graduate faculty member, other than his/her major professor, to submit a support letter for the application.

Both need to be submitted to csadmissions@iastate.edu (with subject line: "Recommendation letter for <studentName>") .

The recommendation letter from the major professor should describe the student's research progress, potential and capabilities. The letter should also state whether or not the major professor is willing to supervise the student's doctoral work if the student's application in PhD program is approved.

Three graduate faculty members, including graduate admissions committee chair and the DOGE[5], will review and evaluate the application documents. The evaluators will provide recommendation to the graduate committee chair. There are three types of recommendations

[5] Faculty advisors do not evaluate his/her student's application. If faculty advisor is either the chair of the admissions committee or the DOGE, then members from the admissions committee replace them as evaluators.

a. Admission to Ph.D. program denied
b. Admission to Ph.D. program with condition
c. Admission to Ph.D. program without condition

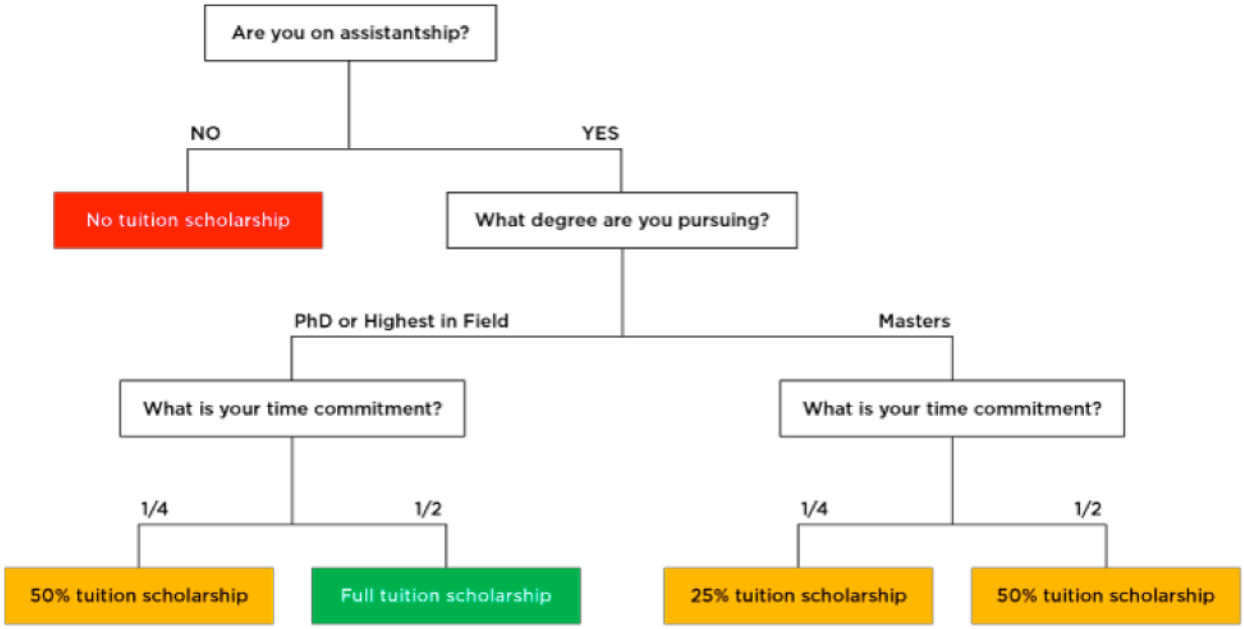
If the student is notified that his/her conversion from M.S. to Ph.D. has been approved (with or without condition), then the student is responsible for filing the appropriate transfer form available from the graduate college website within the college-specified deadline:
http://www.grad-college.iastate.edu/common/forms/student_forms.php

Students in the M.S. program who decide to continue their research into the PhD program may apply with the appropriate form. With approval from the major professor and DOGE, a student may either opt to do both degree programs or they may bypass the M.S. program and proceed directly with the PhD.

Funding

The department of Computer Science will make its best effort to provide support through a combination of fellowships, teaching assistantships (TA) and research assistantships (RA) to all Ph.D. and M.S. students who are making satisfactory progress in the degree program into which they were admitted. (*The department makes no commitments regarding continued support of students originally admitted into the Ph.D. program if they change their degree objective from Ph.D. to M.S*).

Typically, graduate assistants are employed for 1/4-time (10 hours per week) or 1/2-time (20 hours per week). These assistantships are limited and awarded on a competitive basis. Reappointment eligibility is based on academic progress, performance evaluation, and availability of funds. The tuition for the students are covered based on the assistantship commitment (1/2-time, 1/4-time) and degree sought by the student.



International students should contact the International Student and Scholar's Office (ISSO) for specifics regarding employment related to their visa.

Fellowships

Qualified US citizens and permanent residents may be nominated for fellowships and traineeships offered by NSF and NIH funded training programs at ISU (e.g., the Integrative Graduate Education and Research Training (IGERT) program in Bioinformatics (www.igert.iastate.edu).

Highly qualified graduate students may be nominated for fellowships offered by various organizations (e.g., IBM, Pioneer Hi-Bred, NSF, NIH, DOE, NASA).

The stipend and other benefits associated with such fellowships are typically determined by the funding source.

Stipends

Monthly stipend for all graduate students on teaching or research assistantship in Computer Science is published on the departmental website under graduate degree requirement. For questions, contact graduate program coordinator.

Termination of Assistantship Appointment

One or more of the following may be grounds for termination of appointment:

- Failure to maintain the stipulated cumulative grade point average (3.0) set by the Graduate College for appointment. The assistant will be dismissed at the end of the semester in which notice of academic probation is received, but the grace period may be extended for a specified period of time by an agreement between the DOGE and the Graduate Dean.
- Failure to comply with graduate student responsibilities.
- Personal conduct seriously prejudicial to the university, including violation of the Regents' "Uniform Rules of Personal Conduct" and general university regulations.
- Neglect of duty or incompetence.

CRITERIA FOR RENEWAL OF ASSISTANTSHIPS (TA, RA)

Criteria for Renewal of TA Appointments

Decisions concerning continuing TA appointments are made by the Department Chair, in consultation with the DOGE and with input from faculty. Prerequisites for continuing TA appointment are:

- **Satisfactory Academic Progress:** the DOGE/Graduate Committee certifies it.
- **Satisfactory performance of assigned TA responsibilities:** This is determined based on (a) written evaluations from TA supervisors, (b) student evaluation, and/or (c) other appropriate forms of input.
- **English proficiency:** Applicants must achieve **Level 1 SPEAK-TEACH** test rating for students who have been in the program for at least 2 years, and **level 2 for all others**. Exceptions to this rule are allowed only based on departmental needs.
- **Application for (renewal of) TA appointment:** Application must be completed before the departmental deadline for applications for renewal of TA appointments.

In rare cases, students who fail to meet some of the above criteria may be offered renewal of T**A** appointment, subject to availability of funds, at the discretion of the department chair, in consultation with the DOGE.

Criteria for Renewal of RA Appointments

The research supervisor, subject to availability of funds, typically makes decisions concerning continuing RA appointments.

CODE OF COMPUTER ETHICS

You, as a user of computer science computing facilities, are responsible for adhering to accepted standards of ethical behavior. Any unethical use of resources (information, software, hardware), either local to the department or externally accessible via computer networks, will be treated like any other ethical violation as outlined in the Graduate College Student Handbook and in applicable faculty and staff handbooks.

Computer information (stored or in transit) should be treated with the same respect, integrity, and confidentiality as the written or spoken word. Viewing and using information (programs, files or other data) without authorized permission is an invasion of privacy. Such behavior, if used for academic gain, is considered plagiarism. Modifying information and preventing or delaying access to resources are considered acts of destruction. Ethical standards apply even when information is left unprotected. The following statements are general guidelines for ethical use of the computing resources.

All users of departmental computers must have an authorized account. Faculty, staff and computer science majors are provided with continuing accounts. Each non-major is provided with an account for the duration of the enrollment in specific computer science classes. Other accounts must be requested by an individual or sponsoring professor and must be authorized by a designated department administrator. Unless otherwise specified, each account becomes the sole responsibility of its owner and is to be used solely for authorized purposes. For example, student accounts are intended to be used for class assignments and other departmental-oriented activities that are consistent with obtaining an education in computer science. Use of an account by individuals other than the owner or use of an account on the behalf of other individuals is prohibited.

Users are expected to take reasonable precautions to guard against unauthorized use of their accounts or access to confidential information through careful selection of passwords and protection of files.

Users must not browse, access, copy or change private or public files for which they clearly have no authorization. Also disallowed is the modification of the computer system, damage or alteration of software, and the copying of software specifically licensed for use by the department or university.

Because computing resources are limited, they should be used efficiently in order to minimize any adverse impact on others, e.g. game playing should not be excessive and must be avoided entirely whenever it negatively impacts the accessibility of the computing resources. Compute-intensive processes that are expected to execute for an extended period should be run at low priority. The use of invasive software, such as “worms” and “viruses” destructive to computer systems is illegal. Misuse, waste and/or the disruption of the intended use of resources is prohibited (e.g., the flooding of other users with excessive and/or unwanted information).

The installation and use of any program on departmental computers that provides a service to others on the network, or prolonged connections to (or extensive use of) external network services (e.g., http daemons, connection-maintaining daemons, IRC bots or those that appear to act in this manner) via departmental computers must be pre-authorized by the department.

Sending rude, obscene or harassing materials via any electronic means (e.g., electronic mail, bulletin boards, news groups) is forbidden. Also disallowed are random mailings, chain letters and general mailing of messages of commercial, religious, or political nature. Messages of philanthropic content are allowed only if sanctioned by the university.

Displaying material of a sexually explicit or suggestive nature can be considered intimidating, demeaning, hostile or offensive to others and is in violation of the Iowa State University Sexual Harassment Policy.

Hardware, software, manuals, supplies, etc. must not be removed from computing sites. Abuse or misuse of resources will be regarded as illegal and/or unethical behavior. Any observed or suspected violations are to be reported to the instructor or appropriate department administrator.

Computer Science Department facilities are the property of Iowa State University and the State of Iowa and as such, their use is governed by departmental and university regulations and by state laws. Violators may be billed for illegal use and may be prosecuted under Chapter 716A, Computer Crime of the Iowa Code.

Adapted from the Iowa State University Computer Code of Ethics, the NSF Code of Ethics, the Internet Code of Ethics, September 1995.