

Computer Science, PhD

Requirements

The Doctor of Philosophy program in computer science requires a minimum of 72 s.h. of graduate credit, four examinations (qualifying, comprehensive, dissertation proposal, and final), and a written dissertation. Students must maintain a cumulative grade-point average of at least 3.00. Consult the Computer Science Graduate Handbook for detailed information about PhD requirements and graduate study policies.

Basic PhD requirements are as follows.

Core Requirements

Course #	Title	Hours
This course:		
CS:5350	Design and Analysis of Algorithms	3
And one of these:		
CS:4330	Theory of Computation	3
CS:5340	Limits of Computation	3

Breadth

Students must complete at least three of the following courses, with at least one course selected from each area (9 s.h.).

Systems and Software

Course #	Title	Hours
CS:4640	Computer Security	3
CS:4980	Topics in Computer Science II (section approved by the director of graduate studies)	3
CS:5610	High Performance Computer Architecture	3

Networks and Distributed Systems

Course #	Title	Hours
CS:4980	Topics in Computer Science II (section approved by the director of graduate studies)	3
CS:5620	Distributed Systems and Algorithms	3
CS:5630	Cloud Computing Technology	3

Programming Languages and Compilers

Course #	Title	Hours
CS:4980	Topics in Computer Science II (section approved by the director of graduate studies)	3
CS:5810	Formal Methods in Software Engineering	3
CS:5850	Programming Language Foundations	3

CS:5860	Lambda Calculus and Applications	3
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With departmental approval, new courses or specific section offerings of CS:4980 Topics in Computer Science II also may satisfy a given area requirement.

Practice

Students must complete at least one 3 s.h. course with significant practical or implementation-oriented content. Each semester the department designates courses that satisfy this requirement. The following are typical selections.

Course #	Title	Hours
CS:4400	Database Systems	3
CS:4420	Artificial Intelligence	3
CS:4440	Web Mining	3
CS:4470	Health Data Analytics	3
CS:4500	Research Methods in Human-Computer Interaction	3
CS:4630	Mobile Computing	3
CS:4700	High Performance and Parallel Computing	3
CS:4720	Optimization Techniques	3
CS:4980	Topics in Computer Science II (section approved by the director of graduate studies)	3
CS:5800	Fundamentals of Software Engineering	3
CS:5990	Individualized Research or Programming Project	3

Cognate Area

In consultation with their advisor, students are required to select three courses, totaling 9 s.h. or more, that constitute coherent coverage of an external cognate area; the courses need not be offered by the same department. Choices include, but are not limited to, mathematics, statistics, genetics, biology, and engineering disciplines.

Colloquium

Students must earn at least 4 s.h. in the following.

Course #	Title	Hours
CS:6000	Research Seminar: Colloquium Series (must enroll at least four times)	4

Responsible Conduct of Research Requirement

Students must complete this course within their first two years; it is offered in spring semesters.

Course #	Title	Hours
CS:5980	Topics in Computer Science III (Responsible Conduct of Research)	1 s.h.

Electives

Students fill their remaining semester hours with a selection of computer science graduate courses numbered 4300 or above

and graduate courses outside of the Department of Computer Science, approved by their advisor.

Qualifying Exam

Students are required to pass a qualifying examination by the end of their second year of graduate study. Once students select a topic in consultation with their advisor, they are assigned a three-member faculty examination panel by the department. Then they prepare a written prospectus for review by the committee, followed by an oral presentation.

Comprehensive Exam

The comprehensive examination is an evaluation of a student's mastery of a research area near completion of formal coursework and before the preparation of the dissertation. The exam may be written, oral, or both, at the department's discretion, and is administered by a faculty committee. The comprehensive exam typically should be completed by the end of a student's third year and no later than the end of the fourth year in the PhD program.

Dissertation Proposal

At least six months prior to the final exam, a student must form a dissertation committee and circulate a formal thesis proposal to the committee. The proposal should describe the research performed to date and related work, and outline the expected thesis results. A student must argue the originality and significance of the expected results to the committee in a manner consistent with the advisor's counsel, which may or may not include an oral presentation.

Possible outcomes of a thesis proposal are that the committee finds the proposal satisfactory; the committee suggests modifications, and within a few weeks after the proposal defense, the student and committee reach a consensus by email or in face-to-face meetings on a modified set of expected thesis results; or the committee asks the student to redo their proposal, likely with a fresh proposal document and oral presentation, giving the student enough time to address the committee's concerns.

Dissertation

Each student must write a dissertation, a significant, original contribution to the field of computer science. The dissertation must be prepared in accordance with the format specified on the Graduate College Thesis and Dissertation website.

Final Oral Examination

Once the dissertation is complete and has been reviewed by the student's committee, a final oral examination is administered. This examination must take place no sooner than the semester following the successful completion of the comprehensive examination and no later than five years after completion of the comprehensive exam.