

COMPUTER AND INFORMATION SCIENCES (PHD)

The PhD in Computer and Information Sciences offers an opportunity for exceptional students to pursue substantial research in the computer sciences and related areas. To earn a PhD degree, a student must demonstrate breadth of knowledge in at least two (2) research areas and significant depth in a chosen dissertation area. In addition, the student must conceive, write, and defend a PhD dissertation representing a significant and original contribution to current academic research as demonstrated by a public dissertation defense and publication in established peer-reviewed academic conferences and/or journals.

There are two (2) tracks within the PhD Program: the Computing track (C-track) and the Information Systems and HCI track (I-track). Students pursuing PhD topics in typical computer science areas such as algorithms, artificial intelligence, databases, data mining, programming languages, software engineering, etc. follow the Computing track. The Information Systems and HCI track is for students whose topics fall under the category of Information Systems or Human-Computer Interaction. Students must choose whether to enter the Computing or Information Systems track at admission.

Program Requirements	Quarter Hours
Degree requirements for students entering with relevant master's degree	minimum 60 hours
Degree requirements for conditionally admitted students (students without a relevant master's degree)	minimum 100 hours

Learning Outcomes

Students will be able to:

- Propose a research problem and novel solutions that make significant and unique contributions to advance knowledge.
- Select and apply appropriate research methods and experimental designs within the selected research area.
- Demonstrate knowledge of core concepts, theories, and seminal work in the general field of Computer Science (Computing Track) or Information Systems (Information Systems and HCI Track).
- Communicate research results in academic publications including a clear motivation and problem statement, a rigorous survey of related work, a clear explanation and analysis of work performed, and a summary of the novel research contributions.
- Orally communicate complex and novel research concepts.
- Describe the ethical issues of conducting and publishing research using human subjects.
- Evaluate the novelty, correctness, and rigor of research papers describing research in areas related to the selected research.

Degree Requirements

Course Requirements

Most of the courses that PhD students will take will be geared toward preparing the student for the Breadth exams, and for whatever other

preparation the advisor deems necessary. There are some specific requirements for courses, as specified below.

Number of Credits

Students must take at least 60 credits in the CDM 420 - CDM 699 range, including at least 12 credits of CSC 699 (or equivalent as approved by advisor). Non-CDM courses may be substituted with permission of the advisor.

PhD students are required to attend at least 5 research seminars (SoC colloquium) each academic year. At least 3 of them should be attended in person. An exception to in-person attendance can be granted for remote students, with the approval of their advisor and PhD committee Chairs. After each seminar, the student shall prepare a report and submit it to their advisor. The format of this report is to be discussed with the advisor. These reports are part of their annual performance evaluation.

CSC 426

Students must take CSC 426 in their first two years.

Other Requirements for Conditionally Admitted Students

Students who do not have a master's degree are considered "conditionally admitted" students. These students must complete an additional 40 credits (typically 10 courses) of graduate coursework, including 36 credits (9 courses) of CDM courses in the range of 420 - 598. No courses under CSC 420 shall count toward the PhD degree. Non-CDM courses may be substituted with permission of the advisor.

Grade Requirements

Students must maintain a grade point average of 3.5 or better to remain in good standing in the program. Any course grade below B- is unsatisfactory and will not be counted toward degree requirements.

Continuous Enrollment

Students must remain continuously enrolled in CSC 701 (Full Time, 0 credits) or CSC 702 (Part Time, 0 credits) in Fall, Winter, and Spring quarters if they are not taking any other courses. CSC 701 is for students who are working on their doctoral work on a full-time basis during that quarter. CSC 702 is for those students working on their doctoral work on a part-time basis (e.g., if they also hold a full-time job).

Exams

Breadth Exams

Students must pass two Breadth Exams. Exams are administered in the second week of the Spring and Fall Quarters. Registration for the exams are due 30 days prior. If an exam is unsuccessful, the student is required to retake the Breadth Exam in that same area. Students may attempt a Breadth Exam twice. If a student fails a Breadth Exam twice, he or she will be dismissed from the program.

In consultation with their advisor, students in the C-track can choose two exams from among the following.

- Artificial Intelligence
- Automata Theory, Complexity and Computability
- Cyber-physical Systems Engineering
- Cybersecurity
- Data Science
- Databases
- Human-Computer Interaction
- Networking

- Programming Languages & Compilers
- Software Engineering
- Systems
- Visual Computing

- No less than eight months and no more than five years between Proposal Defense and Dissertation Defense.

In consultation with their advisor, students in the I-track can choose two exams. One of the breadth exams must be selected from the following topic areas. The second breadth exam can be either one of the I-track exams listed below or a C-track exam from the previous list.

- Analysis and Design
- Governance, Risk Management and Compliance
- IT Project Management
- Information Security and Compliance
- IT Policy, Strategy, and Management
- E-Commerce Technology
- Human-Computer Interaction

Depth

Students must complete a Depth examination in the chosen area of research. The Depth Exam must be completed before the Proposal Defense.

For the C-track, the specifics of the depth examination will be determined by the student's Dissertation Committee, who must all agree on the format of the exam and whether it was successfully completed.

The I-track Depth Exam is a take-home exam administered by the student's advisor. This exam covers research methodology and essential data analysis techniques. A common reading list is established by the I-track faculty for this exam.

The Dissertation

After the exams have been passed, the student must propose a significant original research project and successfully defend that proposal to the student's Dissertation Committee. Once the research has been completed, the student must hold a public defense to demonstrate to the Dissertation Committee that the work has been completed satisfactorily.

Time Limits

Full-Time Students

- Year 1: (a) Pass at least 1 breadth exam **or** (b) show concrete evidence of initial research, such as a literature review, technical report, poster presentation at a conference, etc.
- Year 2: (a) Pass both breadth exams **and** (b) show evidence of continuing research, such as publication or conference presentation.
- Years 3 to 5: Continue to demonstrate progress in research; submit additional publication(s) to reputable journals or conferences; **and** pass Proposal Defense.
- No less than six months and no more than three years between Proposal Defense and the Dissertation Defense.

Conditionally admitted students will have an extra year to achieve these milestones.

Part-Time Students

- No more than three years between enrollment in the doctoral program and completion of Breadth Examinations.
- No more than five years between completion of Breadth Examinations and Proposal Defense.