

Doctor of Philosophy in Computer and Information Sciences

The Computer and Information Science Ph.D. program prepares a student to undertake independent research leading to science and engineering advances in computer and information sciences. The program is structured around the Ph.D. dissertation, with coursework and seminars designed to attain the requisite quality of the dissertation. An important criterion for the dissertation is that it be publishable in a recognized journal and presentable at international conferences.

1. Areas of Specialization

The Ph.D. program focuses on four research tracks:

- **Artificial Intelligence and Applications (AI)**, which is concerned with systems that exhibit intelligent behavior; (Track Chair: Dr. Longin Jan Latecki)
- **Computer and Network Systems (NS)**, which covers systems programming, operating systems, and system architectures, including networks and distributed systems; (Track Chair: Dr. Jie Wu)
- **Information Systems (IS)**, which focuses on systems that provide information to improve the performance of organizations; (Track Chair: Dr. Zoran Obradovic)
- **Software Systems (SS)**, which is dedicated to the creation of software and its associated methodologies. (Track Chair: Dr. Justin Shi)

2. Summary of Course Requirements

The detailed course requirements can be found at the [official bulletin](#):

- Students must take 8 courses (24 credits) from among those approved for their track. Please refer to the [official bulletin](#) for a detailed course list for each track.
- Students select 12 credits of research preparation courses (which could be CIS 9182 or 9282 Independent Study, or graduate-level (CIS 5500 level or above) courses, or graduate courses from related domains aligned with the student's research area approved by the faculty advisor)
- Student must take at least 6 credits research courses (CIS 9994 Preliminary exam prep, CIS 9998 Pre-dissertation research, and CIS 9999 Dissertation research). At least 2 credits of the 6 credits are required to be from CIS 9999.

Total credit hours requested is 42.

- To register CIS 9182/9282, 9994, 9998, 9999, please submit "**Ph.D. Course Enrollment Form**" to the Graduate Program Administrative Coordinator.
- Graduate credits from other institutions can be transferred via Advance Standing by a case-by-case basis. Please submit the Graduate School "[Request for Advanced Standing or Transfer of Graduate Credit](#)" Form to the Graduate Program Administrative Coordinator.

Advanced Standing: Students who enter the Ph.D. program with graduate credits in Computer Science or a closely related field may be considered for advanced standing. The CIS Graduate Committee recommends the awarding of advanced standing on a case-by-case basis. The credits must be equivalent to coursework offered at Temple, with a grade of "B" or better having been earned in the course(s). The maximum number of advanced standing credits awarded is 24.

3. Summary of Milestones and Exam Requirements

Each student progresses through the Ph.D. program at a different pace, which may depend on your research topic or background. There are four milestones in the CIS Ph.D. program:

- Qualifying Exam
- Prelim Exam I
- Prelim Exam II
- Dissertation Defense

Detailed requirements of these milestones are listed below.

4. Ph.D. Qualifying Exam

The Qualifying Examination tests the student on the fundamentals of Computer and Information Science and the basic body of knowledge in a track. It consists of a written exam on theory and algorithms, systems, and track-specific material. The Qualifying Exam is usually given every Spring semester (usually in February). The exam consists of seven written questions. [Note: Questions on individual courses may be waived if the student has taken the course at Temple University within four years of admission to the doctoral program and received a grade of A or A- in that course. Transferred credits via advance standing do not satisfy the waiver.]

Qualifying Requirements by Track: The seven courses on which a student's qualifying examination will be based must be approved in writing by the student's Advisor and Track Chair.

Artificial Intelligence:

- - three required CIS courses (the three courses are also required for Qualifying Exam):
CIS 5511 Programming Techniques,
CIS 5526 Machine Learning,
CIS 5603 Artificial Intelligence;
- - at least five CIS courses (choose at most four for inclusion in Qualifying Exam)

Computer and Network Systems:

- at least two Core courses: CIS 5511, 5512, 5513, 5542, 5617
- at most five Didactic courses: CIS 5526, 5536, 5537, 5539, 5544, 5603, 9615, 5516 (9616), 9618, 9664, 9665, 9666, 9669.

Information Systems:

- at least one and up to three Theory/Algorithms courses: CIS 5511, 9615, Stat 8003
- at least one and up to four Systems courses: CIS 5512, 5516, 5617, 5644, 9666
- at least two and up to four Track Specific courses: CIS 5525, 5526, 5527, 5603, 9618, 9664, 9665, 9668, 9590.

Software Systems:

- three Theory/Algorithms courses: CIS 5513, 5511, 9615
- three Systems courses: CIS 5512, CIS 5516, CIS 5617
- one Track Specific course: CIS 9618.

The exam may be retaken only once (either in full or in part), normally within one year of the first attempt, and only with the permission of the Graduate Committee. The Committee may, at its discretion, recommend a passing grade for a student conditional upon the satisfactory completion of a list of courses prescribed by the Committee for the purpose of remedying specific deficiencies. Failing this exam a second time means automatic dismissal from the program.

5. Ph.D. Preliminary Examinations

Doctoral Advisory Committee: Once students have passed the Qualifying Examination, they are expected, during that same semester, to choose the area in which they plan to do their research and to find an advisor willing to supervise them. The student and advisor should formulate a Plan of Study to complete the coursework requirements for the Ph.D. degree. The advisor and the

student will then select at least two additional graduate faculty members for the Advisory Committee. The Advisory Committee must contain at least one other member of the CIS Department (in addition to the advisor) and it must be approved by the Graduate Program Committee. The student's Plan of Study must be approved by this Advisory Committee and the Graduate Program Committee, normally before the end of the semester in which the Qualifier Examination is passed. The Advisory Committee administers the Preliminary Examinations.

Preliminary Examinations: The goal of the preliminary exams is to test the research skills and knowledge of the student and the appropriateness and feasibility of the proposed research. The exams are completed in two stages:

- Prelim I consists of written and oral components testing advanced track knowledge and in-depth knowledge of the research area and includes a literature review of the area. Prelim I will also be used to determine whether the student needs to take additional courses in order to support research in the chosen area. Prelim I is open only to the Doctoral Advisory Committee and members of the department. It is to be taken within one year of passing the Ph.D. Qualifying Examination. Students must be registered for at least 1 credit of CIS 9994 Preliminary Exam Preparation in the semester in which the examination is taken.
- Prelim II consists of written and oral components to assess the appropriateness of the research including the approach and methodology. It is designed to ensure that the selected research problem is of reasonable scope and significance and that the proposed dissertation is feasible. The written portion of Prelim II should be of sufficient quality to be publishable as a department technical report. This exam is open to the public. Students must be registered for at least 1 credit of CIS 9998 Predissertation Research in the semester in which the examination is taken.

The Doctoral Advisory Committee evaluates the preliminary examinations. Each member votes to pass or fail the student. In order to pass, a majority of the committee members must agree that the exam has been satisfactorily completed. The successful completion of the preliminary examinations produces a written understanding among the student, faculty advisor, and Doctoral Advisory Committee, specifying the work to be done to obtain final approval of the dissertation.

Students who are preparing to do their preliminary examinations should confirm a time and date with the Chair of their Doctoral Advisory Committee and register with the CIS Administrative Coordinator one month prior to the date. To schedule an exam, students should contact the CIS Administrative Coordinator.

Students who have completed all coursework for the degree, but have not passed the Prelim I, must register each Fall and Spring semester for at least 1 credit of CIS 9994. Students must be registered for CIS 9994 in the semester in which the examination is taken, including the Summer session. A student who is required to retake the preliminary examination in whole or in part must re-register for 1 credit of CIS 9994 in the semester in which the examination is retaken. Students who have passed the Prelim I, but not the Prelim II must register each Fall and Spring for at least 1 credit of CIS 9998. Students must be registered for CIS 9998 in the semester in which the Prelim II examination is taken, including the Summer session.

Dissertation Proposal: After passing the Prelim II, students are admitted to PHD candidacy by submitting their dissertation proposal with the form of "[Dissertation Proposal Transmittal for](#)

Elevation to Candidacy". The dissertation proposal demonstrates the student's knowledge of and ability to conduct the proposed research. The proposal should consist of:

1. the context and background surrounding a particular research problem;
2. an exhaustive survey and review of literature related to the problem; and
3. a detailed methodological plan for investigating the problem.

The proposal should be finished and approved no more than one year after completing coursework. Upon approval, a timeline for completing the investigation and writing process are established.

6. Dissertation Defense

After passing both parts of the Preliminary Exam and being admitted to PHD candidacy, students begin work on their dissertation under the direction of their Advisory Committee. Students must enroll for at least two credits of CIS 9999 Dissertation Research. Students must be registered for CIS 9999 in the semester in which they defend their doctoral dissertation.

Dissertation: The doctoral dissertation is an original empirical study that makes a significant contribution to the field of Computer and Information Science. It should expand the existing knowledge and demonstrate the student's knowledge of research methods and a mastery of her/his primary area of interest. Dissertations should be rigorously investigated; uphold the ethics and standards of the Computer and Information Science field; demonstrate an understanding of the relationship between the primary area of interest and the broader field of Computer and Information Science; and be prepared for publication in a professional journal. The dissertation should be prepared according to the requirements of the Graduate School. Please refer to the Dissertation & Thesis Handbook for further direction.

The **Doctoral Advisory Committee** is formed to oversee the student's doctoral research and is comprised of at least three Graduate Faculty members. Two members, including the Chair, must be from the Department of Computer and Information Sciences. Committee compositions must be approved by the CIS Graduate Committee. The Chair is responsible for overseeing and guiding the student's progress, coordinating the responses of the committee members, and informing the student of her/his academic progress.

The **Dissertation Examining Committee** evaluates the student's dissertation and oral defense. This committee is comprised of the Doctoral Advisory Committee and at least one additional Graduate Faculty member from outside the Department of Computer and Information Sciences. The Outside Examiner should be identified no later than the beginning of the term in which the student will defend the dissertation. The committee evaluates the student's ability to express verbally her/his research question, methodological approach, primary findings, and implications. The committee votes to pass or fail the dissertation and the defense at the conclusion of the public presentation.

If a student needs to change a member of a committee, the new member must be approved by the CIS Graduate Committee and registered with the Administrative Coordinator and the Graduate School.

Students who are preparing to defend their dissertation should confirm a time and date with their Doctoral Advisory Committee and register with the Administrative Coordinator at least 30 days before the defense is to be scheduled. The student and Chair receive confirmation of the time,

date, and room for the examination. The Administrative Coordinator sends the Graduate School a completed "Announcement of Dissertation Defense" form, found in TUportal under the Tools tab within "University Forms," at least 10 days before the defense. The department posts flyers announcing the defense.

7. Teaching Requirements

As part of the normal graduate training program, all Ph.D. candidates are expected to teach at least one course as a Teaching Assistant (TA).

8. Other Requirements and Policies

In general, students must satisfy the requirements of the CIS Department, the College of Science and Technology, and the Graduate School. These currently include the following:

- Students must register EVERY SEMESTER and must complete the program within seven years from the date of admission, unless permission is given by the Dean of the Graduate School (which includes completing and the approval of a "Leave of Absence" process)
- Students must have a 3.0 (or "B") average and no incomplete courses at the time of graduation;
- Students may not receive more than two grades of less than "B-".
- Students may not receive more than one grade of a "F."

PhD FAQ:

More FAQ can be found at https://cis.cst.temple.edu/academics/graduate/phd_faq/

Can I take courses from other disciplines?

There is no limit on the number of credits earned from other Temple departments. However, such courses must be approved by the Graduate Program Committee in consultation with the student's Advisory Committee.

Can I transfer to one of the MS degree programs?

All CIS graduate students accepted into the Ph.D. program are expected to successfully complete the program. Transfer to one of the MS degree programs is not permitted except under extraordinary circumstances.

When can I apply for a Dissertation Completion Grant?

Students who no longer are receiving support from the University and who are official Ph.D. candidates [having passed Prelim II and been elevated to candidates by the Graduate School] can apply for a one-time Dissertation Completion Grant. Students receiving such awards are not allowed to receive University funding again.