Computer and Information Science PhD

COLLEGE OF SCIENCE AND TECHNOLOGY

Learn more about the Doctor of Philosophy in Computer and Information Science.

About the Program

The Computer and Information Science PhD 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 PhD 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.

Time Limit for Degree Completion: 7 years

Campus Location: Main

Full-Time/Part-Time Status: Students complete the degree program through classes offered after 4:30 p.m. The degree program can be completed on a full- or part-time basis.

Areas of Specialization: The PhD program focuses on four research tracks:

1. Artificial Intelligence and Applications, which is concerned with systems that exhibit intelligent behavior.
2. Computer and Network Systems, which covers systems programming, operating systems, and system architectures, including networks and distributed systems.
3. Information Systems, which focuses on systems that provide information to improve the performance of organizations.
4. Software Systems, which is dedicated to the creation of software and its associated methodologies.

Job Prospects: Graduates typically find employment in universities, industry or government agencies.

Non-Matriculated Student Policy: Non-matriculated students are permitted to take a maximum of two graduate-level CIS courses.

Financing Opportunities: Teaching Assistants teach two undergraduate laboratory sections each term under the direction of a faculty lecturer. Assistantships provide a stipend and full-time tuition.

Admission Requirements and Deadlines

Application Deadline:

Fall: January 15
Spring: November 1; August 1 international

Applications are reviewed as they are received. Late applications may be considered for admission.

APPLY ONLINE to this graduate program.

Letters of Reference:
Number Required: 3

From Whom: Letters of recommendation should be obtained from Computer Science faculty and professionals.

Coursework Required for Admission Consideration: The applicant is required to have a solid background in Computer and Information Science and related disciplines. In addition, acceptance by a PhD Graduate Faculty member in at least one open track is required. To find a faculty advisor, prospective students should contact Graduate Faculty whose research interests are similar to their own. The list of faculty can be found at https://cis.temple.edu/people/faculty.

Master's Degree in Discipline/Related Discipline: A master's degree is not required.

Bachelor's Degree in Discipline/Related Discipline: A baccalaureate degree in Computer Science, Information Science, Mathematics, Science or Engineering is required. The applicant's undergraduate program must include a considerable amount of coursework in Computer and Information Science.

Statement of Goals: Identify your specific interest in Temple's program, research goals, future career goals, and academic and research achievements.

Standardized Test Scores:

GRE: Optional

Applicants who earned their baccalaureate degree from an institution where the language of instruction was other than English, with the exception of those who subsequently earned a master's degree at a U.S. institution, must report scores for a standardized test of English that meet these minimums:

- TOEFL iBT: 85
- IELTS Academic: 6.5
- PTE Academic: 58
- Duolingo: 110

A score of 45 or greater on the Test of Spoken English (TSE) or a score of 28 or greater on the TOEFL iBT Speaking section is required for international applicants who wish to be considered for a Teaching Assistantship.

Resume: Current resume required.

Advanced Standing: Students who enter the PhD 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.

Program Requirements

General Program Requirements:
Number of Credits Required Beyond the Baccalaureate: 36

Required Courses:

Code	Title	Credit Hours
Track-Specific Courses [1]		**24**
Research Preparation Courses		
Select 6 credits from the following:		6
CIS 9182	Independent Study	
CIS 9282	Independent Study	
Graduate-level course aligned with the student's research area [2]		
Research Courses		**6**
CIS 9994	Preliminary Examination Preparation	
CIS 9998	Pre-Dissertation Research / Elevation to Candidacy	
CIS 9999	Dissertation Research	
Total Credit Hours		**36**

1 Required and elective courses are identified in the course lists below for each of the four tracks: Artificial Intelligence and Applications, Computer and Network Systems, Information Systems, and Software Systems.

2 Course selection requires approval from the faculty advisor and Graduate Committee.

Artificial Intelligence and Applications Track

Code	Title	Credit Hours
Core Courses		
Select at least four courses from the following:		12-18
CIS 5511	Programming Techniques	
CIS 5515	Design and Analysis of Algorithms	
CIS 5525	Neural Computation	
CIS 5526	Machine Learning	
CIS 5543	Computer Vision	
CIS 5603	Artificial Intelligence	
Additional Track-Specific Courses		
Select at most four courses from the following:		12-6

CIS 5516	Principles of Data Management	
CIS 5517	Data-Intensive and Cloud Computing	
CIS 5523	Knowledge Discovery and Data Mining	
CIS 5528	Predictive Modeling in Biomedicine	
CIS 5538	Text Mining and Language Processing	
CIS 5617	Computer Networking and Communication	
CIS 5637	Network & Information Security	
CIS 5590	Topics in Computer Science	
CIS 9590	Seminar in Advanced Topics in Computer Science	
CIS 9665	Advanced Topics in Data Base Systems	
Total Credit Hours		**24**

Computer and Network Systems Track

Code	Title	Credit Hours
Core Courses		
Select at least four courses from the following:		12-18
CIS 5511	Programming Techniques	
CIS 5512	Operating Systems	
CIS 5515	Design and Analysis of Algorithms	
CIS 5617	Computer Networking and Communication	
CIS 5637	Network & Information Security	
CIS 5642	Computer Architecture	
Additional Track-Specific Courses		
Select at most four courses from the following:		12-6
CIS 5523	Knowledge Discovery and Data Mining	
CIS 5526	Machine Learning	
CIS 5603	Artificial Intelligence	
CIS 5636	Ad Hoc Networks	
CIS 5639	Wireless Network and Communication	
CIS 5644	Distributed Systems	
CIS 5517	Data-Intensive and Cloud Computing	
CIS 5590	Topics in Computer Science	
CIS 5635	Security in Cyber-Physical Systems	
CIS 5643	Emerging Storage Systems and Technologies	
CIS 5618	Energy Management in Data Centers and Beyond	
CIS 9665	Advanced Topics in Data Base Systems	
CIS 9669	Distributed and Parallel Computer Systems	
Total Credit Hours		**24**

Information Systems Track

Code	Title	Credit Hours
Select a minimum of one and up to three theory courses from the following:		
CIS 5511	Programming Techniques	
CIS 5515	Design and Analysis of Algorithms	
STAT 8003	Statistical Methods and Concepts	
Select a minimum of one and up to three systems courses from the following:		
CIS 5512	Operating Systems	
CIS 5516	Principles of Data Management	
CIS 5517	Data-Intensive and Cloud Computing	
CIS 5617	Computer Networking and Communication	

CIS 5637	Network & Information Security	
CIS 5644	Distributed Systems	
Select a minimum of two and up to four track-specific courses from the following:		
CIS 5523	Knowledge Discovery and Data Mining	
CIS 5524	Analysis and Modeling of Social and Information Networks	
CIS 5525	Neural Computation	
CIS 5526	Machine Learning	
CIS 5528	Predictive Modeling in Biomedicine	
CIS 5590	Topics in Computer Science	
CIS 5603	Artificial Intelligence	
CIS 9590	Seminar in Advanced Topics in Computer Science	
CIS 9665	Advanced Topics in Data Base Systems	
Total Credit Hours		**24**

Software Systems Track

Code	Title	Credit Hours
Core Courses		
Select at least four courses from the following:		12-18
CIS 5511	Programming Techniques	
CIS 5512	Operating Systems	
CIS 5515	Design and Analysis of Algorithms	
CIS 5516	Principles of Data Management	
CIS 5617	Computer Networking and Communication	
CIS 5637	Network & Information Security	
Elective		
Select at most four courses from the following:		12-6
CIS 5517	Data-Intensive and Cloud Computing	
CIS 5523	Knowledge Discovery and Data Mining	
CIS 5525	Neural Computation	
CIS 5526	Machine Learning	
Total Credit Hours		**24**

Additional Requirement:

PhD Qualifying Examination:

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 offered twice a year, usually in late January and late June.

Culminating Events:

Preliminary Examinations:

The goal of the preliminary examinations 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. It includes a literature review of the area. This preliminary exam is 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 PhD Qualifying Examination.
- Prelim II consists of written and oral components to assess the appropriateness of the research, including 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.

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. 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 Administrative Coordinator one month prior to the date. The student and Chair receive confirmation of the time, date and room of the examination.

Dissertation Proposal:
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.

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 their 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 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 their 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 their 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.

Contacts

Program Web Address:

https://www.temple.edu/academics/degree-programs/computer-and-information-science-phd-st-cis-phd

Department Information:

Dept. of Computer and Information Sciences
313 Science and Education Research Center
1925 N. 12th Street
Philadelphia, PA 19122-1801
cisadmit@temple.edu
215-204-8450

Submission Address for Application Materials:

https://cst.temple.edu/academics/graduate-programs/apply-now

Department Contacts:

Admissions:
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215-204-8450

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