

Computer Science with Interdisciplinary Applications (Ph.D.)

Overview

The doctoral program in Computer Science with Interdisciplinary Applications trains PhDs in computer science and the application of computational methods to cutting-edge research in scientific, engineering, and other quantitative fields. The program is offered by the Department of Computer Science with collaborating faculty in science, engineering, business, medicine, and healthcare.

Program Requirements

Students admitted with a bachelor's degree will complete a minimum of 36 hours of coursework and 36 hours of directed research for 72 hours total.

Students admitted with a master's degree in computer science, computer engineering or a closely related field will complete a minimum of 18 hours of coursework and 36 hours of directed research for 54 hours total.

Milestone Requirements

At minimum, program milestones include the following:

1. Students must pass a qualifying exam by the semester after they complete 36 hours in the program (2 years full-time).
2. Students must submit and defend a dissertation proposal within 5 years of starting the program to advance to candidacy.
3. After at least one year of candidacy, students must submit and defend a dissertation.

Admission Requirements

To be admitted, prospective candidates must meet all requirements for graduate admission to The University of Texas Rio Grande Valley (UTRGV), as well as the other requirements listed below:

1. Earned baccalaureate or master's degree in computer science, computer engineering, or a closely related field from a U.S. accredited institution or an international institution recognized by a credentialing service.
2. Students with an earned baccalaureate or master's degree in a STEM or other quantitative field may be considered. Such students will be required to take appropriate leveling course work before beginning the program of study.
3. Awarded a baccalaureate degree with an earned GPA of 3.0 or better on a 4.0 scale in the last 60 semester credit hours from a regionally accredited institution in the United States or a recognized international equivalent in a similar or related field
or
4. Awarded a master's degree with an earned GPA of 3.0 or better on a 4.00 scale from a regionally accredited institution in the United States or a recognized international equivalent in a similar or related field.
5. Three letters of recommendation from professional or academic sources.
6. Letter of intent detailing professional goals and reasons for pursuing the graduate degree.
7. Resume/CV.
8. GRE General Test. GRE test scores are valid for 5 years. A waiver of the GRE requirement will be granted to applicants who show proof of completing an undergraduate degree in computer science or a closely related field with an undergraduate GPA above a 3.0 or a master's degree in computer science with a graduate GPA of 3.25 or higher.

Application for admission must be submitted prior to the published deadline. The application is available at www.utrgv.edu/gradapply.

Other Admission Information

The program will accept part-time students as well as transfer students from other graduate programs. Transfer of graduate credit is based on policies set out by the UTRGV Graduate College and subject to approval by the program director.

Program Requirements

Leveling Courses

Computer Programming Courses:

CSCI 1370	Computer Science I for Majors
CSCI 2380	Computer Science II
CSCI 3329	Object Oriented Programming in Python

Theory and Algorithms Courses:

CSCI 3310	Mathematical Foundations of Computer Science
CSCI 3333	Algorithms and Data Structures

Required Courses - 12 Hours

Students admitted with a bachelor's degree only must complete all of the courses below. Students admitted with a master's degree who have completed comparable courses to those below will take additional elective courses to fulfill the minimum hours for the degree. Conversely, students with a master's degree who have not taken comparable courses to those below will take all four courses and will take reduced elective courses.

CSCI 6323	Design and Analysis of Algorithms
CSCI 6339	Theoretical Foundations of Computer Science
CSCI 8101	Doctoral Seminar
CSCI 8301	Doctoral Studies in Computing

CSCI 8101 must be taken three times.

Prescribed Electives - 3 Hours

Students admitted with a bachelor's degree must complete one of the courses below. Students admitted with a master's degree who have completed comparable courses to those below will take additional interdisciplinary elective courses to fulfill the minimum hours for the degree. This degree plan includes courses that appear in more than one section of the degree plan. Such courses can only be used to fulfill one requirement on the degree plan and credit hours will only be applied once.

CSCI 6334	Advanced Operating Systems
CSCI 6335	Advanced Computer Architecture
CSCI 6356	Parallel Computing

Interdisciplinary Electives – 21 Hours

Students admitted with a bachelor's degree must complete seven of the following courses, with a minimum of four CSCI courses. Students admitted with a master's degree must complete one of the following courses. Students are required to consult with their adviser to determine an appropriate set of electives for their research. This degree plan includes courses that appear in more than one section of the degree plan. These courses can only be used to fulfill one requirement on the degree plan and credit hours will only be applied once.

CSCI 6333	Advanced Database Design and Implementation
CSCI 6334	Advanced Operating Systems
CSCI 6335	Advanced Computer Architecture
CSCI 6350	Advanced Artificial Intelligence
CSCI 6352	Advanced Machine Learning

CSCI 6355	Bioinformatics
CSCI 6356	Parallel Computing
CSCI 6366	Data Mining and Warehousing
CSCI 6373	Information Retrieval and Web Search
CSCI 8321	Advanced Games and Computation
CSCI 8322	Molecular Computation
CSCI 8323	Cryptography
CSCI 8324	Computational Geometry
CSCI 8350	Deep Learning
CSCI 8351	Reinforcement Learning
CSCI 8360	Advanced Data Mining
CSCI 8361	Pattern Recognition in Time-Series Data
CSCI 8370	Topics in Computer Science
CSCI 8371	Swarm Robotics
CSCI 8386	Systems Biology
ELEE 6331	Nonlinear Systems
ELEE 6332	Optimization
ELEE 6347	Image Processing
ELEE 6378	Robot Modeling and Control
HGEN 8330	Advanced Topics in Statistical Genetics
HGEN 8335	Advanced Topics in Bioinformatics
HGEN 8355	Advanced Topics in Omics Research
HGEN 8360	Advanced Topics in Population Genetics
INFS 8338	Design Science Information Systems Research
INFS 8358	Digital Society
INFS 8388	Social Media Analytics
MANE 6321	Robotics and Automation
MANE 6328	Dynamic System Modeling and Forecasting
MANE 6331	Advanced Manufacturing Planning and Control
MANE 6340	Operations Research and Analysis
MANE 6342	Decision Support Systems
MATH 8331	Abstract Algebra
MATH 8365	Advanced Probability & Statistics
MATH 8375	Advanced Numerical Analysis
MATH 8379	Advanced Stochastic Processes
PHYS 6352	Computational Physics
PHYS 6355	Computational Physics II
PHYS 8352	Advanced Computational Physics

Dissertation Research – 33 hours

Students must complete 33 total credit hours through a combination of 1, 3, 6 and 9 credit hour research courses as advised by their faculty advisor.

CSCI 8190	Dissertation Research
CSCI 8390	Dissertation Research

CSCI 8690	Dissertation Research
CSCI 8990	Dissertation Research

Dissertation – 3 Hours

Students enroll for the following course in the semester that they submit and defend their dissertation.

CSCI 9300	Doctoral Dissertation
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Catalog Publication

The PhD in Computer Science with Interdisciplinary Applications has been approved by UT System, the Texas Higher Education Coordinating Board, and the Southern Association of Colleges and Schools Commission on Colleges. The program will accept its first cohort fall of 2024. The program will be published in the 2024-2025 UTRGV Graduate Catalog.