



DOCTORAL DEGREE Programs in

# Computer Science

College of Engineering, Design and Computing  
University of Colorado Denver

*These degree requirements are in effect starting from 2024-2025 Admission.*

The Department of Computer Science and Engineering (CSE) offers two Doctor of Philosophy degrees as part of the Computer Science and Engineering Graduate Program:

- Computer Science and Information Systems (CSIS)
- Engineering and Applied Science (EAS); an umbrella degree within the College of Engineering, Design and Computing with four possible home departments (Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, and Civil Engineering)

The CSE department also offers a master's degree in CS, several graduate certificates, and undergraduate degrees. For a complete list of degrees, please visit the CSE website at [cse.ucdenver.edu](http://cse.ucdenver.edu).

**Research & Faculty Expertise:** For the list of our current faculty and their research areas visit the [department faculty website](#). Some areas of emphasis include computer graphics & virtual reality, cyber-physical systems, cybersecurity & secure computing, data science, big data management and mining, high-performance distributed computing, human-centric computing, machine learning, parallel and distributed systems, theory and algorithms.

## **Computer Science and Engineering Department PhD Degree Requirements**

For students interested in earning a PhD from the CSE Department, please see the College of Engineering, Design and Computing [Graduate Admissions website](#) for admission requirements and deadlines.

Both PhD programs require a total of minimum of 30 credits of graduate level coursework and 30 hours of PhD dissertation.

## **Required Coursework**

Students are required to complete a total of 30 credit hours of graduate level coursework satisfying the following minimum requirements.

### ***CSIS PhD Coursework***

- 30 credit hours of graduate-level (5000-level or above) coursework.
- Up to 6 credit hours of 7000-level Independent Study under supervision of a CSE faculty research advisor is allowed/recommended.

### ***EAS PhD Coursework***

- 30 credit hours of graduate-level (5000-level or above) coursework.
- 12 credit hours of the total 30 **must** be from a secondary (non-Computer Science) area.
- 2 semesters of Engineering Seminar (0.5 credits/semester will not be counted towards the 30 hours of required coursework).
- Must include 3 credit hours of 7000-level Independent Study under supervision of a CSE faculty research advisor is allowed/recommended.

***Your program plan must be made in consultation and approval of your research advisor.***

Students are responsible for completing all requirements towards graduation. Students are expected to work closely with their CSE research advisor to verify satisfactory progress towards their doctoral degree. All degree requirements must be met within eight (8) years of matriculation.

Students must complete all 30 hours of coursework and pass their preliminary exams before enrolling in any Dissertation credit hours.

## **Preliminary Exams**

The Ph.D. Preliminary Exams are intended to test students' knowledge in four core subject areas of computer science. Students are required to select three out of four core knowledge areas listed below and pass a written exam for each:

- Algorithms
- Computer Architecture
- Operating Systems
- Theory

The preliminary exams are held once per year in January, during the last week of Winter Break, before the start of Spring semester classes. Exams for Architecture and Operating Systems will be held on that Thursday at 10:00am and 12:00pm respectively; exams for Algorithms and Theory will be held on that Friday at 10:00am and 12:00pm respectively.

Students must sign up for the exams by December 5th of the previous year (the Fall semester before exams take place). Students may take one, two, or all three exams at once. Students may

elect to take the exams of their choosing within the first year of their admission. Students must successfully complete three exams before or during the second year of the program. Students may repeat an exam area once, but cannot change the 3 chosen exam areas once their exams have begun. A guide for the exams is available on the [CSE department website](#).

## Comprehensive Exam

The Ph.D. Comprehensive Exam is intended to test students' capability to complete, with guidance, key research in computer science. Performance on the exam should reflect the students' knowledge of relevant literature, current research within the scope of his/her area of research focus, and a plan to conduct research toward the goal of defining, implementing, and completing a PhD research dissertation in computer science.

The Comprehensive Exam must be taken upon completion of student's coursework and Preliminary Exams and completed within three years of admission to the PhD program (at most 10 credits of dissertation hours may be completed thus far).

The *Request for Examination* and *Application for Candidacy* forms are due a minimum of **2 weeks** prior to the date of the Comprehensive Exam. For a list of university-mandated forms, please visit [Graduate Education's Forms webpage](#).

A minimum committee of three CSE full-time graduate faculty is required. The chair of the committee cannot be the student's advisor.

Please reference the [PhD Comprehensive Exam Guide](#) for further instruction.

## Proposal Defense

The PhD Proposal Defense is intended to test student's ability to perform, present and discuss his/her research. This exam has both a written and an oral component. Students are expected to describe their research including literature review, problem definition, and methodologies/models being used to study an original investigation of a significant and novel problem in computer science toward fulfilling the doctoral dissertation.

The Proposal Defense should be completed no later than the semester before graduation, and within four years of admission into the PhD program. Students must obtain their advisor's recommendation with a minimum of 75% of their dissertation completed. A committee of five members is required: a minimum of 3 CSE full-time graduate faculty and a minimum of one external faculty. This committee must be the same as the Ph.D. Final Defense committee. The chair of the committee cannot be the student's advisor.

The *Request for Examination* form is due a minimum of **2 weeks** prior to the date of the exam. For a list of university-mandated forms, please visit [Graduate Education's Forms webpage](#).

Students are responsible for coordinating a time and room for the Proposal Defense to take place with their committee.

## **Ph.D. Final Defense**

At the completion of graduate studies, students must prepare, defend and submit a written thesis describing the results of an original investigation contributing to the state-of-the-art in the field. Students must submit their dissertation as a PDF to the CU Denver Writing Center for format review prior to the defense. Students must submit their final dissertation to ProQuest by the last day of classes in semester in which they defend. For more information on Dissertation formatting and ProQuest, please visit Graduate Education's [Thesis and Dissertation](#) webpage.

A committee of five members is required: a minimum of 3 CSE full-time graduate faculty and a minimum of one external faculty. This committee must be the same as the Proposal Defense committee. The chair of the committee cannot be the student's advisor.

The *Request for Examination* and *Thesis/Dissertation Approval* forms are due a minimum of **2 weeks** prior to the date of the exam and must adhere to CU Denver's Graduate Education deadlines. Students only need to complete sections 1 and 3 of the *Thesis/Dissertation Approval* form; the student's committee chair will complete the rest post-defense. For a list of university-mandated forms, please visit [Graduate Education's Forms webpage](#).

Students must defend their dissertation by the deadlines set by CU Denver's Graduate Education. Students are responsible for coordinating a time and room for the Ph.D. Final Defense to take place with their committee. **All final defenses must be completed in-person.**

For an updated list of university-mandated deadlines, please visit [Graduate Education's Key Dates and Deadlines](#) webpage.

## **Transfer Credits**

Transfer credits will be considered after successful completion of preliminary exams. With certain limitations, up to 21 relevant graduate coursework may be transferred with the recommendation of advisor and approval of the program director.

## **Concurrent MS Degree**

PhD students in the Department of Computer Science and Engineering may apply to receive their Master of Science degree while pursuing their Ph.D. Students pursuing this option are required to complete all master of science course-only requirements (Plan III), including the Category A requirement, and then satisfy the final master of science program assessment requirement by

either 1.) passing their computer science PhD preliminary exam, 2.) producing a publication during their PhD studies, 3.) completing a written report at the completion of a PhD-level Independent Study, or 4.) completing the final MS assessment if none of the above applies.

Students doing the Concurrent MS may also apply up to 6 credits of 5000-level Independent Study to their MS degree – this is an exception to the regular Plan III Track requirements.

Students should also ensure that they have met all other graduation requirements for the Plan III track, which include: 1) a minimum of 30 hours of coursework, including up to 6 credits of Independent Study, 2) a minimum of 3 Category A courses, 3) a minimum of B- grade or higher in all courses, and 4) a minimum GPA of 3.0.

## **Funding**

There are a few opportunities for funding as a PhD candidate. Department positions include GI (graduate instructor), TA (teaching assistant) positions, GA (graduate assistant positions) and RA (research assistant) positions. Department positions are hourly-based positions and do not include tuition reimbursement. These positions are competitive and are based on availability, need, and qualifications. **All available department positions are posted on [Handshake](#), the student employment website. Applications are not accepted via email.**

Students are eligible for GI positions who have completed a minimum of one semester at CU Denver with the recommendation of their advisor. Preference is given to students who have successfully completed their prelims. TA positions are competitive and depend on the needs of the department. TA positions are hourly positions and do not include tuition reimbursement. TA decisions are made 1-2 weeks after the beginning of each semester by the department. TA's are hired through [Handshake](#), the student employment website; applications are not accepted via email.

GA positions and RA positions are very competitive and depend on availability of research funding and experience working in the area of need. Faculty often may consider providing funding support after a period of time in which the student has demonstrated their ability and interest in the program. GA and RA's are hired through [Handshake](#), the student employment website; applications are not accepted via email. If you are interested in working with a specific faculty member, please review our "[People](#)" webpage, which lists our faculty members and their research areas. Please email [computerscience@ucdenver.edu](mailto:computerscience@ucdenver.edu) to request an appointment with any faculty members you wish to work with.

Computer science students are also eligible for other on campus employment. On campus positions are hired through [Handshake](#), the student employment website.

Please note, funding is not guaranteed for any student. Here is more information about [costs and financial aid for international students](#). Here is more information about [costs and financial aid for domestic students](#).

## **CSE Contact Information**

Please contact the CSE Department for information, appointments, and inquiries:

### **Mailing Address:**

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**Location:** Lawrence Street Center 8th floor, Suite 800

**Telephone:** (303) 315-1408

**Email:** [computerscience@ucdenver.edu](mailto:computerscience@ucdenver.edu)

## **Department Staff**

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**Kelly Konrad** – Graduate Program Coordinator

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## **Full-Time Tenure Track Faculty**

**Gita Alaghband** – Program Chair, Professor

Ph.D. University of Colorado Boulder

Research areas: parallel and distributed systems, high performance computing, operating systems, computer architecture, simulation.

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**Mazen Al Borno** – Assistant Professor

Ph.D. University of Toronto

Research areas: computational models, motor neuroscience, robotics.

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**Tom Altman** – Professor

Ph.D. University of Pittsburgh

Research areas: theory, algorithms.

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**Farnoush Banaei-Kashani** – Associate Professor

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Research areas: big data, data science, data management and mining, database systems, applied machine learning, computational biomedicine, and biology.

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**Ashis Kumer Biswas** – Assistant Professor  
Ph.D. University of Texas at Arlington  
Research areas: machine learning, deep learning, and bioinformatics.  
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**Madhuri Debnath** – Assistant Professor, CTT  
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**Ellen Gethner** – Associate Professor  
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Research areas: graph theory and graph algorithms, combinatorial, discrete and computational geometry, discrete mathematics, number theory.  
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**J. Haadi Jafarian** – Assistant Professor  
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Research areas: proactive security for cyber threats, big data analytics for cyber threat intelligence, security analytics and automation, and security of cyber-physical systems and internet of things (IoT).  
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**Salim Lakhani** – Associate Teaching Professor  
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Research areas: cloud computing and security, distributed computing & database systems.  
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**Zhengxiong Li** - Assistant Professor  
Ph.D. SUNY Buffalo  
Research areas: internet of things (IoT), cyber-physical security, emerging technologies and applications (e.g. smart health).  
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**Dave Ogle** – Professor  
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Research areas: parallel and distributed systems, network architecture.  
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**Ilkyeun Ra** – Associate Professor, Chair of Graduate Committee  
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Research areas: high performance distributed computing and computer communication network, cloud computing.

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**Full-Time Teaching Track Faculty**

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