Twin Cities Campus

Computer Science M.S.

Computer Science and Engineering Administration

College of Science and Engineering

Link to a list of faculty for this program.

Contact Information:
Department of Computer Science and Engineering, University of Minnesota, 4-192 Keller Hall, 200 Union Street SE, Minneapolis, MN 55455 (612- 625-4002; fax: 612-625-0572)
Email: csgradmn@umn.edu
Website: http://www.cs.umn.edu

- Program Type: Master's
- Requirements for this program are current for Spring 2020
- Length of program in credits: 31
- This program does not require summer semesters for timely completion.
- Degree: Master of Science

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The graduate program in computer science offers coursework from across a broad spectrum of theoretical and applied computer science, combined with research opportunities in nearly all areas of the field. The graduate program's faculty members advise students in such areas as algorithms and theoretical computer science; numerical, parallel, and high-performance computing; distributed computing and systems; artificial intelligence, robotics, and computer vision; databases and data mining; human-computer interaction and information systems; graphics and visualization; software engineering and programming languages; computer architecture and compilers; networking; bio-informatics and computational biology; and computer security. In addition, students may choose a course of study that integrates research in computer science with applications in other fields.

Computer science degrees include the MS (offered Plan A with thesis, Plan B with project, or coursework-only Plan C with coursework-based projects), the MCS (a terminal, coursework-only degree), and the PhD. The department also supports a master of science in software engineering (MSSE) degree.

Faculty from the Department of Computer Science and Engineering also participate in a variety of other graduate programs, including bioInformatics and computational biology, health informatics, cognitive science, scientific computation, and human factors and ergonomics.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)
- completely online (all program coursework can be completed online)
- primarily online (at least 80% of the instruction for the program is online with short, intensive periods of face-to-face coursework)
- partially online (between 50% to 80% of instruction is online)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.25.

A degree in any major with a substantial background in computer science is required; a computer science major is preferred.

Other requirements to be completed before admission:
Applicants with an inadequate background must resolve any deficiencies before applying to the program.

The program requires all applicants to complete the University's online application. The names and email addresses of three recommenders are required; Scores from the General (Aptitude) Test of the GRE are required for MS program applicants. Master's students are accepted for fall admission only. The application deadline is March 1. Additional information is available at https://www.cs.umn.edu/admissions/graduate

Applicants must submit their test score(s) from the following:

- GRE

International applicants must submit score(s) from one of the following tests:

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- TOEFL
  - Internet Based - Total Score: 85
  - Internet Based - Writing Score: 23
  - Internet Based - Reading Score: 23
  - Paper Based - Total Score: 550
- IELTS
  - Total Score: 6.5
  - Reading Score: 6.5
  - Writing Score: 6.5
- MELAB
  - Final score: 80

Key to test abbreviations(GRE, TOEFL, IELTS, MELAB).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

Plan A: Plan A requires 21 major credits, 0 credits outside the major, and 10 thesis credits.The final exam is written and oral.

Plan B: Plan B requires 31 major credits and 0 credits outside the major.The final exam is oral.

Plan C: Plan C requires 31 major credits and 0 credits outside the major.The is no final exam.

This program may be completed with a minor.

Use of 4xxx courses towards program requirements is not permitted.

A minimum GPA of 3.25 is required for students to remain in good standing.

The MS requires a minimum of 31 credits and is offered under three plans. All plans require students to take one course from each of the 3 breadth areas in computer science (9 credits): theory and algorithms; architecture, systems and software; and applications; and 1 credit of colloquium (CSCI 8970).

A minimum of 6 credits in computer science 8xxx-level courses, in addition to the colloquium, must be included in the required coursework for Plan A and Plan C; Plan B students must include a minimum of 3 credits in computer science 8xxx-level courses, in addition to the colloquium and Plan B project credits.

Plan A requires 13 credits in computer science coursework, including the breadth courses and colloquium credit, plus 10 thesis credits. The remaining 8 credits may be taken in the major field or any related field as defined by the graduate handbook.

Plan B and Plan C require 16 credits in computer science coursework, including the breadth courses and colloquium credit. Plan B students must also include 3 credits of the project course, CSCI 8760. The remaining 15 credits may be taken in the major field or in any related field.

Breadth Courses

Students in all plans must take 3 breath requirement courses, one from each subject area.

Applications

Take 1 or more course(s) from the following:

- CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
- CSCI 5125 - Collaborative and Social Computing (3.0 cr)
- CSCI 5271 - Introduction to Computer Security (3.0 cr)
- CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
- CSCI 5471 - Modern Cryptography (3.0 cr)
- CSCI 5511 - Artificial Intelligence I (3.0 cr)
- CSCI 5512 - Artificial Intelligence II (3.0 cr)
- CSCI 5521 - Machine Learning Fundamentals (3.0 cr)
- CSCI 5523 - Introduction to Data Mining (3.0 cr)
- CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
- CSCI 5561 - Computer Vision (3.0 cr)
- CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)

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•CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
•CSCI 5609 - Visualization (3.0 cr)
•CSCI 5611 - Animation & Planning in Games (3.0 cr)
•CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
•CSCI 5707 - Principles of Database Systems (3.0 cr)

Architecture, Systems and Software

Take 1 or more course(s) from the following:
•CSCI 5103 - Operating Systems (3.0 cr)
•CSCI 5106 - Programming Languages (3.0 cr)
•CSCI 5161 - Introduction to Compilers (3.0 cr)
•CSCI 5204 - Advanced Computer Architecture (3.0 cr)
•CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
•CSCI 5221 - Foundations of Advanced Networking (3.0 cr)
•CSCI 5231 *{Inactive}*(3.0 cr)
•CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
•CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
•CSCI 5801 - Software Engineering I (3.0 cr)
•CSCI 5802 - Software Engineering II (3.0 cr)

Theory and Algorithims

Take 1 or more course(s) from the following:
•CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
•CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
•CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
•CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
•CSCI 5525 - Machine Learning: Analysis and Methods (3.0 cr)

Colloquium Credits

Students must take 1 credit of CS Colloquium
CSCI 8970 - Computer Science Colloquium (1.0 cr)

Computer Science Courses

Students may choose additional coursework from this list or consult with their advisor for further options.
Take 0 or more credit(s) from the following:
•CSCI 5103 - Operating Systems (3.0 cr)
•CSCI 5105 - Introduction to Distributed Systems (3.0 cr)
•CSCI 5106 - Programming Languages (3.0 cr)
•CSCI 5115 - User Interface Design, Implementation and Evaluation (3.0 cr)
•CSCI 5125 - Collaborative and Social Computing (3.0 cr)
•CSCI 5143 - Real-Time and Embedded Systems (3.0 cr)
•CSCI 5161 - Introduction to Compilers (3.0 cr)
•CSCI 5204 - Advanced Computer Architecture (3.0 cr)
•CSCI 5211 - Data Communications and Computer Networks (3.0 cr)
•CSCI 5231 *{Inactive}*(3.0 cr)
•CSCI 5271 - Introduction to Computer Security (3.0 cr)
•CSCI 5302 - Analysis of Numerical Algorithms (3.0 cr)
•CSCI 5304 - Computational Aspects of Matrix Theory (3.0 cr)
•CSCI 5421 - Advanced Algorithms and Data Structures (3.0 cr)
•CSCI 5451 - Introduction to Parallel Computing: Architectures, Algorithms, and Programming (3.0 cr)
•CSCI 5461 - Functional Genomics, Systems Biology, and Bioinformatics (3.0 cr)
•CSCI 5481 - Computational Techniques for Genomics (3.0 cr)
•CSCI 5511 - Artificial Intelligence I (3.0 cr)
•CSCI 5512 - Artificial Intelligence II (3.0 cr)
•CSCI 5521 - Machine Learning Fundamentals (3.0 cr)
•CSCI 5523 - Introduction to Data Mining (3.0 cr)
•CSCI 5525 - Machine Learning: Analysis and Methods (3.0 cr)
•CSCI 5551 - Introduction to Intelligent Robotic Systems (3.0 cr)
•CSCI 5552 - Sensing and Estimation in Robotics (3.0 cr)
•CSCI 5561 - Computer Vision (3.0 cr)
•CSCI 5607 - Fundamentals of Computer Graphics 1 (3.0 cr)
•CSCI 5608 - Fundamentals of Computer Graphics II (3.0 cr)
•CSCI 5611 - Animation & Planning in Games (3.0 cr)
•CSCI 5619 - Virtual Reality and 3D Interaction (3.0 cr)
•CSCI 5707 - Principles of Database Systems (3.0 cr)
•CSCI 5708 - Architecture and Implementation of Database Management Systems (3.0 cr)
•CSCI 5715 - From GPS, Google Maps, and Uber to Spatial Data Science (3.0 cr)
•CSCI 5801 - Software Engineering I (3.0 cr)

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•CSCI 5802 - Software Engineering II (3.0 cr)
•CSCI 5980 - Special Topics in Computer Science (1.0 - 3.0 cr)
•CSCI 8115 - Human-Computer Interaction and User Interface Technology (3.0 cr)
•CSCI 8205 - Parallel Computer Organization (3.0 cr)
•CSCI 8211 - Advanced Computer Networks and Their Applications (3.0 cr)
•CSCI 8271 - Security and Privacy in Computing (3.0 cr)
•CSCI 8363 - Numerical Linear Algebra in Data Exploration (3.0 cr)
•CSCI 8551 - Intelligent Agents (3.0 cr)
•CSCI 8715 - Spatial Data Science Research (3.0 cr)
•CSCI 8735 - Advanced Database Systems (3.0 cr)
•CSCI 8970 - Computer Science Colloquium (1.0 cr)

Plan A

Plan A students must take 10 thesis credits.
CSCI 8777 - Thesis Credits: Master's (1.0 - 18.0 cr)

Plan B

Plan B requires 3 credits of the Plan B project course, CSCI 8760. The Plan B project is a significant project demonstrating the student's familiarity with the tools of research, the capability to work independently, and the ability to effectively relate their results to their committee. A written report describing the Plan B project must be approved by the advisor. A copy of the report should be provided to the committee members at least 1 week before the oral presentation.
CSCI 8760 - Plan B Project (3.0 cr)

Plan C

Plan C is a coursework only degree. Students must complete a minimum of 100 hours of course-based project work, a written research report, and an oral presentation within CSCI courses taken for graduate credit. Students can count at most 3 credits of the following directed research/independent study courses toward their degree plan: CSCI 5994, 8994, 5991, and 8991.
CSCI 5991 - Independent Study (1.0 - 3.0 cr)
CSCI 5994 - Directed Research (1.0 - 3.0 cr)
CSCI 8991 - Independent Study (1.0 - 3.0 cr)
CSCI 8994 - Directed Research in Computer Science (1.0 - 3.0 cr)

Program Sub-plans

A sub-plan is not required for this program.
Students may not complete the program with more than one sub-plan.

Integrated B.S.Comp.Sc./M.S. - Computer Science

The Department of Computer Science and Engineering offers an integrated bachelor of science in computer science (B.S.Comp.Sc.) and master of science (M.S.). The integrated BSCompSc/MS program offers students the opportunity to earn both degrees in five years. The combined program offers several advantages: streamlined admissions from the undergraduate to the graduate program (GRE not required); flexibility in fulfilling required courses for both degrees during the senior year; eligibility for graduate assistantships and fellowships; and financial savings by allowing up to 16 graduate credits to be completed at the undergraduate tuition rate.

Both the BSCompSc and MS degrees must be completed in their entirety, with no courses shared between them. The graduate degree cannot be earned before the undergraduate requirements are satisfied. Students must spend a minimum of two semesters as a graduate student after the completion of their undergraduate degree.

Eligibility requirements:
Application to the integrated program is open to University students in the computer science or computer engineering program who have completed a majority of the required upper division courses for their undergraduate degree and have a technical GPA of 3.5 or higher, or a strong recommendation from a Computer Science and Engineering faculty member.

For full application instructions and deadlines visit the Department of Computer Science and Engineering website.

Integrated B.Comp.E./M.S. - Computer Science

The Department of Computer Science and Engineering offers an integrated bachelor of computer engineering (B.Comp.E.) and master of science (MS). Benefits, eligibility requirements, and degree-completion requirements outlined for the BSCompSc/MS integrated program also apply to the BCompE/MS.

Integrated B.A./M.S. - Computer Science

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The Department of Computer Science and Engineering offers an integrated bachelor of arts (BA) and master of science (MS) in computer science. Benefits, eligibility requirements, and degree-completion requirements outlined for the BSCompSc/MS integrated program also apply to the BA/MS.

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