COMPUTER SCIENCE, MS

The vision of the MS in computer science graduate program is to cultivate an innovative research and teaching ecosystem that advances computational and AI-driven solutions, empowering society to address complex challenges in an era of rapid technological transformation.

Program Related Information

Program Contact

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Program Website (https://www.unomaha.edu/college-of-information-science-and-technology/academics/degrees-programs.php)

Fast Track

The Department of Computer Science has developed a Fast Track program for highly qualified and motivated students providing the opportunity to complete a bachelor's degree and a master's degree in an accelerated time frame.#With Fast Track, students may count up to 9 graduate credit hours towards the completion of their undergraduate program as well as the graduate degree program. Students will work with both undergraduate and graduate advisors to ensure graduate classes selected will count toward both programs, should a student wish to earn a graduate degree in a separate College of Information Science & Technology (CIST) area than their undergraduate degree.

Program Specifics:

- This program is available for undergraduate students pursuing any CIST undergraduate degree desiring to pursue an MS in either the same or a related CIST field.
- Students must have completed no less than 60 undergraduate hours.
- Students must have a minimum undergraduate GPA of 3.0.
- Students must complete the Fast Track Approval form and obtain all signatures and submit to the Office of Graduate Studies prior to first enrollment in a graduate course.
- Students will work with their undergraduate advisor to register for the graduate courses.
- A minimum cumulative GPA of 3.0 is required for graduate coursework to remain in good standing.
- Students remain undergraduates until they meet all the requirements for the undergraduate degree and are eligible for all rights and privileges granted undergraduate status including financial aid.
- Near the end of the undergraduate program, formal application to the graduate program is required. All applicants will need to meet any other admission requirements established for the MS in selected CIST program. The application fee will be waived if the applicant contacts the Office of Graduate Studies for a fee waiver code prior to submitting the MS application.
  - Admission to Fast Track does NOT guarantee admission to the graduate program.
  - The admit term must be after the completion term of the undergraduate degree.

Admissions

General Application Requirements and Admission Criteria (http://catalog.unomaha.edu/graduate/admission/)

Application Deadlines

Applicants are strongly encouraged to apply as early as possible, especially if applying for assistantships or scholarships. Some scholarships may have earlier deadlines or run out of funding.

- Spring 2026:
  - October 1 for international applicants who are required to secure a new student visa
  - November 1 for all other applicants
- Summer 2026:
  - March 1 for international applicants who are required to secure a new student visa
  - March 15 for all other applicants
- Fall 2026:
  - May 1 for international applicants who are required to secure a new student visa
  - July 1 for all other applicants

Other Requirements

- The minimum undergraduate grade point average (GPA) requirement for the MS in computer science program is 3.0 or equivalent score on a 4.0 scale. Applicants should have the equivalent of a four-year undergraduate degree.
- **Entrance Exam:** The Graduate Record Exam (GRE) is not required, but those who are applying for a graduate assistantship are strongly encouraged to submit their official GRE results. GRE results cannot be older than five years. Successful applicants have typically had GRE scores of 150 verbal and 160 quantitative or better.
- **English Language Proficiency:** Applicants are required to have a command of oral and written English. Those who do not hold a baccalaureate or other advanced degree from the United States, **OR** a baccalaureate or other advanced degree from a predetermined country on the waiver list (https://www.unomaha.edu/office-of-graduate-studies/admissions/entrance-exams.php), must meet the minimum language proficiency score requirement in order to be considered for admission.
  - Internet-based TOEFL: 80, IELTS: 6.5, PTE: 53, Duolingo: 110
- **Resume:** Submit a detailed resume indicating your work experience and background.
- OPTIONAL: One letter of recommendation from a reference who can evaluate your work and/or academic achievements.
- OPTIONAL: Application for Graduate Assistant Position
  - If interested in applying for graduate assistant (GA) positions, please submit a letter stating your research area interests and why you feel you would make a good GA. Please note that GA positions will be considered after admission and program admission is not a guarantee of receiving a GA position.

Degree Requirements

Undergraduate Deficiencies

The curriculum for the MS in computer science requires a basic knowledge of computer fundamentals including mathematics, programming, data structures, computer architecture and operating systems. Successful completion of these courses with a "B-" or better in each course is required to become an unconditionally admitted student.

Code	Title	Credits
CIST 1400	INTRODUCTION TO COMPUTER SCIENCE I	3

CSCI 1620	INTRODUCTION TO COMPUTER SCIENCE II	3
CSCI 2030	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	3
CSCI 3320	DATA STRUCTURES	3
CSCI 3660	THEORY OF COMPUTATION	3
CSCI 3710	INTRODUCTION TO DIGITAL DESIGN AND COMPUTER ORGANIZATION	3

Core Courses

The five courses listed below provide an overall breadth in the areas of languages, algorithms, architecture, operating systems, and software engineering. Refer to the UNO Graduate College Quality of Work Standards for additional grade requirements.

Students selecting the thesis/project option or declaring a concentration area as part of their program are required to take three core courses; students selecting coursework option with no area of concentration must take all five core courses (note that some core courses are needed as prerequisites for certain areas of concentration).

Coursework Option

Code	Title	Credits
Core Courses		
CSCI 8000	ADVANCED CONCEPTS IN PROGRAMMING LANGUAGES	3
CSCI/MATH 8080	DESIGN AND ANALYSIS OF ALGORITHMS	3
CSCI 8150	ADVANCED COMPUTER ARCHITECTURE	3
CSCI 8530	ADVANCED OPERATING SYSTEMS	3
CSCI 8700	SOFTWARE SPECIFICATIONS AND DESIGN	3
Electives		
Select either three or five graduate-level computer science courses depending on whether a computer science area of concentration is declared.		
Concentrations		
All areas of concentration require four classes selected according to the requirements of each concentration. See Computer Science Concentrations.		
CSCI 8910	MASTER OF SCIENCE CAPSTONE [1]	3
TOTAL		**33**

[1] The capstone course should be taken only after students have completed **at least 75%** of course requirements for the major, this includes all core classes. Students with insufficient progress toward degree completion are prohibited from enrolling. Students must have an overall GPA of at least a 3.0 to register for the capstone course.

Thesis Option

Code	Title	Credits
Core Courses		
Select three of the following:		9
CSCI 8000	ADVANCED CONCEPTS IN PROGRAMMING LANGUAGES	
CSCI/MATH 8080	DESIGN AND ANALYSIS OF ALGORITHMS	
CSCI 8150	ADVANCED COMPUTER ARCHITECTURE	
CSCI 8530	ADVANCED OPERATING SYSTEMS	
CSCI 8700	SOFTWARE SPECIFICATIONS AND DESIGN	
Electives		
Select any five additional graduate-level computer science courses.		
Concentrations		
All areas of concentration require four classes selected according to the requirements of each concentration. See Computer Science Concentrations.		
CSCI 8990	THESIS	6
Total		**30**

Project Option

Code	Title	Credits
Core Courses		
Select three of the following:		9
CSCI 8000	ADVANCED CONCEPTS IN PROGRAMMING LANGUAGES	
CSCI/MATH 8080	DESIGN AND ANALYSIS OF ALGORITHMS	
CSCI 8150	ADVANCED COMPUTER ARCHITECTURE	
CSCI 8530	ADVANCED OPERATING SYSTEMS	
CSCI 8700	SOFTWARE SPECIFICATIONS AND DESIGN	
Electives		
Select any five additional graduate-level computer science courses.		
Concentrations		
All areas of concentration require four classes selected according to the requirements of each concentration. See Computer Science Concentrations.		
CSCI 8960	THESIS EQUIVALENT PROJECT IN COMPUTER SCIENCE	6
Total		**30**

Total Credit Hours

Thesis Option: 30 hours
Project Option: 30 hours
Coursework Option: 33 hours

Concentrations

Artificial Intelligence Concentration

The concentration in artificial intelligence provides students with an in-depth understanding of the principles and technologies used to embody machines with human-like intelligent capabilities. Students taking this concentration will have an opportunity to learn, as well as perform hands-on experiments in different areas of artificial intelligence such as software agents, multi-agent and multi-robot systems, machine vision and image processing technologies, neural network based adaptive software systems, heuristics and stochastic optimization techniques for critical decision making, machine learning and knowledge engineering techniques for embedding intelligence in computers and information systems.

Students must take any three (3) of the five (5) core courses listed under the Requirements tab (9 hours).

Code	Title	Credits
Required Courses		
CSCI 8456	PRINCIPLES OF ARTIFICIAL INTELLIGENCE	3
Elective Courses		
Select three of the following:		9

CSCI 8110	ADVANCED TOPICS IN ARTIFICIAL INTELLIGENCE	
CSCI 8300	IMAGE PROCESSING AND COMPUTER VISION	
CSCI 8360	MACHINE LEARNING FOR TEXT	
CSCI 8450	ADVANCED TOPICS IN NATURAL LANGUAGE UNDERSTANDING	
CSCI 8476	PATTERN RECOGNITION	
CSCI/MATH 8480	MULTI-AGENT SYSTEMS AND GAME THEORY	
CSCI 8486	ALGORITHMS FOR ROBOTICS	
CSCI 8590	FUNDAMENTALS OF DEEP LEARNING	
Total Credits		**12**

Database and Knowledge Engineering Concentration

The database and knowledge engineering concentration is designed to introduce students to preliminary as well as advanced concepts in data and knowledge management.

Students must take any three (3) of the five (5) core courses listed under the Requirements tab (9 hours).

Code	Title	Credits
Required Courses		
CSCI 8856	DATABASE MANAGEMENT SYSTEMS	3
CSCI 8340	DATABASE MANAGEMENT SYSTEMS II	3
CSCI 8360	MACHINE LEARNING FOR TEXT	3
Elective Courses		
Select one of the following:		3
CSCI 8040	LARGE SCALE NETWORK ANALYSIS ALGORITHMS	
CSCI 8050	ALGORITHMIC GRAPH THEORY	
CSCI 8350	DATA WAREHOUSING AND DATA MINING	
CSCI 8390	ADVANCED TOPICS IN DATA BASE MANAGEMENT	
CSCI 8876	DATA MANAGEMENT AND KNOWLEDGE DISCOVERY IN COMPUTING AND INFORMATICS	
Total Credits		**12**

Dependable Computing Systems Concentration

The objective of the dependable computing systems (DCS) concentration is to provide the students with a broad introduction to the design and evaluation of secure and dependable distributed computing systems. The concentration focuses on the theory, development, performance evaluation, and testing of systems to cope with the today's complex challenges such as failures, malicious adversaries, integrity, safety, and availability. The general domains include network security, software assurance, and fault tolerance. Students will be exposed to both software and hardware aspects for building such systems.

Students must take any three (3) of the five (5) core courses listed under the Requirement tab (9 hours).

Code	Title	Credits
Required Courses		
CSCI 8410	DISTRIBUTED SYSTEMS AND NETWORK SECURITY	3
CSCI 8430	TRUSTED SYSTEM DESIGN, ANALYSIS AND DEVELOPMENT	3
Elective Courses		
Select two of the following:		6
CSCI 8420	SOFTWARE ASSURANCE	
CYBR 8436	QUANTUM COMPUTING AND CRYPTOGRAPHY	
CSCI 8450	ADVANCED TOPICS IN NATURAL LANGUAGE UNDERSTANDING	
CSCI 8610	FAULT TOLERANT DISTRIBUTED SYSTEMS	
CSCI 8760	FORMAL METHODS IN SOFTWARE ENGINEERING	
Total Credits		**12**

Network Technologies Concentration

The concentration in network technologies will equip students to design, build, manage and leverage today's complex communication networks. This program covers not only a blend of theoretical topics and practical examples, but also state of the art network technologies such as mobile computing, distributed systems, wireless technologies, and network security.

Students must take any three (3) of the five (5) core courses listed under the Requirements tab (9 hours).

Code	Title	Credits
Required Course		
CSCI 8210	ADVANCED COMMUNICATIONS NETWORKS	3
Elective Courses		
Select three of the following:		9
CSCI 8040	LARGE SCALE NETWORK ANALYSIS ALGORITHMS	
CSCI 8050	ALGORITHMIC GRAPH THEORY	
CSCI/MATH 8156	GRAPH THEORY & APPLICATIONS	
CSCI 8610	FAULT TOLERANT DISTRIBUTED SYSTEMS	
CSCI 8620	MOBILE COMPUTING AND WIRELESS NETWORKS	
Total Credits		**12**

Software Engineering Concentration

The concentration in software engineering is designed to address the growing market demand for software engineers. The concentration covers fundamental and advanced principles in all aspects of software development, equipping students with the necessary technical background to quickly adapt to rapidly changing software engineering practices and technologies.

Students must take CSCI 8700 as one of the three (3) core courses chosen from the Requirements tab (9 hours).

Code	Title	Credits
Elective Courses		
Select 4 of the following:		12
CSCI 8256	HUMAN COMPUTER INTERACTION	
CSCI 8266	USER EXPERIENCE DESIGN	
CSCI/CYBR 8420	SOFTWARE ASSURANCE	
CSCI 8430	TRUSTED SYSTEM DESIGN, ANALYSIS AND DEVELOPMENT	
CSCI 8710	MODERN SOFTWARE DEVELOPMENT METHODOLOGIES	

CSCI 8760	FORMAL METHODS IN SOFTWARE ENGINEERING	
CSCI 8790	ADVANCED TOPICS IN SOFTWARE ENGINEERING	
Total Credits		**12**

Systems Concentration

The systems concentration pertains to the advances in ubiquitous and emerging technologies that span over the complex cores of computing systems such as network communication, distributed computing, operating systems, and computer architecture. Recent advances in computing systems include cloud computing, social computing, Internet of Things, and cyber-physical-systems. The concentration provides the students with the fundamentals of computing systems that can be pursued in hardware, software or a combination of both.

Students must take CSCI 8150 and CSCI 8530 as two of the three (3) core courses chosen from the Requirements tab (9 hours).

Code	Title	Credits
Required Courses		
Select 9 hours from the following:		9
CSCI 8160	INTRODUCTION TO VLSI DESIGN	
CSCI 8446	INTRODUCTION TO PARALLEL COMPUTING	
CSCI 8610	FAULT TOLERANT DISTRIBUTED SYSTEMS	
CSCI 8706	COMPILER CONSTRUCTION	
Elective Courses		**3**
CSCI 8040	LARGE SCALE NETWORK ANALYSIS ALGORITHMS	
CSCI 8050	ALGORITHMIC GRAPH THEORY	
CSCI 8156	GRAPH THEORY & APPLICATIONS	
CSCI 8430	TRUSTED SYSTEM DESIGN, ANALYSIS AND DEVELOPMENT	
CSCI 8450	ADVANCED TOPICS IN NATURAL LANGUAGE UNDERSTANDING	
CSCI 8620	MOBILE COMPUTING AND WIRELESS NETWORKS	
CSCI 8626	3D COMPUTER GRAPHICS	
Any course not taken listed under required courses		
Depending on student's interest, a graduate course approved by GPC		
Total Credits		**12**

Quality of Work Standards

The Graduate College Quality of Work Standards shall be applied to foundation courses (deficiency courses) as well as courses taken as part of the degree program. In particular, the GPC will recommend to the Graduate College that any

1. Student receiving a grade of "C-" or below in any graduate course or undergraduate foundation course will be dismissed from the program or, in the case of unclassified or non-degree students, be automatically denied admission.
2. Student receiving a grade of "C+" or "C" in any undergraduate foundation course or graduate course will be placed on probation or dismissed from the program. Graduate courses may be repeated once with GPC approval. Undergraduate foundation courses will follow the repeat policy for IS&T undergraduate courses.
3. At most three graduate courses ending in 6 (8xx6) will be counted toward the degree requirements. Graduate courses with an undergraduate component (listed under Undergraduate Deficiencies) are not eligible as elective courses.
4. Student must have a minimum grade point average (GPA) of 3.0 ("B"), with no grades lower than a "B-".