M.S. IN COMPUTER SCIENCE

The Master of Science program in Computer Science is overseen by the Computer Science Graduate Committee (CSGC). The basic guidelines for approval of a student's program are recommendations appearing in the Communications of the Association for Computing Machinery (ACM), the professional society in Computer Science.

Prerequisites for Admission

Completion of the following courses, or their equivalents, is prerequisite to entry into the program:

Code	Title	Credit Hours
CSC 120	Computer Programming I	4
CSC 220	Computer Programming II	4
CSC 317	Data Structures and Algorithm Analysis	3
MTH 161	Calculus I	4
MTH 224	Introduction to Probability and Statistics	3
MTH 210	Introduction to Linear Algebra	3
MTH 309	Discrete Mathematics I	3
Total Credit Hours		**24**

Students may be admitted with deficiencies, normally a maximum of 6 credits. These must be completed in addition to the degree requirements.

Admission Requirements

Completion of the following courses, or their equivalents, is prerequisite to entry into the program:

Code	Title	Credit Hours
CSC 120	Computer Programming I	4
CSC 220	Computer Programming II	4
CSC 317	Data Structures and Algorithm Analysis	3
MTH 161	Calculus I	4
MTH 224	Introduction to Probability and Statistics	3
MTH 210	Introduction to Linear Algebra	3
MTH 309	Discrete Mathematics I	3
Total Credit Hours		**24**

Students may be admitted with deficiencies, normally a maximum of 6 credits. These must be completed in addition to the degree requirements.

Curriculum Requirements

Thesis Option

Students must complete the Graduate School requirements, and the Departmental requirements described here.

Code	Title	Credit Hours
Coursework		**24**
24 credits from approved courses, including at least 9 credits from CSC7XX courses and at least one course from four of the following five core areas. [1]		
Algorithms		
CSC 609	Data Security and Cryptography	
or CSC 616	Cybersecurity	
or CSC 632	Introduction to Parallel Computing	
or CSC 640	Algorithm Design and Analysis	
or CSC 645	Introduction to Artificial Intelligence	
or CSC 647	Computational Geometry	
or CSC 648	Problem Solving for Bioinformatics	
or CSC 732	Parallel Algorithms	
Data Science / Artificial Intelligence		
CSC 642	Statistical Learning with Applications	

or CSC 645	Introduction to Artificial Intelligence	
or CSC 646	Introduction to Machine Learning with Applications	
or CSC 648	Problem Solving for Bioinformatics	
or CSC 649	Biomedical Data Science	
or CSC 650	Computational Neuroscience	
or CSC 746	Neural Networks and Deep Learning	
or CSC 749	Automated Reasoning	
or CSC 751	Semantic Web	
or CSC 752	Autonomous Robotic Systems	
Software		
CSC 629	Introduction to Computer Graphics	
or CSC 631	Introduction to Software Engineering	
or CSC 632	Introduction to Parallel Computing	
or CSC 642	Statistical Learning with Applications	
or CSC 645	Introduction to Artificial Intelligence	
or CSC 646	Introduction to Machine Learning with Applications	
or CSC 647	Computational Geometry	
or CSC 648	Problem Solving for Bioinformatics	
or CSC 649	Biomedical Data Science	
or CSC 650	Computational Neuroscience	
Systems		
CSC 609	Data Security and Cryptography	
or CSC 616	Cybersecurity	
or CSC 629	Introduction to Computer Graphics	
or CSC 632	Introduction to Parallel Computing	
Theory		
CSC 609	Data Security and Cryptography	
or CSC 640	Algorithm Design and Analysis	
or CSC 751	Semantic Web	
Thesis		
CSC 810	Master's Thesis	6
Total Credit Hours		**30**

[1] At least 18 credit hours must be from CSC 6XX and CSC 7XX courses, and may not include more than 6 credit hours from CSC 670.

Curriculum Requirements

Non-Thesis Option

Students must complete the Graduate School requirements, and the Departmental requirements described here.

Code	Title	Credit Hours
Coursework		**27**
27 credits from approved courses, including at least 9 credits from CSC7XX courses. and at least one course from four of the following five core areas. [1]		
Algorithms		
CSC 609	Data Security and Cryptography	
or CSC 616	Cybersecurity	
or CSC 632	Introduction to Parallel Computing	
or CSC 640	Algorithm Design and Analysis	
or CSC 645	Introduction to Artificial Intelligence	
or CSC 647	Computational Geometry	
or CSC 648	Problem Solving for Bioinformatics	
or CSC 732	Parallel Algorithms	
Data Science / Artificial Intelligence		

CSC 642	Statistical Learning with Applications	
or CSC 645	Introduction to Artificial Intelligence	
or CSC 646	Introduction to Machine Learning with Applications	
or CSC 648	Problem Solving for Bioinformatics	
or CSC 649	Biomedical Data Science	
or CSC 650	Computational Neuroscience	
or CSC 746	Neural Networks and Deep Learning	
or CSC 749	Automated Reasoning	
or CSC 751	Semantic Web	
or CSC 752	Autonomous Robotic Systems	
Software		
CSC 629	Introduction to Computer Graphics	
or CSC 631	Introduction to Software Engineering	
or CSC 632	Introduction to Parallel Computing	
or CSC 642	Statistical Learning with Applications	
or CSC 645	Introduction to Artificial Intelligence	
or CSC 646	Introduction to Machine Learning with Applications	
or CSC 647	Computational Geometry	
or CSC 648	Problem Solving for Bioinformatics	
or CSC 649	Biomedical Data Science	
or CSC 650	Computational Neuroscience	
Systems		
CSC 609	Data Security and Cryptography	
or CSC 616	Cybersecurity	
or CSC 629	Introduction to Computer Graphics	
or CSC 632	Introduction to Parallel Computing	
Theory		
CSC 609	Data Security and Cryptography	
or CSC 640	Algorithm Design and Analysis	
or CSC 751	Semantic Web	
Coursework Capstone		
CSC 712	Computer Science Graduate Internship	3
or CSC 793	Research Project	
Total Credit Hours		**30**

[1] At least 18 credit hours must be from CSC 6XX and CSC 7XX courses, and may not include more than 6 credit hours from CSC 670.

Curriculum Requirements

Software Systems Concentration

Students must complete the Graduate School requirements, and the Departmental requirements described here.

Code	Title	Credit Hours
Core Course		
CSC 631	Introduction to Software Engineering	3
Electives		**21**
21 credits from approved courses including at least 6 credits from CSC7XX courses and at least one course from three of the following four core areas. [1]		
Algorithms		
CSC 609	Data Security and Cryptography	
or CSC 616	Cybersecurity	
or CSC 632	Introduction to Parallel Computing	
or CSC 640	Algorithm Design and Analysis	
or CSC 645	Introduction to Artificial Intelligence	

or CSC 647	Computational Geometry	
or CSC 648	Problem Solving for Bioinformatics	
or CSC 732	Parallel Algorithms	
Data Science / Artificial Intelligence		
CSC 642	Statistical Learning with Applications	
or CSC 645	Introduction to Artificial Intelligence	
or CSC 646	Introduction to Machine Learning with Applications	
or CSC 648	Problem Solving for Bioinformatics	
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or CSC 752	Autonomous Robotic Systems	
Systems		
CSC 609	Data Security and Cryptography	
or CSC 616	Cybersecurity	
or CSC 629	Introduction to Computer Graphics	
or CSC 632	Introduction to Parallel Computing	
Theory		
CSC 609	Data Security and Cryptography	
or CSC 640	Algorithm Design and Analysis	
or CSC 751	Semantic Web	
Software Development Capstone		**6**
Option 1: Complete Internship:		
CSC 712	Computer Science Graduate Internship	
Option 2: Complete the following courses:		
CSC 710	Computer Science Software Project Design (Software Design)	
CSC 713	Computer Science Software Project Implementation (Software Implementation)	
Total Credit Hours		**30**

[1] At least 18 credit hours must be from CSC 6XX and CSC 7XX courses, and may not include more than 6 credit hours from CSC 670.

Each program must include both theoretical and experimental topics. By graduation students will have knowledge in the areas of Programming Languages, Algorithm Design and Analysis, Theory of Computing, Operating Systems, Computer Networks, and Software Engineering. Each program is approved by the CSGC and the Department Chairman or designate. Programs may be individually tailored to meet varied backgrounds and objectives. It is recognized that there are individuals with undergraduate degrees in other fields wishing to pursue graduate work in Computer Science, and individuals with work experience in the field wishing to advance their formal training in Computer Science.

All Computer Science graduate TAs and RAs must complete Responsible Conduct of Research (RCR) training during their first semester in the department. All other Computer Science graduate students must complete RCR training before starting research work. Information about RCR training can be found from UM ethics programs: https://bioethics.miami.edu/clinical-and-research-ethics/responsible-conduct-of-research/index.html (https://bioethics.miami.edu/clinical-and-research-ethics/responsible-conduct-of-research/).

Sample Plan of Study

Thesis Option (2 Years)

Year One		
Fall		**Credit Hours**
Approved Course		3
Approved Course		3
Approved Course		3
	Credit Hours	**9**

Spring		
Approved Course		3
Approved Course		3
Approved Course		3
	Credit Hours	**9**
Year Two		
Fall		
Approved Course		3
Approved Course		3
CSC 810	Master's Thesis	3
	Credit Hours	**9**
Spring		
CSC 810	Master's Thesis	3
	Credit Hours	**3**
	Total Credit Hours	**30**

Sample Plan of Study

Non-Thesis Option

Year One		
Fall		**Credit Hours**
Approved Course		3
Approved Course		3
Approved Course		3
	Credit Hours	**9**
Spring		
Approved Course		3
Approved Course		3
Approved Course		3
Approved Course		3
	Credit Hours	**12**
Year Two		
Fall		
Approved Course		3
Approved Course		3
CSC 712 or 793	Computer Science Graduate Internship or Research Project	3
	Credit Hours	**9**
	Total Credit Hours	**30**

Sample Plan of Study

Software Systems Concentration (1 Year)

Year One		
Fall		**Credit Hours**
CSC 631	Introduction to Software Engineering	3
Approved Course		3
Approved Course		3
Approved Course		3
	Credit Hours	**12**
Spring		
Approved Course		3
Approved Course		3
Approved Course		3

Approved Course		3
	Credit Hours	**12**
Summer		
CSC 710 or 712	Computer Science Software Project Design (Software Design) or Computer Science Graduate Internship	3
CSC 713 or 712	Computer Science Software Project Implementation (Software Implementation) or Computer Science Graduate Internship	3
	Credit Hours	**6**
	Total Credit Hours	**30**

Mission

The Department's mission is to educate and perform scholarly activities in Computer Science.

Student Learning Outcomes

- Student has adequate knowledge of 1) hardware and software systems and 2) design and implementation procedures for software systems.
- Student has foundation of theoretical computer science including discrete mathematics, automata and language theory, design and analysis of algorithms, computational complexity, and correctness of programs.
- Student has understanding and knowledge of the state-of-the-art hardware and software applications in one or more research area and has identified one or more open and interesting problems that computer scientists are currently addressing.
- Student has applied knowledge of computer science theories and software development methodologies to solve an original research topic. The student has written a thesis and presented to his thesis committee or created a significant software project.