

COMPUTER SCIENCE M.S.

Degree: Master of Science

<https://www.towson.edu/fcsm/departments/computerinfosci/grad/computersci/>

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The Master of Science in Computer Science program provides a comprehensive approach to advanced study in the field of computer science. It also prepares professionally responsible individuals to be capable of holding a variety of scientific and technical positions in the area of computing applications.

Such jobs are found in research and development departments; in federal, state and local government agencies; in computer software development companies; in cybersecurity companies; in Internet, e-commerce and Web development companies; and in companies involved in the development of hardware and software products for applications in aerospace, biological, chemical, medical and genetic research. Graduates will also be prepared for further work at the doctoral level.

The main objectives of the program are:

1. to provide students the opportunity to study and attain knowledge in current computer science specialties;
2. to develop student ability to apply computer science problem-solving methods and tools to realistic research and industry-related problems;
3. to equip students with the tools and knowledge necessary for contributing to the needs of a high technology society through preparation for continued learning; and
4. to prepare students for advanced graduate work in computer science.

Accelerated Bachelor's-Master's Program

Students may also earn an M.S. in Computer Science through the Department of Computer Science accelerated bachelor's and master's program. This program allows students to complete their undergraduate and graduate degrees in a shorter time frame. Prospective applicants should contact the director of accelerated programs for details.

Requirements

Admission Requirements

Application deadlines and a full listing of materials required for admission can be found on the website.

Prerequisites for Admission

Code	Title	Units
COSC 501	FUNDAMENTALS OF DATA STRUCTURES AND ALGORITHM	6

COSC 502	COMPUTER ORGANIZATIONAL AND ASSEMBLY LANGUAGE FOR NON CS/CIS MAJOR	3
MATH 263	DISCRETE MATHEMATICS	3

Both COSC 501 and COSC 502 can be taken together in the same term. These prerequisites are not required for students who have a baccalaureate degree in Computer Science. MATH 263 is not required for students who have an engineering, mathematics or computer science baccalaureate degree. Students with no engineering, mathematics or computer science degree background must take all three prerequisites.

A grade of "B" or better (or pass) is required for the successful completion of any prerequisite course.

Students may repeat prerequisite courses no more than two times to be eligible to take graduate-level courses.

Degree Requirements

- Satisfactory completion of any assigned preparatory courses. (This only applies to students who do not have an undergraduate degree in computer science.)
- All M.S. students must complete the Core Courses.
- Satisfactory completion of the requirements for the M.S. in Computer Science or M.S. in Computer Science with one of three Tracks: Software Engineering; Cybersecurity; or Data Science.
- At least 24 units of degree work must be at the 600- to 800-level.
- Earn a grade of "B" or better in all Core Courses. Courses may be repeated once to satisfy this requirement.

Core Requirements for All Tracks

Code	Title	Units
Core Courses		
COSC 519	OPERATING SYSTEMS PRINCIPLES	3
COSC 578	DATABASE MANAGEMENT SYSTEMS I	3
COSC 600	ADVANCED DATA STRUCTURES AND ALGORITHM ANALYSIS	3
COSC 612	SOFTWARE ENGINEERING I	3
COSC 650	COMPUTER NETWORKS	3
Project/Thesis		3-6
Select one of the following:		
COSC 880	COMPUTER SCIENCE GRAD PROJECT	
COSC 897	COMPUTER SCIENCE THESIS	
Total Units		18-21

M.S. in Computer Science (33 units)

Code	Title	Units
Core Courses		
See core requirements above.		
Project/Thesis		3-6
Elective Courses ¹		12-15

Any 500/600/700-level COSC courses that are not taken in Core Courses will be counted as Elective Courses. (COSC 501 and COSC 502 cannot be counted as Elective Courses.) NOTE: Students may not count more than 9 units of 500-level courses toward their graduation requirements.

Total Units	33
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¹ Students choosing the thesis option will complete 15 units of Core Courses, 6 units of thesis coursework and 12 units of Elective Courses. Students choosing the non-thesis option will complete 15 units of Core Courses, 3 units of project coursework, and 15 units of Elective Courses.

Software Engineering Track (33 units)

Code	Title	Units
Core Courses		15
See core requirements above. If thesis option is chosen, thesis must be in software engineering area. ¹		
Project/Thesis		3-6
Track Courses		9
Select at least three courses from the following:		
COSC 601	SOFTWARE REQUIREMENTS ENGINEERING	
COSC 603	SOFTWARE TESTING AND MAINTENANCE	
COSC 618	ENTERPRISE ARCHITECTURE	
COSC 716	OBJECT-ORIENTED METHODOLOGY	
Elective Courses ¹		3-6
Any 600/700-level COSC courses that are not taken in Core Courses or Track Courses will be counted as an Elective Course. Those who want to take elective courses from a discipline other than COSC must get the COSC program director's approval before enrolling in the course.		
Total Units		33

¹ Students choosing the thesis option will complete 15 units of Core Courses, 6 units of thesis coursework, 9 units of Track Courses, and 3 units of Elective Courses. Students choosing the non-thesis option will complete 15 units of Core Courses, 3 units of project coursework, 9 units of Track Courses, and 6 units of Elective Courses.

Cybersecurity Track (33 units)

Code	Title	Units
Core Courses		15
See core requirements above. If thesis option is chosen, thesis must be in cybersecurity area. ¹		
Project/Thesis		3-6
Track Courses		9
Select at least three courses from the following:		
COSC 647	APPLICATION SOFTWARE SECURITY	
COSC 685	INFORMATION SECURITY AND RISK MANAGEMENT	
COSC 734	NETWORK SECURITY	
COSC 745	ADVANCED TOPICS IN COMPUTER SECURITY	
Elective Courses ¹		3-6

Any 600/700-level COSC courses that are not taken in Core Courses or Track Courses will be counted as Elective Courses. Those who want to take Elective Courses from a discipline other than COSC must get the COSC program director's approval before enrolling in the course.

Total Units	33
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¹ Students choosing the thesis option will complete 15 units of Core Courses, 6 units of thesis coursework, 9 units of Track Courses, and 3 units of Elective Courses. Students choosing the non-thesis option will complete 15 units of Core Courses, 3 units of project coursework, 9 units of Track Courses, and 6 units of Elective Courses.

Data Science Track (33 units)

Code	Title	Units
Core Courses		15
See core requirements above. If thesis option is chosen, thesis must be in Data Science area. ¹		
Project/Thesis		3-6
Track Courses		
COSC 757	DATA MINING	3
Select at least two courses from the following:		
COSC 657	DATABASE MANAGEMENT SYSTEMS II	6
COSC 710	SOCIAL NETWORK ANALYSIS	
COSC 750	NEURAL NETWORKS AND DEEP LEARNING	
COSC 760	BIG DATA ANALYTICS	
Elective Courses ¹		3-6
Any 600/700-level COSC courses that are not taken in Core Courses or Track Courses will be counted as Elective Courses. Those who want to take Elective Courses from a discipline other than COSC must get the COSC program director's approval before enrolling in the course.		
Total Units		33

¹ Students choosing the thesis option will complete 15 units of Core Courses, 6 units of thesis coursework, 9 units of Track Courses, and 3 units of Elective Courses. Students choosing the non-thesis option will complete 15 units of Core Courses, 3 units of project coursework, 9 units of Track Courses, and 6 units of Elective Courses.

Transfer Courses

A student can transfer up to two graduate-level courses from a recognized institution with the approval of the graduate program director.

Learning Outcomes

1. Apply advanced skills in theoretical and applied computing principles and practices to solve a variety of governmental and industrial problems.
2. Design, develop, analyze, and evaluate computing systems, computer software and algorithmic approaches to prepare and advance computing solutions in various areas of software engineering, computer security and data science.
3. Work effectively in teams and communicate effectively, both orally and in writing.

4. Participate in and contribute toward research and development of computing solutions for both the industrial and/or academic workforce.