

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:

- to provide students the opportunity to study and attain knowledge in current computer science specialties;
- to develop student ability to apply computer science problem-solving methods and tools to realistic research and industry-related problems;
- 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
- 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.

Admission Requirements

- A baccalaureate degree in computer science from a regionally accredited college or university**, or a baccalaureate degree from a regionally accredited college or university** in any other field and completion of one to three preparatory courses from among MATH 263, COSC 501* and COSC 502*, as determined by the graduate program director.
- An undergraduate GPA of 3.00 for full admission, or 2.75 for conditional admission, is required. All GPA calculations for admission are based upon the last 60 units of undergraduate and post-baccalaureate study.

*COSC 501 and COSC 502 are offered during the fall and summer semesters **only** of each academic year.

Non-immigrant International Students

Program Enrollment: F-1 and J-1 students are required to be enrolled full-time. The majority of their classes must be in-person

and on campus. See the list of programs that satisfy these requirements, and contact the International Student and Scholars Office with questions.

Admission Procedures: See additional information regarding Graduate Admission policies and International Graduate Application online.

See **Exceptions to Policy in Graduate Admissions.

Prerequisite Courses

| 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/Internship/Thesis | | 3-6 |
| Select one of the following: | | |
| COSC 880 | COSC PROJECT/INTERNSHIP | |
| COSC 897 | COMPUTER SCIENCE THESIS | |
| Total Units | | 18-21 |

M.S. in Computer Science (33 units)

| Code | Title | Units |
|---|-------|--------------|
| Core Courses | | 15 |
| See core requirements above. | | |
| Project/Internship/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 |

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/internship 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/Internship/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/internship 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/Internship/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 |

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/internship 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/Internship/Thesis | | 3-6 |
| Track Courses | | |
| COSC 757 | DATA MINING | 3 |
| Select at least two courses from the following: | | |
| COSC 657 | DATABASE MANAGEMENT SYSTEMS II | |
| COSC 683 | SECURITY AND INTERNET ALGORITHMS | |
| COSC 710 | SOCIAL NETWORK ANALYSIS | |
| 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/internship 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.

- Apply advanced skills in theoretical and applied computing principles and practices to solve a variety of governmental and industrial problems.
- 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.

- c. Work effectively in teams and communicate effectively, both orally and in writing.
- d. Participate in and contribute toward research and development of computing solutions for both the industrial and/or academic workforce.