Monmouth University’s School of Science, Technology and Engineering (STE) is a community of learners and teacher-scholars. We actively foster learning, quantitative reasoning, and scientific inquiry among our majors and among all students. Our goal is to lead in the innovative development and delivery of curricula and in providing creative solutions to problems that include significant technical components. We focus on the application of technical research to the solution of contemporary global problems of regional interest. Our educational programs build a foundation for life-long learning, critical thinking, and collaborative, technical problem solving in professional and business contexts.

The School of Science, Technology and Engineering offers several undergraduate degree programs. Master’s degrees are awarded in Computer Science and Software Engineering.

Study in science, technology, and engineering and related professional fields provides valuable perspectives and skills necessary for both the job market and community life. Among our academic goals are proficiency in all forms of communication, such as: scientific and technological literacy; an appreciation for the diversity of people and ideas and the ability to collaborate with others; and the ability to think scientifically and to have a broad understanding of ethics and contemporary civilization.

The Center for Rapid Response Database Systems provides research opportunities in support of Homeland Security and Homeland Defense for graduate students. Since its inception in August 2004, the center has employed more than 20 students, including some pursuing the master theses in software engineering. The School of Science, Technology and Engineering operates the software engineering-based center, which aims to develop decision-enhancing aids that enable early and enhanced threat identification and appropriate response in the support of the chemical, biological, radiological, nuclear, and explosive events. These same techniques can be applicable to homeland security/counter-terrorism, natural disaster, environmental crisis and pandemic scenarios, and this duality provides an open, accessible and reasonably inexpensive test bed for the development of prototypes being designated to meet both domestic and military needs.
MASTER OF SCIENCE IN COMPUTER SCIENCE (M.S.)

The Master of Science in Computer Science provides a broad background in graduate-level computer science study. The 33-to-48-credit program includes tracks in Computer Networks and Intelligent Information Systems. When the applicant has a strong background in computer science, such as a bachelor’s degree in computer science with excellent standing, up to 15 credits (CS501B-CS509) may be waived. Other science and engineering majors may be required to take some or all of these courses. These foundation courses must be completed with a minimum GPA of 3.0, and all pre-requisite courses must be passed with a grade of B- or better. In addition, students have the option of taking the interdisciplinary Program in Telecommunications using certain required and elective courses. The main objective of the telecommunications program is to provide a broader perspective in both engineering and software aspects of telecommunications.

Admission requirements are as follows:

1. Possession of a baccalaureate degree with a minimum 2.75 overall GPA preferably in the sciences or engineering.
2. Two letters of recommendation.
3. Two semesters of Calculus (I and II) with grades of “C” or better.
4. Two semesters of computer programming courses within the past five years (equivalent to Monmouth’s CS175 and CS176) at a recognized institution with a grade of “B” or better. Applicants not meeting these requirements for programming experience may be admitted conditionally and required to take CS501A, or its equivalent.

Please refer to the curriculum charts in the appendix for program requirements:

- M.S. Computer Science, Computer Networks Track, page B7-B9
- M.S. Computer Science, Intelligent Information Systems Track, page B10-B12
- M.S. Computer Science, Telecommunications Track, page B13-B15

GRADUATE CERTIFICATE IN COMPUTER SCIENCE

The Graduate Certificate Program in Computer Science, “Software Systems Design and Development,” is specifically designed to provide essential software development skills, including computer programming, data structures, algorithms and operating systems for graduates of programs with minimal or no computer science training. Those students receiving the Certificate will be:

- Knowledgeable of and competent in use of object oriented programming languages and techniques, including advanced features of C++ and efficient code design
- Knowledgeable of fundamental data structures and computing algorithms
- Knowledgeable of operating system concepts, design, development, applications
- Able to design and develop computer programs of realistic and practical complexity, either as individuals or as part of a team.

The new certificate program will generally be a three-to-five-course sequence, depending on the prior programming skills of the applicant. A student can be admitted to the Certificate Program with “advanced standing,” having been given credit for relevant experience or courses taken previously. However, a student must take at least three courses in the sequence at Monmouth in order to receive the Certificate. If the applicant has some programming background, but insufficient or non-recent training with modern programming languages, they can be conditionally admitted and required to take a sixth course, CS501A, as an alternative to delaying admission while the programming pre-requisite is being met.

The certificate program is intended to serve primarily part-time students employed by area business, education and government organizations. It may also be an opportunity for professional development, career change or career enhancement in situations where computer programming is a valued skill. Upon completion of the program with a GPA of 3.00 or better, the student will receive a certificate and
guaranteed admission to the Computer Science Graduate Program at Monmouth University. However, none of the Certificate courses can be applied to the main 11-course master’s degree requirement.

Admission requirements are the same as those listed above for the M.S. in Computer Science.

Please refer to the curriculum chart in the appendix for program requirements:

- Software Systems Design and Development, page B64

MASTER OF SCIENCE IN SOFTWARE ENGINEERING (M.S.)

Monmouth University was one of the first institutions in the United States to recognize the newly emerging discipline of Software Engineering by establishing a separate department to specialize in this strategic engineering discipline. The Department offers a Master of Science Degree in Software Engineering, and two graduate certificate programs: the Certificate in Software Development and the Certificate in Software Engineering.

The objective of the master’s degree program is for the student to master the necessary skills and knowledge that allow him or her to be an effective member of a software development team. The program educational objectives are to prepare students so that upon graduation they will: (a) Be able to find employment in organizations that develop or use software or enter a PhD program. (b) Effectively participate in teams that specify, design, construct, test, deploy, maintain or use software systems. (c) Be capable of developing experience in additional areas of professional specialty. (d) Use their engineering, communications, interpersonal and business skills to advance their position in a business, government or academic environment. (e) Critically assess their technical capabilities and acquire the additional knowledge and skills they need to maintain currency within their evolving work environment. (f) Assist their employers’ organizations in achieving their business goals.

All classes are held in the late afternoon, and most of our students are from New Jersey’s premier software industries. The Department offers the entire program at the main campus of Monmouth University.

The Master of Science in Software Engineering degree is a 36 credit curriculum, with five core courses, five advanced elective courses, and a six-credit thesis or practicum. The core courses provide the student with the foundations of modern software engineering. Two of those courses will be waived for students who have a bachelor’s degree in software engineering and who choose to complete a thesis.

The Software Engineering Masters Degree Program offers six interdisciplinary tracks. Students take 15 credits of electives, which may focus on one of the following tracks: The Organizational Management track which prepares students to become software development managers or specialists in software process improvement; The Telecommunications track which prepares students to become specialists in telecommunications software development; The Embedded Systems track which prepares students to become specialists in real-time embedded systems development; The Information Management track which prepares students to be chief information officers or specialists in information systems integration and development; The Management of Software Technology track which prepares students to be chief technology officers or specialists in the acquisition of software systems for businesses. The Thesis Track which prepares students who enter the program with a BSSE degree to specialize in two of the fields associated with the tracks outlined above.

Admission requirements are as follows:

1. Possession of a baccalaureate degree in software engineering, computer science, computer engineering, or another engineering related discipline with a 2.5 overall GPA and a 3.0 GPA in the undergraduate major. Candidates whose major is not computer science or a related field may be admitted on a case-by-case basis.

2. Demonstrate completed course work in computer programming, data structures and algorithms, operating systems, discrete mathematics, and software engineering. Applicants who have not completed course work in these areas will be required to complete preparatory/foundation courses as necessary. (Credits earned will not be applied
toward the M.S. degree.) Students must earn a grade “B” or better in each of these courses.

3. Thesis track students must hold a bachelor’s degree in software engineering from a college or university accredited by its regional accrediting agency.

Candidates whose major is not Computer Science may be admitted on a case-by-case basis.

Please refer to the curriculum charts in the appendix for program requirements:
  • M.S. in Software Engineering, page B44
  • M.S. in Software Engineering, Embedded Systems Track, page B45
  • M.S. in Software Engineering, Information Management Track, page B46
  • M.S. in Software Engineering, Management of Software Technology Track, page B47
  • M.S. in Software Engineering, Organizational Management Track, page B48
  • M.S. in Software Engineering, Telecommunications Track, page B49
  • M.S. in Software Engineering, Thesis Track, page B50

SOFTWARE ENGINEERING CERTIFICATE PROGRAMS

The certificate in Software Development, which includes 15 credits of foundation courses plus a three-credit project course, prepares students to become proficient software developers. It also serves as a foundation for those who do not have the necessary background, but hope to enter the master’s degree program. It is the ideal starting point for those holding bachelor’s degrees in disciplines other than software engineering or computer science who are interested in a career in software engineering or who hope to do software development into their chosen field.

The certificate in Software Engineering is an 18 credit program that prepares graduates to become effective members of a software development team. Students gain an understanding of team capability, dynamics, and performance. Requirements include the 15 credits of core courses needed for the Master of Science in Software Engineering as well as a course (3 credits) in software project management. (Up to 15 credits of foundation courses may also be required.) Upon completion of this program students will have the ability to design software that solves practical problems, a critical skill for career success and advancement.

Admission requirements are the same as those listed above for the M.S. in Software Engineering.

Please refer to the curriculum charts in the appendix for program requirements:
  • Certificate in Software Development, page B60
  • Certificate in Software Engineering, page B61