

Software Engineering

Department of Computer and Information Science
College of Engineering and Computer Science



The Program

Software Engineering is the area of computer science concerned with the theoretical and practical aspects of the design, building, testing, modification, optimization, implementation, and management of large, high-quality software systems for a wide range of applications across society.

The software engineering degree program offered by the Department of Computer and Information Science stresses the technical, systematic, and managerial aspects of the software engineering process, but places primary emphasis on the technical facets of designing, building, and modifying large and complex software systems. Students complete a **minimum of 120 credits** and receive a **Bachelor of Science (B.S.) degree in Software Engineering**. The application areas offered include computer game design, web engineering, and information systems. The program is primarily directed to day students, with some evening courses offered. The degree prepares graduates for immediate employment as software engineers or project managers and for graduate study.

Software engineers are computer professionals with specific preparation in both software engineering and working in teams. Their goal is to deliver high-quality, reliable software products. Software engineers address such societal needs as:

- The use of software for demanding and safety-critical applications that make it imperative to avoid the serious, indeed sometimes fatal, consequences of poorly designed or poorly built systems
- The need to develop useful, easy-to-use software tools which reliably meet design specifications and whose features and documentation can be used and understood with a high degree of consistency and confidence

Software engineers must know a subset of computer science relevant to software development. They must also know the principles of effective and reliable design, mathematics and the other sciences that are traditionally known by engineers, as well as the skills and applications of project management.

Software engineering students learn:

- How to build commercial, industrial-strength software by the application of validated knowledge and experience that have been codified into formal methods of best practices
- How to systematically improve the quality, cost, and timeliness of the process by which large software systems are designed and developed
- How to manage large projects that design, develop, and implement software to a timely and efficient completion.
- How to develop computer systems that are easy to use and accessible to customers with special needs.

Curriculum Requirements

Area	Semester Credits
Area I: CECS Distribution Requirements	21
COMP 105 English Composition	3
COMP 270 Technical Writing	3
ECON 201 Macroeconomics	3
– Two courses in the humanities, from the specified choices	6
– Two courses in the behavioral/social sciences, from the specified choices	6
Area II: Mathematics, Science, and Business	39
MATH 115 Calculus I	8
MATH 116 Calculus II	8
CIS 275 Discrete Structures I	4
CIS 306 Discrete Structures II	4
MATH 217 Matrix Algebra (or MATH 227 Linear Algebra)	2
IMSE 317 Probability and Statistics	3
Two-semester laboratory science sequence	8
Additional laboratory science course	4
OB 354 Organization Behavior	3
ENGR 400 Applied Business Techniques	3
Area III: CIS Courses and Electives	60
Computer Science Core	28
CIS 150 Computer Science I	4
CIS 200 Computer Science II	4
CIS 310 Computer Organization & Assembly Lang	4
CIS 350I Data Structures and Algorithms for SE	4
CIS 375 Software Engineering I	4
CIS 427 Computer Networks & Distributed Processing	4
CIS 450 Operating Systems	4
Required for Software Engineering	14
CIS 285 Software Engineering Tools	3
CIS 376 Software Engineering II	4
CIS 476 Software Architecture & Design Patterns	3
CIS 496I Design Seminar in SE I	2
CIS 4962 Design Seminar in SE II	2
One Application Area Sequence & Technical Electives	14
Three Application Areas Sequences are offered:	
– Information Systems	
– Computer Game Design	
– Web Engineering	
Electives outside of CIS, mathematics, science, and engineering	4

Note: Curriculum requirements may change. Students should consult an advisor for current requirements.

Facilities of the College of Engineering and Computer Science

www.engin.umd.umich.edu/labs

Modern computer laboratory facilities are essential in preparing students for professional positions in the world of computer science and software engineering practice and research. College of Engineering and Computer Science students use a wide variety of computing resources as part of their undergraduate education: local area networks of Pentium and Unix computers, and the large SUN workstation network. The CIS Department computer facilities include the 3-D Graphics and Visualization Lab, the Agile Software Engineering Lab, the Database and Multimedia Systems Lab, the Game Design and Usability Lab, the Real-Time and Secure Systems Lab, the Vehicular Networking Systems Research Lab, the Virtual Engineering Lab, and the Web Services Lab.

Faculty of the Computer and Information Science (CIS) Department

The software engineering and computer information science degree programs are taught primarily by Ph.D. faculty dedicated to teaching, advising, and research. The research interests of the CIS department faculty include CAD/CAM, computer graphics, digital government, geometric modeling, database systems, data integration, data mining, multimedia information systems, game design, computer usability and accessibility, distributed systems and middleware, mobile computing, multimedia information systems, organizational information systems, peer-to-peer systems, vehicular networking, security and privacy, real-time systems, semantic web, soft computing, software engineering, web information systems, and web services. Some courses are taught by local industry professionals.

Student and Professional Organizations

Students may join the Association of Computing Machinery (ACM). Qualified juniors and seniors are invited to join Upsilon Pi Epsilon, the Computer Science Honor Society.

Undergraduate Scholarships

College of Engineering and Computer Science students may apply for annual scholarships, which may range up to the full tuition costs for an academic year. Scholarships are available from the Computer Science Honor Society and the Society for Information Management.

Cooperative Education

Software engineering students and computer science students are eligible to participate in the College of Engineering and Computer Science's Cooperative Education Program. During co-op placements, students work in their chosen field, gain valuable professional experience and good business skills, and earn a salary.

Students in the computer and information science department have found recent co-op placements in such companies as: Acromag, Activision, Arvin-Meritor, Barton-Marlow Company, Blue Cross Blue Shield, Cebos, Ceridian Corp., CMJ Designs, Crain Communication, Daimler-Chrysler Financial Group, DTE Energy, EDS, Hometown Communications Network, Intel Corp., Lockheed Martin, Marathon Petroleum, Masco Corp., Net Portfolio, Nokia Automotive, Observer, Polk, Ricardo Inc., Sirius Radio, SPX, TRW, Unisys, Urban Science, U.S. Steel, United States Tank Command, Trans-man Logistics, Valassis, and Vector Cantech.

Employment Opportunities

Software engineers are in demand in every segment of society affected by computing technology. Typical employers include companies that build and sell computers; software and computer gaming companies; research and development laboratories; defense and aerospace contractors; and commercial, financial, and manufacturing organizations.

Software engineering students develop and manage complete software engineering projects for industrial clients as part of the regular course work, giving our students an edge in entering the workplace. Recent graduates from the University of Michigan-Dearborn with a B.S. degree in Software Engineering have found professional employment in such companies as Daimler-Chrysler, Urban Science, Ford Motor Company, Siemens, Eccentric, Compuware, Blue Cross/Blue Shield, CEO Image, Detroit Diesel, Pulte Homes, and Arrow Homes.

Admission Requirements

From High School:

3.00 adjusted GPA or higher and ACT of 22 or higher.

From Community College or University:

2.75 adjusted GPA (cumulative, mathematics, and science—all three) in transferable courses. Courses with a grade of C- or below do not transfer.

For More Information

For Engineering and Computer Science Information:

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For Admissions Information and Applications:

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