

Computer Engineering



Department of Electrical and Computer Engineering
College of Engineering and Computer Science

The Program

Computer Engineering (CE) addresses the application and design of computers and digital systems to solve real-world problems. Computer engineers invent, design, develop, and test computer hardware, networks, embedded systems, and multimedia devices.

Computer engineering applications include high performance computers, embedded systems, computer control of machines, microprocessor design, electronic consumer devices, digital communications, computer networks, software development, and programming languages.

CE students are able to specialize in hardware or software through a selection of courses in such areas as embedded systems, computer hardware organization and design, computer architecture, operating systems, computer networks, multimedia engineering, programming, VLSI design, and software engineering.

Students complete a minimum of 125 credits and receive a Bachelor of Science in Engineering (BSE) degree in Computer Engineering. The curriculum prepares computer engineers for immediate professional employment and graduate study. The educational objectives of the CE program are to graduate computer engineers who possess:

- Good design skills, including the ability to formulate problems, design experiments, collect, analyze, and interpret data, and evaluate the material, computational, and management resources needed to solve typical problems
- The ability to work in multidisciplinary teams and communicate effectively
- The ability to pursue higher education as well as a research career in industry, government, or academia
- Hands-on experience with commonly used industry-standard software and hardware tools
- A good awareness of professional responsibility, ethics, and the need to engage in life-long learning
- A strong preparedness to meet regional needs, including the automotive, defence-related, life-sciences, and power industries, consistent with the University's mission
- A strong grounding in the principles and methods of computer engineering, with a good balance between software and hardware skills, design of digital systems, microprocessors, embedded systems, real-time control, and digital communications networks.

Curriculum Requirements

Area	Semester Credits
CECS Distribution Requirements	24
COMP 105 English Composition I	3
COMP 270 Technical Writing	3
ECON 201 or 202 Macro- or Micro- economics	3
– Two courses in the humanities, from specified choices	6
– Two courses in the behavioral/social sciences, from the specified choices	6
– Restricted elective: one course in the humanities, or the behavioral/social sciences, or a 400-level ECE course	3
Basic Preparation Requirements	37
ENGR 100 Introduction to Engineering	2
Mathematics and Probability & Statistics	
MATH 115 Calculus I	4
MATH 116 Calculus II	4
MATH 205 Calculus III	3
MATH 216 Differential Equations	3
MATH 217 Matrix Algebra	2
ECE/MATH 276 Discrete Mathematics	4
IMSE 317 Engineering Probability and Statistics	3
Chemistry and Physics	
CHEM 144 General Chemistry I	4
PHYS 150 General Physics I	4
PHYS 151 General Physics II	4
Professional Requirements	64
Electrical and Computer Engineering Core (20 credits)	
ECE 210 Circuits	4
ECE 270 Computer Methods in ECE I	4
ECE 273 Digital Systems	4
ECE 311 Electronics I	4
ECE 372 Microprocessors	4
Computer Engineering Core (28 credits)	
ECE 370 Advanced Programming in C E	4
ECE 375 Computer Architecture	4
ECE 471 Computer Networks	4
ECE 473 Embedded Systems	4
ECE 475 Computer Hardware Design	4
ECE 478 Operating Systems	4
ECE 4982/4 Computer Engineering Senior Design	4
Applied Business Techniques for Engineers	3
Professional and Technical Electives	13

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

Facilities of the College of Engineering and Computer Science

Modern computer and laboratory facilities are essential in preparing students for professional positions in the world of engineering practice and research. Students use numerous computer and engineering laboratories as part of their required undergraduate courses. The college uses the local area network of PCs and UNIX computers as well as the large Sun workstation network and the computer-aided design laboratories.

In addition, the ECE Department has its own laboratory facilities, equipped with modern computers and workstations and special application software. Students receive hands-on training in designing digital systems using advanced microprocessors. The ECE department laboratories include the automotive electronics, circuits, computer engineering, control systems, digital systems, electronics, field programmable gate array design, intelligent systems, multimedia, power electronics and electric drive, and the vision research laboratories.

Faculty of the ECE Department

The curriculum is taught primarily by regular faculty with Ph.D.s in electrical or computer engineering. Some courses are taught by local industry professionals. Faculty are active in research and work with both undergraduate and graduate students on design and research projects. Faculty research interests include machine vision, image processing, autonomous vehicles, automatic control, fuzzy logic, machine intelligence, and pattern recognition. Recent and current research and design projects are or have been sponsored by NSF, US Army Tank Command, and local industries including Ford Motor Company, Jabil Circuits, and TRW Automotive.

Cooperative Education

CECS students are eligible to participate in the college's cooperative education program. During co-op placements, engineering juniors and seniors alternate semesters of full-time classes with semesters of full-time paid engineering work in a company or organization in their field.

Co-op enables students to gain valuable work experience before they graduate and interact with practicing professionals. Many students who complete their co-op program find employment in the companies they interned in.

Companies which have recently hired computer engineering co-op students include: Acromag, Alcoa Fujikura Ltd. (AFL), Arvin- Meritor, Bosch, Calsonic, Ceberonics, CMJ Designs, Comau-Pico, Comerica, Consumers Energy, Denso International, DTE Energy, Detroit Diesel, EDS, Federal Mogul, Freescale, General Electric, Harman Becker, Hitachi Automotive, Intier Automotive, Lear Corporation, Lockheed Martin, Marathon Ashland, MichCon, Motorola, NASA, Rohm, SeverStal N.A., Siemens Automotive, Sirius Radio, SPX, Sumitomo, ST Microelectronics, Toyota, TRW, Turner-Logistics, Unisys, United States Army Tank Command, Urban Science, US Steel, Vector CanTech, Valassis, Visteon, X2Y Alternators, Xilinx, and Yazaki North America.

Employment Opportunities

The national starting salaries recently reported by new graduates with a BSE in computer engineering average in the \$55,000 to \$65,000 range.

Computer engineers work in many industries, including the automotive, computer design, manufacturing, semiconductors, telecommunications, and defense industries.

Recent graduates from the University of Michigan-Dearborn with a BSE degree in computer engineering have found professional employment with such companies as AT&T, DTE Energy, Ford, General Electric, General Dynamics, General Motors, Lockheed Martin, Motorola, N.S.A., TRW, Unisys, US Steel, Visteon, and Xilinx.

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:

College of Engineering and Computer Science
Student Records and Advising
2000 Heinz Prechter Engineering Complex
4901 Evergreen Road
Dearborn, MI 48128-2406
313-593-5510
uginfo@engin.umd.umich.edu
www.engin.umd.umich.edu

For Admissions Information and Applications:

Office of Admissions and Orientation
University of Michigan-Dearborn
4901 Evergreen Road
Dearborn, MI 48128-2406
313-593-5100
admissions@umd.umich.edu
www.umd.umich.edu