UNDERGRADUATE

MAJOR IN

PENN STATE ENGINEERING

PENNSTATE

1855

Computer Engineering

For more information, contact:

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Department of Computer Science and Engineering
The Pennsylvania State University
338H Information Sciences and Technology Building
University Park, PA 16802-6822

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Two undergraduate computer-related majors are available in the College of Engineering: computer engineering and computer science.

Computer engineering deals with the practical aspects of the design and use of computer systems for information processing. Computer engineers research and develop new computer systems, study their reliability and fault tolerance, evaluate their performance, investigate computer communication requirements, or work on artificial intelligence and robotics. In this major, students can learn about hardware design and software systems, as well as theory and applications of computers.

PROGRAM OBJECTIVES

The mission of the faculty of the undergraduate computer engineering program at Penn State is to provide students with the knowledge and experience needed to pursue a productive lifelong career in industry or to engage in further study at the graduate level. Students participate in a balanced program of instruction covering the basic principles of the design and application of computer systems. The program includes coverage in breadth and depth of basic science, engineering, and abstract concepts of information handling. Students specialize in and are prepared for careers in the design, analysis, and use of hardware, software, and systems. The program is structured to ensure that graduates have a clear understanding of the design and the applications of computers, as well as the ability to apply this knowledge throughout their professional careers. In particular, within a few years after graduation, graduates in computer engineering should be able to:

1. Successfully enter a technical graduate degree program.
2. Complete an assigned portion of a significant hardware/software project that meets the specifications and complies with time and budget constraints.
3. Lead a design team in a significant hardware and/or software project.
4. Function as an engineer or graduate student in an ethical manner.
5. Engage in lifelong learning, keeping up to date with current engineering practice, tools, and technologies.
6. Effectively collaborate with coworkers, customers, and partners in diverse environments.
7. Effectively articulate and defend a technical position.

Students who qualify can participate in the Schreyer Honors College and graduate with honors in computer engineering.

COOPERATIVE EDUCATION

The College of Engineering's Cooperative Education program is available in this major. Beginning with the junior year, co-op students alternate semesters of work and study (using the summer sessions preceding the junior and senior years) to accrue a year's work experience. Typically, co-op delays graduation by one or two semesters due to the additional work semesters. Students graduate from the program with a Certificate in Engineering Cooperative Education. For more information about the Engineering Cooperative Education Programs, contact:

UNDERGRADUATE OFFICE/CO-OP
DEPARTMENT OF COMPUTER SCIENCE
AND ENGINEERING
THE PENNSYLVANIA STATE UNIVERSITY
342E IST BUILDING
UNIVERSITY PARK, PA 16802-6822

CAREER OPPORTUNITIES

Computer engineering is a new and rapidly evolving discipline. Graduates are employed by all sectors of industry, government, and academic institutions. Their work may involve the design of hardware and/or software for computer systems, the analysis and design of algorithms, or the use of computers for various applications. They also may work on research and development of new computer systems, study their reliability and fault tolerance, evaluate their performance, investigate computer communication requirements, or work on artificial intelligence and robotics. To work in these exciting areas of the computer discipline, a bachelor of science degree in computer engineering (or its equivalent) is usually required.

Job demand for computer engineering graduates has been consistently strong. This demand should persist as computer technology advances at a rapid pace.

DEPARTMENT STATISTICS

The Department of Computer Science and Engineering includes 45 faculty members, 133 computer engineering and 166 computer science undergraduate students, and 235 computer science and engineering graduate students. The department offers two B.S. degrees, in computer science or computer engineering; and the M.Eng., M.S., and Ph.D. graduate degrees in computer science and engineering.

ADMISSION REQUIREMENTS

To be eligible for consideration for entrance into this major, a student must have completed, with a grade of C or better, the following requirements: CHEM 110, MATH 140, MATH 141, and PHYS 211.

Computer Engineering is accredited by the Accreditation Board for Engineering and Technology (ABET), 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700; **www.abet.org**.

PROGRAM REQUIREMENTS

The Computer Engineering major is highly technical, with more than 75 percent of the required credit hours in science and engineering fields*

First Semester		CR
(a)	CHEM 110 Chemical Principles	3
	CHEM 111 Experimental Chemistry	1
	ENGL 015 Rhetoric and Composition *or* ENGL 030 Honors Freshman Composition	3
	First-Year Seminar	1
(a)	MATH 140 Calculus with Analytic Geometry I	4
(a)	PHYS 211 General Physics: Mechanics	4
	Total	16

Second Semester		CR
	AHS	3
	AHS	3
(a)	CMPSC 121 Introduction to Programming Techniques	3
(a)	MATH 141 Calculus with Analytic Geometry II	4
	PHYS 212 General Physics: Electricity and Magnetism	4
	Total	17

Third Semester		CR
	AHS	3
(a)	CMPEN 270 Introduction to Digital Systems	4
(a)	CMPSC 122 Intermediate Programming	3
	MATH 220 Matrices	2
	MATH 250 Ordinary Differential Equations	3
	PHYS 214 General Physics: Wave Motion and Quantum Physics	2
	Total	17

Fourth Semester		CR
(a)	CMPEN 331 Computer Organization and Design	3
	CMPSC 221 Object Oriented Programming with Web-based Applications	3
(a)	E E 210 Circuits and Devices	4
(b)	ECON 002 Microeconomic Analysis and Policy	3
	MATH 231 Calculus of Several Variables	2
	Total	15

Fifth Semester		CR
	CAS 100A/B Effective Speech	3
(a)	CMPEN 431 Introduction to Computer Architecture	3
(a)	CMPSC 311 Introduction to Systems Programming	3
(a)	E E 310 Electronic Circuit Design I	4
	STAT 418 Probability	3
	Total	16

Sixth Semester		CR
	CMPEN 362 Communication Networks	3
(a)	CMPSC 360 Discrete Mathematics for Computer Science	3
	CMPSC 473 Operating Systems	3
(a)	E E 353 Signals and Systems: Continuous and Discrete Time	3
	ENGL 202C Technical Writing	3
	Total	15

Seventh Semester		CR
	AHS	3
	CMPEN 482W Computer Engineering Project Design	3
	CMPSC 465 Data Structures and Algorithms	3
(c)	Computer Engineering Elective (from prescribed list)	3
(e)	Department List	3
	Health and Physical Activity	1.5
	Total	16.5

Eighth Semester		CR
	AHS	3
(d)	CMPSC/CMPEN 400-Level	3
(d)	CMPSC/CMPEN 400-Level	3
(c)	Computer Engineering Elective (from prescribed list)	3
(e)	Department List	3
	Health and Physical Activity	1.5
	Total	16.5

(a) A minimum grade of "C" is required in these courses for graduation.

(b) Some substitutions are allowed. See the Computer Engineering Undergraduate Handbook for details.

(c) Choose from CMPEN 362, CMPEN 411, CMPEN 416, CMPEN 417, CMPEN 454, CMPEN 455, CMPEN 471, CMPEN 472, E E 453, and E E 456.

(d) Choose any 400-level CMPSC/CMPEN course.

(e) Free electives; however, some restrictions apply. See the Computer Engineering Undergraduate Handbook.