

# Computer Engineering (CEng)

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## Program Overview

Computer engineers use knowledge of digital hardware and software to produce instruments, devices, and systems from home computers to supercomputers for the benefit of mankind. Digital systems and computers have developed with remarkable speed during the past 30 years and permeate every aspect of human activity from education in elementary schools to research at the frontiers of engineering and science. There is an unprecedented demand for engineers with a high level of skills in both hardware and software. A computer engineer entering the profession today has a wide variety of job opportunities in the fields of digital systems, software engineering, design automation, and others.

## Labs and Facilities

General-purpose laboratories are fully equipped to provide hands-on experiential learning under the direct supervision of electrical and computer engineering faculty in the areas of circuit analysis, electronics, digital logic, control systems, applied electromagnetics, electromechanics, and energy conversion. In addition, there are special-purpose laboratories serving the fields of direct-write circuit fabrication, antenna design and fabrication, microwave engineering, communication systems, mechatronics and real-time embedded systems, robotics, digital signal processing, biomedical instrumentation, reconfigurable Field Programmable Gate Array (FPGA) logic, and computer architecture.

## Curriculum

The basic curriculum includes required course work in mathematics, basic sciences, humanities, social sciences, and fundamental engineering topics in circuit analysis, electronics, electrical systems, digital systems, assembly language, data structures, operating systems, and software engineering.

## Curriculum Listing

### Freshman Year

#### First Semester

MATH 123	Calculus I	4
CHEM 112	General Chemistry I	3
CHEM 112L	General Chemistry Lab I	1
CENG 244	Introduction to Digital Systems	4
PE	Physical Education	1
Humanities or Social Sciences Elective(s)		3
<b>TOTAL</b>		<b>16</b>

#### Second Semester

ENGL 101	Composition I	3
MATH 125	Calculus II	4
PHYS 211	University Physics I	3
PE	Physical Education	1
Humanities or Social Sciences Elective(s)		3
CSC 150	Computer Science I	3
<b>TOTAL</b>		<b>17</b>

### Sophomore Year

#### First Semester

EE 220	Circuits I	4
MATH 321	Differential Equations	4
PHYS 213	University Physics II	3
PHYS 213L	University Physics II Lab	1
EE 264	Sophomore Design	2
CSC 250	Computer Science II	4
<b>TOTAL</b>		<b>18</b>

#### Second Semester

CSC 251	Finite Structures	4
ENGL 279	Tech Comm I	3
EE 221	Circuits II	4
Humanities or Social Sciences Elective(s)		3
EE 351	Mechatronics and Measurements Sys.	4
<b>TOTAL</b>		<b>18</b>

### Junior Year

#### First Semester

CENG 314	Assembly Language	3
ENGL 289	Tech Comm II	3
EE 320	Electronics I	4
CSC 300	Data Structures	4
MATH 225	Calculus III	4
<b>TOTAL</b>		<b>18</b>

#### Second Semester

EE 312	Signals	3.5
CSC 470	Software Engineering	3
CENG 342	Digital Systems	4
Approved Math Elective		2
EM 216 Statics and Dynamics		4
<b>TOTAL</b>		<b>17.5</b>

### Senior Year

#### First Semester

EE 311	Systems	3.5
CENG 464	Senior Design I	2
CENG Elective(s)		4
IENG 301	Basic Engr. Economics	2
Free Elective		1
Humanities or Social Sciences Elective(s)		3
<b>TOTAL</b>		<b>15.5</b>

#### Second Semester

CENG 465	Senior Design II	2
CSC 456	Operating Systems	4
CENG	Elective(s)	3
CENG	Elective(s)	4
Upper Level Humanities or Social Sciences Elective		3
<b>TOTAL</b>		<b>16</b>

### 136 credits required for graduation

Eleven CENG elective credits are required.

CENG Electives		
EE 322	Electronics II	4
EE 421	Communications Systems	4
EE 451	Control Systems	4
CENG 420	Design of Digital Signal Proc. Sys.	4
CENG 440	VLSI Design	4
CENG 442	Microprocessor Design	4
CENG 444	Computer Networks	4
(credit for only one of CENG 444 or CSC 463 may be used)		
CENG 446	Advanced Computer Architectures	4
(credit for only one of CENG 446 or CSC 440 may be used)		
CENG 447	Embedded and Real-Time Comp. Sys.	4
CSC 410	Parallel Computing	3
CSC 415	Robotics	3
CSC 416	Introduction to Autonomous Systems	3
CSC 433	Computer Graphics	3
CSC 440	Adv Digital Systems	4
CSC 447	Artificial Intelligence	3
CSC 464	Intro Digital Image Proc./Comp. Vision	3
CSC 476	Theory of Compilers	3

A maximum of four co-op credits may be used toward the CENG electives requirement if a written request presented by the student is approved by the ECE faculty. The student request must justify that the CENG design requirement is met. Computer engineering students are required to take the Fundamentals of Engineering (FE) exam prior to graduation.