

# Computer Engineering

Computer Engineering deals with the design and analysis of intelligent systems that have become indispensable in today's world and it requires expertise in both hardware and software areas. The Computer Engineering program is offered by the department of Electrical and Computer Engineering (ECE).

## UNDERGRADUATE PROGRAMS

### Mission Statement

The mission of the computer engineering program is to prepare computer engineers to meet the challenges of the future; to promote a sense of scholarship, leadership and service among our graduates; to instill in the students the desire to create, develop, and disseminate new knowledge; and to provide international leadership to the computer engineering profession. The mission is attained through the following program educational objectives.

### Program Educational Objectives in Computer Engineering

The objective of the Computer Engineering program is to produce students who within 5-10 years after graduation will:

- be valued as technically proficient computer engineers in related industries or will be able to successfully pursue advanced degrees
- engage in life-long learning and professional development to advance their knowledge and skills
- communicate effectively, perform well both independently and collaboratively, exhibit high levels of professionalism and ethical responsibility, and demonstrate leadership in their chosen profession and communities

## BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

The required courses for this degree include the fundamentals of electronic circuits, signal theory, logic design, computer architecture, digital systems, structured programming, data structures, software engineering, operating systems and discrete mathematics. A strong foundation in the physical sciences and in mathematics is required. Approved technical electives, chosen with the advisor's consent, are selected in preparation for graduate study or entry into industry according to individual interests.

The program totals 129 credit hours. The Computer Engineering program is accredited by the Engineering Commission of ABET, [www.ABET.org](http://www.ABET.org).

The recommended sequence of courses follows:

First Year			
First Semester	Credits	Second Semester	Credits
ENGL 001	3	ENGL 002	3
MATH 021	4	MATH 022	4
ENGR 005	2	Select one of the following:	4
Select one of the following	5-6	ECO 001	-
CHM 030 & ENGR 010 <sup>1</sup>	-	HSS Elective <sup>3</sup>	-
PHY 011 & PHY 012 <sup>1</sup>	-	Select one of the following	5-6
		CHM 030 & ENGR 010 <sup>1</sup>	-
		PHY 011 & PHY 012 <sup>1</sup>	-
<b>14-15</b>		<b>16-17</b>	
Second Year			
First Semester	Credits	Second Semester	Credits
ECE 033	4	ECE 123	3
ECE 081	4	ECE 132	3
CSE 007	4	MATH 023	4
PHY 021 & PHY 022	5	MATH 205	3

		Select one of the following	3-4
		ECO 001	-
		HSS Elective <sup>3</sup>	-
<b>17</b>		<b>16-17</b>	
Third Year			
First Semester	Credits	Second Semester	Credits
ECE 108	4	ECE 201	3
ECE 128	3	CSE 109	4
CSE 017	3	CSE 140	3
MATH 231 or 309	3	free elective	3
Free elective	3	HSS ELECTIVE (HSS elective)	4
<b>16</b>		<b>17</b>	
Fourth Year			
First Semester	Credits	Second Semester	Credits
CREG 257	3	CREG 258	2
CSE 303	3	Approved technical electives <sup>2</sup>	9
CSE 216	3	HSS elective <sup>3</sup>	4
HSS elective <sup>3</sup>	3-4	FREE ELECTIVE (free elective)	3
<b>15-16</b>		<b>18</b>	

APPROVED TECHNICAL ELECTIVES  
(Approved technical electives)<sup>2</sup>

**Total Credits: 129-133**

- 1 Required natural science courses, one taken fall semester and the other taken in spring
- 2 Approved technical electives (12 credits) are subjects in the area of science and technology. Except for one elective, they are restricted to the offerings in the ECE and CSE departments. One elective must be an engineering science elective from a department other than ECE and CSE. CSE 042, CSE 130, and CSE 252 are not approved technical electives.
- 3 Distribution of HSS courses must satisfy the college requirements.

## GRADUATE PROGRAMS

Graduate programs of study provide a balance between formal classroom instruction and research and are tailored to the individual student's professional goals. The programs appeal to individuals with backgrounds in computer or information science, in computer engineering, in electrical engineering, in mathematics, or in the physical science. Research is an essential part of the graduate program. The research topics are listed in the departmental descriptions for Computer Science and Engineering (CSE) and Electrical and Computer Engineering (ECE). Individual courses are listed in the catalog descriptions of the CSE and ECE departments.

The Master of Science degree requires the completion of 30 credit hours of work and may include a six credit hour thesis for Computer Engineering degree. A program of study must be submitted in compliance with the graduate school regulations. An oral presentation of the thesis is required.

The Master of Engineering degree requires the completion of 30 credit hours of work, which includes design-orientated courses and an engineering project. A program of study must be submitted in compliance with the college rules. An oral presentation of the project is required.

The Ph.D. degree in computer engineering requires the completion of 42 credit hours of work (including the dissertation) beyond the master's degree (48 hours if the master's degree is not from Lehigh), the passing of a departmental qualifying examination appropriate to each degree within one year after entrance into the degree program,

the passing of a general examination in the candidate's area of specialization, the admission into candidacy, and the writing and defense of a dissertation. Competence in a foreign language is not required.

The program has a core curriculum requirement for graduate students. The purpose of this requirement is to guarantee that all students pursuing graduate studies in the program acquire an appropriate breadth of knowledge of their discipline. To satisfy the core curriculum requirements in Computer Engineering, students need to complete at least two courses in the computer hardware/architecture area, at least two courses in a second area, and at least one course in a third area. In each of the three areas at least one course must be at the 400 level. The areas are: computer software systems, signal processing and communications, computer software applications, and circuits and systems. See [www.compe.lehigh.edu](http://www.compe.lehigh.edu) (<http://www.compe.lehigh.edu>) for details about these areas.

Courses from other universities or undergraduate studies may be used to satisfy these requirements, by petition, at the discretion of the program faculty. Additional graduate program information may be obtained from the program's graduate coordinator.

Most courses in the Computer Engineering curriculum are listed in the Computer Science and Engineering (<http://catalog.lehigh.edu/coursesprogramsandcurricula/engineeringandappliedscience/computerscienceandengineering/>) (CSE) and Electrical and Computer Engineering (<http://catalog.lehigh.edu/coursesprogramsandcurricula/engineeringandappliedscience/electricalandcomputerengineering/>) (ECE) departments.

#### **Courses**

##### **CREG 257 Senior Lab Project I 3 Credits**

With CREG 258, provides a complete design experience for Electrical and Computer Engineers. Students are expected to identify essential project aspects crucial to success and to perform in-depth engineering evaluation and testing demonstrating that desired results can be achieved with the proposed implementation. Instruction in technical writing, product development, ethics and professional engineering, and presentation of design and research. Two three hour sessions and one additional two hour lecture per week. Must have senior status.

##### **CREG 258 Senior Lab Project II 2 Credits**

Continuation of CREG 257 Complete design, construction, and testing of projects selected and developed in CREG 257. Final design reviews and project presentations; final written report; development issues, including manufacturability, patents, and ethics. Department approval.

**Prerequisites:** CREG 257