

Computer Engineering, BSE

Requirements

The Bachelor of Science in Engineering (BSE) with a major in computer engineering requires a minimum of 129 s.h. of credit. At the time of graduation, students must have a cumulative grade-point average of at least 2.00 in all college work used to complete degree requirements and in all UI coursework in order to be awarded the BSE.

The computer engineering major shares a core of electrical and computer engineering courses and provides focus and depth for students preparing for graduate study or a career in computer hardware or software engineering. Students begin taking focus area elective courses in their third year.

All BSE students are required to take the same collegiate curriculum. For information about these collegiate requirements, see the Bachelor of Science in Engineering, BSE in the catalog. 6 s.h. of a student's major courses fulfill the basic science or college-level math collegiate requirement. Students completing the major in computer engineering fulfill the collegiate statistics requirement by completing STAT:2020 Probability and Statistics for the Engineering and Physical Sciences.

The BSE with a major in computer engineering requires the following coursework.

Requirements	Hours
Collegiate Curriculum	49
Basic Science and College-Level Math, from Major Requirements or Focus Area	6
Major Requirements	47
Focus Area	27

Major Requirements

Major requirements include a set of courses shared in common with the electrical engineering major (29 s.h.), required courses (17 s.h.), one departmental seminar (1 s.h.), and two capstone design courses (6 s.h.).

Common Courses

Course #	Title	Hours
All of these:		
ECE:2400	Linear Systems I	3
ECE:2410	Principles of Electronic Instrumentation	4
ECE:3320	Introduction to Digital Design	3
ECE:3360	Embedded Systems	3
ECE:3700	Electromagnetic Theory	3
ENGR:2120	Electrical Circuits	3
ENGR:2730	Computers in Engineering	3
MATH:3550	Engineering Vector Calculus	3
PHYS:1612	Introductory Physics II	4

Required Courses

Course #	Title	Hours
All of these:		
ECE:3330	Introduction to Software Design	3
ECE:3350	Computer Architecture and Organization	3
CS:2210	Discrete Structures	4
CS:2230	Computer Science II: Data Structures	4
CS:3330	Algorithms	3

Departmental Seminar

The major in computer engineering includes ECE:3000 Electrical and Computer Engineering Professional Seminar (1 s.h.), typically taken in the third year.

Capstone Design Courses

In the final year of study, students complete a two-semester capstone design sequence culminating in the development and implementation of a significant, original project. The capstone design experience emphasizes teamwork, professionalism, open-ended problem solving, and the ability to work within real-world constraints and engineering standards.

Course #	Title	Hours
Both of these:		
ECE:4880	Electrical and Computer Engineering Senior Design 1	3
ECE:4890	Electrical and Computer Engineering Senior Design 2	3

Focus Area

Students must select focus area courses according to guidelines established by the Department of Electrical and Computer Engineering. A number of established focus areas are available, and students also may work with their academic advisor to create a customized plan tailored to their goals and objectives. Focus areas allow students to personalize their curriculum and to prepare them for the jobs or research they intend to pursue.

Focus areas in the computer engineering major consist of one breadth elective (at least 3 s.h.), one depth elective (3 s.h.), two electrical and computer engineering courses (prefix ECE) numbered above 5000 (6 s.h.), one additional electrical and computer engineering course (prefix ECE), two technical electives that align with the focus area (at least 6 s.h.), and two additional elective courses (6 s.h.).

Carefully selected elective and general education courses may contribute to earning a minor and/or certificate, including the Certificate in Sustainability (College of Liberal Arts and Sciences) or the Certificate in Technological Entrepreneurship (College of Engineering). Students who take an additional advanced math course meet the requirements for a minor in mathematics (College of Liberal Arts and Sciences). Students who take an additional approved computer science course (prefix CS) meet the requirements for a minor in computer science (College of Liberal Arts and Sciences).

For a complete list of focus areas and course selection guidelines, see Focus Areas on the Department of Electrical and Computer Engineering website. Although general

guidelines and requirements for elective courses are listed, course recommendations for specific focus areas differ. While some courses may apply to more than one focus area requirement, a single course may only count once toward completing a focus area.

Breadth Elective

Course #	Title	Hours
One of these:		
ECE:3400	Linear Systems II	3
ECE:3410	Electronic Circuits	4
ECE:3500	Communication Systems	3
ECE:3540	Communication Networks	3
ECE:3600	Control Systems	3
ECE:3720	Semiconductor Devices	3

Depth Elective

The depth elective must be an advanced course, normally numbered 4000 or above, in a subject area within a student's track, excluding seminars. The following courses are options for the depth elective.

Course #	Title	Hours
ECE:5200/IGPI:5450	Machine Learning	3
ECE:5320/CS:5610	High Performance Computer Architecture	3
ECE:5460/IGPI:5460	Digital Signal Processing	3
ECE:5480/IGPI:5480	Digital Image Processing	3
ECE:5525	Cryptography	3
ECE:5800/CS:5800	Fundamentals of Software Engineering	3
ECE:5810/CS:5810	Formal Methods in Software Engineering	3
ECE:5840	Software Security	3
ECE:5845	Modern Databases	3
CS:4400	Database Systems	3
CS:4420	Advanced Artificial Intelligence	3

Advanced Electrical and Computer Engineering Electives

Students complete at least two electrical and computer engineering courses (prefix ECE) numbered above [5000](#), [excluding seminars](#). Specific recommendations vary based on focus area.

Additional Electives

Students complete at least 15 s.h. selected from additional courses in the preceding focus area categories or from a list of suggested electives for their specific focus area. At least one elective must be selected from electrical and computer engineering courses (prefix ECE) not already taken for the major.

While course recommendations for specific focus areas differ, the following is a list of potential elective courses. Courses not listed here may be able to count toward the focus area requirements; students should consult an academic advisor.

Course #	Title	Hours
ACCT:2100	Introduction to Financial Accounting	3

ACCT:2200	Managerial Accounting Analytics and Data Visualization	3
CEE:4107/CBE:4410	Sustainable Systems	3
CHEM:1120	Principles of Chemistry II	4
CHEM:2220	Organic Chemistry II	3
CHEM:2410	Organic Chemistry Laboratory	3
ENGR:2130	Thermodynamics	3
ENTR:2000	Entrepreneurship and Innovation	3
ENTR:3100	Entrepreneurial Finance	3
ISE:2500	Engineering Economy	3
ISE:4172	Big Data Analytics	3
MATH:3800/ CS:3700	Introduction to Numerical Methods	3
MATH:4200	Complex Variables	3
SEES:2013/ BUS:2013/ URP:2013	Introduction to Sustainability	3
STAT:4143/ PSQF:4143	Introduction to Statistical Methods	3
STAT:4520/ IGPI:4522/ PSQF:4520	Bayesian Statistics	3
STAT:4580/ DATA:4580/ IGPI:4580	Data Visualization and Data Technologies	3

Double Major in Computer Engineering/Electrical Engineering

Students may earn a double major in computer engineering and electrical engineering. They must satisfy all requirements of the electrical engineering major and all requirements of the computer engineering major.

Students completing the major in computer engineering (CE) may not also complete a major in computer science (CS) or in computer science and engineering (CSE). Students who are interested in both computer science and computer engineering should pursue the computer science and engineering degree.