

Computer Science and Engineering, B.S.E.

Requirements

The Bachelor of Science in Engineering with a major in computer science and engineering (CSE) requires a minimum of 129 s.h. of credit. Students must have a g.p.a. of at least 2.00 on all college work used to satisfy degree requirements as well as on all work undertaken at the University of Iowa.

The major provides technical depth and breadth as well as flexibility and the opportunity for students to customize their programs according to their own goals and interests. Students choose one of several focus areas according to the type of job or research they plan to pursue; see "Focus Area Courses" below. Students also have the opportunity to work with their academic advisor to build a focus area plan that adheres to their goals and interests.

Students complete the B.S.E. core requirements, which include RHET:1030 Rhetoric, ENGR:1100 Introduction to Engineering Problem Solving, ENGR:1300 Introduction to Engineering Computing, and courses in chemistry, engineering mathematics and fundamentals, and physics.

They also complete the curriculum designed for their major program, which covers four major stems: mathematics and basic sciences, engineering topics, a focus area, and the General Education Component (GEC). For information about the curriculum stems, see the Bachelor of Science in Engineering, B.S.E. in the Catalog.

CSE students must complete core courses; math, science, and communication courses; required computer science and engineering program courses; a constrained program elective course; approved focus area courses; General Education Component (GEC) courses; and a two-semester capstone design sequence.

The B.S.E. with a major in computer science and engineering requires the following coursework.

Core Computing Courses

Code	Title	Hours
All of these:		
CS:1210	Computer Science I: Fundamentals	4
ENGR:1300	Introduction to Engineering Computing	3
ENGR:2730	Computers in Engineering	3

Core Engineering Courses

Code	Title	Hours
All of these:		
ENGR:1000	Engineering Success for First-Year Students	1
ENGR:1100	Introduction to Engineering Problem Solving	3
ENGR:2120	Electrical Circuits	3

Math, Science, and Communication Courses

Code	Title	Hours
All of these:		
CHEM:1110	Principles of Chemistry I	4
PHYS:1611	Introductory Physics I	4
PHYS:1612	Introductory Physics II	4
MATH:1550	Engineering Mathematics I: Single Variable Calculus	4
MATH:1560	Engineering Mathematics II: Multivariable Calculus	4
MATH:2550	Engineering Mathematics III: Matrix Algebra	2
MATH:2560	Engineering Mathematics IV: Differential Equations	3
RHET:1030	Rhetoric	4
STAT:2020	Probability and Statistics for the Engineering and Physical Sciences	3

Required Program Courses

Code	Title	Hours
All of these:		
ECE:2400	Linear Systems I	3
ECE:2410	Principles of Electronic Instrumentation	4
ECE:3000	Electrical and Computer Engineering Professional Seminar	1
ECE:3320	Introduction to Digital Design	3
ECE:3330	Introduction to Software Design	3
ECE:3350	Computer Architecture and Organization	3
ECE:3360	Embedded Systems	3
ECE:3540	Communication Networks	3
CS:2210	Discrete Structures	3
CS:2230	Computer Science II: Data Structures	4
CS:3330	Algorithms	3
CS:3620	Operating Systems	3
CS:3820	Programming Language Concepts	3

Theory Elective

Code	Title	Hours
One of these:		
ECE:5330	Graph Algorithms and Combinatorial Optimization	3
ECE:5450	Machine Learning	3
ECE:5520	Introduction to Information and Coding Theories	3
ECE:5810	Formal Methods in Software Engineering	3
ECE:5995	Contemporary Topics in Electrical and Computer Engineering (when topic is cryptography)	3

CS:4330	Theory of Computation	3
CS:4350	Logic in Computer Science	3
CS:4720	Optimization Techniques	3
CS:5340	Limits of Computation	3
CS:5360	Randomized Algorithms	3
CS:5370	Computational Geometry	3
CS:5430	Machine Learning	3
CS:5620	Distributed Systems and Algorithms	3
CS:5850	Programming Language Foundations	3
CS:5860	Lambda Calculus and Applications	3

Focus Area Courses

Students select a focus area to personalize their curriculum and to prepare them for certain jobs or research study they intend to seek. A number of areas are available, such as bioinformatics, business, medical imaging, embedded systems, and software engineering. Students also may work with their academic advisor to create a customized plan tailored to their goals and interests.

Students complete six focus area elective courses (17 s.h.), which they select according to guidelines established by the department. For a complete list of focus areas and course selection guidelines, see Focus Areas on the Department of Electrical and Computer Engineering website.

Students who choose their focus area and General Education Component (GEC) carefully may be able to earn the Certificate in Sustainability, the Certificate in Technological Entrepreneurship, or one of several undergraduate minors offered by the University by taking minimal additional coursework beyond that required for the computer science and engineering major.

General Education Component

Students are required to take at least 15 s.h. of General Education Component (GEC) courses; see General Education Component on the College of Engineering website.

The requirements are:

Engineering Be Creative

Students complete 3 s.h. A full list of approved courses can be found on the College of Engineering GEC Options: Be Creative Course List web page.

Diversity and Inclusion

Students complete 3 s.h. They must complete 3 s.h. of coursework from the GE CLAS Core Diversity and Inclusion area.

Approved Course Subjects

Students complete 9 s.h. See the College of Engineering GEC Options: Approved Course Subjects web page.

Capstone Design Courses

In their senior year, 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.

Code	Title	Hours
Both of these:		
ECE:4880	Principles of Electrical and Computer Engineering Design	3
ECE:4890	Senior Electrical and Computer Engineering Design	3

Double Major in Computer Science and Engineering/ Electrical Engineering

Students may earn a double major in computer science and engineering (CSE) and electrical engineering (EE). They must satisfy all requirements of the electrical track of the EE major and all requirements of the CSE major.