

Bachelor of Science in Electrical Engineering

This professional degree program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

Educational Objectives of the Bachelor of Science in Electrical Engineering (BSEE) Degree Program

- A. Our graduates will be engaged as practicing professionals in a broad range of careers in industry or government or will pursue advanced degrees in academic graduate education in engineering or a related field.
- B. Our graduates will function effectively as members of teams demonstrating sensitivity to professional and societal contexts, integrity and versatility.

Student Outcomes

Graduates of the BSEE program are expected to know or have the following:

- a. An ability to apply knowledge of mathematics, science and engineering
- b. An ability to design and conduct experiments as well as to analyze and interpret data
- c. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context
- i. A recognition of the need for and an ability to engage in lifelong learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

BSEE Degree Requirements

To obtain the degree Bachelor of Science in Electrical Engineering, students must complete a minimum of 120 units consistent with the residency and other applicable requirements of Washington University and the McKelvey School of Engineering and subject to the following program requirements:

1. Common Studies program of the McKelvey School of Engineering: This includes courses in engineering, mathematics, chemistry, humanities, social sciences and technical writing. The required chemistry sequence is Chem 111A–Chem 151, although Chem 111A–Chem 112A–Chem 151–Chem 152 is recommended. Chem 111A is preferred, but Chem 105 will be allowed.
2. Engr 4501 Engineering Ethics and Sustainability (1 unit).
3. Two of the following three computer science courses: CSE 131 Introduction to Computer Science (3 units), CSE 132 Introduction to Computer Engineering (3 units) or CSE 247 Data Structures and Algorithms (3 units).
4. Engineering and science breadth requirements: 9 units in engineering or science outside of electrical engineering. These units must be taken in the following areas: biomedical engineering, chemical engineering, computer science and engineering, mechanical engineering, systems science and engineering, economics, mathematics, physics, biology, chemistry, earth and planetary sciences, and pre-medicine. These units must be at the 200 level or higher and cannot be used to satisfy the Common Studies requirements (item 1 above) or the computer science requirement (item 3). Courses in other fields can be arranged with special departmental approval.
 Examples of engineering and science courses are MEMS 255 Dynamics, EECE 210 Introduction to Environmental Engineering, CSE 247 Data Structures and Algorithms, Engr 324 From Concept to Market: The Business of Engineering, BME 240 Biomechanics, Physics 217 Introduction to Quantum Physics, Physics 318 Introduction to Quantum Physics II, MEMS 253 Statics and Mechanics of Materials, Biol 2960 Principles of Biology I, Biol 2970 Principles of Biology II, Chem 261 Organic Chemistry I with Lab and Chem 262 Organic Chemistry II with Lab.
5. 31 units of required ESE courses:

Code	Title	Units
ESE 105	Introduction to Electrical and Systems Engineering	3
ESE 230	Introduction to Electrical and Electronic Circuits	4
ESE 232	Introduction to Electronic Circuits	3
ESE 260	Introduction to Digital Logic and Computer Design	3

ESE 318	Engineering Mathematics A	3
ESE 319	Engineering Mathematics B	3
ESE 326	Probability and Statistics for Engineering	3
ESE 330	Engineering Electromagnetics Principles	3
ESE 351	Signals and Systems	3
ESE 498	Electrical Engineering Capstone Design Projects	3
Total Units		31

- Two upper-level laboratory courses (6 units) from the following list: ESE 331, ESE 435, ESE 447, ESE 448, ESE 465 and ESE 488. The selection must contain at least one course from ESE 331, ESE 435, ESE 465 and ESE 488.
- 15 units of elective ESE courses in electrical engineering subjects, from the following list: ESE 330–399, ESE 400, ESE 405, ESE 407, ESE 415, ESE 425, ESE 429-497 and ESE 503–589. The selection must contain at least two courses from ESE 431, ESE 436, ESE 438, ESE 441, ESE 461, ESE 471 and ESE 482.
- The entire course sequence for the BSEE containing engineering topics of at least 45 units. The numbers of engineering topic units assigned to undergraduate courses in the McKelvey School of Engineering vary from none (0) to the number of credits given to the course. For the precise number for each course, please refer to the table of Topics Units — Engineering Courses provided by Engineering Undergraduate Student Services (<http://engineering.wustl.edu/current-students/student-services/Pages/default.aspx>).
- Limitations. No more than 3 credits of 500-level courses may be applied toward the EE elective requirement (item 7).
- Limitations. No more than 6 units of the combined units of ESE 400 Independent Study and ESE 497 Undergraduate Research (including ESE 497A and ESE 497B) may be applied toward the EE elective requirement (item 7) of the BSEE degree. The balance of combined units, if there are any left, are allowed as free electives to satisfy the requirement for the total number of units.
- The courses taken to satisfy the following BSEE degree requirements must be taken for a letter grade and not on a pass/fail basis: item 5 (required ESE courses), item 6 (upper-level laboratory courses) and item 7 (elective ESE courses).

Electrical Engineering Sample Curriculum

Most students acquire more than 120 credit units. For a typical sequence of subjects for the BSEE degree, please refer to the following table:

	Units	
	Fall	Spring
First Year		
Introduction to Electrical and Systems Engineering (ESE 105)	3	—
Physics I (Physics 191)	3	—
Physics I Laboratory (Physics 191L)	1	—
Introduction to Computer Science (CSE 131)	3	—
Calculus II, III (Math 132, 233)	3	3
Humanities or social science elective	—	3
Physics II (Physics 192)	—	3
Physics II Laboratory (Physics 192L)	—	1
Introduction to Computer Engineering (CSE 132)	—	3
Introduction to Digital Logic and Computer Design (ESE 260)	—	3
	13	16
Second Year		
Differential Equations (Math 217)	3	—
Introduction to Electrical and Electronic Circuits (ESE 230)	4	—
Humanities or social science elective	3	3
General Chemistry I or Introductory General Chemistry I (Chem 111A or Chem 105)	3	—
General Chemistry Laboratory I (Chem 151)	2	—
Introduction to Electronic Circuits (ESE 232)	—	3
Signals and Systems (ESE 351)	—	3
Engineering Mathematics A (ESE 318)	—	3
Engineering Mathematics B (ESE 319)	—	3
	15	15
Third Year		
Probability and Statistics for Engineering (ESE 326)	3	—
Humanities or social sciences elective	3	3
Engineering and science breadth elective	3	—
Engineering Electromagnetics Principles (ESE 330)	3	—
Electrical Engineering electives with engineering topics units	3	6
Electrical Engineering laboratory	—	3
Technical Writing (Engr 310)	—	3
	15	15
Fourth Year		
Free electives	3	6
Humanities or social science elective	3	—
Engineering Ethics and Sustainability (Engr 4501)	1	—

Electrical Engineering electives with engineering topics units	3	3
Engineering and science breadth elective	3	3
Electrical Engineering laboratory	3	—
Electrical Engineering Capstone Design Projects (ESE 498)	—	3
	16	15

For more information about the BS in Electrical Engineering curriculum (<https://ese.wustl.edu/undergraduate/degreeprograms/Pages/electrical-engineering.aspx>), please visit the ESE website.