

ELECTRICAL AND COMPUTER ENGINEERING UNDERGRADUATE MAJOR (BS, HBS)

This program is available at the following locations:

- Corvallis
- Ecampus

The Electrical and Computer Engineering (ECE) curriculum provides a wide range of opportunities in undergraduate study in the areas of communications, signal processing and controls, electronics and integrated circuits, power electronics and energy systems, materials and devices, electromagnetism, microwaves and optics, computer architecture, digital hardware design, and computer networks.

The Bachelor of Science and Honors Bachelor of Science degree programs in ECE are accredited by the Engineering Accreditation Commission of ABET, <http://www.ABET.org>. The ECE undergraduate program has the following Program Educational Objectives (PEOs) (see the ABET Accreditation for ECE website (<https://engineering.oregonstate.edu/EECS/about/accreditation/>)).

1. Graduates of the program will have successful careers.
2. Graduates of the program will continue to learn and adapt to a changing world.
3. Graduates of the program will practice ethical and inclusive principles that foster collaborative environments.

The ECE undergraduate degree program includes a common set of core courses that provides a solid foundation as well as junior- and senior-level of electives that allow students to prepare for industry, graduate study, or other career paths, specializing or broadening further their knowledge and skills. Further details on electives can be found on the EECS website (<https://engineering.oregonstate.edu/EECS/>).

Major Code: 039

Upon successful completion of the program, students will meet the following learning outcomes:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Communicate effectively with a range of audiences.
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

- Acquire and apply new knowledge as needed, using appropriate learning strategies.

Code	Title	Credits
Engineering+ (College of Engineering Core)		
ENGR 110 & ENGR 115 or ENGR 310	+TRANSITIONS and THE OREGON STATE ENGINEERING STUDENT ¹ +TRANSITIONS	3
ENGR 102	+DESIGN ENGINEERING AND PROBLEM SOLVING	3
ENGR 103	ENGINEERING COMPUTATION AND ALGORITHMIC THINKING	3
Math		
MTH 231	ELEMENTS OF DISCRETE MATHEMATICS	4
MTH 251Z	+DIFFERENTIAL CALCULUS	4
MTH 252Z	INTEGRAL CALCULUS	4
MTH 254	VECTOR CALCULUS I	4
MTH 256	APPLIED DIFFERENTIAL EQUATIONS	4
MTH 264	INTRODUCTION TO MATRIX ALGEBRA	2
Science		
CH 201	GENERAL CHEMISTRY FOR ENGINEERING APPLICATIONS	3
CH 204	+CHEMISTRY FOR ENGINEERING APPLICATIONS LABORATORY I	1
PH 211	+*GENERAL PHYSICS WITH CALCULUS	4
PH 212	*GENERAL PHYSICS WITH CALCULUS	4
PH 213	*GENERAL PHYSICS WITH CALCULUS	4
Communication and Writing		
COMM 114 or COMM 111Z	+*ARGUMENT AND CRITICAL DISCOURSE +*PUBLIC SPEAKING	3-4
WR 121Z	+*COMPOSITION I	4
WR 227Z	+*TECHNICAL WRITING	4
ECE Sophomore Core		
ECE 200	DISCRETE-TIME SIGNAL PROCESSING	4
ECE 201	DC AND TRANSIENT CIRCUITS	4
ECE 202	AC AND FREQUENCY DEPENDENT CIRCUITS	4
ECE 203	CONTINUOUS-TIME SIGNAL PROCESSING	4
ECE 204	DIGITAL LOGIC DESIGN	4
ECE/CS/ENGR Required Courses		
CS 162	INTRODUCTION TO COMPUTER SCIENCE II	4
CS 274	INTRODUCTION TO SYSTEMS PROGRAMMING	4
ECE 353	PROBABILITY FOR ELECTRICAL AND COMPUTER ENGINEERS	3
ENGR 330	+INCLUSIVE AND EQUITABLE ENGINEERING	3
Math or Science Electives		
Complete the following for a minimum of 7 credits of math or science electives:		
MTH 255 or ST 314	VECTOR CALCULUS II INTRODUCTION TO STATISTICS FOR ENGINEERS	7
Select any additional BB, BHS, BI, CH, MB, MTH, PH, ST or Z course at 200-level or above		
ECE Junior Core		
<i>Junior Design</i>		
ECE 341	JUNIOR DESIGN I	3
ECE 342	+JUNIOR DESIGN II	3
Foundations		
Select four courses from the following:		
ECE 310	SEMICONDUCTOR PROCESSING	16
ECE 320	ELECTRONIC CIRCUIT DESIGN I	
ECE 330	POWER UP!	
ECE 350	FOUNDATIONS OF DIGITAL SIGNAL PROCESSING	
ECE 370	COMPUTER ORGANIZATION AND ASSEMBLY PROGRAMMING	
ECE 380	ELECTROMAGNETIC FIELDS AND WAVES	
Junior Electives		

2 Electrical and Computer Engineering Undergraduate Major (BS, HBS)

Select 12 credits from the following courses, including at least 3 credits from ECE: ²	12
Any ECE, CS or AI course at 300-level or above ³	
CS 261	DATA STRUCTURES
ME 217	MECHANICAL ENGINEERING DYNAMICS
ME 330/NSE 330	INTRODUCTION TO FLUID MECHANICS AND HEAT TRANSFER
MTH 341	LINEAR ALGEBRA I
MTH 342	LINEAR ALGEBRA II
MTH 351	INTRODUCTION TO NUMERICAL ANALYSIS
PH 315	PHYSICS OF CONTEMPORARY CHALLENGES
ECE Senior Core	
<i>Senior Design</i>	
Select one of the following sequences, which must be completed in the same academic year:	8
Sequence A	
ECE 441	*ENGINEERING DESIGN PROJECT
ECE 442	*ENGINEERING DESIGN PROJECT
ECE 443	*ENGINEERING DESIGN PROJECT
Sequence B	
ENGR 415	*MULTIDISCIPLINARY ENGINEERING CAPSTONE DESIGN 1
ENGR 416	+*MULTIDISCIPLINARY ENGINEERING CAPSTONE DESIGN 2
<i>Senior Electives</i>	
Select 24 credits from the following courses, including at least 16 credits from ECE: ^{4,5}	24
Any ECE, CS or AI course at the 400-level or above ³	
CH 411	INORGANIC CHEMISTRY
CHE 444	THIN FILM MATERIALS PROCESSING
CHE 499	SPECIAL TOPICS
MTH 451	NUMERICAL LINEAR ALGEBRA
PH 481	PHYSICAL OPTICS
PH 425	PARADIGMS IN PHYSICS: QUANTUM FUNDAMENTALS
ROB 421	APPLIED ROBOTICS
ROB 456	INTELLIGENT ROBOTS
Remaining Core Education Credits	15
Total Credits	180-181

*
Baccalaureate Core course. Applies to general education requirements for undergraduate students in a catalog year up to 2024-2025

+
Core Education course. Applies to general education requirements for undergraduate students in catalog year 2025-2026 and beyond

^
Writing Intensive Curriculum (WIC) course

1
Students who complete CORE 100 or CORE 300 or a non-ENGR Transitions course and then declare an Engineering major will use an Engineering elective course to substitute for ENGR 115

2
No ECE, CS or AI 401, 403, 404, 405, 406, 407, 410, 501, 503, 504, 505, 506, 507 or 510 courses can be used to satisfy junior electives

3
ECE, CS or AI 500 and 600-level courses can be applied towards junior elective and senior elective requirements with advisor approval

4

No ECE, CS or AI courses 403, 404, 405, 407, 410, 501, 503, 504, 505, 506, 507 or 510 may be used to satisfy the senior electives

5

A maximum of 6 credits of ECE, CS or AI 401 or 406 may be applied to senior electives

Course Waivers or Substitutions

The above course requirements may be waived, or substituted by equivalent courses, only under special circumstances, subject to approval by the School. The ECE curriculum has been designed to meet the following requirements, which must still be met even if specific courses are waived.

Code	Title	Credits
	Mathematics and basic sciences	45
	Engineering science and design	68
	Upper-division courses	60

Major Code: 039

Degree plans are subject to change and the following is only an example of how students may complete their degree in four years. Students should consult their advisor to determine the best degree plan for them. Contact details for advisors can be found on the Academic Advising (<https://catalog.oregonstate.edu/advising/>) page.

First Year

Fall		Credits
CH 201	GENERAL CHEMISTRY FOR ENGINEERING APPLICATIONS	3
CH 204	+CHEMISTRY FOR ENGINEERING APPLICATIONS LABORATORY I	1
ENGR 110 & ENGR 115 or ENGR 310	+TRANSITIONS or +TRANSITIONS	3
ENGR 102	+DESIGN ENGINEERING AND PROBLEM SOLVING	3
MTH 251Z	+*DIFFERENTIAL CALCULUS	4
Credits		14

Winter

COMM 114 or COMM 111Z	+*ARGUMENT AND CRITICAL DISCOURSE or +*PUBLIC SPEAKING	3-4
ENGR 103	ENGINEERING COMPUTATION AND ALGORITHMIC THINKING	3
MTH 231	ELEMENTS OF DISCRETE MATHEMATICS	4
MTH 252Z	INTEGRAL CALCULUS	4
Credits		14

Spring

CS 162	INTRODUCTION TO COMPUTER SCIENCE II	4
MTH 264	INTRODUCTION TO MATRIX ALGEBRA	2
WR 121Z	+*COMPOSITION I	4
Core Ed: Arts & Humanities General		3
Math or Science Elective		3-4
Credits		16

Second Year

Fall		Credits
ECE 200	DISCRETE-TIME SIGNAL PROCESSING	4
ECE 201	DC AND TRANSIENT CIRCUITS	4
MTH 254	VECTOR CALCULUS I	4
PH 211	+*GENERAL PHYSICS WITH CALCULUS	4
Credits		16

Winter		
CS 274	INTRODUCTION TO SYSTEMS PROGRAMMING	4
ECE 202	AC AND FREQUENCY DEPENDENT CIRCUITS	4
MTH 256	APPLIED DIFFERENTIAL EQUATIONS	4
PH 212	*GENERAL PHYSICS WITH CALCULUS	4
Credits		16
Spring		
ECE 203	CONTINUOUS-TIME SIGNAL PROCESSING	4
ECE 204	DIGITAL LOGIC DESIGN	4
PH 213	*GENERAL PHYSICS WITH CALCULUS	4
MTH 255	VECTOR CALCULUS II	3-4
or ST 314	or INTRODUCTION TO STATISTICS FOR ENGINEERS	
Credits		16
Third Year		
Fall		
ECE 341	JUNIOR DESIGN I	3
WR 227Z	+*TECHNICAL WRITING	4
ECE Foundations Courses		8
Credits		15
Winter		
ECE 342	+JUNIOR DESIGN II	3
ECE Foundations Courses		8
Junior Elective		4
Credits		15
Spring		
ECE 353	PROBABILITY FOR ELECTRICAL AND COMPUTER ENGINEERS	3
Junior Electives		8
Core Ed: Difference, Power & Oppression Foundations		3
Credits		14
Fourth Year		
Fall		
ECE 441	*ENGINEERING DESIGN PROJECT	3
ENGR 330	+INCLUSIVE AND EQUITABLE ENGINEERING	3
Senior Electives		8
Credits		14
Winter		
ECE 442	*ENGINEERING DESIGN PROJECT	3
Senior Electives		8
Core Ed: Social Science		3
Credits		14
Spring		
ECE 443	*ENGINEERING DESIGN PROJECT	2
Senior Electives		8
Core Ed: Arts & Humanities Global		3
Core Ed: Seeking Solutions		3
Credits		16
Total Credits		180

*
Baccalaureate Core course. Applies to general education requirements for undergraduate students in a catalog year up to 2024-2025

+
Core Education course. Applies to general education requirements for undergraduate students in catalog year 2025-2026 and beyond

^
Writing Intensive Curriculum (WIC) course