

ELECTRICAL AND COMPUTER ENGINEERING UNDERGRADUATE MAJOR (BS, HBS)

The curriculum in Electrical and Computer Engineering (ECE) provides a wide range of opportunities in undergraduate study in the electrical engineering areas of communications, signal processing and controls, electronics and integrated circuits, power electronics and energy systems, materials and devices, electromagnetism, microwaves and optics, and the computer engineering areas of 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 Computing 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 (<http://eecs.oregonstate.edu/about-eecs/accreditation/electrical-computer-engineering/>)).

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 29-credits of restricted electives. The restricted electives allow students to prepare for industry, graduate study, or other career paths, specializing or broadening further their knowledge and skills. Elective course work is available focusing on sustainability and renewable energy, computers and networks, energy systems, integrated circuits, systems signals and communications, materials and devices, RF/microwaves and optoelectronics, and robotics. The sustainability and renewable energy focus addresses global technological challenges balancing societal needs with environmental and economic tradeoffs. Further details on restricted electives can be found on the EECS website.

Major Code: 039

- 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.

Except as approved by the ECE curriculum committee, the 29 credits of restricted electives must include either CS 344 or ECE 390, plus four ECE 400-level electives and one additional 400-level elective from the approved list.

The ECE curriculum has been designed to meet the following minimum requirements, which still must be met if specific courses are waived:

Code	Title	Credits
Mathematics and basic sciences		45
Engineering science and design		67.5
Upper-division courses		60
Total credits required for graduation		180

Non-MECOP Sample Program for ECE Majors

First Year		Credits
CH 201 or CH 231	CHEMISTRY FOR ENGINEERING MAJORS or GENERAL CHEMISTRY	3-4
COMM 111 or COMM 114	*PUBLIC SPEAKING or *ARGUMENT AND CRITICAL DISCOURSE	3
CS 161	INTRODUCTION TO COMPUTER SCIENCE I ²	4
CS 162	INTRODUCTION TO COMPUTER SCIENCE II ²	4
ECE 111	INTRODUCTION TO ECE: TOOLS	3
ECE 112	INTRODUCTION TO ECE: CONCEPTS	3
HHS 231	*LIFETIME FITNESS FOR HEALTH ³	2
HHS 241	*LIFETIME FITNESS (or any PAC course) ³	1-2
MTH 231	ELEMENTS OF DISCRETE MATHEMATICS ²	4
MTH 251	*DIFFERENTIAL CALCULUS	4
MTH 252	INTEGRAL CALCULUS	4
MTH 254	VECTOR CALCULUS I	4
WR 121	*ENGLISH COMPOSITION	3
Perspectives course ³		9
Credits		51-53

Second Year		Credits
Biological Science course with lab ³		4
CS 261	DATA STRUCTURES ²	4
ECE 271	DIGITAL LOGIC DESIGN ²	3
ECE 272	DIGITAL LOGIC DESIGN LABORATORY ²	1
ENGR 201	ELECTRICAL FUNDAMENTALS I	3
ENGR 202	ELECTRICAL FUNDAMENTALS II	3
ENGR 203	ELECTRICAL FUNDAMENTALS III ²	3
MTH 255	VECTOR CALCULUS II	4
MTH 256	APPLIED DIFFERENTIAL EQUATIONS	4
MTH 306 or MTH 264 <i>and</i> MTH 265	MATRIX AND POWER SERIES METHODS or INTRODUCTION TO MATRIX ALGEBRA <i>and</i> INTRODUCTION TO SERIES	4
PH 211	*GENERAL PHYSICS WITH CALCULUS	4
PH 212	*GENERAL PHYSICS WITH CALCULUS	4
PH 213	*GENERAL PHYSICS WITH CALCULUS	4
Credits		45

Third Year		Credits
ECE 322	ELECTRONICS I	3
ECE 323	ELECTRONICS II	3
ECE 341	JUNIOR DESIGN I	3
ECE 342	JUNIOR DESIGN II	3
ECE 351	SIGNALS AND SYSTEMS I	3

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ECE 352	SIGNALS AND SYSTEMS II	3
ECE 353	INTRODUCTION TO PROBABILITY AND RANDOM SIGNALS	3
ECE 372/CS 372	INTRODUCTION TO COMPUTER NETWORKS ¹	4
ECE 375	COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING	4
ECE 391	TRANSMISSION LINES ¹	3
Difference, Power and Discrimination course ³		3
Restricted Elective ¹		
ECE 390 or CS 344	ELECTRIC AND MAGNETIC FIELDS or OPERATING SYSTEMS I	4
Contemporary Global Issues course ³		3
WR 327	*TECHNICAL WRITING	3
Credits		45
Fourth Year		
CS 391	*SOCIAL AND ETHICAL ISSUES IN COMPUTER SCIENCE	3
ECE 441 & ECE 442 & ECE 443	*ENGINEERING DESIGN PROJECT and *ENGINEERING DESIGN PROJECT and *ENGINEERING DESIGN PROJECT	8
Perspectives course ³		3
Restricted Electives: Select four approved 400-level ECE courses ¹		12-16
Restricted Electives: Select one approved 400-level course ¹		3-4
Select 5-10 credits of approved Restricted Electives ¹		5-10
Credits to meet graduation requirement of 180		5
Credits		39-49
Total Credits		180-192

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Baccalaureate Core Course (BCC)

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Writing Intensive Course (WIC)

1

Must be selected from approved restricted elective list

2

Prerequisite for required upper-division courses

3

Must be selected to satisfy the requirements of the baccalaureate core

Current List of Restricted Electives

Code	Title	Credits
CH 411	INORGANIC CHEMISTRY	3
CHE 444	THIN FILM MATERIALS PROCESSING	4
CHE 499	SPECIAL TOPICS (Conventional Alternative Energy Systems)	3
CS 325	ANALYSIS OF ALGORITHMS	4
CS 331	INTRODUCTION TO ARTIFICIAL INTELLIGENCE	4
CS 344	OPERATING SYSTEMS I	4
CS 434	MACHINE LEARNING AND DATA MINING	4
CS 444	OPERATING SYSTEMS II	4
CS 450	INTRODUCTION TO COMPUTER GRAPHICS	4
ECE 331	ELECTROMECHANICAL ENERGY CONVERSION	4
ECE 390	ELECTRIC AND MAGNETIC FIELDS	4
ECE 406	PROJECTS	1-16
ECE 411	ENGINEERING MAGNETICS	3
ECE 413	SENSORS	3
ECE 415	MATERIAL SCIENCE OF NANOTECHNOLOGY	3
ECE 416	ELECTRONIC MATERIALS AND DEVICES	4
ECE 417	BASIC SEMICONDUCTOR DEVICES	4
ECE 418	SEMICONDUCTOR PROCESSING	4
ECE 422	CMOS INTEGRATED CIRCUITS I	4

ECE 423	CMOS INTEGRATED CIRCUITS II	4
ECE 431	POWER ELECTRONICS	4
ECE 432	DYNAMICS OF ELECTROMECHANICAL ENERGY CONVERSION	4
ECE 433	POWER SYSTEM ANALYSIS	4
ECE 437	SMART GRID	3
ECE 438	ELECTRIC AND HYBRID ELECTRIC VEHICLES	4
ECE 451/ME 430	SYSTEMS DYNAMICS AND CONTROL	4
ECE 461	INTRODUCTION TO ANALOG AND DIGITAL COMMUNICATIONS	4
ECE 462	DIGITAL COMMUNICATIONS AND CHANNEL CODING	4
ECE 463	WIRELESS COMMUNICATIONS NETWORK	4
ECE 464	DIGITAL SIGNAL PROCESSING	4
ECE 468	DIGITAL IMAGE PROCESSING	3
ECE 471	ENERGY-EFFICIENT VLSI DESIGN	4
ECE 472/CS 472	COMPUTER ARCHITECTURE	4
ECE 473	MICROCONTROLLER SYSTEM DESIGN	4
ECE 474	VLSI SYSTEM DESIGN	4
ECE 476/CS 476	ADVANCED COMPUTER NETWORKING	4
ECE 477	MULTIMEDIA SYSTEMS	4
ECE 478	NETWORK SECURITY	4
ECE 482/PH 482	OPTICAL ELECTRONIC SYSTEMS	4
ECE 483/PH 483	GUIDED WAVE OPTICS	4
ECE 484	ANTENNAS AND PROPAGATION	4
ECE 485	MICROWAVE DESIGN TECHNIQUES	4
ECE 499	SPECIAL TOPICS	16
ECE 520	ANALOG CMOS INTEGRATED CIRCUITS	4
ECE 530	CONTEMPORARY ENERGY APPLICATIONS	4
ECE 534		3
ECE 536	POWER SYSTEM PROTECTION	3
ECE 550	LINEAR SYSTEMS	4
ME 311/NSE 311	INTRODUCTION TO THERMAL-FLUID SCIENCES	4
ME 317	INTERMEDIATE DYNAMICS	4
MTH 341	LINEAR ALGEBRA I	3
MTH 342	LINEAR ALGEBRA II	4
MTH 351	INTRODUCTION TO NUMERICAL ANALYSIS	3
PH 315	PHYSICS OF CONTEMPORARY CHALLENGES	3
PH 481	PHYSICAL OPTICS	4
ROB 421	APPLIED ROBOTICS	4
ROB 456	INTELLIGENT ROBOTS	4

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