ENERGY SYSTEMS ENGINEERING UNDERGRADUATE MAJOR (BS, HBS)

This program is available at the following location:

- **OSU-Cascades**

At Oregon State University, the Energy Systems Engineering degree program combines engineering fundamentals with energy-focused technical courses. This multidisciplinary curriculum provides students with a strong foundation in the core principles of mechanical, electrical and industrial engineering.

Program Educational Objectives—Energy Systems Engineering

Note: The Bachelor of Science and Honors Bachelor of Science degrees in Energy Systems Engineering are accredited by the Engineering Accreditation Commission of ABET, http://www.ABET.org (http://www.abet.org/), which requires stated program educational objectives and student outcomes to support these.

OSU Energy Systems Engineering graduates receive an innovative education, and within 3 to 5 years of graduation will have:

1. Created value to organizations through design, analysis, evaluation, and improvement of engineered products, systems, and processes using appropriate engineering methods and tools.
2. Communicated inclusively and effectively across multidisciplinary, multicultural teams in support of project and organizational objectives.
3. Demonstrated resourcefulness and intellectual curiosity in order to contribute to opportunities across their organizations.

Major Code: 293

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
Communication & Writing		
COMM 114	+*ARGUMENT AND CRITICAL DISCOURSE	3
WR 121Z	+*COMPOSITION I	4
WR 227Z	+*TECHNICAL WRITING	4
Math & Science		
CH 201	GENERAL CHEMISTRY FOR ENGINEERING APPLICATIONS	3
CH 202	CHEMISTRY FOR ENGINEERING MAJORS	3
CH 204	+CHEMISTRY FOR ENGINEERING APPLICATIONS LABORATORY I	1
CH 205	LABORATORY FOR CH 202	1
MTH 251Z	+*DIFFERENTIAL CALCULUS	4
MTH 252Z	INTEGRAL CALCULUS	4
MTH 254	VECTOR CALCULUS I	4
MTH 255	VECTOR CALCULUS II	4
MTH 256	APPLIED DIFFERENTIAL EQUATIONS	4
MTH 264	INTRODUCTION TO MATRIX ALGEBRA	2
PH 211	+*GENERAL PHYSICS WITH CALCULUS	4
PH 212	*GENERAL PHYSICS WITH CALCULUS	4
PH 213	*GENERAL PHYSICS WITH CALCULUS	4
ST 314	INTRODUCTION TO STATISTICS FOR ENGINEERS	3
Business Management		
BA 357	OPERATIONS AND SUPPLY CHAIN MANAGEMENT	4
ECON 201Z	+*PRINCIPLES OF MICROECONOMICS	4
ENGR 390	ENGINEERING ECONOMY	3
ESC 395	ENGINEERING PROJECT MANAGEMENT	3
Engineering		
AMT 461	+DESIGNING FUTURISMS	4
ENGR 102	+DESIGN ENGINEERING AND PROBLEM SOLVING	3
ENGR 103	ENGINEERING COMPUTATION AND ALGORITHMIC THINKING	3
ENGR 110 & ENGR 115	+TRANSITIONS and THE OREGON STATE ENGINEERING STUDENT [1]	3
or ENGR 310	+TRANSITIONS	
ENGR 201	ELECTRICAL FUNDAMENTALS I	3
ENGR 202	ELECTRICAL FUNDAMENTALS II	3
ENGR 211	STATICS	3
ENGR 415	^MULTIDISCIPLINARY ENGINEERING CAPSTONE DESIGN 1	4
ENGR 416	+^MULTIDISCIPLINARY ENGINEERING CAPSTONE DESIGN 2	4
ESC 315	STOCHASTIC AND EVENT-DRIVEN SIMULATION OF INDUSTRIAL SYSTEMS	4
ESC 331	INTRODUCTORY FLUID MECHANICS	4
ESC 332	INTRODUCTORY HEAT TRANSFER	4
ESE 330	MODELING AND ANALYSIS OF DYNAMIC SYSTEMS	4
ESE 355	ENERGY REGULATION	4
ESE 360	ENERGY CONSUMPTION ANALYSIS	4
ESE 430	FEEDBACK CONTROL SYSTEMS	4
ESE 450	ENERGY GENERATION SYSTEMS	4
ESE 470	ELECTRICAL ENERGY DISTRIBUTION SYSTEMS	4
ESE 471	ENERGY STORAGE SYSTEMS	4
IE 212	COMPUTATIONAL METHODS FOR INDUSTRIAL ENGINEERING	4
IE 425	INDUSTRIAL SYSTEMS OPTIMIZATION	4
ME 217	MECHANICAL ENGINEERING DYNAMICS	4
ME 310	INTRODUCTION TO THERMODYNAMICS	4
ME 333	THERMODYNAMICS II	4
Restricted Electives		**8**
Remaning Core Ed Courses		**12**
Total Credits		**180**

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

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

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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

Major Code: 293

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
ENGR 110 & ENGR 115 or ENGR 310	+TRANSITIONS or +TRANSITIONS	3
MTH 251Z	+*DIFFERENTIAL CALCULUS	4
WR 121Z	+*COMPOSITION I	4
	Credits	**14**
Winter		
CH 202	CHEMISTRY FOR ENGINEERING MAJORS	3
ECON 201Z	+*PRINCIPLES OF MICROECONOMICS	4
ENGR 102	+DESIGN ENGINEERING AND PROBLEM SOLVING	3
MTH 252Z	INTEGRAL CALCULUS	4
	Credits	**14**
Spring		
CH 204	+CHEMISTRY FOR ENGINEERING APPLICATIONS LABORATORY I	1
CH 205	LABORATORY FOR CH 202	1
COMM 114	+*ARGUMENT AND CRITICAL DISCOURSE	3
ENGR 103	ENGINEERING COMPUTATION AND ALGORITHMIC THINKING	3
MTH 254	VECTOR CALCULUS I	4
WR 227Z	+*TECHNICAL WRITING	4
	Credits	**16**
Second Year		
Fall		
ENGR 201	ELECTRICAL FUNDAMENTALS I	3
ENGR 211	STATICS	3
MTH 256	APPLIED DIFFERENTIAL EQUATIONS	4
PH 211	+*GENERAL PHYSICS WITH CALCULUS	4
	Credits	**14**
Winter		
ENGR 202	ELECTRICAL FUNDAMENTALS II	3
MTH 264	INTRODUCTION TO MATRIX ALGEBRA	2
ME 217	MECHANICAL ENGINEERING DYNAMICS	4
PH 212	*GENERAL PHYSICS WITH CALCULUS	4
Core Ed: Arts & Humanities General		3
	Credits	**16**
Spring		
IE 212	COMPUTATIONAL METHODS FOR INDUSTRIAL ENGINEERING	4
MTH 255	VECTOR CALCULUS II	4
PH 213	*GENERAL PHYSICS WITH CALCULUS	4
ST 314	INTRODUCTION TO STATISTICS FOR ENGINEERS	3
	Credits	**15**
Third Year		
Fall		
ENGR 390	ENGINEERING ECONOMY	3
ESE 330	MODELING AND ANALYSIS OF DYNAMIC SYSTEMS	4
IE 425	INDUSTRIAL SYSTEMS OPTIMIZATION	4
ME 310	INTRODUCTION TO THERMODYNAMICS	4
	Credits	**15**
Winter		
BA 357	OPERATIONS AND SUPPLY CHAIN MANAGEMENT	4
ESC 315	STOCHASTIC AND EVENT-DRIVEN SIMULATION OF INDUSTRIAL SYSTEMS	4
ESE 360	ENERGY CONSUMPTION ANALYSIS	4
ME 333	THERMODYNAMICS II	4
	Credits	**16**
Spring		
ESC 331	INTRODUCTORY FLUID MECHANICS	4
ESC 395	ENGINEERING PROJECT MANAGEMENT	3
ESE 355	ENERGY REGULATION	4
ESE 470	ELECTRICAL ENERGY DISTRIBUTION SYSTEMS	4
	Credits	**15**
Fourth Year		
Fall		
ENGR 415	^MULTIDISCIPLINARY ENGINEERING CAPSTONE DESIGN 1	4
Restricted ESE Elective		4
Core Ed: Arts & Humanities Global		3
Core Ed: Difference, Power & Oppression Foundations		3
	Credits	**14**
Winter		
ESC 332	INTRODUCTORY HEAT TRANSFER	4
ENGR 416	+^MULTIDISCIPLINARY ENGINEERING CAPSTONE DESIGN 2	4
ESE 430	FEEDBACK CONTROL SYSTEMS	4
Core Ed: Seeking Solutions		3
	Credits	**15**
Spring		
AMT 461	+DESIGNING FUTURISMS	4
ESE 450	ENERGY GENERATION SYSTEMS	4
ESE 471	ENERGY STORAGE SYSTEMS	4
Restricted ESE Elective		4
	Credits	**16**
	Total Credits	**180**

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