



Biological & Ecological Engineering (BEE)

Department

Colleges of Engineering and

Agricultural Science

bee.oregonstate.edu

Ecological Engineering

Undergraduate Advising Guide

2022-2023

Registration Dates

FALL TERM 2022

Priority registration runs **Sunday, May 15, 2022** to
Wednesday, June 1, 2022

WINTER TERM 2023

Priority registration runs **Sunday, Nov 13, 2022**
to **Wednesday, Nov 30, 2022**

SPRING TERM 2023

Priority registration runs **Sunday, Feb 26, 2023** to
Wednesday, March 15, 2023



Gilmore Hall

124 SW 26th Street
(located at intersection of
Campus Way and 26th St.)

<https://bee.oregonstate.edu/biological-and-ecological-engineering/advisors>

PREFACE

This advising guide is intended to give an overview of the requirements for the B.S. Ecological Engineering (EcoE) degree in the Biological & Ecological Engineering (BEE) department at Oregon State University (OSU). **This major requires 180 credits for graduation and generally takes 4 years to complete.**

This guide includes information about course prerequisites and sample term-by-term plans to graduate within 4 years. To create an individualized curriculum plan, log in to MyDegrees and utilize the Planner. **The use of Planner is required for all College of Engineering students.**

The information presented in this guide supplements information found in the *OSU General Catalog* as well as in the *OSU Registration Information Handbook*. **It is the student's responsibility to be familiar with important dates, deadlines, regulations and rules detailed within these documents.** Please also carefully review the College of Engineering and the BEE Department policies for admission, student performance, and academic requirements.

Important Links:

- OSU General Catalog: <http://catalog.oregonstate.edu/>
- OSU Registration Information Handbook: <https://registrar.oregonstate.edu/how-register-registration-information-handbook>
- OSU Office of the Registrar webpage: <https://registrar.oregonstate.edu/>
- College of Engineering webpage: <https://engineering.oregonstate.edu/>
- Biological & Ecological Engineering webpage: <https://bee.oregonstate.edu/>

Campus Resources:

- Academic Success Center (ASC): <https://success.oregonstate.edu/>
- Admissions Office: <https://admissions.oregonstate.edu/>
- Counseling & Psychological Services (CAPS): <https://counseling.oregonstate.edu/>
- Degree Partnership Program (DPP): <https://partnerships.oregonstate.edu/>
- Disability Access Services (DAS): <https://ds.oregonstate.edu/>
- Diversity & Cultural Engagement: <https://dce.oregonstate.edu/>
- Financial Aid: <https://financialaid.oregonstate.edu/financial-aid>
- Human Services Resource Center: <https://studentlife.oregonstate.edu/hsrc>
- Scholarship Office: <https://scholarships.oregonstate.edu/>
- Student Care: <https://studentlife.oregonstate.edu/student-care>

DEFINITION OF ECOLOGICAL ENGINEERING

The EcoE degree at OSU is a unique, ABET-accredited degree that is the **first of its kind in the nation**. Ecological Engineering blends engineering and science, and focuses on the design of **sustainable systems** (natural, urban, and agricultural) that are **consistent with ecological principles** and **integrate human activities into the natural environment to the benefit of both**. This discipline is rapidly developing as an important new area of engineering. Graduates from our program are **creative and innovative problem-solvers**, and have found employment in water resources, irrigation design & management, river engineering, ecological restoration, water treatment, bioremediation, ecosystem modeling, and related fields.



CURRICULUM OVERVIEW

Ecological Engineering depends on a broader mix of disciplines than other branches of engineering. In addition to the traditional engineering training in **mathematics, physics, chemistry, and engineering principles**, underclassmen EcoE students receive training in **biology, ecology, soil science, geographic information systems (GIS), surveying, and environmental economics and policy**. Upperclassmen complete upper-division engineering coursework that includes **biosystems analysis and modeling, thermodynamics, fluid mechanics, hydrology and hydraulics, non-point source pollution, and bioremediation**. Upper division engineering and science electives (minimum of 23 credits) as well as a two-quarter senior capstone course are also required. In addition, students take credits to meet basic OSU requirements under the **Baccalaureate Core**, which emphasizes critical thinking, writing, world cultures, appreciation of differences, the arts, sciences, literature, lifelong fitness, and global awareness. **Graduation requires 180 credits.**

See pages 4-8 for an example 4 year plan and a more detailed breakdown of the curriculum.

Example 4 Year Plan (180 credits required)

Credits	First Year			Second Year			Third Year			Fourth Year									
	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring							
1	Engineering Orientation ENGR 100 FWS(3)	Engineering Orientation ENGR 102 FWS(3)	Engineering Orientation ENGR 103 FWS(3)	EcoE Ecology BEE 270 F(3)	EcoE Fundamentals BEE 221 W(3)	EcoE Comp. BEE 222 S(3)	Fluid Mechanics BEE 311 F(4)	Ecohydraulics BEE 312 W(4)	Ecohydrology BEE 313 S(4)	EcoE Design I BEE 481 F(4)	EcoE Design II BEE 482 W(3)	EcoE Design III BEE 483 S(2)							
2	Chemistry CH 231 FW(4)	Chemistry CH 232 WS(4)	Chemistry CH 233 SF(4)	Statics ENGR 211 FWS(3)	Lifetime Fitness HHS 231+Lab FWS(3)	Strength of Materials ENGR 213 FWS(3)							Biosystems Analy. and Modeling BEE 320 F(4)	Thermo and Transfer Processes BEE 322 W(4)	EcoE Laboratory BEE 361 S(4)	BEE 415 F(1)	Bioremediation BEE 468 W(4)	Synthesis Bacc. Core	
3							Differential Equations MTH 256 FWS(4)	Statistics ST 314 FWS(3)	Matrices MTH 264 FWS(2)	Forest Surveying FE 208 F(4)	EcoE Microbial Processes BEE 362 S(3)	Engineering Elective							Engineering Elective
4																			
5	English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective	Synthesis or Perspective Bacc. Core	Perspective Bacc. Core	DPD Bacc. Core								
6												English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective
7	English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective	Synthesis or Perspective Bacc. Core	Perspective Bacc. Core	DPD Bacc. Core								
8												English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective
9	English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective	Synthesis or Perspective Bacc. Core	Perspective Bacc. Core	DPD Bacc. Core								
10												English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective
11	English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective	Synthesis or Perspective Bacc. Core	Perspective Bacc. Core	DPD Bacc. Core								
12												English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective
13	English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective	Synthesis or Perspective Bacc. Core	Perspective Bacc. Core	DPD Bacc. Core								
14												English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective
15	English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective	Synthesis or Perspective Bacc. Core	Perspective Bacc. Core	DPD Bacc. Core								
16												English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective
17	English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective	Synthesis or Perspective Bacc. Core	Perspective Bacc. Core	DPD Bacc. Core								
18												English Composition WR 121 FWS(3)	Speech COMM 111/114 FWS(3)	Physics w/ Calculus PH 211 FWS(4)	Intro. Environ. Econ. & Policy AEC 250 FWS(3)	Ethics* FWS(3-4)	Soil Sci + Lab SOIL 205/206 FWS(4)	Science Elective	Science Elective

- Pre-requisite courses for upper-division coursework
- Electives (23 total elective credits required; minimum 13 credits engineering electives; minimum 10 credits science elective)
- Baccalaureate Core courses not covered by major requirements (S/U grading allowed)
- * Fulfills either a Perspectives or Synthesis baccalaureate core category, dependent on course chosen

This guide is intended for scheduling only. Course offerings and requirements are subject to change. Please refer to the OSU Online catalog for a complete list of degree requirements.

I. Required Courses (142 credits)

Math (23 credits)

Course #	Credits	Description	Prerequisites	Terms
MTH 251	4	Differential Calculus	MTH 112	FWS(Su)
MTH 252	4	Integral Calculus	MTH 251	FWS(Su)
MTH 254	4	Vector Calculus	MTH 252	FWS(Su)
MTH 256	4	Differential Equations	MTH 254	FWS(Su)
MTH 264	2	Introduction to Matrix Algebra	MTH 252	FWS(Su)
MTH 265	2	Introduction to Series	MTH 252	FWS(Su)
ST 314	3	Statistics for Engineers	MTH 252	FWS(Su)

Science (37 credits)

Course #	Credits	Description	Prerequisites	Terms
BEE 270	3	EcoE Ecology	N/A	F
BEE 362	3	EcoE Microbial Processes	N/A	S
CH 231/261	5	General Chemistry + Lab	MTH 111	FW(Su)
CH 232/262	5	General Chemistry + Lab	CH 231	WS(Su)
CH 233/263	5	General Chemistry + Lab	CH 232	FS(Su)
PH 211	4	General Physics with Calculus	MTH 252 (co)	FWS(Su)
PH 212	4	General Physics with Calculus	PH 211, MTH 252	FWS(Su)
PH 213	4	General Physics with Calculus	PH 212, MTH 254	FWS(Su)
SOIL 205/206	4	Soil Science + Lab	N/A	FWS

Science and Public Policy (3-4 credits)

Course #	Credits	Description	Prerequisites	Terms
AEC 250	3	Intro to Environ. Econ and Policy	MTH 111	FWS(Su)
or ECON 201	4	Intro to Microeconomics	MTH 111	FWS(Su)

Ethics (3-4 credits)

Course #	Credits	Description	Prerequisites	Terms
IE 380	3	The Responsible Engineer	Junior standing	WS
or PHL 205	4	Ethics	N/A	FWS(Su)
or PHL 440	3	Environmental Ethics	Sophomore standing	Su
Or PHL 443	3	World Views and Environmental Ethics	Sophomore standing	FWS(Su)

Engineering (56 credits)

Course #	Credits	Description	Prerequisites	Terms
ENGR 100	3	The Oregon State Engineering Student	N/A	FWS
ENGR 102	3	Design Engineering and Problem Solving	N/A	FWS
ENGR 103	3	Engineering Computation and Algorithmic Thinking	ENGR 102 + MTH 112 (co)	FWS
BEE 221	3	EcoE Fundamentals	BI 211 + MTH 256	W
BEE 222	2	EcoE Computation	N/A	S
BEE 311	4	Ecological Fluid Mechanics	PH 212 + MTH 254 + ENGR 211	F
BEE 312	4	Ecohydraulics	BEE 311 or CE 311 or CHE 331	W
BEE 313	4	Ecohydrology	BEE 312	S
BEE 320	4	Biosystems Analysis and Modeling	BEE 222 + MTH 256	F
BEE 322	4	Thermodynamics and Transfer Processes	BEE 320	W
BEE 361	3	EcoE Laboratory	BEE 312	S
BEE 468	4	Bioremediation	BEE 221 or ENVE 322	W
BEE 481	4	EcoE Design I (WIC)	BEE 222	F
BEE 482	3	EcoE Design II (WIC)	BEE 481 (in same AY)	W
BEE 483	2	EcoE Design III (WIC)	BEE 481 & 482 (in same AY)	
ENGR 211	3	Statics	MTH 252	FWS(Su)
ENGR 213	3	Strength of Materials	ENGR 211	FWS(Su)

Professional Skills (20 credits)

Course #	Credits	Description	Prerequisites	Terms
BEE 415	1	Professional Development	BEE 469 (co)	F
COMM 111/114	3	Public Speaking or Argument and Critical Discourse	N/A	FWS(Su)
HHS 231+PAC	3	Lifetime Fitness for Health and Physical Activity Courses	N/A	FWS(Su)
FE 257	3	GIS and Forest Engineering Applications	N/A	W
FE 208	4	Forest Surveying	MTH 252	F
WR 121	3	English Composition	N/A	FWS(Su)
WR 327	3	Technical Writing	WR 121	FWS(Su)

II. Elective Courses (23 credits minimum)

Students are required to take a minimum of 23 credits of upper division science and engineering electives (minimum 10 non-blanket hour* science elective credits and minimum 13 non-blanket hour* engineering elective credits). **Pre-approved electives are listed in the Degree Checklist on MyDegrees and on the BEE advising webpage (link on bottom of Page 1).** If a science or engineering course is not included on the pre-approved lists, students may submit a program petition form (found on the BEE advising webpage- link on bottom of Page 1) to the Head Academic Advisor to receive approval to count it as an elective. This petition will be reviewed by the undergraduate curriculum committee. A maximum of two 200-level engineering electives and one 200-level science elective may be taken.

***Blanket hour credits (BEE 401, 405, 410)**

Blanket hour credits are taken by students completing undergraduate research (BEE 401), individualized study (BEE 405), or an internship (BEE 410). Just as with regular course credits, students are responsible for paying tuition for these credits. To receive blanket-hour credits, students must first **submit a blanket-hour credit form** to the Head Academic Advisor that is signed by their project supervisor and BEE faculty grader (if different person than project supervisor). They will then register for the credits and **submit a substantial report** to their supervisor and grader at the end of the term. More details on the requirements (as well as forms to be submitted) can be found here, <https://agsci.oregonstate.edu/biological-and-ecological-engineering/blanket-hour-courses>.

III. Baccalaureate Core (15 additional credits towards major)

OSU requires completion of a set of Baccalaureate Core ("Bacc Core") courses, divided into 4 groups- Skills, Perspectives, Synthesis, and Difference, Power, and Discrimination. Some of these categories are met by required courses within your major (*).

Skills (15 credits)

Course Category	Credits	Met by	S/U Allowed
Fitness*	--	HHS 231 + PAC	Yes
Mathematics*	--	MTH 251	No
Speech*	--	COMM 111 or 114	No
Writing I*	--	WR 121	No
Writing II*	--	WR 327	No

Perspectives (24 credits)

Course Category	Credits	Met by	S/U Allowed
Biological Science w/ Lab*	--	Soil Science	No
Cultural Diversity	3	N/A	Yes
Literature & Arts	3	N/A	Yes
Physical Science*	--	Chemistry or Physics courses	No
Social Processes & Institutions*	--	AEC 250	No
Western Culture*	3	PHL 205 (if taken)	Yes (No if PHL 205)

Synthesis (6 credits)

Course Category	Credits	Met by	S/U Allowed
Contemporary Global Issues	3	PHL 440 or PHL 443 (if taken)	Yes (No if PHL 440 or PHL 443)
Science, Technology, and Society*	3	IE 380 (if taken)	Yes (No if IE 380)

Difference, Power, & Discrimination (3 credits)- No S/U grading