



## Biological & Ecological Engineering (BEE)

### Department

Colleges of Engineering and

Agricultural Science

[bee.oregonstate.edu](http://bee.oregonstate.edu)

# Ecological Engineering

## Undergraduate Advising Guide

2023-2024

### Registration Dates

#### FALL TERM 2023

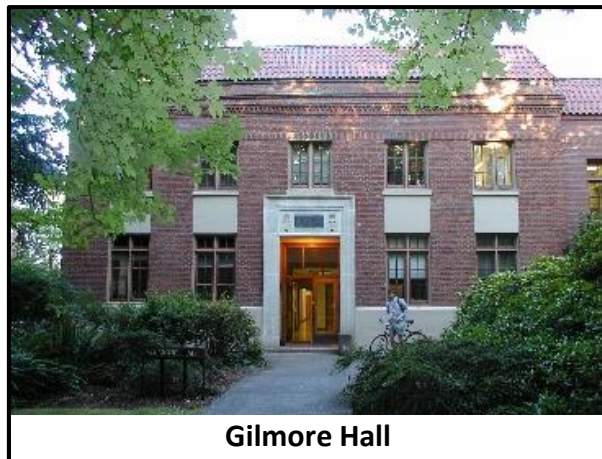
Priority Registration Phase I runs **Sunday, May 21, 2023** to **Wednesday, June 7, 2023**; Priority Registration Phase II runs **Thursday, June 8, 2023** to **Sunday, October 8, 2023**

#### WINTER TERM 2024

Priority Registration Phase I runs **Sunday, Nov 19, 2023** to **Wednesday, Dec 6, 2023**; Priority Registration Phase II runs **Thursday, Dec 7, 2023** to **Sunday, Jan 14, 2024**

#### SPRING TERM 2024

Priority Registration Phase I runs **Sunday, Feb 25, 2024** to **Wednesday, Mar 13, 2024**; Priority Registration Phase II runs **Thursday, Dec 14, 2024** to **Sunday, Apr 7, 2024**



**Gilmore Hall**

124 SW 26<sup>th</sup> Street  
(located at intersection of  
Campus Way and 26<sup>th</sup> 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 **ecology, soil science, geographic information systems (GIS), surveying, and economics and policy**. Upperclassmen complete upper-division engineering coursework that includes **biosystems analysis and modeling, thermodynamics, fluid mechanics, hydrology and hydraulics, and bioremediation**. Upper division engineering and science electives (minimum of 23 credits) as well as a three-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 183 credits.**

## I. Required Courses (144-147 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 (31 credits)

Course #	Credits	Description	Prerequisites	Terms
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
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 (62 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	MTH 256	W
BEE 222	2	EcoE Computation	N/A	S
BEE 270	3	EcoE Ecology	N/A	F
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 362	3	EcoE Microbial Processes	BEE 222	S
BEE 468	4	Bioremediation	BEE 221 or ENVE 322	W
BEE 481	4	EcoE Design I (WIC)	BEE 322	F
BEE 482	3	EcoE Design II (WIC)	BEE 481 (in same AY)	W
BEE 483	2	EcoE Design III (WIC)	BEE 482 (in same AY)	S
ENGR 211	3	Statics	MTH 252	FWS(Su)
ENGR 213	3	Strength of Materials	ENGR 211	FWS(Su)

**Professional Skills (22-23 credits)**

Course #	Credits	Description	Prerequisites	Terms
BEE 415	1	Professional Development	BEE 469 (co)	F
COMM 111Z/114	3-4	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	FS
WR 121Z	4	English Composition	N/A	FWS(Su)
WR 227Z	4	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 9 non-blanket hour\* science elective credits and minimum 10 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 (16 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 111Z or 114	No
Writing I*	--	WR 121Z	No
Writing II*	--	WR 227Z	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 or ECON 201	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	N/A	Yes

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