

Ecological Engineering

Undergraduate Advising Guide

2018-2019



TABLE OF CONTENTS

PREFACE	3
THE UNIVERSITY AND COLLEGES	3
THE DEPARTMENT AND PROGRAM	4
Program educational objectives (PEOs).....	5
Student outcomes (SOs).....	5
THE CURRICULUM – OVERVIEW	6
ADVISING AND ASSISTANCE	11
Your advisor:.....	11
Important Dates and Deadlines:	11
Advising Schedule and Procedures:	12
DETAILED PROGRAM DESCRIPTION	12
Program Core	12
Using Satisfactory/Unsatisfactory Grading System	12
Pass/No Pass Grading	13
Basic and Advanced Sciences	13
Mathematics	13
Statistics	14
Communication Skills.....	14
Perspectives and Synthesis.....	14
Fitness	15
Engineering Science, Engineering Design and other Technical courses.....	15
Writing-Intensive Courses	15
“Blanket Hour” Credits	16
Program Changes	17
ADMISSION POLICY	17
Professional Engineering program.....	17
TRANSFER CREDITS	18
STUDENT PERFORMANCE POLICIES	18
Code of Ethics	19
Academic Honesty	19
Student Demeanor	19
COLLEGE OF ENGINEERING ACADEMIC REQUIREMENTS	19
DEPARTMENTAL ACADEMIC REQUIREMENTS	20
RESOURCES FOR UNDERGRADUATES	20
Resources available to only Engineering students:	20
OSU Academic Support:.....	20

	<p>PREFACE</p> <p>This guide supplements the "Academic Regulations" information found in the 2018-2019 <i>Oregon State University General Catalog</i> (http://catalog.oregonstate.edu/). It is intended to aid students in planning and completing programs leading to a baccalaureate degree in Ecological Engineering as administered by Department of Biological and Ecological Engineering (BEE).</p> <p>It is the student's responsibility to be familiar with important dates, deadlines, regulations and rules given in this guide, in the <i>Registration Handbook</i>, and in the <i>Oregon State University General Catalog</i>. Please carefully review the College of Engineering and the BEE Department policies for admission, student performance, and academic requirements.</p> <p>THE UNIVERSITY AND COLLEGES</p> <p>The University's mission statement is as follows: Oregon State University, a land grant institution, promotes economic, social, cultural and environmental progress for people across Oregon, the nation and the world through our graduates, research, scholarship, outreach, and engagement. This statement is published on the Oregon State University (OSU) website and is also published in the OSU General Catalog and Schedule of Classes.</p> <p>The College of Agricultural Sciences (CAS) mission statement is: The College of Agricultural Sciences at Oregon State University is Oregon's principal source of knowledge relating to agricultural and food systems, and a major source of knowledge regarding environmental quality, natural resources, life sciences, and rural economies and communities worldwide. The College provides undergraduate and graduate education leading to baccalaureate and graduate degrees, and extended education programs throughout Oregon and beyond. Its research programs create knowledge to solve problems and to build a knowledge base for the future. It is a source of information and expertise in integrating and applying knowledge with benefits that are felt in domestic and international settings. This statement is published on the CAS website along with an articulation of CAS' values.</p> <p>The College of Engineering (COE) mission statement is: Driven by our passion, OSU Engineering is fully committed to creating extraordinary engineers and research solutions to the world's most pressing problems, while fueling prosperity through innovation for Oregon and beyond. This statement is published on the COE website and also included in the COE Annual Report and in the OSU General Catalog and Schedule of Classes.</p>
<p><i>OSU mission statement</i></p>	
<p><i>CAS mission statement</i></p>	
<p><i>COE mission statement</i></p>	

<p><i>Definition of Ecological Engineering</i></p>	<p>THE DEPARTMENT AND PROGRAM</p> <p>Ecological Engineering is defined as engineering that incorporates ecological principles into the design of both natural and human-dominated systems. Ecology as used as its fundamental design paradigm, emphasizing resiliency, adaptation and systems approaches to develop engineered solutions that are sustainable, intrinsically incorporate a broad range of biological systems as components, and emphasize mutual improvement of both human and natural environments. This focus on incorporation of ecological principles in engineering design to promote development of robust, sustainable systems sets it apart from other engineering disciplines.</p> <p>The Ecological Engineering BS program graduates students capable of analyzing problems that occur at the interface between humankind and the environment and synthesizing solutions to the benefit of both. These students are capable of addressing crucial environmental issues including habitat loss, fisheries, and pollution at the system level. Many of these issues are not amenable to simple solutions. The systems perspective often suggests solutions that are not intuitively obvious to observers focused on specific aspects of the system under consideration.</p>
<p><i>BEE mission statement</i></p>	<p>The Department of Biological & Ecological Engineering (BEE) mission statement is: Our mission is to achieve national and international recognition as a center of excellence for integrated research and education in the programs broadly defined as Ecological Engineering, Biological Engineering, and Water Resources Engineering while maintaining strong outreach links to the agricultural and natural resources communities. Our stakeholders will include environmental and ecological consulting firms, ecotechnology providers, entrepreneurial enterprises building new 21st-century biology- and ecology-based industries, public resource management agencies, and stakeholders in the state with interests in these focus areas.</p> <p>Our educational mission is to balance innovative undergraduate and graduate programs taking advantage of our unique strengths, and a relevant outreach program that takes advantage of emerging technology to deliver information to a broad clientele on adoption and use of sustainable engineering technology. Our department will produce ecological engineering graduates that are work-ready and entrepreneurial systems thinkers capable of contributing to the future prosperity and sustainable future of the State of Oregon and the global community.</p>

<p><i>Program Objectives</i></p>	<p>Program educational objectives (PEOs)</p> <p>Our educational objectives were developed to link the Department’s mission to the learning outcomes. The outcomes are then supported by the specific course learning objectives.</p> <p>Three PEOs for Ecological Engineering graduates:</p> <ol style="list-style-type: none"> 1) Our graduates will be employed as practicing engineers, engaged in advanced studies, or applying engineering problem-solving skills within non-traditional career paths. 2) Our graduates will bring creative and innovative ecologically-derived systems-level approaches to solving global problems. 3) Our graduates will provide leadership and management skills within their organizations. <p>Student outcomes (SOs)</p> <p>The OSU Biological & Ecological Engineering department prepares its Ecological Engineering Graduates to achieve Program Educational Objectives several years into their careers. This is achieved in the short-term by having students able to perform the following on graduation, while preparing them for immediate and long-term service in the field.</p>
<p><i>Capabilities of our graduates</i></p>	<ul style="list-style-type: none"> • Ability to apply knowledge of mathematics, science, and engineering • Ability to design and conduct experiments as well as analyze and interpret data • Ability to design a system, component, or process to meet desired needs • Ability to function on a multidisciplinary team • Ability to identify, formulate, and solve engineering problems • Understanding of professional and ethical responsibility • Ability to communicate effectively • Broad education necessary to understand impact of engineering solutions in global, economic, environmental and societal context • Recognition of the need for and ability to engage in life-long learning; Knowledge of contemporary issues • Ability to use techniques, skills, and modern engineering tools necessary for engineering practice • Ability to apply knowledge in a specialized area related to ecological engineering • Ability to model and design ecological systems • Awareness of the forces that impact design and decision making, such as resource limitations, system constraints, and the identified goals for improvement.

<p><i>192 Credits Required to Graduate</i></p>	<p>THE CURRICULUM – OVERVIEW</p> <p>The Bachelor of Science (BS) in Ecological Engineering degree program offered through the Colleges of Agricultural Science and Engineering is a new degree program that is the first of its kind nationally at the undergraduate level. The undergraduate Ecological Engineering degree program requires 192 credit hours and leads to a BS in Ecological Engineering.</p>
<p><i>Ecological Engineering Core</i></p>	<p>The curriculum is divided into an Ecological Engineering Core and Upper division Science & Engineering Electives. The Ecological Engineering Core contains the introductory and upper division course work that provides the common engineering and scientific basis or language for our students. The core consists of: (1) Pre-Professional Courses; (2) Baccalaureate Core requirements; (3) Professional Core Upper Division Engineering Courses; (4) Science and Public Policy Courses; (5) Professional Skills requirements; and (6) Ethics requirement.</p>
<p><i>Upper Division Science and Engineering Electives</i></p>	<p>Students are required to take a minimum of 23 credits of upper division science and engineering electives. A maximum of two 200-level engineering electives and one 200-level science elective may be taken. If a science or engineering elective is not included on the pre-approved list (see Table 1), students may submit a program petition form to their academic advisor to receive approval to count it as an elective; this petition will be reviewed by the undergraduate curriculum committee.</p>
<p><i>ABET accredited</i></p>	<p>Table 1 shows the basic program and science and engineering elective options for the Ecological Engineering BS degree. Table 2 shows a sample 4-year program for the Ecological Engineering BS degree.</p> <p>This program is accredited by the Accreditation Board for Engineering and Technology (ABET). The curriculum fulfills the stated requirements of ABET, the College of Engineering, the Ecological Engineering Department, and Oregon State University for a BS degree. The curriculum contains the following components:</p> <ol style="list-style-type: none"> 1. Basic ABET requirements in mathematics, science, liberal arts, engineering science and engineering design; 2. Basic University Requirements covered under the Baccalaureate Core; 3. Basic university and departmental requirements in communications skills; 4. Elective courses in science, engineering science and other technical courses to meet the requirements of ABET and the Ecological Engineering program.

Table 1 – Ecological Engineering, B.S. – 192 Credits

Core Requirements			
Pre-Professional Core* (52 credits)	Cr	Professional Core Cont. (64 credits)	Cr
*BEE 102 – Ecological Engineering II - Applications	3	BEE 470 – Ecological Engineering Design II (WIC)	4
*CH 231/261 – General Chemistry	5	BI 370 – Ecology	3
*COMM 111 – Pub Speak, OR COMM 114 – Arg & Crit Discourse	3	Upper Division Science and Engineering Electives (see next page)	23
*ENGR 211 – Statics	3		
*ENGR 213 – Strength of Materials	3	Professional Skills (11 credits)	
*MTH 251 and *MTH 252 – Differential and Integral Calculus	8	BEE 415 Professional Devel (May be repeated once for credit)	1
*MTH 254 – Vector Calculus	4	ENGR 391 – Engineering Economics & Project Management	3
*MTH 256 – Applied Differential Equations	4	FE 257 – GIS and Forest Engineering Applications	3
*MTH 264 – Introduction to Matrix Algebra (taken w/ MTH 265)**	2	FE 208 – Forest Surveying	4
*MTH 265- Introduction to Series (taken w/ MTH 264)**	2		
*PH 211, *PH 212, *PH 213 – Gen Physics with Calc	12	Science and Public Policy (3-4 credits)	
*WR 121 – English Composition	3	AEC 250 – Intro. To Environ. Econ. And Policy	3
		or ECON 201 – Introduction to Microeconomics	4
Additional Pre-Professional Core (44 credits)			
BEE 101 – Ecological Engineering I – Principles	3	Ethics (3-4 credits)	
BEE 221 – Ecological Engineering Fundamentals	3	IE 380 – The Responsible Engineer	3
BEE 222 – Ecological Engineering Computation	3	or PHL 205 – Ethics	4
BI 211, BI 212, BI 213 – Principles of Biology	12		
CH 232/262, CH 233/263 – General Chemistry	10	OSU Baccalaureate Core Courses (15 credits)	
Lifetime Fitness (HHS 231, 241/251 Series or PAC class)	3	Lifetime Fitness (HHS 231, 241/251 Series or PAC class)	-
SOIL 205/206 – Soil Science	4	Mathematics (met by MTH 251)	-
ST 314 – Statistics for Engineers (or ST 421***)	3	Writing I (met by WR 121)	-
WR 327 – Technical Writing	3	Writing II (met by WR 327)	-
		Writing III (met by COMM 111/114)	-
		Biological Science (met by BI 211)	-
Professional Core (64 credits)			
BEE 311 – Ecological Fluid Mechanics	4	Cultural Diversity	3
BEE 312 – Ecohydraulics (Proposed)	4	Literature and the Arts	3
BEE 313 – Ecohydrology (Proposed)	4	Physical Science (met by CH 231/232)	-
BEE 320 – Biosystems Analysis and Modeling	4	Social Processes and Institutions (met by AEC 250)	-
BEE 322 – Thermodynamics and Transfer Processes	4	Western Culture (met by PHL 205)	3
BEE 361 – Ecological Engineering Laboratory	3	Difference, Power, and Discrimination	3
BEE 458 – Nonpoint Source Pollution Assessment and Control	3	Contemporary Global Issues	3
BEE 468 – Bioremediation	4	Science, Technology, and Society (met by IE 380)	3
BEE 469 – Ecological Engineering Design I (WIC)	4		

Footnotes:

*Required by the College of Engineering for entrance into the Professional Program;

**Prior to Spring 2019, MTH 264 (2 credits) + MTH 265 (2 credits) were combined into one course 4-credit class, MTH 306.

***ST 421 may substitute for ST 314 but 422 must be taken for Science Elective credit. All statistics course are offered in the summer sessions.

Upper Division 306 Science Electives (at least 9 non-blanket credits)			
AEC 351. Natural Resource Economics and Policy*	3 cr	FW 435. Wildlife in Agricultural Ecosystems ^B	3 cr
AEC 432. Environmental Law	4	FW 456. Freshwater Ecology*	5
ANS 121. Introduction to Animal Sciences ^A	4	FW 462. Ecosystem Services	3
ANS 251. Principles of Animal Foods Technology	3	FW 479. Wetlands and Riparian Ecology	3
ANS 315. Contentious Social Issues in Animal Agriculture ^A	3	GEO 202. Earth Systems Science	4
ANS 351. Advanced Principles of Animal Foods Technology	4	GEO 322. Surface Processes*	4
BA 362. Social Entrepreneurship and Social Initiatives	4	GEO 432. Applied Geomorphology	3
BB 350. Elementary Biochemistry*	4	GEO 481. Glacial Geology	4
BI 301. Human Impacts on Ecosystems ^A	3	GEO 487. Hydrogeology	4
BI 420. Viruses in Modern Society ^{A*}	3	GEOG 201. Foundations of Geospatial Science and GIS ^A	4
BOT 313. Plant Structure	4	GEOG 370. Geovisualization: Cartography*	4
BOT 331. Plant Physiology	4	GEOG 423. Snow Hydrology	3
BOT 341. Plant Ecology	4	GEOG 480. Remote Sensing I: Principles and Applications*	4
BOT 442. Plant Population Ecology	3	HORT 285. Permaculture Design and Theory: Certificate Course	4
CH 324. Quantitative Analysis	4	HORT/CROP 300. Crop Production in Pacific Northwest Agroecosystems	4
CH 331, CH 332. Organic Chemistry	4,4	HORT 318. Applied Ecology of Managed Ecosystems ^B	3
CH 337. Organic Chemistry Laboratory	4	HORT 360. Irrigation and Drainage	4
COMM 440. Theories of Conflict and Conflict Management*	3	HORT/CROP 414. Precision Agriculture	4
COMM 442. Bargaining and Negotiation Processes*	4	MB 302. General Microbiology	3
COMM 444. Third Parties In Dispute Resolution: Mediation & Arbitration	3	MB 303. General Microbiology Laboratory	2
FE 434. Forest Watershed Management**	4 (2)	MTH 351. Introduction to Numerical Analysis	3
FE 460. Forest Operations Regulations and Policy Issues	3	MTH 452. Numerical Solution of Ordinary Differential Equations	3
FES/TOX 435. Genes and Chemicals in Agriculture: Value and Risk ^A	3	MTH 481. Applied Ordinary Differential Equations*	3
FES/FW 445. Ecological Restoration	4	MTH 482. Applied Partial Differential Equations*	3
FES/ANS/FW/SOC 485. Consensus and Natural Resources ^A	3	OC/FW 434. Estuarine Ecology	4
FOR 330. Forest Resource Economics I*	4	RNG 341. Rangeland Ecology and Management	3
FOR 441. Silviculture Principles*	4	RNG 351. Range Ecology I-Grasslands	3
FOR 460. Forest Policy ^B	4	RNG 352. Range Ecology II-Shrublands	3
FOR 462. Natural Resource Policy and Law	3	RNG 355. Desert Watershed Management	3
FST 212. Dairy Processing	2	RNG 421. Wildland Restoration and Ecology	4
FST 213. Dairy Processing Laboratory	1	RNG 455. Riparian Ecohydrology and Management*	4
FST 421. Food Law ^A	3	SOIL 455. Biology of Soil Ecosystems	4
FST 460. Brewing Science	3	ST 421, 422. Introduction to Mathematical Statistics	4,4
FST 461. Brewing Analysis*	3	SUS 304. Sustainability Assessment ^A	4
FST 466. Wine Production Principles	3	SUS 350. Sustainable Communities ^A	4
FST/MB 479. Fermentation Microbiology*	3	TOX 430. Chemical Behavior in the Environment	3
FW 251. Principles of Fish and Wildlife Conservation	3	WSE 455. Marketing and Innovation in Renewable Materials	4
FW 326. Integrated Watershed Management	3	Z 349. Biodiversity: Causes, Consequences, and Conservation ^A	3
FW 350. Endangered Species, Society, and Sustainability ^A	3		

Upper Division Engineering Electives (at least 10 non-blanket credits)	
BEE 401. Research (blanket hour credit)	3-6 cr
BEE 405. Reading and Conference (blanket hour credit)	3-6
BEE 410. Ecological Engineering Internship (blanket hour credit)	3-6
BEE 433. Irrigation System Design	4
BEE 446. River Engineering	4
CCE 201. CCE Engineering Graphics & Design (AutoCAD course)	3
CE 411. Ocean Engineering*	4
CE 413. GIS in Water Resources	3
CE 417. Hydraulic Engineering Design*	4
CE 461. Photogrammetry*	3
CE 463. Control Surveying*	4
CE 465. Oregon Land Survey Law*	3
CE 469. Property Surveys*	3
ENGR 248. Engineering Graphics and 3-D Modeling	3
ENVE 421. Water and Wastewater Characterization*	4
ENVE 422. Environmental Engineering Design*	4
ENVE 425. Air Pollution Control*	3
ENVE 431. Fate and Transport of Chemicals in Environmental Systems*	4
ENVE 456. Sustainable Water Resources Development	3
FE 209. Forest Photogrammetry and Remote Sensing	4
FE 310. Forest Route Surveying*	4
FE 315. Soil Engineering	4
FE 316. Soil Mechanics*	4
FE 371. Harvesting Process Engineering	4
FE 423. Unmanned Aircraft System Remote Sensing*	3
FE 430. Watershed Processes	4
FE 434. Forest Watershed Management**	4 (2)
FE/FOR 457. Techniques for Forest Resource Analysis*	4
FE/CE 479. Slope and Embankment Design*	3

Footnotes for Science and Engineering Electives:

*Pre-requisites needed. Please check the OSU course catalog for more information.

**FE 434 counts as 2 engineering credits and 2 science credits

^A Baccalaureate Core Course (BCC). All BCC courses listed as Upper Division Science and Engineering Electives can only be used to fulfill elective requirements and cannot be used to fulfill Bacc Core requirements.

^B Writing Intensive Course (WIC)

Table 2 B. S. in Ecological Engineering - 4 Year Example Program

Freshman Year			Sophomore Year		
Fall	Winter	Spring	Fall	Winter	Spring
Differential Calculus MTH 251* 4	Integral Calculus MTH 252* 4	Vector Calculus MTH 254* 4	Applied Diff. Eqns. MTH 256* 4	EcoE Fundamentals I BEE 221 3	EcoE Computation BEE 222 3
English Composition WR 121* 3	Speech Communications COMM 111 or 114* 3	General Physics/Calc PH 211* 4	General Physics/Calc PH 212* 4	General Physics/Calc PH 213* 4	Introduction to Matrix Algebra and Introduction to Series MTH 264 + MTH 265* 2 + 2
General Chemistry CH 231(4 cr) + CH 261 (1 cr)* 5	General Chemistry CH 232 (4 cr) + 262 (1 cr) 5	General Chemistry CH 233 (4 cr) + 263 (1 cr) 5	Principles of Biology BI 211 4	Principles of Biology BI 212 4	Principles of Biology BI 213 4
Ecological Engineering I BEE 101 3	Lifetime Fitness HHS 231 2	Ecological Engineering II BEE 102* 3	Statics ENGR 211* 3	Ethics IE 380 or PHL 205 3 or 4	Strength of Materials ENGR 213* 3
	Lifetime Fitness HHS 241/251 or PAC course 1			Engineering Statistics ST 314 3	Technical Writing WR 327 3
15	15	16	15	17 (18)	17

Junior Year			Senior Year		
Fall	Winter	Spring	Fall	Winter	Spring
Systems Analysis and Modeling BEE 320 4	EcoE Thermo Transfer Processes BEE 322 4	Ecological Engineering Laboratory BEE 361 3	EcoE Design I (WIC) BEE 469 4	EcoE Design II (WIC) BEE 470 4	Nonpoint Source Pollution BEE 458 3
Ecological Fluid Mechanics BE 311 4	Ecohydraulics BEE 312 4	Ecohydrology BEE 313 4	Professional Development Seminar BEE 415 1	Bioremediation BEE 468 4	Engineering Elective 3 (4)
Ecology BI 370 3	GIS & Forest Engineering App FE 257 3	Engineering Econ & Proj Mgmt ENGR 391 3	Engineering Elective 3 (4)	Engineering Elective 3 (4)	Engineering Elective 3 (4)
Forest Surveying FE 208 4	Principles of Soil Science SOIL 205/206 4	Intro to Environmental Economics and Policy AEC 250 3	Science Elective 3 (4)	Science Elective 3 (4)	Science Elective 3 (4)
Synthesis-Contemporary Global Issues Bacc Core Elective 3	Perspectives-Literature and the Arts Bacc Core Elective 3	Difference, Power, and Discrimination (DPD) Bacc Core Elective 3	Synthesis-Science, Tech. and Society Bacc Core Elective (if taken IE 380 as ethics course, take Western Culture Bacc Core instead) 3	Perspectives-Cultural Diversity Bacc Core Elective 3	Perspectives-Literature and the Arts Bacc Core Elective 3
18	18	16	14 (16)	17 (19)	15 (18)

*Required by the College of Engineering for entrance into the Professional Program

<p><i>Student Responsibilities for Advising</i></p>	<p>ADVISING AND ASSISTANCE</p> <p>Academic advising and assistance in program planning is provided by an academic advisor. The student and his/her academic advisor share responsibilities for planning a program that will satisfy degree requirements and career objectives. The student's advisor is responsible to assist the student in understanding the requirements stated in this document. It is formally the responsibility of the student, rather than of the advisor, to continuously audit his/her program for successful completion of requirements. At quarterly advising appointments, the advisor will make available to the student a numerical audit of the student's progress in meeting the various requirements.</p> <p>The student-advisor relationship can be as rewarding as the student desires. Advisors have resources and experience that can be helpful in planning many aspects of a college education. Students are encouraged to make full use of their advisors for program planning and counseling.</p>
<p><i>Advisor Contact Information</i></p>	<p>Your advisor:</p> <p>The Ecological Engineering business office is located in Room 116 Gilmore Hall. Dr. Rachel Jones serves as Head Advisor. Please contact Dr. Jones at 541-737-3759 or rachel.jones@oregonstate.edu for advising questions. To schedule an advising appointment, or to find out more information about Ecological Engineering advising, please visit this webpage, https://bee.oregonstate.edu/biological-and-ecological-engineering/advisors.</p>
<p><i>First year advising</i></p>	<p>**Please note: First year Ecological Engineering students (high school graduates with less than 24 quarter/16 semester college credits) will meet with a COE First Year advisor during their first academic year at OSU (http://engineering.oregonstate.edu/advising/first-year-engineering-students).</p> <p>Important Dates and Deadlines:</p> <p>The <i>Registration Handbook</i> lists dates for University pre-registration, registration, fee payment, beginning of classes and drop dates, as well as other important dates. It is the student's responsibility to be familiar with this listing. This information is also available at: http://registrar.oregonstate.edu/registration.</p>

<p><i>Students must complete a one-year plan prior to advising appointment</i></p>	<p>Advising Schedule and Procedures:</p> <p><u>Spring term</u> – All students must meet with their academic advisor during the Spring term to go over their curriculum plan for the upcoming academic year. The student should have a one-year curriculum plan filled out in MyDegrees prior to their appointment time. During the appointment, the student and advisor will look over the plan and make any necessary changes. The advisor will then distribute the student’s registration PIN so that he/she can register for classes on their scheduled day (refer to https://registrar.oregonstate.edu/registration for assigned registration date).</p>
<p><i>Students must meet advisor each quarter to receive registration PIN.</i></p>	<p><u>Fall and Winter terms</u> – All students must make an advising appointment with their advisor to receive their registration PIN for the next quarter. Prior to meeting with their advisor, the student should have reviewed their current progress, identified possible courses, determined potential schedule conflicts, and updated their MyDegrees planner. The student can then register for classes on their scheduled day (refer to https://registrar.oregonstate.edu/registration for assigned registration date).</p>
<p><i>The Program Core provides flexibility across other Engineering programs</i></p>	<p>DETAILED PROGRAM DESCRIPTION</p> <p>Program Core</p> <p>The core curriculum in Ecological Engineering is similar to that required by other programs in the College of Engineering. It is planned and coordinated so that transfer between engineering programs during the first 2 years (Pre-Engineering) can be made with a minimum loss of time or credits. The core provides a background in communication skills, sciences, mathematics, engineering sciences, and liberal arts (humanities and social sciences).</p> <p>A detailed listing of all courses required by the Department is shown in Table 1. All courses required by the College of Engineering for admission to the professional program are labeled with an “*”. Any deviation from these requirements must be requested by petition and approved by the department’s Head Advisor or by the Department Head. To aid in program planning, a four-year program format for completion of the Ecological Engineering curriculum is shown in Table 2.</p>
<p><i>S/U grading</i></p>	<p>Using Satisfactory/Unsatisfactory Grading System</p> <p>The maximum number of non-graded (i.e., S/U) course credits allowed to satisfy baccalaureate degree requirements cannot exceed 3 times the number of terms enrolled at OSU as a full-time student, or a maximum of 36 credits. Courses in the following categories may be taken S/U: perspectives/synthesis, fitness, and free electives.</p>

<p><i>P/N grading</i></p>	<p>Pass/No Pass Grading</p> <p>Certain courses are only offered with P/N (pass/no pass grading). Examples include Physics recitations (PH 221, 222, and 223). The maximum number of P/N- graded course credits allowed to satisfy baccalaureate degree requirements is 5.</p>
<p><i>Basic Science is required of all EcoE students</i></p>	<p>Basic and Advanced Sciences (all courses must be graded; "C" or better required)</p> <p>ABET requires a total of 45 credit hours of mathematics and science. Basic science requirements include General Physics with calculus (PH 211, 212, 213), General Chemistry (CH 231+261, 232+262, 233+263), and Principles of Biology (BI 211, 212, 213). Advanced Science includes SOIL 205/206 Soil Science, BI 370 Ecology and 3 Upper Division Science electives totaling at least 9 credits. A maximum of one 200-level science elective may be taken. The Ecological Engineering degree program automatically meets the biological and physical science requirements for OSU's Baccalaureate Core. Students who complete the Chemistry for Engineers sequence, including recitations (CH 201, 202, 205, 211, and 212) will need an additional 6 credits of 200-level or above chemistry (requires petition). Transfer and change of major students who have completed CH 121, 122, 123 each with a grade of B or better may, with the completion of CH 324 Analytical Chemistry Lab, waive the 200-level chemistry requirement.</p>
<p><i>Math through Applied Differential Equations is required</i></p>	<p>Mathematics (all courses must be graded; "C" or better required)</p> <p>ABET requires a total of 45 credit hours of mathematics and science. This includes Differential Calculus (MTH 251), Integral Calculus (MTH 252), Vector Calculus I (MTH 254), Introduction to Matrix Algebra (MTH 264), Introduction to Series (MTH 265), and Applied Differential Equations (MTH 256). At the Community College students may take Infinite Series and Sequences (MTH 253) and Linear Algebra (MTH 2XX) to substitute for Introduction to Matrix Algebra (MTH 264) and Introduction to Series (MTH 265). Some Oregon community colleges teach a MTH 253 that is equivalent to OSU MTH 264 + MTH 265 (formerly MTH 306). Check with your advisor to determine whether that is the case when transferring MTH 253.</p> <p>Students with a strong high school program in science and mathematics typically begin at the level of Differential Calculus (MTH 251). Students with exceptionally strong mathematics backgrounds or with advanced placement credits may start at more advanced levels. Conversely, students having a limited mathematical background should first take preparatory courses such as MTH 111 (College Algebra) or MTH 112 (Elementary Functions). Credit earned in these preparatory courses cannot be used to fulfill the ABET mathematics credit requirements. Completion of the above</p>

<p><i>Statistics coursework must include ST 314 or ST 421</i></p>	<p>mathematics requirements will satisfy the mathematics requirements for OSU's Baccalaureate Core.</p> <p>Statistics (course must be graded; "C" or better required)</p> <p>The Ecological Engineering BS degree program requires Statistics for Engineers (ST 314) in recognition of the importance that statistical analysis plays in systems modeling. ST 421 Introduction to Mathematical Statistics is a recommended substitute for ST 314 but ST 422 must be taken additionally as an Upper Division Science Elective course. The lower level statistics does not fulfill this requirement. Students changing majors to Ecological Engineering who have completed ST 351 with a grade of B or better may substitute ST 351 for the ST 314 requirement.</p> <p>Communication Skills (all courses must be graded; "C" or better required)</p> <p>A minimum of 9 credits of communication skill coursework is required for a baccalaureate degree in Ecological Engineering. Specified courses include: English Composition (WR 121); Technical Writing (WR 327); and Speech Communication (COMM 111 or 114 or 218). Completion of these courses will fulfill both the ABET requirement and OSU's Baccalaureate Core requirements. Additional communication skills are provided through the inclusion of the Senior Design sequence WIC courses.</p>
<p><i>Perspectives and Synthesis courses provide breadth to a student's educational experience</i></p>	<p>Perspectives and Synthesis (courses may be non-graded (S/U); passing grade required)</p> <p>The intent of the perspectives/synthesis requirement in the Baccalaureate Core is to encourage students to develop non-technical interests. The ABET requirement for liberal arts is a balance of breadth and depth among humanities and social sciences. The ABET requirements are fulfilled through the OSU perspectives and synthesis courses. The Baccalaureate Core requirements for liberal arts include 15 hours of "perspectives" courses and 6 hours of "synthesis" courses. Within the 15 credit hours of perspectives coursework, students are required to complete 3 hours each in "Literature and Arts," "Cultural Diversity," "Western Culture," "Difference, Power, and Discrimination," and "Social Processes and Institutions." No more than two courses from any one department may be used by a student to satisfy the <i>Perspectives</i> category of the core. Within the 6 credit hours of synthesis coursework, students are required to complete 3 hours each in "Science, Technology, and Society" and "Contemporary Global Issues." The two courses used to fulfill the <i>Synthesis</i> requirement may not be in the same department.</p> <p>The specific requirements and listing of acceptable courses for the Baccalaureate Core are given in detail in the front of the <i>2018-2019 Oregon</i></p>

<p><i>EcoE students are well grounded in engineering design and technical coursework</i></p>	<p>State University General Catalog (http://catalog.oregonstate.edu/). Courses that are recommended (but not required) are listed as footnotes in Table 1.</p> <p>Fitness (course may be non-graded; passing grade required) The Baccalaureate Core requires completion of either the 2-credit course HHS 231 "Lifetime Fitness for Health" or NFM 232 "Nutrition and Lifetime Fitness" and one of the following 1-credit lab/activity courses: HHS 241, HHS 242, HHS 243, HHS 244, HHS 245, HHS 246, HHS 247, HHS 248, or HHS 251. The lecture and lab courses can be taken concurrently or in separate terms.</p> <p>Engineering Science, Engineering Design and other Technical courses (all courses must be graded; "C" or better required) ABET requires that Ecological Engineering students be exposed to a wide breadth of technical subject matter. This is accomplished in the Ecological Engineering curriculum with a requirement of a total of 75 credit hours of engineering science, engineering design, and other technical course credits. The required courses automatically provide 53 credit hours of technical credits included in engineering science and design. Six engineering electives totaling at least 21 credits provide the balance of the student experience. These are shown in Table 1. A maximum of two 200-level engineering electives may be taken.</p> <p>The Ecological Engineering curriculum includes several design experiences that build upon one another. Many of these experiences are within required courses; others are integral parts of elective courses. The design experience includes a required capstone design project that exposes students to problems and issues similar to those encountered in the practices of civil and environmental engineering. This course incorporates economic and institutional constraints, team activities, and oral and written presentations.</p>
<p><i>Writing skills are emphasized through design reports</i></p>	<p>Writing-Intensive Courses The OSU Baccalaureate Core requires that an upper division course, the credits for which are included in the major, be writing-intensive. The course must include general writing activities. The Ecological Engineering major uses BEE 469 Ecological Engineering Design I and BEE 470 Ecological Engineering Design II as its writing-intensive courses.</p>

<p><i>At most, six “blanket hour” credits are typically allowed in your program</i></p>	<p>“Blanket Hour” Credits (BEE 401, 405, 410 or equivalent from other departments)</p> <p>The maximum number of “blanket hour” course credits allowed to satisfy baccalaureate degree requirements is six unless approved by the Head Advisor. To receive blanket-hour credits students must complete the following steps:</p> <ol style="list-style-type: none"> 1. In advance of the work, consult with a faculty member and work supervisor (for BEE 410 or blanket numbered courses outside the department) and ascertain whether they will agree to supervise the student’s work. The work supervisor (for BEE 410 or blanket numbered courses outside the department) will sign-off on the final report. The faculty member will sign-off on and assign a letter grade for the final report. 2. If the faculty member and work supervisor (for BEE 410 or blanket numbered courses outside the department) agree, complete a “Blanket Hour Credits Request Form” (available on BEE website) in consultation with the faculty member and work supervisor (for BEE 410 or blanket numbered courses outside the department). 3. Reach agreement with the faculty member and work supervisor (for BEE 410 or blanket numbered courses outside the department) on credits to be received (normally 1 – 3), commensurate with requirements in regular courses. Regular course credits are based on 30 hours of academic effort for each credit hour granted (based on 10 weeks X 3 hours/week/credit = 30 hours/credit). 4. Provide a final copy of the “Blanket Hour Credits Request Form”, signed by the responsible faculty member and work supervisor (for BEE 410 or blanket numbered courses outside the department), to the Head Advisor (Dr. Rachel Jones) for inclusion in the student’s permanent file. 5. Register for the Blanket Hour credits. 6. Produce a substantial report for the completed work, graded by the responsible faculty member and work supervisor (for BEE 410 or blanket numbered courses outside the department, as tangible evidence and documentation of the work performed and of its technical merit. 7. Submit a Program Petition Form (available on BEE website) to the Head Advisor requesting where blanket hour credits should be applied in the student’s program as either Science or Engineering Elective Credits. The Undergraduate Program Committee will approve or deny the request based on how well the student achieved the objectives of the work per feedback from the work supervisor or faculty member and on the grade given by the faculty member.
---	---

<p><i>Program changes may occur while a student is pursuing their degree</i></p>	<p>Program Changes</p> <p>Changes are made periodically in the curricula of the Department, College and University. These result from new opportunities to address changing technology and societal needs, as well as from accreditation considerations. If program changes occur during the period while a student is pursuing a BS Ecological Engineering degree, the Department will establish policy for meeting old or new requirements. It is the student's responsibility to become familiar with these requirements through conversations with their advisor.</p> <p>The basic advising policy applied to students entering the Professional Program is that they should meet pre-engineering course requirements effective during the most recent two-year period prior to entering the junior year Professional Program (e.g., 2004 - 2005 and 2005 - 2006 pre-engineering requirements for those entering the Professional Program in Fall 2006). Similarly, graduating seniors should satisfy all requirements in effect during the final two years of their professional program. Thus, students who spend more than two years to complete either the pre-professional program or the professional program may need to meet new requirements rather than old requirements should program changes be made during their studies.</p>
<p><i>Any OSU student can enter the EcoE Undergraduate Program</i></p>	<p>ADMISSION POLICY</p> <p>The undergraduate Ecological Engineering program consists of a Pre-Engineering program (Major Code: 654) and Professional Engineering program (Major Code: 450). Admission to the Pre-Engineering program (freshman and sophomore years of a 4 year program) is open to any student admitted to the University. Admission to the Professional Engineering Program (beginning at the junior year) is competitive and restricted to those students who have demonstrated an ability to achieve the high standards required for professional engineering studies as ranked by their pre-engineering core GPA (see below).</p>
<p><i>Admission to the EcoE Professional Program is dependent on satisfying the requirements as well as demonstrated performance</i></p>	<p>Professional Engineering program</p> <p>For admission to the Professional Engineering program, students must have been previously admitted to the University and must apply to the College of Engineering (https://engineering.oregonstate.edu/pro-school). The application for fall entry is open during the month of August; the application for winter entry is open during the month of November; the application for summer entry is open during the month of May. There is no spring entry to the Professional Engineering program.</p> <p>To be eligible to apply, students must have completed 52 credit hours of required pre-engineering core courses (See Table 1) with grades of C or</p>

<p><i>Attendance in 3xx and 4xx EcoE classes generally requires admission into the professional program.</i></p>	<p>Professional Engineering program continued</p> <p>better and a GPA of 2.5 or greater in these courses. In addition, students should complete the courses identified by ** in Table 1, so that all prerequisites for junior courses are met. Repeated courses are included in the GPA calculation per University Guidelines for grade replacement. For students with more than two repeats, the second posted grade is used for GPA calculation purposes. However, the student must continue repeating the course until the C minimum is obtained and the deficiency is cleared.</p> <p>Students are not allowed into junior-level professional engineering courses until they are admitted into the professional program, except by department petition under limited circumstances. Students who are deficient in required pre-engineering core courses or who miss the application deadline for professional school may petition to enroll in BEE 320 and BEE 311 in the fall quarter to allow timely graduation. Students submitting this petition must be co-enrolled in all missing Pre-Engineering Core courses during the fall and must apply for the winter pro-school application cycle. In the event of space limitations in BEE 320 and BEE 311, students petitioning will be ranked based on completed Pre-Engineering Core GPA and number of incomplete courses remaining. Pre-Engineering Core GPA calculations will assume a C for Pre-Engineering Core courses not completed.</p> <p>More generally, enrollment in any upper division engineering course in the College of Engineering requires that: (a) students have been admitted to a COE professional engineering program and that the course is required in their program of study, or (b) students are enrolled in any major program at OSU whose curriculum, as printed in the <i>OSU General Catalog</i>, stipulates the course by name and number, or (c) students admitted with the approval of the College and the Department offering the course by a petition process.</p> <p>TRANSFER CREDITS</p> <p>Policies regarding transfer students, transfer credits and advanced placement credits are discussed at http://oregonstate.edu/admissions/transfer.html. Transfer students with upper transfer courses that have no OSU equivalent as determined by the Registrar's office will be required to bring copies of transfer course materials including syllabus to their initial advising appointment for credit determination. This process might include contacting OSU instructors for courses that might be equivalent to determine equivalency. The entire process is described at the URL listed above.</p> <p>STUDENT PERFORMANCE POLICIES</p> <p>The professional character of engineering instruction involves many considerations other than those reflected by Oregon State University minimum grade standards. The College of Engineering has adopted certain policies and procedures that are described below.</p>
--	---

<p><i>Ethical standards are enforced</i></p> <p><i>Academic honesty is expected for all students; dishonesty will result in expulsion from the program.</i></p> <p><i>Standards of good behavior are expected of all students</i></p>	<p>Code of Ethics</p> <p>Each student is expected to comply with those aspects of the code of ethics of the profession that are applicable to students. Ethical conduct constitutes an important element of professional competence. Evasion of full personal responsibility is considered unethical by the profession, by the College of Engineering, and by the Biological & Ecological Engineering Department.</p>
	<p>Academic Honesty</p> <p>Academic dishonesty is defined as an intentional act of deception in which a student seeks to claim credit for the work or effort of another person or uses unauthorized materials or fabricated information in any academic work. It includes "cheating" (intentional use or attempted use of unauthorized materials, information, or study aid), "fabrication" (intentional falsification or invention of any information), "assisting in dishonesty" (intentionally or knowingly helping or attempting to help another commit an act of dishonesty), "tampering" (altering or interfering with evaluation instruments and documents), and "plagiarism" (intentionally or knowingly representing the words or ideas of another person as one's own). Academic honesty is expected and required of all students; infringement of this standard can result in termination from the program.</p>
	<p>Student Demeanor</p> <p>The dignity of the classroom setting has an important influence on learning. To enhance and preserve this dignity, Ecological Engineering students are expected to be seated, prepared to work when the period begins, and remain until dismissed by the instructor at the end of the period. Students are required to demonstrate considerate behavior while in the classroom setting. Disruptive activities in class, such as open conversations during lectures and general lack of attentiveness, are discourteous and will not be condoned by instructors. Cell phone usage is prohibited, including text messaging unless by prior arrangement with the instructor.</p>
	<p>COLLEGE OF ENGINEERING ACADEMIC REQUIREMENTS</p> <p>To assure that all College of Engineering graduates have the strongest possible educational preparation for a professional career in engineering with no deficiencies in any required area of study, the College has adopted rules for Academic Warning, Probation and Suspension, which can be found at http://engineering.oregonstate.edu/undergraduate-policy-manual.</p>

DEPARTMENTAL ACADEMIC REQUIREMENTS

1. Students must demonstrate that adequate background has been gained in all coursework used to satisfy program requirements. Therefore, all coursework must be passed with a grade of "C" or better.
2. When proceeding in sequence courses or in courses with prerequisites, a student receiving a grade below "C" in a prerequisite course must see the Head Advisor before proceeding in the sequence.

RESOURCES FOR UNDERGRADUATES

Resources available to only Engineering students:

- **The HUB**: Offers a variety of resources including study tables, academic coaching, and information on study abroad.
- **College of Engineering Academic Coaching**: Meet with academic coaches to discuss and to explore the future direction of your educational goals while helping you improve your grades, manage your time, prepare for exams, etc. To schedule an appointment, please email enrcoaching@oregonstate.edu.

OSU Academic Support:

- **Collaborative Learning Center (CLC)**: Offering peer-tutors and GTAs to help with math, sciences and writing. Located on the main floor of the Valley Library.
- **Chemistry Tutoring (Mole Hole)**: General chemistry tutoring offered in the Valley Library Collaborative Learning Center, located on the main floor.
- **Math Tutoring (Math Learning Center)**: The Math Learning Center provides free drop-in tutoring, printed resources, calculators, help using MATLAB and other math software, study areas, and a computer classroom. Private tutoring for a fee is also available. Located in Kidder Hall 108.
- **Physics Tutoring (Worm Hole)**: General physics tutoring offered in Weniger Hall 145 (M-F) and the Valley Library Collaborative Learning Center (Su-Th).
- **Writing Center**: The Writing Center's mission is to provide writing support that enable students at all levels to function effectively, efficiently, and confidently in an academic environment. Writing assistants can help with all aspects of the writing process from brainstorming and organization to questions of grammar and usage.