



**Bachelor of Science**

# **Forest Engineering Program**

**Undergraduate Advising Guide**

**2016-2017**

**Forest Engineering, Resources and Management  
Department Office — 210 Snell Hall  
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# Forest Engineering Careers

Congratulations on selecting Oregon State University's Forest Engineering degree program. Graduates from this degree program receive a rigorous blend of engineering and forestry education that provides a foundation for diverse career options. There is only one other university in the U.S. that offers a forest engineering degree. The OSU Forest Engineering Program is the only one that is accredited in both engineering and forestry.

The Forest Engineering Program is divided into pre-professional and professional components. The pre-professional coursework provides the foundation on which the professional coursework is built. This gives you an opportunity to demonstrate that you have the aptitude, desire, professional attitude, and academic accomplishment required for advancement to the professional level. Acceptance into the professional program in Forest Engineering is based upon your performance in the pre-professional courses. Admission requirements for the FE Professional Program are detailed on page 10.

Graduates from the Forest Engineering degree program are prepared to play a variety of key roles in meeting the world's appetite for wood products from sustainable forests, while also protecting other resource values such as soils, water, wildlife habitat, and recreation opportunities. In a world of more than 7 billion people, society's wood demands are enormous and growing, even with aggressive recycling programs. Many Forest Engineering graduates help meet these demands in positions that plan, design, and implement forestry activities — applying the best engineering, science, technology and experience available to conduct safe, cost effective, and environmentally responsible forest operations.

Some Forest Engineering graduates pursue careers with less focus on forestry. Examples include land development, surveying engineering, transportation engineering and management, environmental consulting, and municipal engineering.

Traditional forest engineering jobs typically involve developing and maintaining transportation systems, and planning and designing timber harvests and other forest operations. Forest products or timberland management companies, federal or state agencies, and consulting or contracting firms are the most common employers for new graduates. Some stay in field-oriented positions for much of their career, but many graduates have become successful managers and executives as they gain experience. A substantial number of graduates find opportunity and satisfaction in owning their own consulting or contracting business, especially if they are interested in entrepreneurship.

All of these types of positions represent vibrant and timely career opportunities. Forestry continues to be a cornerstone of the economy of many communities, providing jobs and economic vitality. This is a good time to be entering this field as the baby boomer generation begins to retire. As the population of the world grows and natural resource challenges become more complex, the need for well-rounded highly trained forest engineers increases. Oregon State University is working to fill that need!

# Introduction

Oregon State has a long tradition of excellence in undergraduate education for Forest Engineering. Our programs are designed to provide a solid Engineering background as well as fundamental knowledge in Forestry principles and practices. We provide an engineering education that focuses on solving the engineering problems of Forest Resource Management. It is appropriate that the Forest Engineering program is housed in the College of Forestry — the “Forest” in Forest Engineering is vital to the strength of our undergraduate programs. Employers in forest industries, consulting firms, and public agencies recognize this strength. The quality in the Forest Engineering program is maintained by including breadth and depth in both Forestry and Engineering topics in the curriculum. The Bachelor of Science in Forest Engineering curriculum is accredited by the Society of American Foresters (SAF) and by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

This advising guide is your map through the Forest Engineering Curriculum. **You should retain this advising guide as you progress through the program.** It is your obligation as an aspiring professional to maintain accurate records of your courses and accomplishments, just as the University maintains the official records of your progress.

This guide is a supplement to the University’s requirements and regulations, available online at <http://catalog.oregonstate.edu/>.

## Forest Engineering Program Objectives

The Forest Engineering Program at Oregon State University prepares graduates to plan and implement solutions to complex forestry and natural resource problems. It provides work ready graduates to enter the diverse professional field of Forest Engineering. Early career accomplishments include harvest unit design, forest road location and design, contract inspection and administration, cost analysis, and forest transportation management. Mid-career assignments may involve aspects of engineering management including planning and budgeting, supervision, wood supply procurement, harvest and road design reviews, and scheduling and controlling forest operations.

Preparation for a successful career in Forest Engineering is achieved through a program of study that is an outgrowth of the departmental mission of developing, communicating, and teaching the science and engineering necessary for sustainable management of forest, land, and water resources to achieve economic, environmental, and social objectives.

The Program Educational Objectives are achieved through an educational program that includes the following elements:

- **Engineering in a Forestry Context** - The Forest Engineering program will provide a rigorous engineering education within a forestry context.
- **Forestry Principles** - The Forest Engineering program will incorporate an adequate presentation of fundamental forestry principles so that Forest Engineering graduates will be able to develop engineered forest operations that achieve silvicultural objectives.
- **Soil and Water Resources** - The Forest Engineering program will incorporate an adequate presentation of the physical and biological aspects of soil and water resources so that Forest Engineering graduates will be able to design forest operations that appropriately protect these resources.
- **Surveying and Measurement** - The Forest Engineering program will incorporate adequate surveying and measurement of land and forest resources so that the engineering tasks associated with Forest Land Management, specifically, the design of appropriate Forest Operations can be effectively completed.
- **Forest Transportation** - The Forest Engineering program will incorporate adequate analysis and design principles for the physical and system aspects of the Forest Transportation infrastructure so that Forest Engineering graduates can provide designs and manage the forest transportation in a way that meets the needs of forest land management and minimizes environmental impact.

- **Harvesting Operations** - The Forest Engineering program will incorporate adequate analysis and design principles for the physical and system aspects of harvesting operations so that Forest Engineering graduates can plan and manage safe, economic, and environmentally sound forest operations.
- **Planning and Economics** - The Forest Engineering program will incorporate adequate principles and techniques for forest land management and operational planning in an environmental and economic context so that Forest Engineering graduates can effectively develop successful forest operation plans.

## Forest Engineering Program Outcomes

Throughout your studies in Forest Engineering, you will be prepared to meet the challenges of professional practice in Forest Engineering by achievement of a series of program outcomes. These describe the attributes that a graduate must possess in order to be successful as a professional. These program outcomes have been developed in part by the Engineering Commission of ABET, and in part by the Forest Engineering faculty in consultation with the Forest Engineering Advisory Committee (made up of working professionals from forest industry, forest engineering, consulting firms, and state and federal agencies charged with the management of forest land and resources).

As a graduate of the Forest Engineering Program, you will have:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
- (l) an ability to develop engineered forest operations that achieve silvicultural objectives
- (m) an ability to develop engineered forest operations that appropriately protect soil and water resources
- (n) an ability to survey and measure land and forest resources so that the engineering tasks associated with Forest Land Management, specifically, the design of appropriate Forest Operations can be effectively completed
- (o) an ability to provide designs and manage the forest transportation in a way that meets the needs of forest land management with societally acceptable environmental impact
- (p) an ability to plan and manage safe, economic and environmentally sound forest operations
- (q) an ability to incorporate long term forest land management and operational planning in an environmental and economic context into forest operation plans

## Requirements for Graduation

In addition to the University and degree program requirements, students in the College of Forestry (COF) professional forestry programs must also meet specific requirements to graduate.

**S/U Grading** — Students majoring in Forest Engineering may not take for S/U (Satisfactory/Unsatisfactory) grading any course listed as a requirement for the major or option. This includes approved substitutions. Baccalaureate core courses may be taken S/U unless they are also being used to fulfill a program requirement.

**Speech** — College of Forestry students are required to take COMM 111 or 114 to fulfill the Speech Baccalaureate Core requirement. COMM 111 or 114 cannot be taken for S/U (Satisfactory/Unsatisfactory) grading.

**Grades of "C" or better must be earned** in all required courses (or approved substitutions) for majors and options in forestry degree programs.

**Approved Work Experience.** Six months of work experience is required in all College of Forestry professional forestry undergraduate degree programs.

**Credit Hour requirement** – A minimum of 192 credits are required to complete the Forest Engineering degree, to attain this additional free electives may be needed.

## Advising and Assistance

The College of Forestry and the Department of Forest Engineering, Resources and Management are committed to helping students succeed. That includes assistance with identifying majors and minors, and understanding broader University rules and regulations. Your academic advisor, Sandy Jameson, is a great resource when you have questions. The College of Forestry Student Services Office is another valuable resource for University procedures, rules and regulations.

This advising guide provides details of the Forest Engineering program not listed in the University Catalog, and helpful suggestions for your success as a student. The guide does not replace the need for regular term-by-term visits with your advisor. The FE program is tightly structured, hence there are few elective choices to the student who wishes to graduate in four years. However, the choices that are required are very important for satisfying the intent of the curriculum and for providing the professional education that you desire. A close association with your advisor will help you make the best choices as you progress through the program. Your advisor is also an invaluable resource for discussions about options to add extra value to your education through additional coursework, minors, additional degrees, or co-curricular experiences.

You should refer to your College of Forestry Undergraduate Handbook for detailed information about advising, including the rights and responsibilities inherent in the advisor/advisee relationship. The most current advising information, and appointment scheduling, is available online: <http://undergrad.forestry.oregonstate.edu/advising>

# Forest Engineering Curriculum Overview

The coursework that makes up the Forest Engineering program is structured to begin with a broad general foundation in the Science, and Mathematics, followed by Forest Science and Engineering Science that provides a bridge between the basic sciences and Forest Management and Forest Engineering Science (Figure 1). Incorporating the University's Baccalaureate Core ("Bacc Core") requirements provides basic skills and broader perspectives. The curriculum is completed with Forest Engineering Synthesis, Analysis and Design, the hallmark of Forest Engineering Practice.

The Forest Engineering program is divided into pre-professional coursework and professional coursework. Pre-professional courses are commonly completed in the freshman and sophomore years. The professional coursework begins in the junior year, and requires that you be admitted to Professional Program.

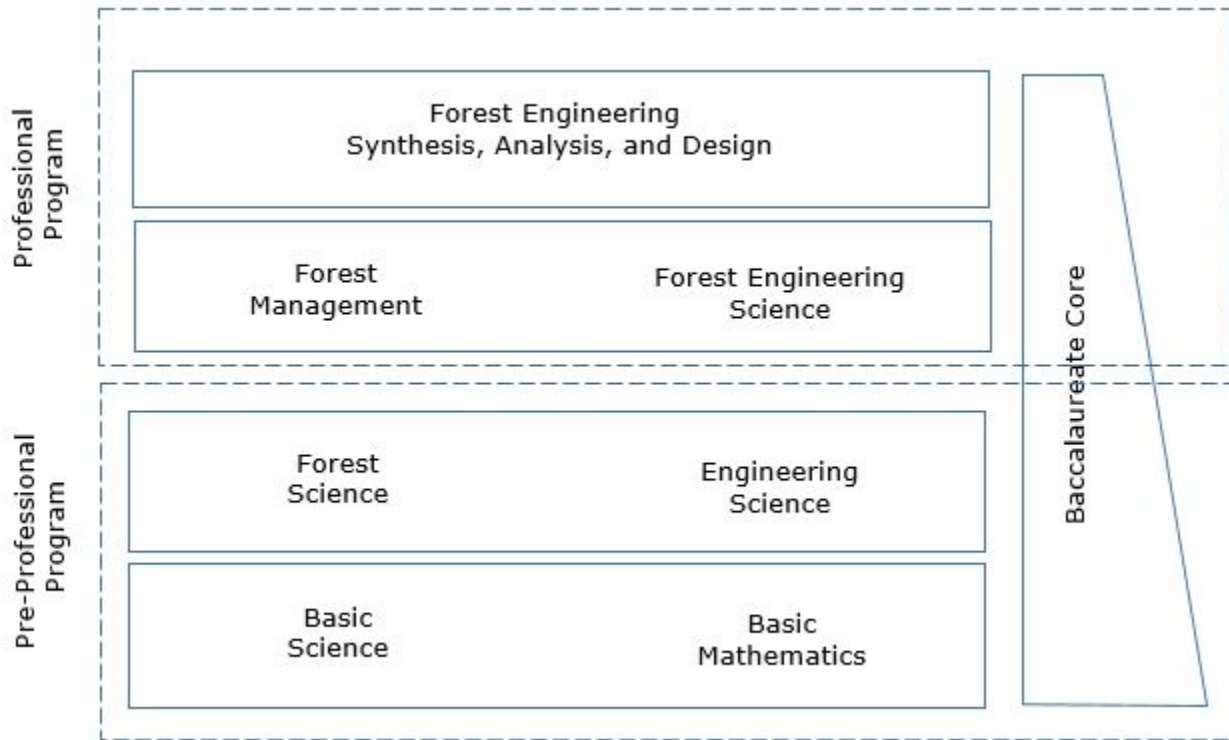


Figure 1. Forest Engineering Curriculum Schematic

In addition to the structure and categories illustrated in the figure above, the Forest Engineering program has been structured to satisfy the accreditation criteria of the Society of American Foresters (SAF) and of the Engineering Accreditation Commission (EAC) of ABET, Inc. SAF divides Forestry curricula into seven categories; Communication, Science and Math, Humanities and Social Science, Forest Ecology and Biology, Forest Measurements, Forest Management, and Forest Policy and Administration. ABET divides engineering curricula into three categories: Mathematics and Basic Science, Engineering topics and a General Education Component. Courses may include material that can fit in more than one category.

## **Pre-Professional Forest Engineering Program**

Grade standards for the pre-professional program as listed in the program description apply.

### **First Year (46 – 47 credits)**

CH 201. Chemistry for Engineering Majors (3)<sup>E</sup>  
COMM 111. \*Public Speaking (3)<sup>1E</sup>  
or COMM 114. \*Argument and Critical Discourse (3)<sup>1E</sup>  
ECON 201. \*Introduction to Microeconomics (4)<sup>1E</sup>  
FE 101. Introduction to Forest Engineering (2)<sup>E</sup>  
FE 102. Forest Engineering Problem Solving and Technology (3)<sup>E</sup>  
FOR 111. Introduction to Forestry (3)<sup>E</sup>  
FES 240. \*Forest Biology (4)<sup>1E</sup>  
HHS 231. \*Lifetime Fitness for Health (2)<sup>1</sup>  
HHS 241. \*Lifetime Fitness (1)<sup>1</sup>  
or any PAC course (1–2)  
MTH 251. \*Differential Calculus (4)<sup>1E</sup>  
MTH 252. Integral Calculus (4)<sup>E</sup>  
MTH 254. Vector Calculus I (4)<sup>E</sup>  
PH 211. \*General Physics with Calculus (4)<sup>1E</sup>  
WR 121. \*English Composition (3)<sup>1E</sup>  
Free Electives (2)

### **Sophomore Year (48 – 49 credits)**

CCE 201. Civil and Construction Engineering Graphics and Design (3)<sup>E</sup>  
ENGR 211. Statics (3)<sup>E</sup>  
ENGR 212. Dynamics (3)<sup>E</sup>  
ENGR 213. Strength of Materials (3)<sup>E</sup>  
FE 208. Forest Surveying (4)<sup>E</sup>  
FE 209. Forest Photogrammetry and Remote Sensing (4)<sup>E</sup>  
FE 257. GIS and Forest Engineering Applications (3)<sup>E</sup>  
FES 241. Dendrology (3)<sup>E</sup>  
MTH 256. Applied Differential Equations (4)<sup>E</sup>  
PH 212. \*General Physics with Calculus (4)<sup>E</sup>  
SOIL 205. \*Soil Science (3)<sup>1E</sup>  
and FOR 206. \*Forest Soils Laboratory for SOIL 205 (1)<sup>1E</sup>  
or SOIL 206. \*Soil Science Laboratory for SOIL 205 (1) **and** FOR 208. Forest Soils Recitation (1)  
ST 201. Principles of Statistics (4)<sup>E</sup>  
WR 327. \*Technical Writing (3)<sup>1E</sup>  
Bacc Core Course (3)

### **Professional Forest Engineering Program**

Grade standards for the professional program as listed in the program description apply.

All students pursuing the BS in Forest Engineering;

1. must earn grades of "C" or better in all required professional forestry courses marked with <sup>E</sup> or approved substitutions for majors and options, and;
2. must maintain a 2.0 GPA in all major course work, defined as courses listed by prefix and courses used for substitution of required courses.

### **Junior Year (50)**

FE 307. Junior Seminar (1)  
FE 310. Forest Route Surveying (4)  
FE 312. Forestry Field School (2)  
FE 315. Soil Engineering (4)  
FE 316. Soil Mechanics (4)  
FE 330. Forest Engineering Fluid Mechanics and Hydraulics (3)  
FE 371. Harvesting Process Engineering (4)  
FE 434. Forest Watershed Management (4)  
FE 440. Forest Operations Analysis (4)  
FE 470. Logging Mechanics (4)  
FE 471. Harvesting Management (3)

FOR 321. Forest Mensuration (5)  
FOR 330. Forest Resource Economics I (4)  
FOR 331. Forest Resource Economics II (4)

**Senior Year (48)**

FE 415. Forest Road Engineering (3)  
FE 416. Forest Road System Management (4)  
FE 456. \*International Forestry (3)<sup>1</sup>  
FE 457. Techniques for Forest Resource Analysis (4)  
FE 459. Forest Management Planning and Design I (4)  
FE 460. ^Forest Operations Regulations and Policy Issues (3)  
FE 469. Forest Management Planning and Design II (4)  
FE 480. Forest Engineering Practice and Professionalism (1)  
FOR 441. Silviculture Principles (4)  
GEOG 300. \*Sustainability for the Common Good (3)<sup>1</sup>  
    or FW 350. \*Endangered Species, Society and Sustainability (3)<sup>1</sup>  
Bacc Core Courses (9)  
Free Electives (6)

[Cooperative Education students will be required to complete 4 credits of FE 411, Cooperative Education Mentored Work Experience (1), as a part of their Coop Education; these can be in place of free electives.

**Total=192**

**Footnotes:**

- <sup>E</sup> Required for entry into the professional program
- \* Baccalaureate Core Course (BCC)
- ^ Writing Intensive Course (WIC)
- <sup>1</sup> Must be selected to satisfy baccalaureate core requirements.

In addition to the courses listed, all students are required to complete a total of six months of satisfactory employment in an area related to their major. This is usually accomplished by two or more summers of work, but it may include work during the academic year. An optional Cooperative Education program that includes two 6-month internships is available and information concerning this program may be found online: <http://undergrad.forestry.oregonstate.edu/student-services/cooperative-education-program>.



# Forest Engineering Program

## The Forest Engineering Pre-Professional Program

The Forest Engineering pre-Professional Program is intended to be completed during the freshman and sophomore years (see Table 1 below). The term-by-term sequence shown in Table 1 reflects both course prerequisites and the term in which the courses are taught. There are a few cases where courses may be taken in more than one term. In those cases you should consult the schedule of classes and your academic advisor for your best options. The term-by-term schedule should be followed exactly for all Math, Physics, Chemistry, Engineering Science (ENGR), Forestry (FOR and FES), and Forest Engineering (FE) courses because **there are no guarantees that courses will be taught at times that do not conflict with other required courses except during the term identified in Table 1.** Some students may require additional time to complete the pre-professional courses due to preparation in math, chemistry, or physics.

**Table 1. Forest Engineering Pre-Professional Program**  
**First pre-Professional Year (46 – 47 credits)**

Fall Term			Winter Term			Spring Term		
Course		Cr	Course		Cr	Course		Cr
MTH 251	Differential Calculus [BC]	4	MTH 252	Integral Calculus	4	MTH 254	Vector Calculus I	4
CH 201	Chemistry for Engineering Majors	3	ECON 201	Introduction to Microeconomics [BC]	4	PH 211	General Physics with Calculus [BC]	4
FOR 111	Introduction to Forestry	3	FE 102	Forest Engineering Problem Solving and Technology	3	FES 240	Forest Biology [BC]	4
FE 101	Introduction to Forest Engineering	2	HHS 231	Lifetime Fitness for Health [BC]	2	COMM 111/114	Public Speaking or Argument and Critical Discourse [BC]	3
WR 121	English Composition [BC]	3	HHS 241 - or PAC	Lifetime Fitness: (various activities) [BC]	1-2		Free Elective	1
				Free Elective	1			
	<b>Term Total</b>	<b>15</b>		<b>Term Total</b>	<b>15 - 16</b>		<b>Term Total</b>	<b>16</b>

**Second Year (48 credits)**

Fall Term			Winter Term			Spring Term		
Course		Cr	Course		Cr	Course		Cr
MTH 256	Applied Differential Equations	4	ST 201	Principles of Statistics	4	ENGR 212	Dynamics	3
PH 212	General Physics with Calculus	4	FE 257	GIS & Forest Engineering Applications	3	FES 241	Dendrology	3
ENGR 211	Statics	3	CCE 201	Civil & Construction Engineering Graphics & Design	3	SOIL 205	Soil Science [BC]	3
FE 208	Forest Surveying	4	FE 209	Forest Photogrammetry and Remote Sensing	4	FOR 206 <b>or</b> SOIL 206 and FOR 208	Forest Soil lab Or Soil Science lab and Forest Soil Recitation [BC]	1 <b>or</b> 1 & 1
			ENGR 213	Strength of Materials	3	[BC]	Bacc Core course	3
						WR 327	Technical Writing [BC]	3
	<b>Term Total</b>	<b>15</b>		<b>Term Total</b>	<b>17</b>		<b>Term Total</b>	<b>16-17</b>

[BC] indicates courses that fulfill a Baccalaureate Core requirement

## The Forest Engineering Professional Program

Admission to the Forest Engineering professional program will be granted to students meeting the admission requirements prior to fall term of the junior year. Enrollment in Forest Engineering professional program courses is restricted to those students who have been admitted to the professional program.

To be eligible for admission, students must earn:

1. a grade of "C" or better in all pre-professional courses required for entry into the professional program. Grade repeat (replacement) policy will follow OSU Academic Regulation #20.
2. a minimum GPA of 2.25 in the pre-professional courses (or transfer equivalents).

Application for the professional program will be available on the College of Forestry website in March. Applications will be due in early April, and applicants will be notified of their status by early May. The number of students admitted to the program is determined based on available resources. Students meeting the minimum pre-Forest Engineering GPA of 2.25 may or may not be admitted depending on available resources.

The Forest Engineering Professional Program curriculum is shown in term-by-term sequence in Table 2 (which incorporates both course prerequisites and the term in which the courses are taught).

**Table 2. Forest Engineering Professional Program  
Junior Year (50 credits)**

Fall Term			Winter Term			Spring Term		
Course		Cr	Course		Cr	Course		Cr
FE 434	Forest Watershed Management	4	FE 307	Forest Engineering Seminar	1	FE 310	Forest Route Surveying	4
FOR 321	Forest Mensuration	5	FE 315	Soil Engineering	4	FE 316	Soil Mechanics	4
FE 371	Harvesting Process Engineering	4	FE 440	Forest Operations Analysis	4	FOR 331	Forest Resource Economics II	4
FE 312	Forestry Field School	2	FE 470	Logging Mechanics	4	FE 471	Harvesting Management	3
FE 330	Forest Engineering Fluid Mechanics & Hydraulics	3	FOR 330	Forest Resource Economics I	4			
	<b>Term Total</b>	<b>18</b>		<b>Term Total</b>	<b>17</b>		<b>Term Total</b>	<b>15</b>

**Senior Year (48 credits)**

Fall Term			Winter Term			Spring Term		
Course		Cr	Course		Cr	Course		Cr
GEOG 300 or FW 350	Sustainability for the Common Good [BC] or Endangered Species, Society and Sustainability	3	FE 459	Forest Management Planning and Design I	4	FE 469	Forest Management Planning and Design II	4
[BC]	Bacc Core course	3	FE 415	Forest Road Engineering	3	FE 416	Forest Road System Management	4
[BC]	Bacc Core course	3	FE 457	Techniques for Forest Resource Analysis	4	FE 456	International Forestry [BC]	3
[BC]	Bacc Core course	3	FE 460	Forest Operations Regulations and Policy Issues [WIC]	3	FOR 441	Silviculture Principles	4
	Free Elective	3	FE 480	Forest Engineering Practice & Professionalism	1			
				Free Elective	3			
	<b>Term Total</b>	<b>15</b>		<b>Term Total</b>	<b>18</b>		<b>Term Total</b>	<b>15</b>

[BC] indicates courses that fulfill a Baccalaureate Core requirement

**Table 3. Baccalaureate Core and Major Requirements**

Bacc Core Category	Course	Grading Options	Also Fulfills a Major Requirement?	Special Requirements
Writing I	WR 121	A-F	Yes	Must be completed satisfactorily (grade of C- or better) within the first 45 credits at OSU.  WR 121 courses are alpha-sectioned so the first letter of your last name determines the term in which you can take the course. Last names A-G = Fall Last names H-N = Winter Last names O-Z = Spring
Writing II	WR 327	A-F	Yes	Must be completed satisfactorily within the first 90 credits at OSU.
Speech	COMM 111 or COMM 114	A-F	Yes	Must be completed satisfactorily within the first 45 credits at OSU.
Mathematics	MTH 251	A-F	Yes	A mathematics course numbered MTH 105 or higher must be completed satisfactorily within the first 45 credits at OSU.
Fitness		A-F or S/U	No	Two parts: HHS 231 (2 credits) and HHS 24X/PAC (1 credit)
Biological Science & Lab	SOIL 205 & lab	A-F	Yes	These categories are called <i>Perspectives Courses</i> .  Students can have no more than two courses from the same department in the perspectives categories.
Physical Science & Lab	PH 211	A-F	Yes	
Additional Lab Science	FES 240	A-F	Yes	
Social Processes & Institutions	ECON 201	A-F	Yes	
Western Culture	Choose from a list	A-F or S/U	No	
Difference, Power, and Discrimination	Choose from a list	A-F or S/U	No	
Cultural Diversity	Choose from a list	A-F or S/U	No	
Literature & Arts	Choose from a list	A-F or S/U	No	
Contemporary Global Issues	FE 456	A-F	Yes	These categories are called <i>Synthesis</i> .  Your synthesis courses must be from two different departments.
Science, Technology, and Society	FW 350 or GEOG 300	A-F	Yes	
Writing Intensive	FE 460	A-F	Yes	

**Mathematics (all required courses must be graded "C" or higher)**

A grade of "C" or higher is required in all Mathematics courses listed with the MTH prefix (e.g. MTH 251: Differential Calculus). Preparatory Mathematics courses not required for your major (such as MTH 111: College Algebra) can be taken for an S/U grade, but you must earn an S grade in order to meet the prerequisite requirements for the subsequent courses. You should consult with your advisor on any S/U grading questions as well as the possibility of retaking Math courses for which a grade of "C" is earned.

**Basic Science (all courses must be graded "C" or higher)**

The Basic Science requirement includes Physics, Chemistry, Soil Science, and an array of Forestry courses. Some Forestry courses include subject matter that is considered to be an Engineering Topic as well. All required courses that include basic science content are listed in Table 4.

**Engineering Topics (all courses must be graded C or higher)**

Engineering Science (ENGR courses) provides the bridge between the basic sciences and engineering synthesis and design. The classical Engineering Science sequence, Statics, Dynamics, and Strength of Materials, is easily identifiable as engineering science course material. Many other components of engineering science are less easily delineated, and make up only portions of engineering or other courses. In some cases, courses taught by other departments have engineering science character appropriate to Forest Engineering. For example, the application of basic mathematics to the Engineering and Management analysis of the "time value of money" is an engineering science topic even though it is presented in Forest Resource Economics I (FOR 330). Similarly, the application of mathematics and statistics to measurement of forest resource quantities is an engineering science topic even though it is presented in Forest Mensuration (FOR 321). All required courses that include engineering content are listed in Table 4.

The heart of engineering practice is Synthesis and Design; hence Synthesis and Design are the capstone of an engineering education. Within Forest Engineering coursework, the most common occurrence of engineering science topics is in the beginning of a course or course sequence, the latter portion of which is engineering synthesis or design. The Engineering Design experience in the Forest Engineering program culminates in the Forest Planning Sequence (FE 459 and FE 469). This sequence provides the challenge and opportunity for students to integrate components of the entire curriculum, including the disciplines of Engineering, Forest Ecology, Silviculture, Fisheries, and Wildlife, into the design of a timber harvesting plan that meets a set of financial objectives developed with consideration of the time value of money and forest growth. All required courses that include engineering design content are listed in Table 4.

**Forest Engineering Program Electives for admission to the Fundamentals of Land Surveying Examination**

The Oregon State Board of Examiners for Engineering and Land Surveying [OSBEELS] has just established, through Oregon Administrative Rule [OAR] 820-010-0226, the minimum educational qualifications for admission to the Fundamentals of Land Surveying Examination. These qualifications require that Forest Engineering graduates who wish to pursue a professional career in land surveying take additional coursework beyond that required for the Bachelor of Science in Forest Engineering. If you are interested in professional land surveying, please consult the listed OAR, and discuss the educational requirements with your advisor.

### Table 4. Forest Engineering Degree Credit Distribution

Check Completed	Course Title	Course Prefix and Number	Basic Science and Mathematics Credit	Engineering Topics Credit	Supporting General Education Credits
<b>Forest Engineering Pre-Professional Program</b>					
	Chemistry for Engineering Majors ** [3 cr M&S]	CH 201	3		
	Introduction to Forest Engineering ** [1 cr ET; 1 cr Other]	FE 101		1	1
	Introduction to Forestry ** [1 cr M&S; 1 cr ET; 1 cr Other]	FOR 111	1	1	1
	Differential Calculus [BC] ** [4 cr M&S]	MTH 251	4		
	English Composition [BC] **	WR 121			3
	Introduction to Microeconomics [BC] **	ECON 201			4
	Forest Engineering Problem Solving and Tech ** [1 cr M&S; 1 cr ET; 1 cr Other]	FE 102	1	1	1
	Lifetime Fitness [BC] **	HHS 231			2
	Lifetime Fitness Activity [BC] or Physical Activity (PAC) **	HHS 241-248 or PAC			1
	Integral Calculus ** [4 cr M&S]	MTH 252	4		
	Public Speaking, or Argument & Critical Discourse [BC] **	COMM 111/114			3
	Dendrology ** [3 cr M&S]	FES 241	3		
	Vector Calculus I ** [4 cr M&S]	MTH 254	4		
	General Physics with Calculus [BC] ** [4 cr M&S]	PH 211	4		
	Statics ** [3 cr ET]	ENGR 211		3	
	Forest Surveying ** [4 cr ET]	FE 208		4	
	Applied Differential Equations ** [4 cr M&S]	MTH 256	4		
	General Physics with Calculus ** [4 cr M&S]	PH 212	4		
	Civil Engr and Const Engr Graphics & Design ** [3 cr ET]	CCE 201		3	
	Strength of Materials ** [3 cr ET]	ENGR 213		3	
	Forest Photogrammetry ** [4 cr ET]	FE 209		4	
	GIS & Forest Engineering Applications ** [3 cr ET]	FE 257		3	
	Principles of Statistics ** [4 cr M&S]	ST 201	4		
	Dynamics ** [3 cr ET]	ENGR 212		3	
	Forest Biology ** [4 cr M&S]	FES 240	4		
	Soil Science [BC] ** [3 cr M&S]	SOIL 205	3		
	Forest Soil lab [BC] ** [1 cr M&S]	FOR 206	1		
	Or Soil Science lab [BC]. ** & Forest Soils recitation	SOIL 206 & FOR 208			
	Technical Writing [BC]	WR 327			3
<b>Forest Engineering Professional Program</b>					
	Forest Engineering Field School [2 cr ET]	FE 312		2	
	Forest Engineering Fluid Mechanics and Hydraulics [3 cr ET]	FE 330		3	
	Harvesting Process Engineering [4 cr ET]	FE 371		4	
	Forest Watershed Management [2 cr M&S; 2 cr ET]	FE 434	2	2	
	Forest Mensuration [1 cr M&S; 1 cr ET; 3 cr Other]	FOR 321	1	1	3
	Forest Engineering Seminar [1 cr ET]	FE 307		1	
	Soil Engineering [4 cr ET]	FE 315		4	
	Forest Operations Analysis [3 cr ET]	FE 440		4	
	Logging Mechanics [4 cr ET]	FE 470		4	
	Forest Resource Economics I [1 cr ET; 3 cr Other]	FOR 330		1	3
	Forest Route Surveying [4 cr ET]	FE 310		4	
	Soil Mechanics [4 cr ET]	FE 316		4	
	Forest Resource Economics II	FOR 331		1	3
	Harvesting Management [3 cr ET]	FE 471		3	
	Sustainability for the Common Good [BC] [1 cr M&S; 2 cr Other]	GEOG 300	1		2
	Forest Road Engineering [3 cr ET]	FE 415		3	
	Techniques for Forest Resource Analysis [4 cr ET]	FE 457		4	
	Forest Management Planning and Design I [4 cr ET]	FE 459		4	
	Forest Operations Regulations and Policy Issues [WIC] [3 cr ET]	FE 460		3	
	Forest Road System Management [4 cr ET]	FE 416		4	
	Forest Management Planning and Design II [4 cr ET]	FE 469		4	
	International Forestry [1 cr M&S; 2 cr Other]	FE 456	1		2
	Forest Engineering Practice & Professionalism [1 cr ET]	FE 480		1	
	Silviculture Principles [4 cr M&S]	FOR 441	4		
<b>Other Baccalaureate Core Courses [Bacc Core]</b>					
	Cultural Diversity				3
	Literature and Arts				3
	Western Culture				3
	Difference, Power, and Discrimination				3
	Free Electives				8
<b>Category Credit Totals</b>			<b>53</b>	<b>87</b>	<b>52</b>

\*\* Pre-Professional Course that must be completed before entering the Professional Program.

**DISCLAIMER:** Future term data are continually updated. Course descriptions and credits may change from time to time, check the web frequently for current information.

Forest Engineering 4 year curriculum – 192 credits

Freshman Fall Term			Winter Term			Spring Term		
MTH 251	Differential Calculus [BC]	4	MTH 252	Integral Calculus	4	MTH 254	Vector Calculus I	4
CH 201	Chemistry for Engring Majors	3	ECON 201	Introduction to Microeconomics [BC]	4	PH 211	General Physics with Calculus [BC]	4
FOR 111	Introduction to Forestry	3	FE 102	Forest Engineering Problem Solving and Technology	3	FES 240	Forest Biology [BC]	4
FE 101	Intro to Forest Engineering	2	HHS 231	Lifetime Fitness for Health [BC]	2	COMM 111/114	Public Speaking or Argument and Critical Discourse [BC]	3
WR 121	English Composition [BC]	3	HHS 241 or PAC	Lifetime Fitness or PAC courses [BC]	1-2		Free Elective	1
				Free Elective	1			
	<b>Term Total</b>	<b>15</b>		<b>Term Total</b>	<b>15-16</b>		<b>Term Total</b>	<b>16</b>

Sophomore Fall Term			Winter Term			Spring Term		
MTH 256	Applied Diff. Equations	4	ST 201	Principles of Statistics	4	ENGR 212	Dynamics	3
PH 212	General Physics with Calculus	4	FE 257	GIS & Forest Engineering Applications	3	FES 241	Dendrology	3
ENGR 211	Statics	3	CCE 201	Civil Engineering Graphics & Design	3	SOIL 205	Soil Science [BC]	3
FE 208	Forest Surveying	4	FE 209	Forest Photogrammetry and Remote Sensing	4	FOR 206 or SOIL 206 & FOR 208 [BC]	Forest Soil lab Or Soil Science lab & Forest Soil Rec. [BC]	1 or 1 & 1
			ENGR 213	Strength of Materials	3		Bacc Core course	3
						WR 327	Technical Writing [BC]	3
	<b>Term Total</b>	<b>15</b>		<b>Term Total</b>	<b>17</b>		<b>Term Total</b>	<b>16-17</b>

Junior Fall Term			Winter Term			Spring Term		
FE 434	Forest Watershed Management	4	FE 307	Forest Engineering Seminar	1	FE 310	Forest Route Surveying	4
FOR 321	Forest Mensuration	5	FE 315	Soil Engineering	4	FE 316	Soil Mechanics	4
FE 371	Harvesting Process Engineering	4	FE 440	Forest Operations Analysis	4	FOR 331	Forest Resource Economics II	4
FE 312	Forestry Field School	2	FE 470	Logging Mechanics	4	FE 471	Harvesting Management	3
FE 330	Forest Engring Fluid Mechanics & Hydraulics	3	FOR 330	Forest Resource Economics I	4			
	<b>Term Total</b>	<b>18</b>		<b>Term Total</b>	<b>17</b>		<b>Term Total</b>	<b>15</b>

Senior Fall Term			Winter Term			Spring Term		
GEOG 300 or FW 350	Sustainability for the Common Good [BC] or Endangered Species, Society and Sustainability	3	FE 459	Forest Management Planning and Design I	4	FE 469	Forest Management Planning and Design II	4
[BC]	Bacc Core course	3	FE 415	Forest Road Engineering	3	FE 416	Forest Road System Management	4
[BC]	Bacc Core course	3	FE 457	Techniques for Forest Resource Analysis	4	FE 456	International Forestry [BC]	3
[BC]	Bacc Core course	3	FE 460	Forest Operations Regulations and Policy Issues [WIC]	3	FOR 441	Silviculture Principles	4
Elective	Free Elective	3	FE 480	Forest Engineering Practice & Professionalism	1			
				Free Elective	3			
	<b>Term Total</b>	<b>15</b>		<b>Term Total</b>	<b>18</b>		<b>Term Total</b>	<b>15</b>