The Engineering Profession

Engineering is the profession in which knowledge of the mathematical and natural sciences gained through education and practice is applied with judgment to develop ways to economically utilize the materials and forces of nature for the benefit of humankind. It is a licensed profession in all of the states of the USA, and educational programs must meet high professional standards. Engineers are not only responsible for planning, designing, manufacturing, construction, and management, but also for the safety and welfare of the public that relies on their work.

Mission and Goals

The college's undergraduate educational mission is to provide high quality engineering programs that prepare students for successful careers, lifelong learning, and service to their profession and society. OSU engineering graduates will be known for their technical competence and creativity; for their ability to apply, adapt, and extend their knowledge to solve a wide variety of problems; and for their effective communication skills. Their education will provide them with an understanding of the ways in which the humanities, social sciences, basic sciences, and technology interact to affect society. These programs will foster an environment that stimulates learning and promotes diversity.

The college's undergraduate programs have four goals:

1. Educate students thoroughly in mathematics, basic science and engineering sciences relevant to their discipline's professional work, including fundamental concepts, experimental techniques, methods of analysis, and computational applications.
2. Develop the ability of students to communicate effectively and to work collaboratively in diverse team environments.
3. Develop in students an awareness of the historical evolution of knowledge and technical applications, the state of current professional practice, their need for lifelong learning, contemporary issues, and the impact of engineering actions and solutions in a societal and global context; and to develop an understanding of their professional and ethical responsibilities.
4. Develop the ability of students to formulate and solve problems, to integrate and synthesize knowledge, and to think creatively, leading to the capability to analyze and design components, processes, or systems; plan and carry out experiments effectively; and troubleshoot and modify processes and systems.

Preparing for an Engineering Career

To prepare for the practice of engineering, students complete an accredited program of study leading to a bachelor of science degree in an established engineering field. Most engineering curricula require 180 credits; exceptions include programs in chemical, ecological, environmental and bioengineering. All programs include a balance of course work in mathematics, science, liberal arts, engineering science, and engineering design.

Upon graduation, engineering students are eligible to take the Fundamentals of Engineering Examination of the State Board of Engineering Examiners in any state. After passing the examination and completing four years of progressively responsible engineering work, graduates are eligible to take the professional engineering license examination of the state in which they intend to practice.

Although some fields of industrial and government employment do not require formal professional licensure, the educational preparation for the bachelor's degree is a necessity for virtually all such employment.
Preparation for the professional practice of land surveying follows a pattern of education, experience, examination, and professional licensure similar to that required for professional engineering practice.

Students completing the BS in Radiation Health Physics degree will be eligible to take part I of the Certified Health Physics (CHP) Examination of the American Board of Health Physics after one year of applied health physics practice. After six years of responsible professional experience in health physics, graduates will be eligible to take part II of the CHP examination.

Choosing a Major
The selection of a major is often difficult for students who have not had close association with engineering activities. Students should not be overly concerned with this problem since the pre-professional curricula of all engineering programs during the first year are similar. This flexibility allows students to change majors during the first year without loss of progress. Engineering students who are unsure about their choice of a major are advised to register in pre-general engineering until they make a decision.

Humanitarian Engineering Minor (#769)
The humanitarian engineering minor provides multidisciplinary academic course work for students interested in the application of engineering, science, and technology-based solutions to global development challenges such as access to basic resources (e.g., clean water, clean energy), improved quality of life, and increased ability to earn a livelihood particularly in rural, resource-limited or low-to-middle income settings. A core of course work in humanitarian engineering, science and technology (HEST) is required with an emphasis on engineering as demonstrated by completion of the engineering design class (with engineering prerequisites). Both in the core course work and in the electives, there is an emphasis on context including social, cultural, economic, resource, political, and environmental. For more information, see the Humanitarian Engineering minor page at http://catalog.oregonstate.edu/MinorDetail.aspx?minor=769&college=16.

International Engineering Minor (#476)
The minor in International Engineering offers undergraduate engineering students an opportunity to certify their global competencies and demonstrate their understanding of the intercultural needs of modern engineers. By combining an engineering experience abroad, courses from a generalized global core, thematic elective courses, and the signature course for the minor, students may demonstrate their readiness for the increasingly global field of engineering. For more information, see the International Engineering minor page at http://catalog.oregonstate.edu/MinorDetail.aspx?minor=476&college=16.

Graduate Study
Because of the growing complexity of modern engineering practice, graduate study is important for those students who wish to specialize. Students who have established satisfactory undergraduate records and who are looking for the greatest opportunity in their professional field should consider continuation of their education beyond the baccalaureate degree. Study for the Master of Science (MS) and Master of Engineering (MEng) degrees normally requires one or two years. The Doctor of Philosophy (PhD) degree requires three to four additional years.

Accreditation
The Bachelor of Science degrees in Bioengineering, Chemical, Civil, Ecological, Electrical and Computer, Energy Systems, Environmental, Industrial, Manufacturing, Mechanical, and Nuclear Engineering baccalaureate programs are accredited by the Engineering Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700. The Construction Engineering Management program is accredited by the American Council for Construction Education. The Bachelor of Science degree in Computer Science-Computer Systems option is accredited by the Computing Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700. The Bachelor of Science degree in Radiation Health Physics is accredited by the Applied Science Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700.

Pre-Professional Program
Courses included in the first and sophomore years comprise a pre-professional program of study that produces a solid foundation for professional program studies at the junior, senior, and advanced degree levels. The pre-professional program may be taken at Oregon State University or at any accredited college or university that offers equivalent courses transferable to OSU.

The required pre-professional courses in the program listings are designated with an (E). These courses must be completed before the student is eligible for admission to the professional program. The other courses listed are important and may constitute prerequisites for junior-level courses.

All engineering programs have similar required pre-professional courses. This allows the flexibility of selecting a major after one year of study. Other majors offered by the college have different required pre-professional courses appropriate to that major.

Professional Program
The professional program consists of various curricula offered at the junior and senior levels that are designed to prepare students for a professional career.

Each curriculum provides an opportunity for specialization through judicious selection of elective courses; however, to become fully versed in a specialty requires additional study at the graduate level.

Admission Requirements
Pre-professional Program
Admission to the pre-professional program requires that students meet general university admission requirements, as published in the OSU General Catalog. Students admitted to the pre-professional program are assigned to the department or school of their choice after their first year for advising and program planning.

Professional Program
Enrollment in professional program courses is restricted to those students who have clearly demonstrated an ability to achieve the high standards required for professional studies.

Students must apply to the College of Engineering for admission to starting professional level courses prior to starting professional level courses. To apply, grades of C or better and a minimum of 2.25 cumulative GPA must be earned in required classes. The minimum GPA for admissions will typically be higher than 2.25, but will never be lower.

Students who have completed their pre-professional studies at a college or university other than Oregon State University must apply both to the OSU Office of Admissions for admission to OSU and to the College of Engineering for admission to the professional program. Application links
and information on policies and programs are available from the College of Engineering.

**Engineering Science**
Each engineering curriculum includes a number of courses that are appropriate for all engineering students. Because of their commonality, these are called engineering science courses.

Engineering sciences have their roots in mathematics and basic science and serve as a bridge between science and engineering. They involve the application of scientific methods to practical engineering situations and lead to solutions of problems that are fundamental in analysis, design, and synthesis.

"Sophomore standing in engineering" refers to a student registered in an accepted program, who has completed 45 credits (with minimum grades of C), including MTH 251 *DIFFERENTIAL CALCULUS, MTH 252 INTEGRAL CALCULUS, plus three additional science or mathematics courses listed in an engineering curriculum. Many engineering courses require sophomore standing in engineering as a prerequisite.

**Forest Engineering**
See College of Forestry. Also see College of Forestry for information on the Forest Engineering-Civil Engineering program.

**General Engineering**
The first year of the general engineering curriculum meets the requirements of all other engineering curricula except bioengineering, chemical engineering, environmental engineering, and ecological engineering, which require a different chemistry sequence. Students who have not decided upon a major are encouraged to register in general engineering during their pre-professional studies.

**Curriculum**
The pre-general engineering curriculum below will prepare students to enter many of the engineering department or school programs. Students may transfer into another program at any time during the first year; they must transfer by the end of the year.

**Pre-General Engineering (One-year Program, Major Code: 345)**

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tr>
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<td>CH 201 &amp; CH 202</td>
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<td>&amp; CH 202</td>
<td>CHEMISTRY FOR ENGINEERING MAJORS</td>
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<tr>
<td>COMM 111 or</td>
<td>*PUBLIC SPEAKING 1 or *ARGUM AND CRITICAL DISCOURS</td>
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<td>COMM 114</td>
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<td>ENGR 111</td>
<td>ENGINEERING ORIENTATION</td>
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<tr>
<td>HHS 231</td>
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<td>HHS 241</td>
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<td>MTH 251</td>
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<td>VECTOR CALCULUS</td>
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<td>PH 211</td>
<td>*GENERAL PHYSICS WITH CALCULUS</td>
<td>4</td>
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<tr>
<td>WR 121</td>
<td>*ENGLISH COMPOSITION</td>
<td>3</td>
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- Biological science elective
- Perspectives

**College of Engineering Grading and GPA Requirements**
- All technical, writing and communications courses must be taken for letter grades (A through F): C or better grades are passing.
- Pre-engineering students must have at least a 2.25 Pre-core GPA for admission to the professional program.
- Professional engineering students must have at least a 2.25 Pro-core GPA and a 2.25 institutional GPA for graduation.

The Pre- and Pro-core GPAs are computed based on graded course work (only the second graded attempt is used for a repeated course). See the College of Engineering advising website for details.

**Satisfactory Academic Progress for Professional School Students**
A student in good academic standing satisfies university, college, and program academic requirements. The university may change a student’s status to warning, probation, or suspension following guidelines contained in the Schedule of Classes. The College of Engineering has a similar, but independent, process for students in the professional program.

At the conclusion of each term, pro-core term and cumulative GPA are calculated and academic standings are determined for students according to the criteria outlined below. Students whose standings evidence a lack of satisfactory progress will be warned of this condition and advised to seek help from their academic advisors.

1. Academic Warning: Students with a term pro-core GPA below 2.25 and fewer than 10 credits of pro-core course work will be
placed on academic warning. The student must meet with their academic program advisor before they will be allowed to register for subsequent terms.

2. **Academic Probation:** Students who have completed 10 or more credits of pro-core course work and have a cumulative pro-core GPA below 2.25 will be placed on academic probation. A registration hold ("dean’s hold") will be placed on the student’s account until the student meets with an academic program advisor. The student and academic program advisor will complete an academic success agreement.

3. **Academic Suspension:** Students who are on academic probation and fail to meet the terms of their academic success agreement will be placed on academic suspension. Students who are academically suspended are removed from the professional program and are not allowed to take additional upper-division College of Engineering courses.

4. **Reinstatement to the College:** Suspended students may be reinstated to the professional program after one year, or completion of a minimum of 24 quarter credits of acceptable transferable college-level work at an accredited college or university, with a GPA of 2.5 or above. **These 24 credits must be pre-approved in writing by the program head advisor.** Students reinstated to the professional program who are subsequently suspended may only apply for reinstatement under the "one year" option.

Reinstatement requests from students will be considered by the College Committee on Reinstatement (CCR) made up of three College of Engineering school advisors and college head advisor (or their designee). Reinstatement guidelines are available electronically in the College of Engineering Undergraduate Policy Manual.

**Graduation Requirements**

To graduate with a baccalaureate degree in any of the engineering or computer science majors, a student must complete 180 credits; exceptions include programs in chemical, environmental, ecological, and bioengineering, which require 192 credits. In addition, students must have a minimum 2.25 institutional GPA and minimum 2.25 GPA in all professional core course work as defined in the respective major. A student must also meet all university degree requirements published each year in the printed and electronic "Academic Regulations and Procedures" section of the Registration Information Handbook and in the General Catalog.

**Academic Dishonesty Policy**

Students that violate the academic honesty policy a second time will be suspended from the College of Engineering for a period of one year.