Engineering

PROGRAM OBJECTIVES

The Engineering Science minor, the 3/2 Engineering Cooperative with Oregon State University, and the Pre-Engineering program are designed to initiate the process that leads to engineering licensure while maintaining a unique liberal arts base. The problem-solving approaches developed in the curriculum enhance critical thinking and can be applied to a wide range of endeavors, including the many engineering professions.

LEARNING OUTCOMES

Upon completion of the engineering science minor, students will:

- Be proficient in the problem-solving approaches, both theoretical and experimental, used by engineers. This includes proficiency in the computer simulation.
- Have an understanding of the main areas of engineering, especially electrical, mechanical, and civil engineering.
- Have a good understanding of laboratory instrumentation, and be able to design experiments and instrumentation as needed.
- Be able to communicate the knowledge and applications of engineering to peers and to the general public, orally and in writing.

MEANS OF ASSESSMENT

Several tools are used in assessing student learning. Examinations are designed to assess students' ability to apply fundamental concepts and problem-solving skills to the solutions of specific problems. The laboratory notebook is evaluated in courses containing a laboratory component. Evaluation of oral presentations and term papers is used in the upper-division courses. In the first-year course, the Force Concept Inventory exam is used to evaluate improvement in conceptual understanding by students.

REQUIREMENTS FOR THE MINOR IN ENGINEERING SCIENCE

1. A minimum of 30 graded credits are required for the minor.

The following courses are required:
ENGR 101 Engineering Orientation (2)
ENGR 211 Statistics (3)
ENGR 212 Dynamics (3)
ENGR 213 Strengths of Materials (3)
PHYS 343 Experimental Techniques (5)
PHYS 344 Experimental Techniques (5)
A minimum of 9 graded credits selected from the following:

PHYS 345 Experimental Techniques (5)
PHYS 321*, 322
Waves and Quantum Theory (5 each)
PHYS 401 Research (1-15)
PHYS 441, 442, 443
Theoretical Physics (5 each)
PHYS 410 Selected Topics (1-6)
CHEM 440 Thermodynamics (4)
CHEM 443 Thermodynamics Laboratory (1)

*Chemistry Majors may substitute Chem 441

2. A minimum GPA of 2.0 required for courses counting toward the minor.

3. A grade of "C-" or better in each course counting toward the minor.

4. A minimum of 10 hours counting toward the minor must be completed at Eastern Oregon University.

There are three options available to students interested in pursuing a degree in Engineering.
Transfer to an engineering school after one or two years of pre-engineering course work at EOU (Options I and II);

If not prepared to start with Calculus, take two years of coursework at EOU and transfer to a school offering engineering (Option III); or

Enroll in the Three-Plus-Two program at EOU, in which you obtain a B.S. degree in Physics or Chemistry from EOU and a B.S. degree in Engineering from Oregon State University. Option IV.

Courses for transferring to an engineering school after one or two years at EOU (except for Chemical Engineering; see adviser) include:

First Year
Engineering 101
Physics 221, 222, 223
Mathematics 251, 252, 253

Writing 121

Second Year
Engineering 211, 212, 213
Chemistry 204, 205, 206
Mathematics 254, 321
Physics 343 (recommended)
Computer Science 161
Speech 112
Mathematics Electives (see adviser)

Courses for transferring to an engineering school after two years at EOU (for students not prepared to start with calculus) include:

First Year
Engineering 101
Chemistry 204, 205, 206
Mathematics 111, 112, 113
Speech 112
Writing 121
Electives

Second Year
Physics 221, 222, 223
Mathematics 251, 252, 253
Computer Science 161
Electives

ENGINEERING (Option 1)

Transfer: at the end of 1 year student continues in the second year of the pre-engineering program at OSU, PSU or any other school of engineering.

TYPICAL FIRST YEAR CURRICULUM

Fall
ENGR 101 Engineering Orientation (2)
MATH 251 [1] Calculus (4)
PHYS 221 [2]
General Physics with Calculus (5)
WR 121 Expository Writing (4)
PE 180 PE Activities (1)

Winter
MATH 252 [1] Calculus II (4)
PHYS 222 General Physics with Calculus (5)
CS 161
Foundations of Computer Science I (4)
General Education or
Elective Courses (2-4)

Spring
MATH 253 [1] Calculus III (4)
PHYS 223 General Physics with Calculus (5)
General Education or
Elective Courses (6-9)

Note:
[1] Students may need to enroll in a lower level math sequence determined by an EOU evaluation. Students requiring a lower level math course may not enroll in PHYS 221, 222, 223, and should select Option III in Engineering. Option III is a two-year program at EOU.

[2] Students interested in chemical engineering should substitute CHEM 204, 205, 206 for the physics sequence.

ENGINEERING (Option II)

Transfer at the end of 2 years to OSU, PSU or to any other school of engineering (student applies for admission to the professional engineering program at OSU).

TYPICAL FIRST YEAR CURRICULUM

Fall
ENGR 101 Engineering Orientation (2)
MATH 251 [1] Calculus (4)
PHYS 221 General Physics with Calculus (5)
General Education or
Elective Courses [2] (5)

Winter
MATH 252 [1] Calculus II (4)
PHYS 222 General Physics with Calculus (5)
General Education or
Elective Courses [2] (7)

Spring
MATH 253 [1] Calculus III(4)
PHYS 223 General Physics with Calculus (5)
WR 121 Writing (4)
General Education or
Elective Courses [2] (2)

TYPICAL SECOND YEAR CURRICULUM

Fall
ENGR 211 Statics (3)
CHEM 204 General Chemistry (5)
MATH 254 Vector Calculus (4)
General Education or
Elective Courses [2] (4-6)

Winter
ENGR 212 Dynamics (3)
CHEM 205 General Chemistry (5)
MATH 321 Differential Equations (5)
CS 161
Foundations of Computer Science I (4)

Spring
ENGR 213 Strength of Materials (3)
CHEM 206 Qualitative Analysis (5)
MATH Electives [3] (3)
General Education or
Elective Courses [2] (5)

Note:
[1] Students may need to enroll in a lower level math sequence as determined by an EOU evaluation. Students requiring a lower level math course may not enroll in PHYS 221, 222, 223, and should select Option III in Engineering. Option III is a two year program at EOU.

[2] Selected to meet general education requirements in Humanities and Social Science. OSU requires 12 hours in each.

[3] Selected from MATH 322: Fourier Analysis; STAT 315, 316: Statistics. OSU requires 4 hours beyond MATH 321.

ENGINEERING (Option III)

Transfer at the end of 2 years to OSU or PSU; for students not prepared to start with the calculus in freshman year.

TYPICAL FIRST YEAR CURRICULUM

Fall
ENGR 101 Engineering Orientation (2)
MATH 111 [1] College Algebra (4)
CHEM 204 [2] General Chemistry (5)
General Education or Elective Courses [3] (5)

Winter
MATH 112 Precalculus (4)
CHEM 205 [2] General Chemistry (5)
WR 121 Expository Prose Writing (5)
General Education or Elective Courses [3] (2)

Spring
MATH 113 Precalculus (4)
CHEM 206 Qualitative Analysis (5)
General Education or Elective Courses [3] (7)

TYPICAL SECOND YEAR CURRICULUM

Fall
MATH 251 Calculus I (4)
PHYS 221 General Physics with Calculus (5)
General Education or
Elective Courses [3] (6-8)

Winter
MATH 252 Calculus II (4)
PHYS 222 General Physics with Calculus (5)
SPCH 112 Public Speaking (3)
CS 161
Foundations of Computer Science I (4)

Spring
MATH 253 Calculus III (4)
PHYS 223 General Physics with Calculus (5)
Elective Courses (9)

Note:
[1] Students may need to enroll in a different level math course as determined by an EOU evaluation.

[2] Students not meeting admission requirements in CHEM 204, 205, 206 should enroll in general education courses.

[3] Selected to meet general education requirements in Humanities and/or Social Science. A student should complete a minimum of 10 hours during the academic year.

ENGINEERING (Option IV)

EOU Degree: B.S. in Physics (from EOU);
B.S. in Engineering (from OSU): (for Chemical Engineering see page 57.)

Students wishing to complete a Physics Degree at Eastern Oregon University and a second degree in Engineering at Oregon State University should attend EOU for three years and then transfer to OSU for two years to complete the requirements for the Physics degree at EOU and the Engineering degree at OSU. Some of the engineering degrees offered by OSU:
Chemical Engineering
Civil Engineering
Electrical and Computer Engineering
Environmental Engineering
Forest Engineering
Industrial and Manufacturing Engineering
Mechanical Engineering
Nuclear Engineering
Engineering Physics

It is possible to complete the program at an engineering school other than OSU. The procedures in this case would be worked out on an individual basis; consult your adviser.

PHYSICS/ ENGINEERING (3/2)

(A combination Degree and Transfer Program)

1. To be admitted to the program, candidates must have completed ENGR 101, and PHYS 221, 222, 223 with a combined 2.00 GPA or better and have attempted the Writing Proficiency Examination. Entry may also be gained by petition to the school.

2. Complete EOU graduation requirements.

3. Complete the following with a grade of "C-" or better in each course. To assure later acceptance to a School of Engineering, a minimum GPA of 2.75 is recommended.

ENGR 101 Engineering Orientation (2)
PHYS 221, 222, 223
General Physics with Calculus (15)
PHYS 321, 322
Waves and Quantum Theory (10)
PHYS 343, 344, 345
Experimental Techniques (15)
PHYS 441, 442, 443 Theoretical Physics (15)
ENGR 211 Statics (3)
ENGR 212 Dynamics (3)
MATH 251, 252, 253 Calculus (12)
MATH 254 Vector Calculus (4)
MATH 321 Differential Equations (5)
CS161
Foundations of Computer Science I (4)
CHEM 204, 205 General Chemistry (10)
CHEM 206 Qualitative Analysis (5)
CHEM 440 Thermodynamics (5)

In addition, ENGR 213, Strength of Materials (3) is recommended.

TYPICAL FIRST YEAR CURRICULUM

Fall
ENGR 101 Engineering Orientation (2)
MATH 251 [1] Calculus I (4)
PHYS 221 [2]
General Physics with Calculus (5)
General Education or
Elective Courses [3] (5)

Winter
MATH 252 [1] Calculus II (4)
PHYS 222 [2]
General Physics with Calculus (5)
General Education or
Elective Courses [3] (7)

Spring
MATH 253 [1] Calculus III (4)
CS 161
Foundations of Computer Science I (4)
PHYS 223 [2]
General Physics with Calculus (5)
General Education or
Elective Courses [3] (4)

TYPICAL SECOND YEAR CURRICULUM

Fall
ENGR 211 Statics (3)
CHEM 204 General Chemistry (5)
MATH 254 Vector Calculus (4)
ECON 201 Microeconomics (5)
General Education and
Elective Courses (0-2)

Winter
CHEM 205 General Chemistry (5)
PHYS 321 Waves and Quantum Theory (5)
MATH 321 Differential Equations (5)
ENGR 212 Dynamics (3)
See Note 4

Spring
ENGR 213 Strength of Materials (3)
CHEM 206 Qualitative Analysis (5)
PHYS 322 Waves and Quantum Theory (5)
General Education &
Elective Courses (0-5) [4]

TYPICAL THIRD YEAR CURRICULUM

Fall
PHYS 441 Theoretical Physics (5)
CHEM 440 Thermodynamics (5)
MATH 241 Linear Algebra (3)
PHYS 343 Experimental Techniques (5) [5]

Winter
PHYS 344 Experimental Techniques (5)
PHYS 442 Theoretical Physics (5)
SPCH 112 Speech (3)
ECON 202 Macroeconomics (5)

Spring
PHYS 345 Experimental Techniques (5)
PHYS 443 Theoretical Physics (5)
MATH 322 Fourier Analysis (3)
General Education and
Elective Courses (5)

Note:
[1] Students may need to enroll in lower level math sequence as determined by an EOU Evaluation. Should this occur, then the student should substitute CHEM 204, 205, 206 for PHYS 221, 222, 223 the first year.

[2] Students must have completed or be concurrently enrolled in Math 251, or obtain permission of the instructor.

[3] Students in this program must complete the University Writing Requirement.

[4] Recommended mathematics electives are: MATH 261, 262, Linear Algebra; MATH 322, Fourier Analysis; MATH 417, Complex Variables.

[5] PHYS 343,344,345 are given every other year. Therefore, the student may have to modify his/her schedule and take this sequence the second year.

ENGINEERING COURSE DESCRIPTIONS

ENGR 101 - Engineering Orientation Credits: 2.00
An introduction to the profession of engineering and engineering problem solving. Prerequisite: Strong background in algebra and trigonometry; MATH 112 recommended.

ENGR 110 - Selected Topics Credits: 1.00 to 6.00

ENGR 210 - Selected Topics Credits: 1.00 to 6.00

ENGR 211 - Statics Credits: 3.00
Analysis of forces acting upon rigid bodies. Prerequisite: MATH 252, PHYS 222.

ENGR 212 - Dynamics Credits: 3.00
Kinematics, Newton's laws of motion, work-energy and impulse-momentum relation-ships applied to engineering systems. Prerequisite: ENGR 211 or equivalent.

ENGR 213 - Strength of Materials Credits: 3.00
Analysis of stresses, strains and deformations of elastic materials. Solutions of elementary problems involving stresses and deflections for both statically determinant and statically indeterminant structures. Prerequisite: ENGR 211 or equivalent.

ECE 171 - Digital Circuits Credits: 4.00
Foundation course in digital design, Topics such as number systems, basic logic gates, TTL device parameters, Boolean algebra, logic circuit simplification techniques, timing analysis, the application of MSI combinational logic devices, programmable logic devices, flip-flops, synchronous state machines and counters. Introduces students to a systematic design methodology. Uses computer based tools such as schematic capture programs, programmable logic development programs, and digital circuit stimulators.

ECE 201 - Electric Circts Lab I Credits: 1.00
Pre- or co-requisite: ECE 221, 222, 223. S/U only.

ECE 202 - Electric Circts Lab II Credits: 1.00
Pre- or co-requisite: ECE 221, 222, 223. S/U only

ECE 203 - Electric Circts Lab III Credits: 1.00
Pre- or co-requisite: ECE 221, 222, 223. S/U only.

ECE 221 - Electric Circuits-PSU Credits: 4.00
Experimental laws, network theorems, and computer analysis techniques of electrical circuit analysis. Network responses to various forcing functions using time-domain and phasor-domain methods. Prerequisite: MATH 253

ECE 222 - Signals & Systems-PSU Credits: 4.00
Step and impulse response of electric circuits, introduction to the frequence domain, Laplace and Fourier transforms, convolution integrals, and spectra Bode plots. Block diagrams and transfer functions. Prerequisite: ECE 221

ECE 223 - Feedback & Control-PSU Credits: 4.00
Continuous-time and discrete-time Fourier series, continuous-time Fourier transform, discrete-time Fourier transform, fast Fourier transform, sampling, aliasing, communications, modulation, the z-transform, discrete-time filters. Prerequisite: ECE 222.

ECE 271 - Digital Systems Credits: 4.00
Second course in a sequence of digital and microprocessor courses. Covers shift register devices and circuits; design, timing analysis, and application of synchronous state machine circuits using discrete devices and programmable logic devices; timing analysis of asynchronous state machines, arithmetic circuits and devices; internal architecture of a microprocessor; design and interfacing of memory systems; and an introduction to design for test techniques. Reinforces the systematic design methodology, documentation standards, and use of computer-based tools introduced in ECE 171. Prerequisite: ECE 171

ECE 301 - Electronics Lab I-PSU Credits: 1.00
Prerequisite or co-requisite: ECE 321. S/U only.

ECE 302 - Electronics Lab II-PSU Credits: 1.00
Prerequisite or co-requisite: ECE 322. S/U only.

ECE 303 - Electronics Lab III-PSU Credits: 1.00
Prerequisite or co-requisite: ECE 323. S/U only.

ECE 311 - Feedback & Control-PSU Credits: 4.00
Stability concepts for linear time invariant networks, Routh-Hurwitz criterion. Stability through feedback, Nyquist and root-locus design methods. Compensation methods derived from Bode plots. Introduction to state space system analysis. Prerequisite: ECE 223.
Restrictions: May not be enrolled in one of the following Class(es): Freshman

ECE 321 - Electronics I-PSU Credits: 4.00
Introduction to solid state electronics, leading to die physical properties and characteristics of solid state electronic devices. Analysis and design of diode, bipolar junction, and field-effect transistor circuits. Application of a computer-aided design (CAD) tool such as SPICE. Prerequisite: ECE 223

ECE 322 - Electronics II-PSU Credits: 4.00
Study of digital circuits used in various logic families. Analysis of electronic amplifiers using small-signal models of electronic devices; introduction to feedback amplifier analysis and design; review of transfer function and Bode analysis. Computer-aided design. Prerequisite: ECE 321

ECE 323 - Electronics III-PSU Credits: 4.00
Introduction to differential and operational amplifier

circuits. Study of operational amplifier design techniques involving current mirrors and active loads. Design and analyze active filters, waveform generators, and large-signal electronic amplifiers. Computer-Aided design. Prerequisite: ECE 322

ECE 331 - Electromagnetic Prin-PSU Credits: 4.00
Review of vector calculus, electric and magnetic fields, Maxwell's equations in integral and differential form. Poisson's equation, Laplace's equation, Wilform plane waves. Prerequisite: ECE 323

ECE 332 - Electromagnetic Syst-PSU Credits: 4.00
Magnetic circuits, coupled coils and transformers, electromagnetic energy conservation, magnets and actuators, fundamentals of dc, induction, and synchronous machines. Prerequisite: ECE 331

ECE 371 - Microprocessor Syst-PSU Credits: 4.00
This course covers the fundamentals of microprocessor architecture, software development, and hardware interfacing. Emphasis is placed on eight bit microprocessors systems. Machine and assembly language programming, applications of microprocessors in controls, microprocessor systems design, and memory and I/O interfacing are the topics studied. Laboratory work includes several software and hardware development projects. Prerequisite: ECE 271

Eastern Oregon University

English/Writing

ENGLISH / WRITING PROGRAM OBJECTIVES

The Bachelor of Arts in English provides three possible concentrations for students: literature/film, discourse studies, and writing. Objectives, Typical Four Year Curricula, Course Descriptions, Minors, and Capstone Project guidelines can be found in the following pages for each of these options. In all three options, students will be asked to acquire a solid background in writing, language, and literature/film. In all areas, sophisticated analysis, clear, confident, and original writing, and tolerance for diversity, complexity, and ambiguity will be stressed. In all areas, students are encouraged to select appropriate minors, engage in inter-disciplinary studies, and complete advanced studies in modern languages, computer applications, allied arts, or second majors. Students should carefully consult with and follow recommendations of their major advisers for timely completion of general education and degree requirements. A number of career opportunities are possible in all three concentrations in the discipline, and students should discuss these with an adviser early in their course of study.

LEARNING OUTCOMES

Outcomes are listed for each concentration.

MEANS OF ASSESSMENT

English/Writing Majors are evaluated in a rich environment of oral, aural, visual, and, of course, written performance, with multiple assessments taking place in each course throughout our curriculum. Students do a great deal of self-assessment using a variety of rubrics specific to each English/Writing outcome, and they do peer assessment based on instructor and class-generated rubrics as well. Such assessments are key to preparing students for the workplace and for lifelong literacies. In short, evaluation and self-assessment are completely integrated throughout our curriculum.

To ensure that students meet program outcomes, we evaluate their proficiencies by means of the following:

Essays, research papers, examinations, projects, performances, multi-works, multi-genre writing, multi-authored collaborations, poems, short stories, scenes, plays, screenplays, novels, prose poems, flash fiction, personal narratives, creative nonfiction, oral presentations, conference papers, publications, editorial productions, self-editing, peer editing, small group collaborations, synthetic exercises, news stories, news features, editorials, journals, technical reports, handbooks, web pages, listserve postings, short papers, portfolios, ethnographies, reflections, translations, demonstrations, tutorial, teaching classes and supervised responding to student work, assignment design, class presentations, action research, reviews, videos, photos, other art and artifactual productions, songs, radio broadcasts and productions, inter-disciplinary projects, public readings, capstone projects, and other formal and informal productions.

REQUIREMENTS FOR THE BACHELOR OF ARTS IN ENGLISH

1. Admission to the English degree program may be achieved by meeting the following requirements:
    a. complete at least 45 credit hours of