

ENGINEERING (ENGR)

ENGR 025 LABORATORY TECHNIQUES: MACHINE SHOP (1 credit)

\$30 lab fee. 1 credit. (EL)

Total Course fees: \$30.00

(EXPERIENTIAL LEARNING)

ENGR 201 INTRODUCTION TO ENGINEERING (3 credits)

This course is an introduction to the engineering profession and the development of basic skills important to engineering. These skills include problem solving, machining, designing, use of computers, computer programming, engineering economics, and ethics in engineering.

Prerequisites: ENGR 201L required co-requisite.

Typically offered: Fall Semester, Annually

ENGR 252 ENGINEERING STATICS AND DYNAMICS (4 credits)

Newtonian mechanics with emphasis on problem-solving and engineering applications: force, mass, and acceleration; force systems; free-body diagrams; distributed forces; particle kinematics; motion of rigid bodies; conservation of energy; translational and angular momentum; systems of particles; applications of vector algebra and calculus. Lecture and discussion.

Prerequisites: PHYS 210. MATH 200 (must be taken prior or concurrently).

Typically offered: Fall Semester, Odd Years

ENGR 253 STRENGTH OF MATERIALS (3 credits)

Continuation of study of engineering mechanics following 252.

Equilibrium and geometric compatibility in devices and structures; Hooke's Law, stress and strain in variously loaded members; deformation and deflection; theory of failure. Lecture and discussion.

Prerequisites: PHYS 210 and ENGR 252.

Typically offered: Spring Semester, Even Years

ENGR 303 INTRODUCTION TO MATERIALS SCIENCE (3 credits)

Introduction to the science of materials (metals, ceramics, polymers, composites, and semiconductors). Crystal structures and designations. Techniques of materials characterization. Mechanical, thermal, electrical, and magnetic properties. Forming and materials processing. Problem solving, lecture, discussion, and field trips. (Listed as ENGR 303 and PHYS 303)

Prerequisites: PHYS 215.

ENGR 310 ENGINEERING DESIGN & GRAPHICS (3 credits)

Engineering drawing standards, projection theory, visual thinking, free-hand sketching, pictorial sketching, solid modeling (including operating 3-D printer), and tolerance concepts. Introduction to drafting using computeraided design programs and other tools. Lecture and laboratory.

Total Course fees: \$50.00

Prerequisites: ENGR 025, PHYS 210, and MATH 170 must be completed prior. ENGR 310L required co-requisite.

Typically offered: Spring Semester, Odd Years

ENGR 315 CIRCUITS AND ELECTRONICS I (4 credits)

Electrical concepts and measurements. Circuit laws and theorems. Analysis of dc and ac steady state circuits, including phasor analysis techniques and Bode plots. Operational amplifiers and diodes. Digital combinational and sequential logic circuitry. Lecture, discussion, and laboratory. (Listed as ENGR 315 and PHYS 315)

Prerequisites: MATH 170. PHYS 211, junior standing recommended. ENGR 315L required co-requisite.

Typically offered: Fall Semester

(NATURAL WORLD)

ENGR 316 CIRCUITS AND ELECTRONICS II (4 credits)

Semiconductor materials and solid-state devices. Diode and transistor circuits. Selected topics such as magnetism, inductors, and transformers; second-order ac and dc circuit analysis; Laplace and Fourier transforms; analog to digital conversion; and electronic system design. Completion of an independent project. Lecture, discussion, and laboratory. (Listed as ENGR 316 and PHYS 316)

Prerequisites: PHYS 315 or ENGR 315. ENGR 316L required co-requisite.

Typically offered: Spring Semester, Odd Years

(QUANTITATIVE REASONING)

ENGR 489 ENGINEERING DESIGN PROJECT (4 credits)

Design an engineering solution to a specified need, incorporating appropriate engineering process and standards and meeting multiple realistic constraints. Research prior knowledge; identify clear design specifications; create prototypes; conduct appropriate experimentation, modeling, and theoretical analysis; and analyze and interpret results. Each student's individual contribution will address a unique project component or system and be appropriate and sufficient for writing up as a senior thesis. Recommended: an 8-9 credit sequence to develop practical engineering and science skills, such as: ENGR 025, ENGR 252, ENGR 253; or ENGR 315, ENGR 316; or COMP 160, COMP 161, COMP 262.

Prerequisites: ENGR 310 and consent of instructor. Recommended: an 8-9 credit sequence to develop practical engineering and science skills, such as: ENGR 025, ENGR 252, ENGR 253; or ENGR 315, ENGR 316; or COMP 160, COMP 161, COMP 262.

Typically offered: Fall Semester