

# ENGINEERING (ENGR)

## ENGR 0010. Engineering Survey Measurements

*Units: 4*

Prerequisite: Completion of MATH 27 with grade of "C" or better  
 Advisory: Completion with grade of "C" or better or concurrent enrollment in ENGR 22A  
 Hours: 108 (54 lecture, 54 laboratory)

Theory and practice with total stations (with and without data collectors), leveling instruments, and tapes. Creation of a boundary and topographic survey requiring traverse adjustment and area within irregular boundaries. Mock construction project requiring a construction survey including field staking. Problems including horizontal and vertical curves, slopes and alignments, cut and fill, topographic maps and volume calculation. Introduction to GPS. Designed for engineering students and required for Civil Engineering majors. (CSU, UC)

## ENGR 0017. Introduction to Circuit Theory

*Units: 3*

Prerequisite: Completion of MATH 32, PHYS 210 and PHYS 210L with grades of "C" or better; completion with grade of "C" or better or concurrent enrollment in MATH 33  
 Hours: 54 lecture

Introduction to circuit analysis. Includes all basic, passive circuit elements and operational amplifiers. Covers constant and time variant circuit networks; network analysis and simplification techniques; response of circuit networks, natural and forced; steady state sinusoidal circuit analysis development from the network differential equations; power calculations; analysis involving operational amplifiers. (CSU, UC)

## ENGR 0017L. Circuit Theory Laboratory

*Unit: 1*

Prerequisite: Completion with grade of "C" or better or concurrent enrollment in ENGR 17; and completion of PHYS 210 and 210L with grades of "C" or better  
 Hours: 54 laboratory

Designed to parallel ENGR 17. Experimental verification of circuit analysis concepts. Laboratory exercises include DC, transient and AC measurements on circuits including resistors, capacitors, inductors and operational amplifiers. Digital logic circuits are also addressed. Basic electrical instrumentation is used. (CSU, UC)

## ENGR 0022A. Engineering Drawing and CAD

*Units: 3*

Hours: 90 (36 lecture, 54 laboratory)  
 Introduction to the graphical methods, equipment and software used to produce and interpret engineering drawings. Fundamentals of technical drawing including sketching, geometric constructions, orthographic projection, dimensioning, sectional views, auxiliary views, threads and fasteners, and pictorial projection. Emphasis on the production of two-dimensional working drawings utilizing freehand sketching and computer-aided drafting (CAD) hardware and software. (CSU)

## ENGR 0022B. Descriptive Geometry and Solid Modeling

*Units: 3*

Formerly known as ENGR 23

Prerequisite: Completion of ENGR 22A; or DES 1 and 2 with grade(s) of "C" or better  
 Hours: 90 (36 lecture, 54 laboratory)

Fundamental principles of descriptive geometry with application to technical drawing and engineering problems. Visualizing spatial relationships from orthographic drawings. Includes sketches and computer-aided drafting (CAD) projects. Provides an introduction to solid modeling including part and assembly modeling. Designed for Engineering and Drafting and Engineering Support majors. (CSU, UC)

## ENGR 0028. Independent Study

*Units: 1-3*

Designed for students interested in furthering their knowledge at an independent study level in an area where no specific curriculum offering is currently available. Independent study might include, but is not limited to, research papers, special subject area projects, and research projects. See Independent Study page in catalog. (CSU, UC-with unit limitation)

## ENGR 0035. Statics

*Units: 3*

Prerequisite: Completion of PHYS 205, PHYS 205L, and MATH 31 with grades of "C" or better

Advisory: Completion of ENGR 22A with grade of "C" or better

Hours: 54 lecture

Introduces the concepts of engineering based on forces in equilibrium. Includes concentrated forces, distributed forces, forces due to friction, and inertia as they apply to machines, structures, and systems. Upon completion, students should be able to solve problems which require the ability to analyze systems of forces and bodies in static equilibrium. (C-ID ENGR 130) (CSU, UC)

## ENGR 0037. Manufacturing Processes

*Units: 3*

Advisory: Completion of ENGR 22A with grade of "C" or better

Hours: 90 (36 lecture, 54 laboratory)

Application of multiple fabrication techniques including tools and materials required for the manufacture of a mechanical assembly. Introduction to design and documentation of a final product. Manufacturing processes in the areas of forming, joining, material removal, casting, assembly and prototyping which includes hands on use of manufacturing equipment. Each student fabricates a final project based on principles of manufacturing. (CSU, UC)

## ENGR 0045. Materials Science

*Units: 3*

Prerequisite: Completion of PHYS 205 and 205L with grades of "C" or better; and completion with grade of "C" or better or concurrent enrollment in CHEM 1A

Basic principles of physical and chemical behavior of metals, polymers, composites and ceramics in engineering applications; topics include bonding, crystalline structure and imperfections, diffusion, kinetics, phase diagrams, corrosion, mechanical and electrical properties. Laboratory experiments analyze actual behavior of materials; topics include metallography, mechanical properties of metals and heat treatment. (CSU, UC)

**ENGR 0095. Internship in Engineering**

*Units: 0.5-4*

Designed for advanced students to work in an area related to their educational or occupational goal. Provides new on-the-job technical training under the direction of a worksite supervisor, allowing students to expand knowledge and skills in the chosen field. Mandatory orientation session and faculty approval to determine eligibility. One unit of credit is equal to each 60 hours of non-paid work, or each 75 hours of paid work. Students may earn up to a total of 16 units in internship courses (any course numbered 95 and PDEV 94). (CSU-with unit limitation)

**ENGR 0110. Introduction to Engineering Design**

*Units: 3*

Hours: 54 lecture

Exploration of the engineering profession, focusing on branches of engineering and relationships between them, spectrum of work functions, professionalism and ethics. Introduces the fundamentals of engineering design, problem solving, planning, prototyping and some fabrication. Includes orientation to Sierra College engineering program, evaluation of engineering as a personal career choice and participation in multiple engineering activities. (CSU, UC)

**ENGR 0150. Introduction to the Engineering Profession**

*Unit: 1*

Hours: 18 lecture

Exploration of the engineering profession, focusing on branches of engineering and relationships between them, spectrum of work functions, professionalism and ethics. Includes orientation to Sierra College engineering program, evaluation of engineering as a personal career choice and participating in engineering activities. (CSU, UC)

**ENGR 0220. Programming and Problem Solving in Engineering**

*Units: 4*

Prerequisite: Completion of MATH 30 and PHYS 205 and 205L with grades of "C" or better. PHYS 205 may be taken concurrently

Hours: 108 (54 lecture, 54 laboratory)

Introduction to methods and techniques of programming software in MATLAB to solve engineering problems. Includes coverage of MATLAB user environment and functions, engineering problems, engineering variables, advanced math (matrices), engineering solutions (plotting) and verification. Designed to train students in solving engineering problems with MATLAB software. (C-ID ENGR 220)(CSU, UC)