ENGINEERING (ENGR)

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 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 0101. Engineering Seminar
Unit: 1
Formerly known as ENGR 150
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 participation in engineering activities. (CSU, UC)

ENGR 0110. Introduction to Engineering Design
Units: 3
Hours: 54 lecture
Explores the branches of engineering, the functions of an engineer, and the industries in which engineers work. Explains the engineering education pathways and explores effective strategies for students to reach their full academic potential. Presents an introduction to the methods and tools of engineering problem solving and design including the interface of the engineer with society and engineering ethics. Develops communication skills pertinent to the engineering profession. Introduces the fundamentals of engineering design, problem solving, planning, prototyping and some fabrication. (C-ID ENGR 110) (CSU, UC)

ENGR 0130. Statics
Units: 3
Formerly known as ENGR 35
Prerequisite: Completion of PHYS 205, PHYS 205L, and MATH 31 with grades of "C" or better
Advisory: Completion of ENGR 151 with grade of "C" or better
Hours: 54 lecture
A first course in engineering mechanics: properties of forces, moments, couples and resultants; two- and three-dimensional force systems acting on engineering structures in equilibrium; analysis of trusses, and beams; distributed forces, shear and bending moment diagrams, center of gravity, centroids, friction, and area and mass moments of inertia. Optional additional topics include fluid statics, cables, Mohr's circle and virtual work. (C-ID ENGR 130) (CSU, UC)

ENGR 0137. Manufacturing Processes
Units: 3
Formerly known as ENGR 37
Advisory: Completion of ENGR 151 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, welding, 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 0140B. Materials Science and Engineering
Units: 4
Formerly known as ENGR 45
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
Hours: 108 (54 lecture, 54 laboratory)
Presents the internal structures and resulting behaviors of materials used in engineering applications, including metals, ceramics, polymers, composites, and semiconductors. The emphasis is upon developing the ability both to select appropriate materials to meet engineering design criteria and to understand the effects of heat, stress, imperfections, and chemical environments upon material properties and performance. Laboratories provide opportunities to directly observe the structures and behaviors discussed in the course, to operate testing equipment, to analyze experimental data, and to prepare reports. (CSU, UC)

ENGR 0151. Engineering Graphics
Units: 4
Formerly known as ENGR 22A and ENGR 22B
Hours: 108 (54 lecture, 54 laboratory)
Covers the principles of engineering drawings in visually communicating engineering designs and an introduction to computer-aided design (CAD). Topics include the development of visualization skills; orthographic projections; mechanical dimensioning and tolerancing practices; and the engineering design process. Assignments develop sketching and 2-D and 3-D CAD skills. The use of CAD software is an integral part of the course. (CSU, UC)

ENGR 0180. Engineering Surveying
Units: 4
Formerly known as ENGR 10
Prerequisite: Completion of MATH 27 with grade of "C" or better
Advisory: Completion with grade of "C" or better or concurrent enrollment in ENGR 151
Hours: 108 (54 lecture, 54 laboratory)
Applies theory and principles of plane surveying: office computations and design; operation of surveying field equipment; and production of engineering plans/maps. Topics include distances, angles, and directions; differential leveling; traversing; property/boundary surveys; topographic surveys/mapping; volume/earthwork; horizontal and vertical curves; land description techniques; and GPS. Extensive field work using tapes, levels, transits, theodolites, total stations, and GPS. (C-ID ENGR 180) (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
Advisory: PHYS 205 may be taken concurrently
Hours: 108 (54 lecture, 54 laboratory)
Utilizes the MATLAB environment to provide students with a working knowledge of computer-based problem-solving methods relevant to science and engineering. It introduces the fundamentals of procedural and object-oriented programming, numerical analysis, and data structures. Examples and assignments in the course are drawn from practical applications in engineering, physics, and mathematics. (C-ID ENGR 220) (CSU, UC)

ENGR 0230. Dynamics
Units: 3
Prerequisite: Completion of ENGR 130 with grade of "C" or better
Advisory: Completion of ENGR 151 with grade of "C" or better
Hours: 54 lecture
Fundamentals of kinematics and kinetics of particles and rigid bodies. Topics include kinematics of particle motion; Newton's second law, work-energy and momentum methods; kinematics of planar motions of rigid bodies; work-energy and momentum principles for rigid body motion; Introduction to mechanical vibrations (optional). (C-ID ENGR 230) (CSU, UC)

ENGR 0260. Electric Circuits
Units: 3
Formerly known as ENGR 17
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
An introduction to the analysis of electrical circuits. Use of analytical techniques based on the application of circuit laws and network theorems. Analysis of DC and AC circuits containing resistors, capacitors, inductors, dependent sources, operational amplifiers, and/or switches. Natural and forced responses of first and second order RLC circuits; the use of phasors; AC power calculations; power transfer; and energy concepts. (CSU, UC)

ENGR 0260L. Electric Circuits Laboratory
Unit: 1
Formerly known as ENGR 17L
Prerequisite: Completion of PHYS 210 and 210L with grades of "C" or better
Corequisite: Concurrent enrollment in ENGR 260
Hours: 54 laboratory
An introduction to the construction and measurement of electrical circuits. Basic use of electrical test and measurement instruments including multimeters, oscilloscopes, power supplies, and function generators. Use of circuit simulation software. Interpretation of measured and simulated data based on principles of circuit analysis for DC, transient, and sinusoidal steady-state (AC) conditions. Elementary circuit design. Practical considerations such as component value tolerance and non-ideal aspects of laboratory instruments. Construction and measurement of basic operational amplifier circuits. (CSU, UC)