ENGINEERING

- Engineering Fundamentals, Certificate of Achievement
- Engineering, Associate in Science
- Engineering, Certificate of Achievement

Engineering (ENGR)

ENGR 1A - Introduction to Engineering (3 units)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 34 hours lecture; 51 hours lab
The course explores the branches of engineering, the functions of an engineer, and the industries in which engineers work. It explains the engineering education pathways and explores effective strategies for students to reach their full academic potential. It 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. It develops communication skills pertinent to the engineering profession. Portions of instruction may be offered online; may also be offered fully online. [C-ID ENGR 110]

Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU & UC
GE Credit: MPC 7.2 Career Exploration

ENGR 1B - Design and Prototyping (2 units)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 17 hours lecture; 51 hours lab
This course provides a practical introduction to engineering and industrial design in which students develop and prototype solutions to a wide array of possible design problems. Basic training is provided in mechanical design, 3D printing, electronic fabrication, and aesthetic considerations.

Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU

ENGR 2 - Engineering Design Graphics (3 units)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 34 hours lecture; 51 hours lab
This course covers the principles of drawings in visually communicating engineering designs and introduces 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. Portions of instruction may be offered online; may also be offered fully online.

Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU & UC

ENGR 4 - Engineering Materials (4 units)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 51 hours lecture; 51 hours lab
This course presents the internal structure and resulting behavior of materials used in engineering applications, including metals, ceramics, polymers, composites, and semiconductors. Emphasis is on 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. Portions of instruction may be offered online; may also be offered fully online. [C-ID ENGR 140]

Prerequisite(s): CHEM 1A; PHYS 3A
Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU & UC

ENGR 8 - Engineering Statics (3 units)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 51 hours lecture; 17 hours lab
This course introduces students to the principles of statics and their application to engineering problems. Topics include two- and three-dimensional force systems acting on particles and rigid bodies in equilibrium, analysis of trusses and beams, distributed forces, shear and bending moment diagrams, friction, center of gravity, centroids, and moments of inertia. Optional additional topics include fluid statics, cables, Mohr's circle, and virtual work. Portions of instruction may be offered online; may also be offered fully online. [C-ID ENGR 130]

Prerequisite(s): PHYS 3A
Pre/Corequisite(s): MATH 20C
Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU & UC

ENGR 9 - The Science of Robotics (4 units)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 51 hours lecture; 51 hours lab
This course surveys the scientific principles behind robots – machines that observe, think and act in a goal-directed manner – and the scientific discoveries inspired by them. Students apply the scientific method to topics ranging from Newtonian mechanics, analog and digital circuits, feedback control systems, information theory, and machine intelligence. Also considered are the societal implications of robotics technology.

Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU
GE Credit: MPC 5 Natural Sciences (must include lab)

ENGR 12 - Engineering Circuits (3 units)
Letter Grade (LG) Only • Total hours: 51 hours lecture; 17 hours lab
This course is an introduction to the analysis of electrical circuits. It investigates the use of analytical techniques based on the application of circuit laws and network theorems. Topics include the analysis of DC and AC circuits containing resistors, capacitors, inductors, dependent sources, operational amplifiers, and/or switches along with natural and forced responses of first and second order RLC circuits, the use of phasors, AC power calculations, power transfer, and energy concepts. Portions of instruction may be offered online; may also be offered fully online. [C-ID ENGR 260]

Prerequisite(s): PHYS 3B
Corequisite(s): ENGR 12L
Pre/Corequisite(s): MATH 32
Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU & UC

ENGR 12L - Engineering Circuits Laboratory (1 unit)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 51 hours lab
This course is an introduction to the construction and measurement of electrical circuits. It explores the basic use of electrical test and measurement instruments including multimeters, oscilloscopes, power supplies, and function generators. Topics include the use of circuit simulation software and the interpretation of measured and simulated data based on principles of circuit analysis for DC, transient, and sinusoidal steady-state (AC) conditions as well as elementary circuit design, practical considerations such as component value tolerance and non-ideal aspects of laboratory instruments, the construction and measurement of basic operational amplifier circuits, and an introduction to fundamental semiconductor components such as diodes and transistors. Portions of instruction may be offered online; may also be offered fully online. [C-ID ENGR 260L]

Corequisite(s): ENGR 12
Credit transferable: Transfers to CSU & UC

ENGR 17 - Programming and Problem-Solving in MATLAB (3 units)
Letter Grade (LG) or Pass/No Pass (P/NP) • Total hours: 34 hours lecture; 51 hours lab
This course 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. Portions of instruction may be offered online; may also be offered fully online. [C-ID ENGR 220]

Prerequisite(s): MATH 20A
Advisory: Completion of or concurrent enrollment in ENGL C1000
Credit transferable: Transfers to CSU & UC