

ENGINEERING (ENGR)

ENGR 110 **2.0 UNITS**
Introduction to Engineering
 Class Hours: 2.0 Lecture
 Total Contact Hours: 36 Lecture

This course explores the branches of engineering, the functions of engineers, and the industries in which they work. It explains the engineering education pathways and explores effective strategies for students to reach their full academic potential. Methods and tools of engineering problem-solving and design are presented, including the interface of the engineer with society and engineering ethics. This course develops communication skills pertinent to the engineering profession.

Transfer Credit: CSU; UC
 C-ID: ENGR 110

ENGR 112 **3.0 UNITS**
Engineering Graphics
 Class Hours: 2.0 Lecture / 3.0 Laboratory
 Total Contact Hours: 36 Lecture / 54 Laboratory

Prerequisite: MATH 140 or equivalent with a grade of "C" or higher or "Pass."

This course covers the principles of the graphic language of the engineer expressed through sketching and instrument drawings covering orthographic projection, primary and secondary auxiliary views, dimensioning and tolerancing practices, and the working drawing. This course provides an introduction to computer-aided design (CAD) and 2D and 3D CAD sketching skills. The use of CAD software is an integral part of the course. Descriptive geometry methods will be introduced. This course is required of all engineering students.

Transfer Credit: CSU; UC
 C-ID: ENGR 150

ENGR 210 **4.5 UNITS**
Materials Science and Engineering
 Class Hours: 3.0 Lecture / 3.0 Laboratory
 Total Contact Hours: 54 Lecture / 54 Laboratory

Prerequisite: PHYS 201 and CHEM 111 or equivalent with a grade of "C" or higher or "Pass."

This course 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.

Transfer Credit: CSU; UC
 C-ID: ENGR 140B

ENGR 215 **3.0 UNITS**
Circuits
 Class Hours: 3.0 Lecture
 Total Contact Hours: 54 Lecture

Prerequisite: PHYS 202 or equivalent with a grade of "C" or higher or "Pass."

Corequisite: MATH 240 or MATH 250 or prior completion of MATH 240 or MATH 250 or equivalent with a grade of "C" or higher or "Pass"

This course includes the study of the fundamental principles essential to understanding electric circuits. These include Kirchhoff's laws, Ohm's law, network theorems, mesh and nodal analysis, Thevenin and Norton equivalents, inductors and capacitors, resistor capacitor and resistor coil circuits, and sinusoidal steady-state analysis and calculations.

Transfer Credit: CSU; UC
 C-ID: ENGR 260

ENGR 215L **1.0 UNITS**
Circuits Laboratory
 Class Hours: 3.0 Laboratory
 Total Contact Hours: 54 Laboratory

Prerequisite: ENGR 215 or equivalent with a grade of "C" or higher or "Pass" or concurrent enrollment.

This course is an introduction to the construction and measurement of electrical circuits. This includes basic use of circuit testing and measurement instruments (including multimeters, oscilloscopes, power supplies, and function generators); the 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; and the construction and measurement of basic operational-amplifier circuits. Practical considerations such as component-value tolerance and nonideal aspects of laboratory instruments will be addressed.

Transfer Credit: CSU; UC
 C-ID: ENGR 260L

ENGR 220 **3.0 UNITS**
Programming and Problem-Solving in MATLAB
 Class Hours: 2.0 Lecture / 3.0 Laboratory
 Total Contact Hours: 36 Lecture / 54 Laboratory

Prerequisite: Math 170 or equivalent with a grade of "C" or higher or "Pass".

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.

Transfer Credit: CSU; UC
 C-ID: ENGR 220

ENGR 235 **3.0 UNITS**
Statics
 Class Hours: 3.0 Lecture
 Total Contact Hours: 54 Lecture

Prerequisite: MATH 190 and PHYS 201 or equivalents with grades of "C" or higher or "Pass."

This course covers the part of the science of mechanics that deals with external force systems and equilibrium conditions on bodies.

Transfer Credit: CSU; UC
 C-ID: ENGR 130

ENGR 240

3.0 UNITS

Dynamics

Class Hours: 3.0 Lecture

Total Contact Hours: 54 Lecture

Prerequisite: ENGR 235 or equivalent with a grade of "C" or higher or "Pass".

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.

Transfer Credit: CSU; UC

C-ID: ENGR 230

ENGR 245

3.0 UNITS

Strength of Materials

Class Hours: 3.0 Lecture

Total Contact Hours: 54 Lecture

Prerequisite: ENGR 235 or equivalent with a grade of "C" or higher or "Pass".

This course is a study of stresses, strains and deformations associated with axial, torsional and flexural loading of bars, shafts and beams, as well as pressure loading of thin-walled pressure vessels. The course also covers stress and strain transformation, Mohr's Circle, ductile and brittle failure theories, and the buckling of columns. Statically indeterminate systems are also studied.

Transfer Credit: CSU; UC

C-ID: ENGR 240