

## Engineering

### ENGR 100 Introduction to Engineering

#### 1.0 unit

Acceptable for credit: Transfer to UC, CSU

Advisories: ENGL 514 - Writing Skills 4 or eligibility for ENGL 101

This course provides an overview of the engineering profession and educational path in order for students to evaluate engineering as a career choice. The course is also applicable for science, mathematics and architecture majors. The engineering branches are introduced, along with their relationships to science and other fields of study. The education process and strategies for engineering and science students to reach their full academic potential are explored. Course topics include professional duties, responsibilities, employment opportunities, the engineering design process and problem solving. Students will develop a study plan and research technical topics. Guest speakers include working engineers and university representatives. (Fall, Spring) (Letter Grade or Pass/No Pass)

### ENGR 124 Excel for Science and Engineering

#### 1.0 unit

Acceptable for credit: Transfer CSU

Prerequisite: MATH 181 - Calculus 1

An introduction to Excel as used in science and engineering. Students use math operations, functions, statistics and graphs to analyze and display data and to differentiate and integrate. Basic application problems are solved. (Fall) (Pass/No Pass)

### ENGR 126 MATLAB for Science and Engineering

#### 1.0 unit

Acceptable for credit: Transfer to UC, CSU

Prerequisite: MATH 181 - Calculus 1

An introduction to Matlab as used in science and engineering. Students create and manipulate matrices, program script, and m-files; generate 2-d and 3-d plots; and solve ODEs. Basic application problems are solved. (Spring) (Pass/No Pass)

### ENGR 152 Statics

#### 3.0 units

Acceptable for credit: Transfer to UC, CSU

C-ID Course Number: ENGR 130

Prerequisite: MATH 182 - Calculus 2 ; and PHYS 161 - Engineering Physics 1

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. (Fall) (Letter Grade Only)

### ENGR 154 Dynamics

#### 3.0 units

Acceptable for credit: Transfer to UC, CSU

C-ID Course Number: ENGR 230

Prerequisite: ENGR 152 - Statics ; and MATH 182 - Calculus 2

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). (Spring) (Letter Grade Only)

### ENGR 156 Strength of Materials

#### 4.0 units

Acceptable for credit: Transfer to UC, CSU

C-ID Course Number: ENGR 240

Prerequisite: ENGR 152 - Statics

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. (Spring) (Letter Grade Only)

### ENGR 161 Materials Science

#### 3.0 units

Acceptable for credit: Transfer to UC, CSU

C-ID Course Number: ENGR 140B

Advisories: concurrent enrollment in ENGR 162

Prerequisite: PHYS 161 - Engineering Physics 1 ; and CHEM 150 - General Chemistry 1

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. (Fall) (Letter Grade Only)

### ENGR 162 Materials Science Lab

#### 1.0 unit

Acceptable for credit: Transfer to UC, CSU

C-ID Course Number: ENGR 140B

Corequisite: ENGR 161 - Materials Science or prior completion of ENGR 161

Prerequisite: PHYS 161 - Engineering Physics 1 ; and CHEM 150 - General Chemistry 1

Laboratory to parallel ENGR 161. This course is the experimental exploration of the connections between the structure of materials and materials properties. Laboratories provide opportunities to directly observe the structures and behaviors discussed in the lecture course (ENGR 161), to operate testing equipment, to analyze experimental data, and to prepare reports. (Fall) (Letter Grade Only)

### ENGR 170 Electric Circuit Analysis

#### 3.0 units

Acceptable for credit: Transfer to UC, CSU

C-ID Course Number: ENGR 260

Advisories: concurrent enrollment in ENGR 171

Corequisite: MATH 184 - Linear Algebra/Differential Equations or previous completion.

Prerequisite: PHYS 163 - Engineering Physics 3

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. Most engineering majors are required to complete the associated course (ENGR 171); the laboratory course should be taken concurrently. (Spring) (Letter Grade Only)

### **ENGR 171 Electric Circuit Lab**

**1.0 unit**

Acceptable for credit: Transfer to UC, CSU

C-ID Course Number: ENGR 260L

Corequisite: MATH 184 - Linear Algebra/Differential Equations ;  
ENGR 170 - Electric Circuit Analysis or prior completion of ENGR 170

Prerequisite: PHYS 163 - Engineering Physics 3

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. The associated lecture course (ENGR 170) should be taken concurrently. (Spring) (Letter Grade Only)