

# ENGINEERING

## ENGINEERING (ENGR)

DIVISION: Natural Sciences

### ENGR 001A SURVEYING

**3 unit**

*Transfer Credit: CSU; UC*

*C-ID: ENGR 180*

**Prerequisite(s):** MATH 008 or MATH 009

Application of 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.

Total of 36 hours lecture and 54 hours laboratory.

**Grade Mode:** Audit, Letter Grade, Pass/No-Pass

### ENGR 002 ENGINEERING GRAPHICS

**3 unit**

*Transfer Credit: CSU; UC*

*C-ID: ENGR 150*

**Prerequisite(s):** MATH 008 OR MATH 009

Introduction to principles of engineering drawings in visually communicating engineering design and an introduction to computer-aided design (CAD). Engineering design projects with an emphasis on the development of visualization skills, orthographic projections, mechanical dimensioning and tolerancing practices, problem-solving, critical thinking, collaboration and communication across multiple industries, software and prototyping technologies. Total of 36 hours lecture and 54 hours laboratory.

**Grade Mode:** Audit, Letter Grade

### ENGR 010 INTRODUCTION TO ENGINEERING

**2 unit**

*Transfer Credit: CSU; UC*

*C-ID: ENGR 110*

Exploration of different branches of engineering, industries, and functions of an engineer. Explains the engineering education pathways and explores effective strategies for students to reach their full academic potential. Introduction to the methods and tools of engineering problem solving and design including the interface of the engineer with society and engineering ethics. Students will practice developing communication skills pertinent to the engineering profession. Total of 18 hours lecture and 54 hours laboratory.

**Grade Mode:** Audit, Letter Grade

### ENGR 011 STATICS

**3 unit**

*Transfer Credit: CSU; UC*

*C-ID: ENGR 130*

**Prerequisite(s):** MATH 005B or MATH 005BH and PHYS 001A or PHYS 008A

Introduction to engineering mechanics. Topics include: 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 moment diagrams, center of gravity, centroids, friction, and are and mass moments of inertia. No credit if taken after ENGR 015A. Total of 54 hours lecture.

**Grade Mode:** Audit, Letter Grade

### ENGR 012 DYNAMICS

**3 unit**

*Transfer Credit: CSU; UC*

*C-ID: ENGR 230*

**Prerequisite(s):** ENGR 011

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 which is optional for an introductory dynamics course. No credit if taken after ENGR 017. Total of 54 hours lecture.

**Grade Mode:** Audit, Letter Grade

### ENGR 013 STRENGTH OF MATERIALS

**3 unit**

*Transfer Credit: CSU; UC*

*C-ID: ENGR 240*

**Prerequisite(s):** ENGR 011

The study of mechanics of material. Topics include 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. Includes stress and strain transformation, Mohr's Circle, ductile and brittle failure theories, and the buckling of columns. Statically indeterminate systems are also studied. No credit if taken after ENGR 015B. Total of 54 hours lecture.

**Grade Mode:** Audit, Letter Grade

### ENGR 014 MATERIALS OF ENGINEERING

**3 unit**

*Transfer Credit: CSU, UC*

*C-ID: ENGR 140*

**Prerequisite(s):** CHEM 001A and either PHYS 001A or PHYS 008A

Presentation of the internal structures and resulting behaviors of materials used in engineering applications, including metals, ceramics, polymers, composites, and semiconductors. Emphasis on material selection to meet engineering design criteria. Determine the effects of heat, stress, imperfections, and chemical environments upon material properties and performance. No credit if taken after ENGR 015A. Total of 54 hours lecture.

**Grade Mode:** Audit, Letter Grade

**ENGR 015B APPLIED MECHANICS****3 unit***Transfer Credit: CSU; UC***Prerequisite(s):** MATH 005B

States of stress and strain; analysis and design of structural elements; pressure vessels, beams, torsion bars, springs, columns, riveted and welded connections; inelastic behavior; strength under combined loading; statically indeterminate structures. Total of 54 hours lecture.

**Grade Mode:** *Audit, Letter Grade***ENGR 016 ENGINEERING CIRCUITS****3 unit***Transfer Credit: CSU; UC**C-ID: ENGR 260***Prerequisite(s):** *PHYS 001C or PHYS 008B; enrollment in or completion of MATH 055 or MATH 055H*

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. Total of 54 hours lecture.

**Grade Mode:** *Audit, Letter Grade***ENGR 016L ENGINEERING CIRCUITS LABORATORY****1 unit***Transfer Credit: CSU; UC**C-ID: ENGR 260L***Prerequisite(s):** *Enrollment in or completion of ENGR 016*

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. Total of 54 hours laboratory.

**Grade Mode:** *Audit, Letter Grade***ENGR 018 PROGRAMMING AND PROBLEM-SOLVING IN MATLAB****3 unit***Transfer Credit: CSU; UC**C-ID: ENGR 220***Prerequisite(s):** *MATH 005A or MATH 005AH*

Introduction to numerical analysis, computational methods, computer programming, and problem-solving using MATLAB. Provides a working knowledge of the computer as a tool to solve engineering and scientific problems. Understanding of programming and problem-solving allowing use of these tools and techniques to extend MATLAB knowledge. Total of 36 hours lecture and 54 hours laboratory.

**Grade Mode:** *Audit, Letter Grade*