

# ENGINEERING (ENGR)

## ENGR A110 3 Units (54 lecture hours)

### Introduction to Engineering and Design

**Prerequisite(s):** MATH A010 or equivalent.

**Grading Mode:** Standard Letter, Pass/No Pass

**Transfer Credit:** CSU, UC.

This course is an introduction to the field of engineering and the engineering design. It explores various branches of engineering as regards to academic preparation, opportunities and career options. It explains the engineering education pathways and explores effective strategies for students to reach their academic potential. Emphasis is also on the realization of the regional and global problems of engineering nature and the methods to find responsible solutions. Students are introduced to the applied engineering concepts, methods and tools of problem solving and the engineering design process. Activities also include engineering design projects. Other topics include engineering ethics, professional and legal responsibilities of engineers as a member of the society, understanding of the global challenges and the engineer's role and responsibilities in finding possible solutions. **C-ID:** ENGR 110.

## ENGR A110H 3 Units (54 lecture hours)

### Introduction to Engineering and Design Honors

**Prerequisite(s):** MATH A010 or equivalent.

**Grading Mode:** Standard Letter, Pass/No Pass

**Transfer Credit:** CSU.

This course is an introduction to the field of engineering and the engineering design. It explores various branches of engineering in regards to academic preparation, opportunities and career options. It explains the engineering education pathways and explores effective strategies for students to reach their academic potential. Emphasis is also on the realization of the regional and global problems of engineering nature and the methods to find responsible solutions. Students are introduced to the applied engineering concepts, methods and tools of problem-solving and the engineering design process. Activities also include engineering design projects. Other topics include engineering ethics, professional and legal responsibilities of engineers as a member of the society, understanding of the global challenges and the engineer's role and responsibilities in finding possible solutions.

## ENGR A180 4 Units (54 lecture hours; 72 lab hours)

### Engineering Graphics

**Prerequisite(s):** MATH A120.

**Grading Mode:** Standard Letter

**Transfer Credit:** CSU; UC.

This course covers the fundamentals of the graphic communication necessary for engineering design. Freehand sketching and Computer-Aided Design (CAD) are the main techniques utilized in this course. 2-D and 3-D visualization skills are developed through the analysis and practice of orthographic projections, principle of descriptive geometry, geometric dimensioning and tolerancing, working drawings and engineering design process. **C-ID:** ENGR 150.

## ENGR A199 0.5-5 Units (9-72 lecture hours; 0-54 lab hours)

### Current Topics in Engineering

**Grading Mode:** Standard Letter, Pass/No Pass

**Transfer Credit:** CSU.

Current topics in Engineering may include cultural topics as well as engineering topics and could rotate through a variety of topics, such as field studies, design/build projects, design studies, and construction studies. May be taken for grades or on a pass-no pass basis.

## ENGR A210 3 Units (54 lecture hours)

### Engineering Materials

**Prerequisite(s):** CHEM A180 and PHYS A185 or PHYS A185H.

**Grading Mode:** Standard Letter

**Transfer Credit:** CSU, UC.

This is an introductory course emphasizing the understanding of the structure and properties of the materials, and the design and selection of materials for engineering applications. Studies include analysis of ferrous and non-ferrous metals, ceramics, polymers, composites and semiconductors. Emphasis is on micro and macro structure, relationship between the structure and properties of materials, and effect of heat, stress, imperfections and chemical environments on material structure, properties and performance. Topics also include mechanical, thermal, electrical (including semiconductors), magnetic and optical properties and also corrosion and degradation of materials. **C-ID:** ENGR 140.

## ENGR A220 4 Units (54 lecture hours; 54 lab hours)

### Programming and Problem-Solving in MATLAB

**Prerequisite(s):** MATH A180 or MATH A180H.

**Grading Mode:** Standard Letter

**Transfer Credit:** CSU; UC.

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. **C-ID:** ENGR 220.

## ENGR A230 3 Units (54 lecture hours)

### Dynamics

**Prerequisite(s):** ENGR A280.

**Grading Mode:** Standard Letter, Pass/No Pass

**Transfer Credit:** CSU, UC.

This course is an introduction to kinematics and kinetics of particles and rigid bodies. Vector analysis and calculus are used extensively as the tool to describe the motion of the systems and also to study the kinetics of particles and rigid bodies. Topics involved are the geometry of the motion (kinematics), and the methods of analysis, which include second law of motion, work-energy and momentum-impulse methods as applied to particles, system of particles and the rigid bodies. The mechanical vibration of particles and the rigid bodies are also studied in detail. It includes free and forced vibration, with and without damping. **C-ID:** ENGR 230.

**ENGR A240** **3 Units (54 lecture hours)**

**Mechanics of Materials**

**Prerequisite(s):** ENGR A280.

**Grading Mode:** Standard Letter, Pass/No Pass

**Transfer Credit:** CSU, UC.

This course provides the engineering students with the means of analyzing and designing various structures and machines subjected to different loading conditions. Students develop the techniques of stress and strain analysis of the systems under axial, torsional, transverse loading and pure bending. It also includes the major topics of design of the beams, shafts and the columns. Analysis of systems using energy method, and deflection of beams by integration and moment-area methods are also introduced. **C-ID:** ENGR 240.

**ENGR A280** **3 Units (54 lecture hours)**

**Statics**

**Prerequisite(s):** MATH A185 or MATH A185H or MATH A182H; and PHYS A185 or PHYS A185H.

**Grading Mode:** Standard Letter

**Transfer Credit:** CSU; UC.

Vector mechanics, covering force diagrams, moment of forces and couples, two- and three-dimensional force systems, analysis of engineering structures at equilibrium (e.g. trusses and beams), distributed force, centroids and center of gravity, shear and bending moment diagrams, friction, are and mass moments of inertia. **C-ID:** ENGR 130.

**ENGR A285** **4 Units (54 lecture hours; 54 lab hours)**

**Engineering Circuits**

**Prerequisite(s):** MATH A285 or MATH A285H (or concurrent enrollment); and PHYS A280.

**Grading Mode:** Standard Letter

**Transfer Credit:** CSU; UC.

Analysis of electric circuits, including DC circuits, network theorems, energy sources, transient analysis, sinusoidal analysis, phasors, AC power, and frequency response of circuits. Lab will include connection of circuits and observation of circuit behavior using electronic instrumentation.