

## ENGR - Engineering Courses

### ENGR B17 Introduction to Electrical Circuits

3 units

**Prerequisites:** Successful completion of PHYS B4B or equivalent with a grade of C or better.

**Corequisite:** Math B6D with a grade of 'C' or better, or may be taken concurrently.

**Description:** Principles and techniques of D.C. and A.C. circuit analysis, including Kirchhoff's laws, mesh and nodal analysis, Thevenin's and Norton's theorems, impedance, phasors, frequency response, power calculations, natural and forced responses, analog building blocks, operational amplifiers, and Laplace transforms.

**Hours:** 54 lecture

**Transferable:** CSU, UC, and private colleges

### ENGR B17L Electric Circuit Lab

1 unit

**Prerequisites:** Successful completion of ENGR B17 or equivalent with a grade of C or better or may be taken concurrently.

**Description:** 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 lab instruments. Construction and measurement of basic operational amplifier circuits.

**Hours:** 54 lab

**Transferable:** CSU, UC, and private colleges

### ENGR B19C Introduction to Programming Concepts and Methodologies for Engineers

4 units

**Prerequisites:** Successful completion of MATH B1B or equivalent with a grade of C or better.

**Description:** The purpose of this course is expose students to (1) the fundamental concepts of procedure oriented programming, (2) associated abstraction mechanisms and design processes, (3) the interface of software with the physical world (e.g., the use of sensors), and (4) the application of programming concepts to numerical analysis techniques. This course utilizes the C/C++ programming language.

**Hours:** 54 lecture, 54 lab

**Transferable:** CSU, UC, and private colleges

### ENGR B20 Programming and Problem-Solving in MATLAB

3 units

**Prerequisites:** Successful completion of MATH B6A with a grade of C or better.

**Description:** 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.

**Hours:** 36 lecture, 54 lab

**Transferable:** CSU transferable. Degree applicable.

### ENGR B24 Engineering Graphics and Descriptive Geometry

3 units

**Prerequisites:** BC placement into math level 06 or successful completion of MATH B1B with a grade of C or better or evidence of prior coursework in Trigonometry, including High School Math Analysis with a grade of C or better.

**Description:** This course covers the principles of engineering drawings in visually communicating engineering designs and an introduction to 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.

**Hours:** 36 lecture, 54 lab

**Transferable:** CSU, UC, and private colleges

### ENGR B36 Engineering Mechanics-Statics

3 units

**Prerequisites:** Successful completion of MATH B6B and PHYS B4A or equivalent with a grade of C or better.

**Description:** 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.

**Hours:** 54 lecture

**Transferable:** CSU, UC, and private colleges

### ENGR B37 Engineering Mechanics-Dynamics

3 units

**Prerequisites:** Successful completion of ENGR B36 or equivalent with a grade of C or better.

**Description:** Fundamental principles of motions of particles and rigid bodies and their application to engineering problems. Velocity, acceleration, relative motion, work, energy, impulse and momentum. Mathematical modeling and analysis of mechanical systems.

**Hours:** 54 lecture

**C-ID:** ENGR 230

**Transferable:** CSU, UC, and private colleges

### ENGR B40 Surveying

3 units

**Prerequisites:** Successful completion of MATH B1B or equivalent with a grade of C or better or High School Geometry or Trigonometry with a grade of C or better or evaluation by instructor.

**Description:** The course applies 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.

**Hours:** 36 lecture, 54 lab

**Transferable:** CSU, UC, and private colleges

**ENGR B45 Properties of Materials**

4 units

**Prerequisites:** Successful completion of CHEM B1A and PHYS B4A or equivalent with a grade of C or better.

**Description:** Internal structure of engineering materials. Characteristics of single and multiple phase metals; polymers, ceramics and composite materials. Mechanical, thermal, chemical and electrical behavior of engineering materials. Lab investigation of the physical properties of metals, wood, soils, concrete, and polymers.

**Hours:** 54 lecture, 54 lab

**Transferable:** CSU, UC, and private colleges

**ENGR B47 Introduction to Engineering and Design**

2 units

**Description:** Introduction to the engineering profession and the engineering design process. Explores the branches of engineering, the functions of an engineer, and the industries in which engineers work. Explains the engineering education pathways and explores the effective strategies for students to reach their full academic potential. 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. Develops communication skills pertinent to the engineering profession.

**C-ID:** ENGR 110

**Hours:** 18 lecture, 54 lab

**Transferable:** CSU, UC, and private colleges