

# ENGINEERING

Engineering: Turning Ideas into Reality!

Engineers apply mathematics, science and experience to create new machines, devices, systems, structures, materials and processes that have never existed before. Engineering students learn to identify, formulate, and solve math, science, and engineering problems; to design and conduct experiments, and to analyze and interpret data.

A baccalaureate degree in engineering is the entry point into professional engineering practice. Engineers work for public or private entities in civil engineering, mechanical engineering, electrical engineering and computer engineering. Baccalaureate engineers also go on to earn advanced graduate degrees (Master's and PhD) in all engineering fields.

## Contact Information

### Engineering Faculty Contact

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### Mathematics and Engineering Division Chair

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## Associate Degree

- Associate of Science in Engineering (AS) (<https://catalog.cos.edu/areas-study/engineering/associate-science-engineering-transfer-as/>)

For a complete list of courses and descriptions visit: COURSES (<https://catalog.cos.edu/course-descriptions/>)

### ENGR 001 Engineering Graphics 4unit(s)

Hours: 3 Lecture/Discussion Hours:  
3 Lab

This course covers the principles of engineering drawings in visually communicating engineering designs and includes 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. (C-ID: ENGR 150)  
**Prerequisites:** MATH 054 or equivalent college course with a minimum grade of C.

### ENGR 002 Statics 3unit(s)

Hours: 3 Lecture/Discussion

The study of two- and three-dimensional force systems acting on particles and rigid bodies in static equilibrium. Included are analysis of distributed forces, trusses, beams, frames and machines, shear and bending moment diagrams, center of mass, centroids, friction and moments of inertia. Additional topics may include fluid statics, forces in cables, Mohr's circle and virtual work. (C-ID: ENGR 130)

**Prerequisites:** PHYS 055 and MATH 067 (may be taken concurrently) or equivalent college courses with a minimum grade of C.

### ENGR 003 Materials Science and Engineering 4unit(s)

Hours: 3 Lecture/Discussion Hours:  
3 Lab

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. (C-ID: ENGR140B)

**Prerequisites:** CHEM 001 and PHYS 055 or equivalent college course with a minimum grade of C.

### ENGR 004 Circuit Analysis 4unit(s)

Hours: 3 Lecture/Discussion Hours:  
3 Lab

An introduction to the analysis of electrical circuits using analytical techniques based on the application of circuit laws and network theorems. Topics include the 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 in AC analysis; AC power calculations; power transfer; and energy concepts. The laboratory portion of the course provides an introduction to the construction and measurement of electrical circuits including: the basic use of electrical test and measurement instruments such as 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; practical considerations such as component value tolerance and non-ideal aspects of laboratory instruments; and construction and measurement of basic operational amplifier circuits. (C-ID: ENGR260 and ENGR260L)

**Prerequisites:** MATH 081 (may be taken concurrently) and PHYS 056 (may be taken concurrently) or equivalent college course with a minimum grade of C.

**ENGR 020 MATLAB Programming**

**3unit(s)**

Hours: 2 Lecture/Discussion Hours:  
3 Lab

***Equivalent Course: CSCI 020***

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)

**Prerequisites:** MATH 065 or equivalent college course with a minimum grade of C.

**ENGR 110 Introduction to Engineering**

**2unit(s)**

Hours: 2 Lecture/Discussion

This course explores the branches of engineering, the functions of an engineer, and the industries in which engineers work. Explains the engineering education pathways and explores 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 ENGR110)

## **Engineering**

Allen, Dillon

B.S., University of California, Santa Barbara

M.S., Johns Hopkins University