

ENGINEERING

DIVISION: Natural Sciences

Prepare for the high pay, high demand, high tech careers of the future. Our various certificate programs will teach you the foundational skills of engineering, with each program leading to a variety of dynamic professional careers. Additionally, through our Associate degree program, you can prepare to transfer and study complex engineering at the university level.

- Engineering & Technology – Associate in Science Degree (<https://curriculum.pasadena.edu/academic-programs/engineering/engineering-technology-as/>)
- Engineering: Civil Engineering Emphasis - Associate in Science Degree (<https://curriculum.pasadena.edu/academic-programs/engineering/engineering-civil-engineering-emphasis-as/>)
- Engineering: Electrical Engineering Emphasis - Associate in Science Degree (<https://curriculum.pasadena.edu/academic-programs/engineering/engineering-electrical-engineering-emphasis-as/>)
- Engineering: Mechanical, Aerospace, and Manufacturing Engineering Emphasis - Associate in Science Degree (<https://curriculum.pasadena.edu/academic-programs/engineering/engineering-mechanical-aerospace-manufacturing-engineering-emphasis-as/>)
- Manufacturing Engineering Technician – Certificate of Achievement (<https://curriculum.pasadena.edu/academic-programs/engineering/manufacturing-engineering-technician-cert-achievement/>)
- Mechanical Engineering Technician – Certificate of Achievement (<https://curriculum.pasadena.edu/academic-programs/engineering/mechanical-engineering-technician-cert-achievement/>)

Courses

ENGR 001A SURVEYING

3 unit

Transfer Credit: CSU; UC

Prerequisite(s): MATH 007A

Introduction to the field of Surveying to fulfill engineering transfer credit and provide career exploration to entry level occupation in the field. Topics covered includes both optical and electronic instruments, distance measurements, stadia surveys, leveling and traversing using optical instruments, electronic distance measuring instruments and total stations. Total 36 hours lecture and 54 hours laboratory.

Grade Mode: Audit, Letter Grade

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 and PHYS 001A

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 CONSTRUCTION

3 unit

Transfer Credit: CSU

Prerequisite(s): CHEM 001A

Physical properties of engineering materials; their reactions to conditions encountered in various uses; processes by which they are produced and treated. 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

Prerequisite(s): MATH 005B

Mesh and nodal analysis of electric circuits using Ohm's and Kirchhoff's Laws; Thevenin and Norton Theorems; superposition; transient analysis of RL and RC circuits; steady state analysis of AC circuits; analysis of passive two-port networks; polyphase circuits. Total of 54 hours lecture.

Grade Mode: *Audit, Letter Grade*

ENGR 018 INTRODUCTION TO NUMERICAL ANALYSIS

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*