

ENGINEERING (ENGR)

UC credit limit: all CADD courses, ENGR 119, ENGR 129, OH 200, OH 201 combined: maximum credit, one course

ENGR-100

Introduction to Engineering and Design

4 UNITS

3.0 hours lecture, 3.0 hours laboratory

Introduction to engineering as a way of perceiving the world. Overview of design and analytical techniques, problem solving and strategic thinking. Introduction to engineering as a way of perceiving the world. Overview of design and analytical techniques, problem solving and strategic thinking, disciplines, and ethics. Fundamentals of engineering graphics as a universal language and application to the visualization, representation, and documentation of designed artifacts, including orthographic projections, pictorial, section, and detail views; creation of basic to intermediate solid parts and assemblies; dimensioning and tolerancing practices; thread notation per ASME Y14.5M-1994. This course covers the principles of engineering drawings in visually communicating engineering designs, and an introduction to solid modeling and computer-aided design (CAD). Assignments develop technical sketching and 2D and 3D CAD skills. The use of solid modeling CAD software (SolidWorks and Creo Parametric) is an integral part of the course, as is the production of physical prototypes using 3D printing and other techniques. This course focuses on the design process and on spatial reasoning and visualization. (C-ID ENGR 110) (CSU/UC) (AA/AS-A2)

ENGR-103

Environmental Engineering Seminar

3 UNITS

3.0 hours lecture

Exploring the breadth and depth of environmental engineering field through presentations by invited faculty, guests, and seminar enrollees; includes individual library/internet research with written and oral presentations on selected environmental topics. (CSU)

ENGR-119

Basic Engineering CAD

3 UNITS

Prerequisite: "C" grade or higher or "Pass" in CADD 115 or ENGR 100 or equivalent

Recommended Preparation: Working knowledge of basic computer operations and file administration

2.0 hours lecture, 4.0 hours laboratory

CAD (Computer-Aided Drafting) fundamentals for engineers. Basic drawing techniques and commands in AutoCAD. Includes geometric construction, multiview and singleview projections, section views, dimensions, and text. Not open to students with credit in CADD 120, 120ABCD. (CSU/UC)

ENGR-120

Engineering Computer Applications

3 UNITS

Prerequisite: "C" grade or higher or "Pass" in MATH 180 or equivalent or concurrent enrollment

2.0 hours lecture, 3.0 hours laboratory

Use of computerized mathematical analysis, computer programming, and computer graphics as tools for solving engineering problems. (CSU/UC)

ENGR-125

Solid Modeling Design

3 UNITS

Prerequisite: "C" grade or higher or "Pass" in CADD 115 or ENGR 100 or equivalent

Recommended Preparation: Working knowledge of basic computer operations and file administration

2.0 hours lecture, 4.0 hours laboratory

This is advanced graphic communication course using solid modeling techniques. This course covers feature based solid part construction including extrudes, cuts and revolves; advanced surface shaping using lofts and sweeps. This also covers assembly construction and constraining in an engineering design environment. Students learn how to produce technical/engineering drawing including proper layout of component drawing views, sectioning and detailing. Threads and fasteners are also included in this course. Dimensioning and tolerancing will be taught in accordance with ANSI standard. Introduction to 3D printing technology (aka Additive Manufacturing) is part of this course. SolidWorks software is used throughout the course. Also listed as CADD 125. Not open to students with credit in CADD 125. (CSU/UC)

ENGR-129

Engineering Solid Modeling

3 UNITS

Prerequisite: "C" grade or higher or "Pass" in CADD 115 or ENGR 100 or equivalent

2.0 hours lecture, 4.0 hours laboratory

Advanced 3D computer-aided mechanical design and drafting. This parametric modeling course provides skills and knowledge of appropriate software and feature based part construction using extrudes, cuts, revolves, lofts and sweeps. Students will enhance their skills in sheet metal design as well as model assembly and assembly drawings including proper organization and layout of component drawing views, dimensioning and tolerancing, sectioning and detailing. 3D printing technology (additive manufacturing) is integrated to this course. Also listed as CADD 129. Not open to students with credit in CADD 129. (CSU/UC)

ENGR-182

Work Experience in Engineering Technology

1-3 UNITS

Prerequisite: Completion of a minimum of 10 units in an engineering technology program (e.g., CADD Technology, Mechatronics) and recommendation from engineering or CADD instructor. Must meet state guidelines for work experience.

Students who are employed in the engineering technology industry full-time or part-time (paid or unpaid) and able to work the minimum required hours during the semester are eligible to enroll in this course. Assessment of student will be performed by instructor in discussion with appropriate supervisor at place of employment. Students will further develop skills attained in the classroom setting. Preregistration counseling with the instructor is required. Occupational cooperative work experience may accrue at the rate of one to eight units per semester for a total of sixteen units, and students must work 75 paid hours or 60 non-paid hours per unit earned. 75 hours paid or 60 hours non-paid work experience per unit, 1-3 units. (CSU)

ENGR-199

Special Studies or Projects in Engineering

1-3 UNITS

Prerequisite: Consent of instructor

Individual study, research or projects under instructor guidance. Written reports and periodic conferences required. Content and unit credit to be determined by student/instructor conferences and the Office of Instruction. May be repeated with different content for a maximum of 9 units. 48-54 hours (1 unit), 96-108 hours (2 units), 144-162 hours (3 units).

ENGR-200**Engineering Mechanics-Statics****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in PHYC 201 or equivalent

Corequisite: MATH 280 or previous enrollment

3.0 hours lecture

Engineering applications of the principles of static equilibrium of force systems acting on particles and rigid bodies; structural analysis of trusses, frames, and machines; forces in beams; dry friction; centroids and moments of inertia. (CSU/UC)

ENGR-210**Electric Circuits****4 UNITS**

Prerequisite: "C" grade or higher or "Pass" in MATH 280, PHYC 202 or equivalent

3.0 hours lecture, 3.0 hours laboratory

Fundamentals of electrical circuits for engineers. Includes both DC and AC analysis. Concepts include Kirchhoff's laws, nodal and mesh analysis, linearity and superposition, Thevenin's theorem, ideal and real operational amplifiers, step response of first and second order RLC circuits, complex impedance, steady-state sinusoidal AC circuits, and AC power. Laboratory work supports the theory, and introduces basic lab practices and tools (e.g., oscilloscopes and signal generators). (CSU/UC)

ENGR-218**Plane Surveying****4 UNITS**

Prerequisite: "C" grade or higher or "Pass" in MATH 170 or MATH 176, or equivalent or concurrent enrollment

2.0 hours lecture, 6.0 hours laboratory

Use, care and adjustment of surveying instruments. Fundamental surveying methods, traverse measurements, and area computations. Introduction to horizontal and vertical curves, stadia, and construction layout. Introduction to topographic mapping. Earth work computations. Also listed as SURV 218. Not open to students with credit in SURV 218. (CSU/UC)

ENGR-220**Engineering Mechanics-Dynamics****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in ENGR 200 or equivalent

3.0 hours lecture

Motion of particles, particle systems and rigid bodies, and the effects thereon of applied forces and moments. Newtonian laws of motion, work and energy; linear and angular momentum. Application to engineering problems. (C-ID ENGR 230) (CSU/UC)

ENGR-225**Mechanics for Civil Engineers****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in MATH 180 and PHYC 201 (for engineering focus) or PHYC 130 (for non-engineering focus) or equivalent

Recommended Preparation: Review of materials covered in the prerequisite for the course

3.0 hours lecture

Engineering applications of the principles of static equilibrium of force systems acting on particles and rigid bodies; structural analysis of trusses, frames, and machines; forces in beams; centroids and moments of inertia; kinematics and Newtonian laws of motion for particles. (CSU/UC)

ENGR-230**Basics of Mechatronics****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in MATH-280 and PHYC-202, or equivalent

2.0 hours lecture, 3.0 hours laboratory

Introductory mechatronics. Basic DC and AC circuits, breadboarding, capacitors, inductors, circuit components, integrated circuit amplifiers, filters, with applications to mechanical engineering. Ohm's Law. Laboratory topics include measurement techniques using function generator, multimeter, oscilloscope, and computer simulation using circuit analysis software. (CSU)

ENGR-260**Engineering Materials****3 UNITS**

Prerequisite: "C" grade or higher or "Pass" in PHYC 201 or equivalent

Corequisite: CHEM 141 or previous enrollment

3.0 hours lecture

Atomic and molecular structure of materials used in engineering. Analysis of the relationships between structure of materials and their mechanical, thermal, electrical, corrosion and radiation properties, together with examples of specific application to engineering problems. (CSU/UC)

ENGR-261**Materials Laboratory****1 UNITS**

Corequisite: ENGR 260

3.0 hours laboratory

Experimental methods used to characterize engineering materials and their mechanical behavior. Students will use a variety of material testing equipment to gain hands-on experience testing for materials properties and exploring the mechanical behaviors of materials. (CSU)

ENGR-270**Digital Design****4 UNITS**

Prerequisite: "C" grade or higher or "Pass" in MATH 175 or 176 or equivalent

3.0 hours lecture, 3.0 hours laboratory

Modeling, analysis, simulation, design and construction of combinational and sequential digital logic systems and networks. (CSU/UC)