

Engr Courses - 2023-2024 Catalog

Engineering (ENGR)

ENGR 012

Civil/Architectural Blueprint Reading

Unit(s): 2.0 Class Hours: 36.0 Lecture total.

Reading and interpreting blueprints for civil engineering, architecture, and construction fields. No prior blueprint reading experience is needed. Course provides preparation for more advanced civil and architectural drafting coursework.

ENGR 051

Introduction to Drafting and CAD

Unit(s): 0.5 Class Hours: 9.0 Lecture total.

Introductory course on civil, mechanical, and electrical drafting. Topics include: drafting careers, reading and creating basic engineering drawings (modeling, dimensioning, annotations) using industry-standard CAD software (such as AutoCAD and Solidworks). Course is an appropriate starting course for students with no drafting or CAD experience and are interested in the fields. Course provides direction for continuing drafting coursework.

ENGR 060

Robotics Survey

Unit(s): 0.5 Class Hours: 9.0 Lecture total.

This course introduces students to basic robotics. Students will program a robot to receive sensor input, control motors, and produce behaviors. Course provides student exposure to robotics, which now plays a major role in modern manufacturing and industrial automation.

(Pass/No Pass Only)

ENGR 100A (C-ID ENGR 110)

Introduction to Engineering

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

The 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.

CSU/UC

ENGR 100B

Introduction to Civil Engineering

Unit(s): 2.0 Class Hours: 36.0 Lecture total.

Introduction to the Civil Engineering and the related fields of architecture and construction. Includes an overview of academic programs, career information and preparation requirements, possible field trips and guest speakers.

CSU

ENGR 101

Programming Survey

Unit(s): 0.5 Class Hours: 9.0 Lecture total.

This survey course introduces students to C++ programming language. Students will code, compile and execute programs that control hardware. Students will be learning the input-process-output (IPO) model, a widely used approach in systems analysis and software engineering, that receives inputs from a user or other source, does computations on the inputs, and returns the results of the computations. (same as CMPR-101)

CSU/UC

ENGR 103

Solidworks Beginning Solid Modeling

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Introductory course in parametric solid modeling using Solidworks, an industry standard engineering design software (CAD). This course will include a solid modeling overview, solid model construction techniques (extrude, revolve, fillet, chamfer, etc.), including the preparation of individual solid components and basic solid model assemblies (Same as Manufacturing Technology 103).

CSU

ENGR 104

Solidworks Intermediate Solid Modeling

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: ENGR 103, MNFG 103; Intermediate course for solid modeling using Solidworks, an industry standard engineering design software (CAD). Includes a review of the introductory class and changes to the Solidworks interface. Instruction in the use of intermediate Solidworks part modeling skills such as assembly modeling and sub-assemblies is included (Same as Manufacturing Technology 104).

CSU

ENGR 105

Solidworks Advanced Solid Modeling

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: ENGR 104, MNFG 104; Advanced course for solid modeling includes a review of the intermediate class and changes to the Solidworks interface. Instruction in the use of Solidworks part modeling, assembly modeling, sub-assemblies, advanced photoworks and advanced animator emphasized (Same as Manufacturing Technology 105).

CSU

ENGR 111

Basic Mechanical Blueprint Reading

Unit(s): 2.0 Class Hours: 36.0 Lecture total.

Reading and interpreting blueprints for manufacturing technologies (Same as Manufacturing Technology 111.)

CSU

ENGR 114

Geometric Dimensioning and Tolerancing

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Drawing interpretation utilizing geometric dimensioning and tolerancing per ASME Y14.5M (formerly ANSI Y14.5M) as applied in engineering, manufacturing, and inspection. Suggested preparation: prior course or experience in drafting with conventional dimensioning and tolerancing. (Same as Manufacturing Technology 114)

CSU

ENGR 115**Cooperative Work Experience Education-Occupational**

Unit(s): 1.0-4.0 Class Hours: 60.0-300.0 Lab total.

This work experience course of supervised employment is designed to assist students to acquire desirable work habits, attitudes and skills in a field related to the students' major so as to enable them to become productive employees. This course also provides students with career awareness for jobs. 75 hours of paid work or 60 hours of un-paid work equals one unit of course credit. Student repetition is allowed per Title 5, Section 55253.

(Pass/No Pass Only) CSU

ENGR 118 (C-ID ENGR 180)**Surveying**

Unit(s): 3.0 Class Hours: 36.0 Lecture, 54.0 Lab total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: MATH 162, or MATH 170, transcribed high school trigonometry or pre-calculus;

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. Field work using tapes, levels, transits, theodolites, total stations, and GPS.

CSU/UC

ENGR 119**Advanced Plane Surveying**

Unit(s): 3.0 Class Hours: 36.0 Lecture, 54.0 Lab total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: ENGR 118, Instructor may waive if student can show proof of industry experience in surveying equal to or greater than ENGR 118.;

A second course in surveying with emphasis on coordinate geometry calculations. Topics include: route surveying with horizontal and vertical curves, topographic surveying and mapping, construction surveying, introduction to geospatial technologies, boundary surveying and surveys of public lands. Field surveying projects. Completion of Engr 118 and 119 assists in passing the land-surveyor-in-training (LSIT) exam.

CSU/UC

ENGR 122**Engineering Drawing**

Unit(s): 3.0 Class Hours: 45.0 Lecture, 27.0 Lab total.

Principles of engineering drawing: projections, views, sections, dimensions, tolerancing, assemblies, manufacturing processes, engineering drafting practices. Utilizing 2D CAD and 3D solid modeling CAD software. Suggested preparation: prior course or experience in drafting and CAD.

CSU/UC

ENGR 125 (C-ID ENGR 150)**Engineering Graphics**

Unit(s): 3.0 Class Hours: 45.0 Lecture, 27.0 Lab total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: MATH 162;

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; the engineering design process. Assignments develop sketching skills for 2-D and 3-D CAD. The use of CAD software is an integral part of the course. Suggested preparation: prior course or experience with drafting and CAD.

CSU/UC

ENGR 131**Introduction to Mechatronics**

Unit(s): 0.5 Class Hours: 9.0 Lecture total.

Course provides exposure to micro-controllers and rapid-prototyping technologies used in mechatronics and engineering. Course provides a good introduction to the Engineering Mechatronics program.

CSU

ENGR 132**Introduction to Robotics**

Unit(s): 2.0 Class Hours: 36.0 Lecture total.

Introductory course in robotics. Topics include: basic design, sensors, actuators, circuits, programming, micro-controllers, and a hands-on robot construction project.

CSU

ENGR 133**Mechatronics I**

Unit(s): 3.0 Class Hours: 45.0 Lecture, 27.0 Lab total.

A first course in mechatronics. Topics emphasize hands-on work and include: solid modeling design, micro-controllers and programming, rapid prototype fabrication, testing, measurement, actuators, sensors, and basic electronics. Prior experience with Solidworks, Arduino, and basic algebra is suggested but not required.

CSU

ENGR 134**Mechatronics II**

Unit(s): 3.0 Class Hours: 45.0 Lecture, 27.0 Lab total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: ENGR 133;

A second course in mechatronics. Topics emphasize hands-on work and include: solid-modeling design, rapid prototype fabrication, testing, measurement, micro-controllers, programming, industrial robotics, and PLC control. Prior experience or coursework in Solidworks, Arduino, and basic algebra is strongly suggested.

CSU

ENGR 154**Revit and Civil Drafting**

Unit(s): 4.0 Class Hours: 72.0 Lecture total.

Course introduces Autodesk Revit, a 3D parametric CAD software that is an industry standard for architectural/civil design. Topics include 3D modeling, design, drawing creation, and BIM (building information modeling) concepts. Course also teaches creation of industry-standard drawings in civil engineering, architecture, and construction using industry-standard CAD software (AutoCAD, Civil 3D, and Revit). Topics include - views, line types, projection, annotations, and callouts. Prior course or experience with AutoCAD (e.g., Engr 183) and drafting is strongly suggested.

CSU

ENGR 158**Basic Machining Concepts and Operations**

Unit(s): 3.0 Class Hours: 18.0 Lecture, 126.0 Lab total.

Fundamental operations on lathes, milling machines, grinders, and drill presses, including precision measurements and layout. Equips students with skills and theory necessary to enter or upgrade within the machinist trade. (Same as Manufacturing Technology 158).

CSU

ENGR 183
AutoCAD I

Unit(s): 4.0 Class Hours: 72.0 Lecture total.

A first course in AutoCAD by Autodesk, an industry standard engineering CAD software, especially in the civil and architectural fields. Topics include display and file management, units, entities, object selection, advanced editing, layers, dimensions, text, and graphic exchange. CSU/UC

ENGR 184
AutoCAD II

Unit(s): 4.0 Class Hours: 72.0 Lecture total.

A second course in Autodesk AutoCAD, an industry standard engineering CAD software, especially in the civil and architectural fields. Topics include: advanced dimensioning, viewports, hatches, blocks, plotting, attributes, inquiry, intermediate apps, working drawings, introduction to 3D CAD. Suggested preparation: prior course or experience with AutoCAD. CSU

ENGR 185
Civil 3D

Unit(s): 4.0 Class Hours: 72.0 Lecture total.

Course teaches Autodesk Civil 3D – an industry standard CAD software for civil engineers. Topics include advanced modeling, model merging, project management, parcels, surveys, surfaces, alignments, profiles, 3D rendering, and presentation. Prior coursework or experience with AutoCAD is strongly suggested. CSU

ENGR 235 (C-ID ENGR 130)
Statics

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: PHYS 217, MATH 185;
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. Utilizes SI metrics. CSU/UC

ENGR 240 (C-ID ENGR 230)
Dynamics

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: ENGR 235;
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. CSU/UC

ENGR 250
Electric Circuits

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Corequisite: Completion with a grade of "C" or better or a Passing grade or Concurrent enrollment in: MATH 280, PHYS 227;
Corequisite: Concurrent enrollment in: (both may be taken previously or concurrently);
An introduction to the analysis of electrical circuits. Use of analytical techniques based on the application of circuit laws and network theorems. 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; AC power calculations; power transfer; and energy concepts. CSU/UC

ENGR 250L
Electric Circuits Laboratory

Unit(s): 1.0 Class Hours: 54.0 Lab total.

Corequisite: Concurrent enrollment in: ENGR 250;
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. Interpretation of measured data under DC, transient, and sinusoidal steady-state (AC) conditions. CSU/UC

ENGR 280 (C-ID ENGR 240)
Strength of Materials

Unit(s): 3.0 Class Hours: 54.0 Lecture total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: ENGR 235;
This course is a study of 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. The course also covers stress and strain transformation, Mohr's Circle, ductile and brittle failure theories, and the buckling of columns. Statically indeterminate systems are also studied. CSU/UC

English (ENGL)

ENGL 061
Introduction to Composition

Unit(s): 4.0 Class Hours: 72.0 Lecture total.

Prerequisite: Completion with a grade of "C" or better or a Passing grade in: Qualifying profile from English placement process.;
Expository paragraph writing emphasizing various methods including argumentation. Practice in refining sentence skills and grammar.

ENGL 061X
Accelerated Introductory Composition Skills

Unit(s): 5.0 Class Hours: 90.0 Lecture total.

Recommended Preparation: Completion with a grade of "C" or better or a Passing grade in: READ 101X, READ 101 recommended to be taken concurrently;
An introductory English course designed to prepare students for English 101, Freshman Composition, emphasizing sentence structure, paragraph writing, essay writing, and argumentation using reading-based modeling.