

Lecture Contact Hours: 32-36; Homework Hours: 64-72;
Laboratory Contact Hours: 48-54; Outside-of-Class Hours: 0;
Total Student Learning Hours: 144-162

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Engineering 125 – Solid Modelling Design

2 hours lecture, 2 units
3 hours laboratory, 1 unit
Total units: 3 units

Catalog Description

This is advanced graphic communication course using solid modeling techniques. This course covers feature based solid part construction including extrudes, cuts and revolves, loft and sweep. 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, detailing and auxiliary views. 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.*

Prerequisite

"C" grade or higher or "Pass" or concurrent enrollment in CADD 115 or ENGR 100 or equivalent

Recommended preparation

Working knowledge of PC computer operations and file administration

Entrance Skills

Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:

- 1) Complete - orthographic drawings.
- 2) Solve basic geometric construction with accuracy and detail.

Course Content

- 1) Design process and engineering drawing
- 2) Basic part modeling technique
- 3) Advanced concepts in part modeling
- 4) Creation of assembly models
- 5) Advanced assembly operations
- 6) Parts and assembly drawings and bill of materials
- 7) Additive manufacturing (aka: 3D printing) Technology

Course Objectives

Students will be able to:

- 1) Execute a modern approach to the engineering design process.
- 2) Create part model sketches to construct 3D models.
- 3) Apply pattern features to create multiple identical objects.
- 4) Use solid modeling software techniques to demonstrate the manufacturing of components for assembly.
- 5) Produce working drawing of parts and assemblies, including auxiliary, sectional, and detail drawings.
- 6) Create dimensions and tolerances in accordance with ASNI standard.

- 7) Refine presentation of parts and assembly and generating multiple sheet-drawings.
- 8) Create parts using additive manufacturing technology.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Student portfolio of drawing exercises and final project that demonstrate students' skill and competency in using and applying SolidWorks for 3D solid modeling in engineering applications.
- 2) Midterm exam that measures students' ability to apply 3D solid modeling software in simple engineering design, using SolidWorks as a tool to the subject matter.
- 3) Final exam that measures students' capabilities in advanced and complex engineering design and assembly of parts.
- 4) In-class activities (written/oral) that measure students' ability to articulate fundamental 3D solid modeling skills required in the field of engineering graphics.

Special Materials Required of Student

Electronic storage media

Minimum Instructional Facilities

CAD computer lab

Method of Instruction

- 1) Lecture and lab demonstration
- 2) Lab assignments
- 3) Hand-out materials, projects

Out-of-Class Assignments

- 1) **Reading:** Technical-Reading assignments from Engineering drafting journal.
- 2) **Writing:** Preparing reports on bi-weekly group projects.
- 3) **Other:** None.

Texts and References

- 1) Required (representative example): Howard, William and Joseph Musto. *Introduction to Solid Modeling Using SolidWorks 2025*. McGraw Hill, 2025.
- 2) Supplemental: Handouts

Exit Skills

Students having successfully completed this course exit with the following skills, competencies, and/or knowledge:

- 1) Apply the fundamental skills in 3D model design and produce engineering drawing/documentation.
- 2) Create part model sketches to construct advanced and complex 3D models.
- 3) Use solid modeling software techniques to demonstrate the manufacturing of parts and assemblies.
- 4) Refine presentations of parts and assemblies and generate multiple sheet-drawings.
- 5) Produce working drawing of parts and assemblies, including auxiliary, sectional, and detail drawings
- 6) Create dimensions and tolerances in accordance with ANSI standard
- 7) Create parts using additive manufacturing technology

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Develop 3D part modeling (simple/complex) from a 2D sketch.
- 2) Produce working drawings of complex designed parts including, Orthographic views, Section views, Auxiliary views and Detail views.

- 3) Provide documentation including exploded pictorial view, label all assembly components along with Bill of Materials (BoM), scale of drawing and relevant information in title block.
- 4) Establish dimensions and tolerances in accordance with ANSI standard.
- 5) Produce Rapid Prototypes of the parts using Additive Manufacturing technology.