

*Lecture Contact Hours: 32-36; Outside-of-Class 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

CADD Technology 115 – Engineering Graphics

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

Catalog Description

Introduction to engineering drafting. Covers the fundamentals of drafting using both mechanical instruments and the computer as drafting tools. Students will learn the fundamentals of engineering graphics as a universal language of communication in all engineering fields. Includes organization and drawing layouts, text, dimensions, tolerances, scales, orthographic projections, and pictorial drawings to visualize, represent and document basic engineering problems.

Prerequisite

None

Course Content

- 1) Drawing in AutoCAD
 - a. AutoCAD's User Interface
 - b. The Drawing Area
 - c. Accessing AutoCAD Commands
 - d. Standard Toolbar
 - e. Custom User Interface
 - f. Coordinates
 - g. Printing
- 2) Orthographic Projection
 - a. Engineering Graphics Overview
 - b. Orthographic Projection
 - c. The Glass Box Method
 - d. The Standard Views
 - e. Lines Used in an Orthographic Projection
 - f. Rules for Line Creation and Use
 - g. Creating an Orthographic Projection
 - h. Auxiliary Views
- 3) Orthographic Projections in AutoCAD
 - a. Layers
 - b. Line Type Scale
 - c. Properties
 - d. Printing
 - e. Title Blocks
 - f. Model and Layout Space
- 4) Dimensioning
 - a. Detailed Drawings
 - b. Learning to Dimension
 - c. Dimension Appearance and Techniques based on ANSI-Standard
 - d. Dimensioning and Locating Simple and Advanced Features

- e. Dimension Choice
- 5) Dimensioning in AutoCAD
 - a. Dimension Commands
 - b. Dimension Style and Variables
 - c. The DIM Prompt
 - d. Associative Dimensions
- 6) Sectioning
 - a. Sectional Views
 - b. Types of Sections; Full section, Half-section and offset section views
- 7) Creating Section Views in AutoCAD
 - a. Cutting Plane Lines
 - b. Hatches
- 8) Isometric Pictorial Drawings
 - a. Isometric Pictorial Axes
 - b. Drawing Linear Features
 - c. Drawing Circles and Radii
 - d. Drawing Cylinders
 - e. Oblique Pictorials Overview
- 9) Creating Isometric Pictorial-Drawings in AutoCAD
 - a. Isometric Snap
 - b. Isocircles

Course Objectives

Students will be able to:

- 1) Identify the differences in graphic language of various engineering fields.
- 2) Use mechanical and Computer-Aided drafting tools to produce sketches.
- 3) Use geometric construction tools to produce 2D-geometric drawings.
- 4) Produce orthographic projections both manually and with Computer using AutoCAD.
- 5) Sketch and draw pictorial drawings.
- 6) Create sectional views to produce complex drawings.
- 7) Apply dimensions and tolerances in accordance with industry standards.

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) Portfolio of drawing exercises and projects that demonstrate the student's skill and competency in using and applying mechanical and computer-aided drafting tools for engineering applications.
- 2) Midterm exam that measures the student's ability to describe and apply fundamental drafting concepts, terminology and techniques used in engineering graphics.
- 3) Final exam that measures the student's capability as a draftsman. For example, the student will be required to use engineering concepts to produce 2D drawings.
- 4) In-class activities (written/oral) that measure the student's ability to articulate fundamental drafting design and production skills required in the field of engineering graphics.

Special Materials Required of Student

High quality graph pad, isometric layout pad, mechanical pencil .5-.7mm and leads (HB or B), pink rubber eraser, brushes, scale, linear unit (millimeter & Inches) 1:1, triangles (30/60 & 45), compass (Bow & Friction head), electronic storage media (USB thumb drive, 2GB)

Minimum Instructional Facilities

CAD computer lab

Method of Instruction

- 1) Lecture and lab demonstration
- 2) Lab assignments and projects

Out-of-Class Assignments

- 1) **Reading:** lecture notes, course materials, content on websites, and more.
- 2) **Writing:** assignments describing and applying fundamental drafting concepts, designs, terminology, and techniques used in engineering graphics, and more.
- 3) **Other:** portfolio of drawing exercises and projects demonstrating skill and competency in using and applying mechanical and computer-aided drafting tools for engineering applications.

Texts and References

- 1) Required (representative example): Plantenberg, Kristie. *Engineering Graphics Essentials with AutoCAD 2025 Instruction*. SDC Publications, 2024.
- 2) Supplemental: Handouts

Exit Skills

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

- 1) Complete orthographic drawings (using mechanical tools/computer).
- 2) Solve geometric construction with accuracy and detail.
- 3) Create sectional and auxiliary views.
- 4) Create pictorial drawings.

Student Learning Outcomes

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

- 1) Draw orthographic projections and isometric pictorial drawings.
- 2) Produce working drawings with engineering documentation such as title block and drawing scale.
- 3) Create sectional, and detail drawings.
- 4) Produce dimensioning and tolerances in accordance with industry standards (ASME 14.5 and ISO standards)