

**CUYAMACA COLLEGE**  
**COURSE OUTLINE OF RECORD**

**CADD TECHNOLOGY 115 – ENGINEERING GRAPHICS**

2 hours lecture, 4 hours laboratory, 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, multiview 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 using Pen Widths
  - e. Title Blocks
  - f. Blocking
  - g. Model and Layout Space
- 4) Dimensioning
  - a. Detailed Drawings
  - b. Learning to Dimension
  - c. Dimension Appearance and Techniques
  - 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
    - 1. Full section
    - 2. Half section
    - 3. Offset section
    - 4. Aligned section
    - 5. Rib and web sections
    - 6. Broken section
    - 7. Removed section
    - 8. Revolved section
    - 9. Non-sectioned parts
    - 10. Thin sections
- 7) Creating Section Views in AutoCAD
- a. Cutting Plane Lines
  - b. Hatches
- 8) Tolerancing
- a. Tolerancing and Interchangeability
  - b. Tolerance Types
  - c. General Definitions
  - d. Tolerancing Standards
  - e. Inch Tolerances
  - f. Metric Tolerances
- 9) Tolerancing in AutoCAD
- a. Tolerance Parameters
- 10) Pictorials
- a. Isometric Pictorial Axes
  - b. Drawing Linear Features
  - c. Drawing Circles and Radii
  - d. Drawing Cylinders
  - e. Oblique Pictorials Overview
- 11) Creating Isometric Pictorials 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) Identify and use all tools and equipment required for two dimensional drafting.
- 4) Use geometric construction tools to produce 2D drawings.
- 5) Describe and use the basic AutoCAD terms, concepts and techniques.
- 6) Produce orthographic projections both manually and with Computer using AutoCAD.
- 7) Sketch and draw pictorial drawings.
- 8) Use engineering documentation to support CAD drawings.
- 9) Use sectional and auxiliary views to produce complex drawings.
- 10) 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) Weekly homework
- 2) Portfolio

**Texts and References**

- 1) Required (representative example): Plantenberg, Kristie. *Engineering Graphics Essentials with AutoCAD 2018 Instruction*. SDC Publications, 2017.
- 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 and isometric drawings.
- 2) Produce working drawings with engineering documentation such as title block and drawing scale.
- 3) Create sectional, auxiliary and detail drawings.
- 4) Produce dimensioning and tolerances in accordance with industry standards ( ASME 14.5 and ISO standards)