ACADEMIC AFFAIRS

Course Number: MECH 185   Department: Mechanical Eng. Technology

Course Title: Mechanical CAD I – 2D Fundamentals   Semester: Fall   Year: 2006

Objectives/Competencies

Course Objective	Competencies
1. Manage AutoCAD software	• Start AutoCAD from Windows icon or Start menu. • Identify and customize elements in the drawing editor: toolbars, menus, command line, cursor, screen display preferences. • Exit AutoCAD.
2. Create drawings in AutoCAD	• Differentiate between starting new drawings and opening existing drawings. • Understand and change default drawing settings: units, paper size, Cartesian coordinate system, grid display, UCS icon. • Save a drawing. • Save a drawing with a different name and directory location. • Use automatic save command.

3. Create drawing templates	• Distinguish between standard and metric drawing setups. • Create standard drawing templates (in paper space) in accordance with ANSI Y 14.1 and ANSI Y 14.2: drawing units, paper size, border widths, zone letters and numbers, titleblock. • Create model space viewports. • Differentiate between paper space and model space. • Edit titleblock attribute information. • Discuss and use zoom with respect to paper space
4. Use drawing scales	• Calculate drawing scales. • Describe how plotted scale relates to drawing scale.
5. Organize drawing information	• Create layers, customize colors, linetypes and lineweights. • Discuss ANSI 14.2M standard for line width conventions • Apply line weight and line type conventions to distinguish visible, center, hidden, dimension, cutting plane and section lines. • Modify layer of drawing entities. • Modify the linetype scale.
6. Create orthogonal views of objects	• Select the front view of an object. • Use the Draw toolbar commands: **LINE, CIRCLE, ARC, ELLIPSE, POLYGON, RECTANGLE, PLINE.** • Create centermarks: **DIMCEN** variable and **DIMCENTER** command. • Describe objects with one, two or three views in accordance with ANSI Y14.3. • Use construction lines to create multiple views of an object. • Use X Y point filters to construct views of an object. • Describe objects with one, two or three views in accordance with ANSI Y14.3. • Place centerlines and centermarks. • Use construction lines from existing views to create multiple views. • Create side and top views utilizing the third angle projection method. • Project an auxiliary view of an inclined surface.
7. Create section views	• Discuss ANSI Y14.3 section view guidelines • Define section view types: full, half, broken-out, offset, aligned. • Shorten a view of an elongated object using conventional breaks. • Use text in section and detail view titles, cutting-planes lines. • Use **BHATCH** command to indicate sectioned views. • Select a boundary for sectioning. • Correct boundary errors.

8. Edit drawings	• Use the Modify toolbar commands: **ERASE, MOVE, COPY, OFFSET, TRIM, EXTEND, CHAMFER, FILLET, BREAK, MIRROR, ROTATE, ALIGN, SCALE, STRETCH, ARRAY, PEDIT, EXPLODE.** • Identify and use object selection set methods: **single pick, All, Last, Previous, Window, Window Polygon, Crossing, Crossing Polygon, Fence.** • Reverse last command with **UNDO.** • Use **Grips** to edit a drawing. • Change the template background of an existing drawing: **WBLOCK** objects or views then begin a new drawing with a different template.
9. Check drawing accuracy	• Use **DIST** command to analyze size and location dimensions of objects. • Use **LIST** command to analyze size dimensions and properties of objects. • Calculate the surface area of objects: **AREA** command.
10. Manage drawing display	• Magnify view of drawing with **ZOOM.** • Shift drawing display with **PAN** and graphics window scroll bars.
11. Place notes on drawings.	• Discuss ANSI Y14.2 lettering conventions. • Distinguish general notes from specific notes. • Use the single line, multiline text commands • Create special text characters: diameter, degree, plus/minus symbols, underlining. • Revise text and change text properties. • Created new text styles.
12. Use drawing scales	• Calculate drawing scales. • Describe how plotted scale relates to drawing scale.
13. Set up and use dimension styles.	• Create, name and modify dimension styles.
14. Dimension orthogonal view drawings	• Discuss ANSI Y14.5 dimensioning guidelines. • Create linear, angular, radial, diameter, ordinate dimensions. • Place multiline specific notes on a drawing. • Edit dimensions using **GRIPS.** • Define parts of a dimension: dimension lines, extension lines, arrowheads, dimension text. • Describe dimension arrangement systems: unidirectional versus aligned. • Discuss proper placement of dimensions on orthogonal views.

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- Define the minimum recommended dimension text height.
- Distinguish between size and location dimensions.
- Draw linear dimensions.
- Dimension inclined surfaces.
- Create angular dimensions.
- Dimension repetitive features.
- Dimension common objects: cylinders and cylindrical holes, square shapes and features, rectangular shapes and features, cones, hexagonal parts, keyways, arcs, rounds and fillets, chamfers.
- Dimension manufacturing processes: counterbore, countersink and spotface.
- Show location dimensions: circular and rectangular features.
- Distinguish between datum dimensioning and chain dimensioning.
- Include symbols with dimension text
- Create ordinate dimensions.

| 15. | Make hard copies of drawings | • Understand plot style tables.
• Print drawings.
• Understand and set plot scales.
• Plot drawings. |