COMPUTER AIDED DESIGN AND DRAFTING

ENAR 255

Lecture : 2 **Year : II**
Tutorial : 0 **Part : II**
Practical : 2

Course Objectives:
The objective of this course is to introduce the fundamental concepts of Computer-Aided Design and Drafting (CADD) and to enable students to develop drawing and modeling skills using CADD software. This course aims to equip students with the essential skills required for architectural drafting and 3D modeling through specialized computer applications. It primarily focuses on AutoCAD for precision two-dimensional drafting, layering, annotations, and dimensioning, followed by an introduction to Google SketchUp for building 3D modeling. Google SketchUp is emphasized for its user-friendly interface, extensive model library, and real-time visualization capabilities.

1 Introduction (2 hours)

1.1 AutoCAD interface
1.2 Coordinate system icons, world coordinate system, user coordinate system
1.3 Drawing units and scaling, drawing limits and MV Setup
1.4 Utility commands: help, end, quit and services, qsave, save as, save, savetime

2 Drawing Aids and Commands (4 hours)

2.1 Draw lines, polylines, rectangles, polygon, constructed lines, rays
2.2 Curves, circles, arcs, ellipse, elliptical arcs. donuts and points.
2.3 Drawing aids, isometric, snap, grid, ortho, object snap, polar tracking, object snap tracking, dynamic input, ISO plane
2.4 Function keys (F1, F2, F3, F5, F8, F9)

3 Drawing Modification Tools and Commands (4 hours)

3.1 Move, copy, rotate, scale, mirror, stretch, array, explode, erase
3.2 Break, trim, extend, fillet, chamfer, offset, stretch, lengthen, join
3.3 Editing: polyline, pedit, spline
3.4 Undoing: redo, undo, oops, redraw
3.5 Inquiry command list: dblist, id point, distance, area, volume

4 Layer, Annotation and Hatching (8 hours)

4.1 Layers management: layer propeties, line type, ltscale, lineweight, color, layer isolate, layer unisolate
4.2 Text and entity properties
  4.2.1 Creating simple text, text properties
  4.2.2 Multiline text, text edits
  4.2.3 Special text properties- mirror text, qtext, dtext
4.3 Dimension types and their components, dimension style manager
4.4 Hatching: boundaries, hatch pattern, hatch style and hatch pattern alignment

5 Display Controls and Blocks, Attributes and External References (2 hours)

5.1 Zoom, pan, managing multiple viewports
5.2 Redraw, regen, regenall
5.3 Creating and inserting a block, block editor and xref editing

6 Layout/ Plotting/ Printing/ Publishing (2 hours)

6.1 Changing pen and line type parameters
6.2 Changing basic plot model specifications, saving plot specification
6.3 Layout and page set up manager
6.4 Plotting, efficient printing plotting, Publishing to PDF

7 Basic Three- Dimensional Model of Solids (4 hours)

7.1 Types of 3D models and three-dimensional coordinate system: 3D orbit, ucs, wcs coordinate system
7.2 Three-dimensional modelling: box, cone, cylinder, sphere, wedges, pyramid
7.3 Solid Editing: extrude, union, subtract, intersect solids
7.4 Solid Modify: rotate 3d, mirror 3d, 3d array, 3d align, fillet, chamfer, slice and section
7.5 Mesh, Visualize, Rendering

8 Basic 3D modelling of Building (4 hours)

8.1 Introduction to Google sketch up interface
8.2 Draw tools, modifying tools, editing tools
8.3 Camera: orbit, zoom, pan
8.4 Window: entity info, materials, styles, scenes
8.5 Export, print, animation
8.6 Save, model info, entity, unit

Practical (30 hours)

1. Drafting of a building- Architectural Drawing (Plan, Elevation, Section, Wall Section)
2. Municipal Drawings Preparation
3. 3D Model of a building

References

1. Giesecke, F. E. (2009), Technical Drawing with AutoCAD 2010. Prentice Hall
2. David, H. and Weidner, M.E. (2010), The Auto CAD Workbook: A Practical Guide to Mastering AutoCAD 2010. CRC Press, 2010
3. Paul, S., (2015), AutoCAD 2016: A Problem- Solving Approach. Cengage Learning
4. Donley, M., (2021), Sketchup to Layout, Bizfound, LLC