

Advance Computer Aided Engineering Drawing

Unit	Major Learning Topics and Sub- Topics	Outcomes (in cognitive domain)
UNIT-1 Basic elements of Drawing	1.1 List the different drawing instruments and application 1.2 Convention of lines and its application (Thick, Thin, Axis etc.,) 1.3 Practice use of drawing instruments 1.4 Representative fraction 1.5 Scales - Full Scale, Reduced Scale and Enlarged Scale 1.6 Dimensioning <ol style="list-style-type: none"> a. Aligned system and Unidirectional system in the Sketches b. Chain dimensioning and Parallel dimensioning 1.7 Construct different polygons	1. Drawing equipments, instruments and materials. 2. Equipments-types, specifications, method to use them, applications. 3. Instruments-types, specifications, methods to use those and applications. 4. Pencils-grades, applications, Different types of lines. 5. Scaling technique used in drawing. 6. Dimensioning methods.- Aligned method. Unilateral with chain, parallel dimensioning. 7. Constructions of geometrical figures
UNIT-2 Introduction to Projections	2.1 Introduction to Projections-Principle Planes of Projection and Principle Views 2.2 Introduction to First angle and Third angle method, their symbols 2.3 Projection of points in All 4 Quadrants 2.4 Projection of Lines <ol style="list-style-type: none"> a) Parallel to both the planes b) Parallel to one and Perpendicular to another c) Parallel to one and Inclined to another 2.5 Projection of plane surfaces. <ol style="list-style-type: none"> a) Parallel to one plane and Perpendicular to other two b) Planes Perpendicular to one plane and inclined to the other (Resting on Edge, Corner, Inclined to HP And VP)	1. Reference planes, orthographic projections. 2. Concept of quadrant, 1st angle and 3rd angle projection and their symbols. 3. Projection of points. 1. Projection of lines determination of true length and inclinations for following cases. <ol style="list-style-type: none"> (a) Line parallel to one or both the plane. (b) Line perpendicular to one of the plane. (c) Line inclined to one plane and parallel to another. 1. Projection of Planes. <ol style="list-style-type: none"> (a) Types of planes. (b) Projection of planes parallel to one of the reference planes. (c) Projection of plane inclined to one reference plane and perpendicular to another. Note: <i>Triangle, Square / rectangle, pentagon, hexagon and circle shape should be included in various plane problems.</i>

	<p>2.6 Projection of Solids for the above conditions</p>	<ol style="list-style-type: none"> 1. Projections of solids in various positions with respect to the reference planes. (Parallel, perpendicular and inclined to HP and / or VP.)
<p>UNIT-3 EXPOSURE TO CAD</p>	<ol style="list-style-type: none"> 3.1 Introduction to CAD- Hardware requirements. 3.2 Various CAD software available 3.3 Familiarization of CAD window - Commands like New file, Saving the file, Opening an existing drawing file, Creating templates 3.4 Setting up new drawing: Units, Limits, Grid, Snap. Standard sizes of sheet. 3.5 Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview 3.6 Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, Dimensioning, Inserting text Applying constraints - horizontal, vertical, parallel, concentric, perpendicular, symmetric equal, collinear 3.7 Insert title block for the drawing and take the Print out 3.8 Create objects by applying constraints and convert the objects to full scale , reduced scale and enlarged scale 3.9 Apply copy, mirroring, array, fillet and trim on the object created 	<ol style="list-style-type: none"> 1. Computer graphics & its terminology. 2. CAD definition, concept & need. 3. Commands used in CAD 4. Functional areas of CAD. - Coordinate systems. 5. Familiarization of Cad commands 6. Draw simple Geometrical figures using CAD

<p style="text-align: center;">UNIT-4 Orthographic projections</p>	<p>4.1 Introduction to orthographic, Isometric projections 4.2 Conversion of pictorial view into Orthographic Views (USING SKETCH BOOK AND CAD)</p>	<p>1. Types of projections-orthographic, isometric projections: concept and applications. 2 Various term associated with orthographic projections. (a) Theory of projection. (b) Methods of projection. (c) Orthographic projection. (d) Planes of projection. 3. Conversion of simple pictorial views into Orthographic views. Illustrative problems on orthographic projection. Note : (1) Problem should be restricted up to - Front view/Elevation, Top view/Plan and Side views only. Use First Angle Method only.</p>
<p style="text-align: center;">UNIT-5 Isometric projections</p>	<p>5.1 Introduction to Isometric Projections 5.2 Isometric Scales and Natural Scale 5.3 Isometric View and Isometric Projection 5.4 Conversion of Orthographic Views into Isometric (USING SKETCH BOOK AND CAD)</p>	<p>1. Isometric axis, lines and planes. 2. Isometric scales. 3. Isometric view and isometric drawing. 4. Difference between isometric projection and isometric drawing. 5. Illustrative problems limited to Simple elements</p>
<p style="text-align: center;">UNIT-6 CAD Drafting</p>	<p>6.1 Draw different types of 2D/3D modeling entities using viewing commands, to view them (Problems solved in chapter no 3 and 4 i.e Orthographic, isometric projection). 6.2 2D/3D modeling for Thread profiles,nuts,bolts,studs,setscrews,was her,Locking arrangements. (USING CAD)</p>	<p>1 Difference between 2D & 3D models. 2.2D/3D modeling – concept, Simple objects</p>

PRACTICAL

Sl. No	Unit No	Practical Exercises (Outcomes in Psychomotor Domain)
1	1	1. Teacher will demonstrate a: Use of a. Drawing instruments. b. Planning and layout as per IS. c: Scaling technique.
		2. Draw following. Problem – 1 Drawing horizontal, vertical, 30 degree, 45 degree, 60 & 75 degrees lines using Tee and Set squares/ drafter.(Drawing sheet)
		Problem – 2 Indicate different convention of lines on the drawing. .(Drawing sheet)
		Problem – 3 Copy the sketch to the required scale and dimensioning adopting right system and positioning of dimensions using Tee and Set squares / drafter.(Drawing sheet)
		Problem 4. Draw regular geometric constructions Pentagon, Hexagon, Square, circle, Triangle and other shapes. .(Drawing sheet)
		First angle Projection symbol Problem 5: Draw Projection of points in 1 ^s , 2 nd , 3 ^d and 4 Quadrants.(Drawing sheet)
2	2	Problem 6: Draw Projection of Lines a) Parallel to both the planes b) Parallel to one and Perpendicular to another c) Parallel to one and Inclined to another. .(Drawing sheet)
		Problem 7: Draw Projection of plane surfaces. a) Parallel to one plane and Perpendicular to other two (Resting on Edge, Corner, Inclined to HP And VP)
		Problem 8: Planes Perpendicular to one plane and inclined to the other (Resting on Edge, Corner, Inclined to HP And VP) (Drawing sheets)
2	2	Problem 9: Draw Projection of Solids for the above conditions (Resting on Edge, Corner, Inclined to HP And VP) (Drawing sheet)
		Use of CAD commands , plotting the drawing
3	3	Problem 10: Drawing basic entities : Circle, Arc, Polygon, Ellipse, Rectangle, Multiline
		Applying constrains draw basic entities Insert title Block (CAD Drawings and Printout)

4	4	Problem 11: Draw Orthographic views for the given object. (Sketch book and CAD Drawing)
5	5	Problem 12: Draw Isometric projections for the given Orthographic views (Sketch book and CAD Drawing)
6	6	Problem 13: Produce Orthographic (2D) Drawings in CAD- Chap 3 Problem 14: Produce Isometric and 3D Drawings in CAD - Chap 4 (CAD Drawings and Printout)
		Problem 15: create 3D models of Mechanical Elements such as Hexagonal headed bolt, Simple toy, ball bearing (CAD Drawings and Printout)