



Engineering Drawing-I BEG __ME

Year: I

Semester: I

								Semester: I		
Teaching Hours/ Week				Examination Scheme						Total Marks
				Internal		Final				
				Theory	Practical	Theory		Practical		
Cr	L	P	T			Duration	Marks	Duration	Marks	
3	2	3	-		60	-	-	3	40	100

Course Objectives:

To develop basic projection concepts with reference to points, lines, planes and geometrical solids. To develop sketching and drafting skills to facilitate communication.

Course Contents:

1. **Instrumental Drawing, Technical Lettering Practices & Techniques** (2 hrs)
 - 1.1 Equipment and materials; Description of drawing instruments, auxiliary equipment and Drawing materials
 - 1.2 Techniques of Instrumental Drawing, securing paper, proper use of T-squares, triangles, scales, dividers, and compasses, crashing shields, French curves, Inking pens
 - 1.3 Lettering strokes, letter proportions, use of pencils and pens, uniformity and appearance of letters, freehand techniques, inclined and vertical letters and numerals, upper and lower cases, standard English lettering forms
2. **Dimensioning** (4 hrs)
 - 2.1 Fundamentals and Techniques; Size and location dimensioning, SI Conventions. Use of Scales, measurement units, reducing and enlarging drawings
 - 2.2 General Dimensioning practices, placement of dimensions; aligned and unidirectional recommended practice
3. **Applied Geometry** (8 hrs)
 - 3.1 Plane Geometrical construction; Bisecting and trisecting lines and angles, proportional Division of lines, Construction of angles, triangles, square, polygons. Construction using Tangents and circular areas.
 - 3.2 Techniques to reproduce a given drawing (by construction)
 - 3.3 Methods for drawing standard curves such as ellipses, parabolas, hyperbolas, involutes, cycloids, spirals and helices.
4. **Basic Descriptive Geometry** (8 hrs)
 - 4.1 Introduction to Orthographic projection, Principal Planes, Four Quadrant or Angles
 - 4.2 Projection of points on first, second, third and fourth quadrants



- 4.3 Projection of Lines: Parallel to one of the principal planes, Inclined to one of the principal plane and parallel to other, Inclined to both principal planes
- 4.4 Projection Planes: Perpendicular to both principal planes, Parallel to one of the principal planes and Inclined to one of the principal planes, perpendicular to other and Inclined to both principal planes
- 4.5 True length of lines: horizontal, inclined and oblique lines
- 4.6 Rules for parallel and perpendicular lines
- 4.7 Point view or end view of a line
- 4.8 Shortest distance from a point to a line
- 4.9 Edge View and True shape of an oblique plane
- 4.10 Angle between two intersecting lines
- 4.11 Intersection of a line and a plane
- 4.12 Angle between a line and a plane
- 4.13 Dihedral angle between two planes
- 4.14 Shortest distance between two skew lines
- 4.15 Angle between two non- intersecting (skew) lines
- 5. **Theory of Projection** (2 hrs)
 - 5.1 Common types of projections- Pictorial (Perspective, Isometric, Oblique) and Orthographic Projection
 - 5.2 System of orthographic projection: 1st angle projection and 3rd angle projection
- 6. **Multi view (Orthographic projection Drawings)** (12 hrs)
 - 6.1 Principal Views: Methods for obtaining orthographic views, projection of lines, angles and plane surfaces, analysis in three views projection of curved lines and surfaces. Object orientation and selection of views for best representation, Full and hidden lines
 - 6.2 Orthographic Drawings: Making an orthographic drawing, visualizing objects from the given views, Interpretation of adjacent areas, True- length lines, Representation of holes, Conventional practices.
- 7. **Sectional Views** (5 hrs)
 - 7.1 Full Section, half section, broken section, revolved section, removed (detail) section, phantom or hidden section, auxiliary section views, specifying cutting planes for section, conventions for hidden lines, holes, ribs, spokes
- 8. **Auxiliary Views** (5 hrs)
 - 8.1 Basic Concept and Use of Auxiliary Views
 - 8.2 Drawing Methods and Types of Auxiliary Views
 - 8.3 Symmetrical and Unilateral Auxiliary Views
 - 8.4 Projection of Curved Lines and Boundaries
 - 8.5 Line of Intersection Between two Planes
 - 8.6 True size and shape of plane surfaces
- 9. **Developments and Intersections** (14 hrs)
 - 9.1 Introduction and Projection of Solids



- 9.2 Developments: general concepts and practical considerations, development of a right or oblique prism, cylinder, pyramid, and cone, development of truncated pyramid and cone, Triangulation method for approximately developed surfaces, transition pieces for connecting different shapes, constructing a development using auxiliary views
- 9.3 Intersections: Intersection of – two cylinders, two prisms, prism and cylinder, a cylinder/prism & a cone, pyramid and prism/cylinder

Practical:

1. Freehand Technical Lettering and Use of Drawing Instruments
2. Dimensioning
3. Geometrical and Projection Drawing
4. Descriptive Geometry
5. Projection and Multi view Drawing
6. Sectional Views
7. Auxiliary views
8. Developments and Intersections

Final Examination Scheme:

Chapters	Marks	Remarks
1, 3	8 to 10	
4	4 to 6	
2,5,6,7,8	14 to 16	
9	14	
Total	40	

References:

1. French, T., Vierck, C., & Foster, R. (1981). *Engineering Drawing and Graphic Technology*. McGraw Hill.
2. Giesecke, F., Mitchell, A., H.C. S., & Dygdone, J. (1986). *Technical Drawing*. 8th Edition. Macmillan.
3. Luzadder, W. J. (1981). *Fundamentals of Engineering Drawing, Eighth Edition*. Prentice Hall.