ENGINEERING DRAWING I
BEG146ME

Year: I Semester: I

Teaching Schedule Hours/week			Examination Scheme						Total Marks
			Final				Internal Assessment		
			Theory		Practical		Theory Marks	Practical Marks	
L	P	T	Duration	Marks	Duration	Marks			
1	3	0	-	-	3	40	10	50	100

Course objective:
To develop the basic understanding and the skills of Engineering Graphic Technology to the students.

Course Content:

1.0 Instrumental Drawing, Practices & Techniques (2 hrs)
1.1 Equipment and materials; Description of drawing instruments, auxiliary equipment and Drawing materials
1.2 Techniques of Instrumental Drawing, Pencil Sharpening, securing paper, proper use of T-squares, triangles, scales, dividers, and compasses, crashing shields, French curves, Inking pens

2.0 Freehand Technical Lettering (2 hrs)
2.1 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.

3.0 Dimensioning (5 hrs)
3.1 Fundamentals and Techniques; Size and location dimensioning, SI Conventions. Use of Scales, measurement units, reducing and enlarging drawings
3.2 General Dimensioning practices, placement of dimensions; aligned and unidirectional recommended practice; some 50 items

4.0 Applied Geometry (8 hrs)
4.1 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. Methods for drawing standard curves such as ellipses Parabolas, hyperbolas, involutes, spirals and cam or heart wheel
4.2 Solid Geometrical Construction; Classification and pictorial representation of solid Regular objects such as; Prisms: square, cubical, triangular and oblique Cylinders: right And oblique Cones: right and oblique, Pyramid: square, triangular, oblique, truncated, Doubly-Curved and Warped Surfaces: Sphere, torus, oblate ellipsoid, conoid, serpentine, paraboloid, hyperboloid (Definition)

5.0 Basic Descriptive Geometry (8 hrs)
5.1 Introduction: Application of descriptive geometry, principles to the solution of problems Involving positioning of objects in three-dimensional space
5.2 The projection of points, Lines and planes in space
5.3 Parallel Lines
5.4 True Length of Lines: horizontal, inclined and oblique lines

5.5 Perpendicular Lines
5.6 Bearing of a Line
5.7 Point view or End View of a Line
5.8 Shortest Distance from a point to a Line
5.9 Principal Lines of a Plane
5.10 Edge View of a Plane
5.11 True shape of a Line and a plane
5.12 Intersection of a Line and a Plane
5.13 Angle between a line and a plane
5.14 Angle between two intersecting lines
5.15 Angle between two Non-Intersecting (Skew) lines
5.16 Angle between two planes
5.17 Shortest Distance between Two Skew Lines

6.0 Theory of Projection (2 hrs)

6.1 Common types of projections- Pictorial (Perspective, Isometric, Oblique) and Orthographic Projection
6.2 System of orthographic projection: 1st angle projection and 3rd angle projection

7.0 Multi view (Orthographic projection Drawings) (10 hrs)

7.1 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
7.2 Orthographic Drawings: Making an orthographic drawing, visualizing objects from the given views, Interpretation of adjacent areas, True- length lines, Representation of holes, Conventional practices.

8.0 Sectional Views (5 hrs)

8.1 Full Section
8.2 Half Section
8.3 Broken Section
8.4 Revolved Section
8.5 Removed (Detail) Section
8.6 Phantom or Hidden Section
8.7 Auxiliary Section views
8.8 Specifying Cutting planes for Section
8.9 Conventions for hidden lines, holes, ribs, spokes

9.0 Auxiliary Views (5 hrs)

9.1 Basic Concept and Use of Auxiliary Views
9.2 Drawing Methods and Types of Auxiliary Views
9.3 Symmetrical and Unilateral Auxiliary Views
9.4 Projection of Curved Lines and Boundaries
9.5 Line of Intersection Between two Planes
9.6 True size of Dihedral Angles
9.7 True size and shape of plane surfaces

10.0 Freehand Sketching and Visualization (4 hrs)

10.1 Sketching and Design; Value of Sketching as part of design
10.2 Techniques of Sketching; pencil hardness, squared paper, line densities techniques for horizontal, vertical and circular lines
10.3 Multi view Sketches; Choice of views, adding detail, dimensioning, title, notes, Proportioning and comparative sizing

10.4 Sketching pictorial Views: General pictorial sketching, Mechanical methods of sketching and proportioning, Isometric sketching, Oblique sketching, Perspective sketching, conventional treatment of fillets, rounds and screw threads, sketches of an exploded view to show assembly of components

11.0 Developments, Intersections and Interpenetration (9 hrs)

11.1 Development General concepts and practical considerations. Developments of a rigid or oblique prism, cylinder, pyramid and cone. Development of a truncated pyramid and Cone, Triangulation method for approximately developed surfaces, Transition pieces of connecting different shapes, Development of a sphere

11.2 Intersection & Interpretation: Lines of intersection of geometric surfaces, Piercing point of a line and a geometric solid, Intersection lines of two planes, Intersection of prisms and pyramids, Intersection of a cylinder and an oblique plane, Intersection of a sphere and an oblique plane, Constructing a development using auxiliary views, Intersection of two Cylinders, Intersection of a cylinder and a cone

Laboratory

(i.) Freehand Technical Lettering and Use of Drawing Instruments
(ii.) Freehand Technical Lettering and Use of Drawing Instruments (cont)
(iii.) Dimensioning
(iv.) Geometrical and Projection Drawing
(v.) Descriptive Geometry
(vi.) Descriptive Geometry (contd.)
(vii.) Projection and Multi view Drawing
(viii.) Projection and Multi view Drawing (contd.)
(ix.) Sectional Views
(x.) Auxiliary views
(xi.) Freehand Sketching and Visualization
(xii.) Developments and Intersections
(xiii.) Developments and Intersections(contd.)

Recommended Books:

- "Fundamentals of Engineering Drawing", W.J.Luzadder, Prentice Hall, 8th Edition, 1981
- "Engineering Drawing and Graphic Technology", TE. French, C.J. Vierck & R.J. Foster, MCGraw Hill,1981
- "Technical Drawing" F.E. Giesecke, A. Mtichell, H.C, Spencer & J.T. Dygdone, Macmillan, 8th Edition,1986