

1.6 ENGINEERING DRAWING – I

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RATIONALE

Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation. The emphasis while imparting instructions should be to develop conceptual skills in the students.

- Note:
1. First angle projection is to be followed
 2. Instruction relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students

DETAILED CONTENTS

1. Drawing Office Practice, Lines and Lettering (2 Sheets)
 - 1.1 Definition of drawing, classification of drawing
 - 1.2 Drawing instruments such as mini drafter, drawing board, drawing sheet, drawing pins, pencils, eraser, sandpaper, sharpener, cello-tape etc.
 - 1.3 Sizes and layout of standard drawing sheets and drawing boards
 - 1.4 Different types of lines in engineering drawing as per BIS specifications
 - 1.5 Definition and classification of letterings, free hand lettering (alphabets and numerals) in different standard series of 2.5, 3,5,7,10 and 15 mm heights. Single stroke vertical and inclined lettering at 75° (alphabets and numerals) lowercase and uppercase in the ratio of 7:4.
2. Dimensioning (2 Sheets)
 - 2.1 Necessity of dimensioning, Types of dimensioning (chain, parallel and progressive dimensioning, size and location dimensioning)
Methods of placing dimensioning (Aligned and unidirectional system), use of leader lines. General principles of dimensioning.
 - 2.2 Dimensioning of overall sizes, circles, thread holes, chamfered surfaces, angles, tapered surface holes equally spaced on PCD, counter sunk hole counter bored holes, cylindrical parts, narrow space and gaps, radii, curves and arches.
3. Simple Geometrical Constructions used in Engineering Practice (2 Sheets)
 - 3.1 Construction of regular polygons (triangle, square, pentagon, hexagon) and circles
 - 3.2 Ellipses (concentric circle method and Intersecting Arcs method)
 - 3.3 Parabola (rectangle and tangent method), cycloid
 - 3.4 Freehand sketching of above geometrical shapes

4. Scale (2 sheets)
 - 4.1 Scale – their need and importance, Definition of representative fraction (R.F), find RF of given scale
 - 4.2 Construction of plain and diagonal scales

5. Principle of Projections (10 sheets)
 - 5.1 Principle of orthographic projection and introduction to first angle projection and third angle projection
 - 5.2 Projection of points situated in different quadrants (1 Sheet)
 - 5.3 Projection of lines, Lines inclined to one plane and parallel to the other and vice versa (1st & 3rd quadrants) (1 Sheet)
 - 5.4 Projection of Planes: Planes perpendicular and parallel to either of the planes; planes perpendicular to one plane and parallel to the other or vice versa (1st & 3rd quadrants) (1 Sheet)
 - 5.5 Drawing 3 orthographic views of given objects (6 sheets, at least one sheet in 3rd Angle Projection)
 - 5.6 Identification of surfaces on drawn orthographic views from isometric object drawn (1 Sheet)

6. Sectional Views (2 sheets)
 - 6.1 Need for sectional views –Drawing of different conventions for materials in sections, conventional breaks for shafts, pipes, rectangular, square, angle, channel and rolled sections

7. Isometric Views (2 sheets)
 - 7.1 Fundamentals of isometric projections (theoretical instructions) and isometric scales
 - 7.2 Isometric views of combination of regular solids like cylinder, cone, cube, prism and pyramid

8. Development of Surfaces (2 sheets)
 - 8.1 Parallel line method (Prism and cylinder)
 - 8.2 Radial line method (Pyramid and Cone)

Note: Minimum 20 drawing sheets will be prepared by the students.

INSTRUCTIONAL STRATEGY

Teacher should show model or realia of the component/part whose drawing is to be made. Emphasis should be given on cleanliness, dimensioning and layout of sheet. Focus should be on proper selection of drawing instrument and its proper use.

RECOMMENDED BOOKS

1. Engineering Drawing by KK Dhiman, Ishan Publications, Ambala, Haryana
2. Elementary Engineering Drawing (in first angle projection) by ND Bhatt, Charotar Publishing House, Anand, Gujrat
3. A Text Book of Engineering Drawing by Surjit Singh published by Dhanpat Rai and Co., Delhi
3. Engineering Drawing by PS Gill published by SK Kataria and sons, Delhi
4. Engineering Drawing by RB Gupta published by Satya Prakashan, New Delhi
5. Engineering Drawing by NS Kumar published by King India Publication, New Delhi