This text-book follows:
(i) the metric system of length measurement and
(ii) first-angle method of orthographic projection.

However, the third-angle projection method has not been completely ignored.

The topics of the subject matter are covered in 22 well-arranged chapters — therein it now contains:
* 914 Self-explanatory and neatly drawn diagrams
* 230 Worked examples (Problems)
* 500 Exercises at the end of chapters
* 36 Useful tables

It describes in an easy-to-follow style and with application of the principles of orthographic projection, forms, proportions and uses of simple machine, engine and boiler parts.

The techniques of freehand sketching, dimensioning, conversion of pictorial views and interpretation of views are treated in clear and simple manner. Most of the orthographic views are accompanied by the pictorial views of the objects to enable the students to visualize the shapes easily.

The book covers the syllabi in Engineering Drawing of the First Year of the three year Diploma courses in various branches of Engineering conducted by the Department of Technical Education, for I.T.I. students and also to the candidates reading for the A.M.I.E. and U.P.S.C. Examinations.
Chapter 1 DRAWING INSTRUMENTS AND THEIR USES

1-0. Introduction
1-1. Drawing board
1-2. T-square
1-3. Set-squares
1-4. Drawing instrument box
   (i) Large-size compass with interchangeable pencil and pen legs
   (ii) Lengthening bar
   (iii) Small bow compass
   (iv) Large-size divider
   (v) Small bow divider
   (vi) Small bow ink-pen
   (vii) Inking pen
1-5. Scales
1-6. Protractor
1-7. French curves
1-8. Drawing papers
1-9. Drawing pencils
1-10. Eraser (Rubber)
1-11. Drawing pins
1-12. Sand-paper block
1-13. Duster
1-14. Drafting machine
1-15. General suggestions for drawing a sheet
   (i) Cleaning the instruments
   (ii) Pinning the paper to the drawing board
   (iii) Border lines, To draw the border lines
   (iv) Spacing of drawings

Exercises I

Chapter 2 SHEET LAYOUT AND SKETCHING

2-1. Sheet layout
   Sheet sizes
   Margin
   Border lines
   Borders and frames
   Orientation mark
   Grid reference system
   Title block
   List of parts or the bill of materials
   Revisions of drawing
   Folding marks
   Scales and scale drawing
2-2. Types of machine drawings
   (i) Production drawing
   (ii) Exploded assembly drawing
   (iii) Schematic assembly drawing
   (iv) Drawing for instruction manual
   (v) Drawing for installation
   (vi) Drawing for catalogue
   (vii) Tabular drawing
   (viii) Patent drawing
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   Sketching materials
   To sketch straight lines
   To sketch circles and arcs
   Sketching procedure

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3-1. Lines
   Line thickness
   Inked drawings
   Pencil drawings
   Types of Lines
   Outlines
   Margin lines
   Dimension lines
3-2. Lettering
   I. Single-stroke letters
   II. Gothic letters
3-3. Dimensioning
3-4. Dimensioning terms and notations
   Dimension line
   Extension line
   Arrowhead
   Leader
3-5. Placing of dimensions
   (i) Aligned system
   (ii) Unidirectional system
3-6. Unit of dimensioning
3-7. General rules for dimensioning
3-8. Practical hints on dimensioning
   (a) Continuous or chain dimensioning
   (b) Progressive or parallel dimensioning

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4-1. Scales
   (i) Engineer’s scale
   (ii) Graphical scale
   (iii) Representative fraction
4-2. Scales on drawings
4-3. Types of scales
   (i) Plain scales
   (ii) Diagonal scales
   (iii) Comparative scales
   (i) Inch scale
   (ii) Comparative scale
   (i) Scale of miles
   (ii) Scale of kilometres
   (iv) Vernier scales
   Principle of vernier
   Least count of a vernier
   (i) Forward vernier
   (ii) Backward vernier
   (v) Scale of chords

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5-2. To draw perpendiculars
5-3. To draw parallel lines
5-4. To divide a line
5-5. To bisect an angle
5-6. To trisect an angle
5-7. To find the centre of an arc
5-8. To construct equilateral triangles
   (a) With T-square and set-square only
   (b) With the aid of a compass

Exercises V
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5-10. To construct regular polygons
   (a) Inscribe circle method
   (b) Arc method
   Alternative method
5-11. Special methods of drawing regular polygons
5-12. Regular polygons inscribed in circles
5-13. To draw regular figures using T-square and set-squares
5-14. To draw tangents
   (a) External tangents
   (b) Internal tangents
5-15. Lengths of arcs
5-16. Circles and lines in contact
5-17. Inscribed circles
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   6-1-1. Ellipse
      (a) General method of construction of an ellipse
      (b) Construction of ellipse by other methods
      Normal and tangent to an ellipse
6-1-2. Parabola
      (a) General method of construction of a parabola
      (b) Construction of parabola by other methods
6-1-3. Hyperbola
      Rectangular hyperbola
      General method of construction of a hyperbola
6-1-4. Tangents and normals to conics
      (a) General method
      (b) Other methods of drawing tangents to conics
6-2. Cycloidal curves
6-2-1. Cycloid
      Normal and tangent to a cycloid curve
6-2-2. Trochoid
6-2-3. Epicycloid and hypocycloid
      Normal and tangent to an epicycloid and a hypocycloid
6-2-4. Epitrochoid
6-2-5. Hypotrochoid
6-3. Involute
      Normal and tangent to an involute
6-4. Evolutes
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6-5-1. Archmedian spiral
      Normal and tangent to an Archmedian spiral
6-5-2. Logarithmic or equiangular spiral
6-6. Helix
6-6-1. A method of drawing a helical curve
6-6-2. Helical springs
      (a) Helical spring of a wire of square cross-section
      (b) Helical spring of a wire of circular cross-section
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6-6-4. Helix upon a cone
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7-2. Simple mechanisms
7-2-1. The slider-crank mechanism
7-2-2. A four-bar mechanism
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Chapter 8 PRINCIPLES OF PROJECTION
8-0. Engineering drawing
8-1. Principle of projection
8-2. Methods of projection
8-3. Orthographic projection
8-3-1. First-angle projection
8-3-2. Third-angle projection
     B.I.S. code of practice
     Symbols for methods of projection
     Combination of two methods
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9-2. Isometric scale
9-3. Isometric drawing or isometric view
9-4. Isometric graph
9-5. Illustrative problems
9-5-1. Isometric drawing of planes or plane figures
     I. Method of points
     II. Four-centre method
9-5-2. Isometric drawing of prisms and pyramids
     Methods of drawing non-isometric lines
     (i) Box method
     (ii) Offset method
9-5-3. Isometric drawing of cylinders
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9-5-5. Isometric drawing of sphere
9-6. Typical problems
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10-1. Principle of the oblique projection
10-2. The oblique projection and the isometric projection
10-3. Receding lines and receding angles
10-4. Types of the oblique projection
     (i) Cavalier projection
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Solutions to Exercises XI

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12-1. Cutting-plane line
12-2. Types of sectional views
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13-1. Reading of orthographic views (Blue-print reading)
13-2. Missing lines and missing views
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14-1. Definitions
Crest
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Angle
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Outside or major diameter
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14-2. Forms of screw threads
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(b) Metric thread
(c) Whitworth thread
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(b) Knuckle thread
(c) Buttress thread
(a) External threads
(b) Internal threads
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Sunk taper key
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Gib-head
(ii) Parallel or feather keys
Spline shafts
Woodruff key
Cone keys
Staking-on
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(ii) Sleeve joint
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17-1. Fast or rigid couplings
17-1-1. Box or muff coupling
17-1-2. Half-lap coupling
17-1-3. Split-muff coupling
17-2. Flanged coupling
17-2-1. Protected type flange-coupling
17-2-2. Solid flanged coupling
17-3. Flexible couplings
17-3-1. Universal coupling or Hook’s joint
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18-1. Cast-iron pipes
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18-1-2. Socket and spigot joint
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19-1-1. Caulking and fullering
19-2. Forms and proportions of rivet-heads
19-3. Failure of riveted joints
19-4. Dimensions of a riveted joint
19-5. Types of riveted joints
19-5-1. Lap joint
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19-6. Rolled-steel sections
19-6-1. Connection of plates at right angles
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19-7-1. Welding
19-7-2. Types of welding process
   (i) Pressure welding or forge welding
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   (iii) Fusion and pressure welding

Types of welded joints
Types of welds
19-7-3. Representation of welded joints
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20-0. Introduction
   (i) A journal bearing
   (ii) A pivot bearing
   (iii) A collar or thrust bearing
20-1. Journal bearings
20-1-1. Solid bearing
20-1-2. Bushed bearing
20-1-3. Pedestal bearing or plummer block
20-1-4. Methods of preventing rotation of brasses in a bearing
20-2. Pivot bearing
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21-1. Types of Pulleys
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21-3. Fast and loose pulleys
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22-1. Types of assembly drawings
   (i) Designed assembly
   (ii) Layout assembly
   (iii) Installation assembly
   (iv) Working drawing assembly
   (v) General assembly
22-2. Accepted norms to be observed for assembly drawings
   (i) Selection of views
   (ii) Sectioning
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   (iv) Dimensions
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