

# GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD.

## ENGINEERING DRAWING

### 1. RATIONALE :

Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realisation.

It is an attempt to develop fundamental understanding and application of Engg. Drawing. It covers knowledge & application of drawing instruments & also familiarise the learner about Bureau of Indian standards. The curriculum aims at developing the ability to draw and read various drawings, curves & projections.

### 2. SCHEME OF TEACHING

<b>Sr. No.</b>	<b>Topic</b>	<b>Th Hrs</b>	<b>Pr Hrs</b>	<b>Total Hrs</b>
1.	Uses of Drawing Aids	–	6	6
2.	Planning & Layout of Drawing	–	2	2
3.	Lines, Lettering & dimensioning	–	6	6
4.	Engineering Curves	6	8	14
5.	Projection of points, Lines & Planes	8	10	18
6.	Orthographic Projections	6	10	16
7.	Isometric Projections	5	8	13
8.	Fasteners	–	2	2
9.	Graphs & Charts	2	4	6
10.	Modern methods of storing, reproduction of drawings	1	–	1
<b>Grand Total</b>		<b>28</b>	<b>56</b>	<b>84</b>

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## 3. OBJECTIVES :-

1. Use drawing equipment, instruments & Materials. (Topic 1)
2. Follow and apply standard practice as per bureau of I.S for planning & layout. (Topic 2)
3. Develop the ability to use Lines, lettering & dimensioning. (Topic 3)
4. Develop the ability to draw Engg. curves with proficiency and speed. (Topic 4)
5. Develop concepts of orthographic projections. (Topic 5)
6. Draw the projection of points, lines and planes. (Topic 5)
7. Draw the orthographic views of objects. (Topic 6)
8. Develop the concept & ability to draw the isometric views. (Topic 7)
9. Sketch various fasteners. (Topic 8)
10. Prepare graphs & charts as per need. (Topic 9)
11. Develop the awareness of reproduction and modern storing methods of drawings. (Topic 10)

## 4. TOPICS & SUB TOPICS :-

### TOPIC 1. USES OF DRAWING AIDS :

- Drawing equipment instruments and materials
- Construction of Polygons.

### TOPIC 2. PLANNING & LAYOUT OF DRAWING :

- I.S. codes for planning & layout

### TOPIC 3. LINES, LETTERING & DIMENSIONING :

- Different types of lines
- Vertical capital & lower case letters
- Inclined capital & lower case letters
- Numerals & Greek alphabets.
- Dimensioning methods—aligned method & unilateral with chain, parallel, progressive & combined dimensioning.

### TOPIC 4. ENGINEERING CURVES :

- Various types of curves like Ellipse, parabola, hyperbola, cycloid, epicycloid, hypocycloid, Involute & spiral.

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## **TOPIC 5. PROJECTIONS OF POINTS, LINES & PLANES :**

- Reference planes, orthographic projections
- 1st Angle and 3rd Angle
- Projections of points
- Projections of Lines–determination of true lengths & inclinations.
- Projections of plane–determination of true shape.

## **TOPIC 6. ORTHOGRAPHIC PROJECTIONS :**

- Front view
- Top view
- Side view
- Bottom view & rear view

## **TOPIC 7. ISOMETRIC PROJECTIONS :**

- Difference between isometric projections & isometric drawing.
- Isometric views & isometric projections.

## **TOPIC 8. FASTENERS :**

- Detachable & permanent fasteners–difference
- Sketches of elements of screw threads
- Sketches of thread forms–B.S, B.A,
- Square with worm, Acme with Knuckle
- Buttress–Seller Unified.
- Internal & external threads
- Left hand & right hand threads
- Single & multi start threads
- Lead & pitch
- Sketches of studs, cap screws machine screws, set screws, Locking devices, bolts, hexagonal & square nuts & nut bolt & washer assembly.
- Sketches of plain spring lock, toothed lock, washers, cap nut, check nut, slotted nut, cassette\ nut, sawn nut, wing nut, eye bolt, tee bolt & foundation bolt.
- Sketches of various types of rivet heads (snap–pan–conical–countersunk)
- Sketches of keys (sunk, flat, saddle, gib head, woodruff)
- Sketches of hole & shaft Assembly.

## **TOPIC 9. GRAPHS & CHARTS :**

- Advantages–types (Bar, Pie, Percentage bar, Logarithmic)
- Preparation & interpretation of the graphs and charts.

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## **TOPIC 10. MODERN METHODS OF STORING & REPRODUCTION OF DRAWING :**

- Advantages
- Methods- Micro films & computer Aided

### **5. LABORATORY PRACTICE :**

#### **Sheet 1 :- Use of drawing Instruments. Tee square & set square.**

- Problem – 1 Drawing horizontal, vertical, 30 degree, 45 degree, 60 & 75 degree lines using Tee and set square.
- Problem – 2 Types of Lines
- Problem – 3 Types of dimensioning
- Problem – 4 Alphabets & Numerical ( Vertical & inclined as per I.S.)
- Problem – 5 Drawing Polygon

#### **Sheet 2 :- Types of Curves**

- Problem – 1 Construction of Ellipse using any two methods
- Problem – 2 Construction of parabola
- Problem – 3 Construction of Hyperbola
- Problem – 4 Construction of spiral
- Problem – 5 Construction of Hypocycloid & Epicycloid
- Problem – 6 Construction of involute

#### **Sheet 3 :- Projection of points & lines**

- Problem – 1 Projection of points
- Problem – 2 to 6 Projection of Lines with different conditions

#### **Sheet 4 :- Projections of Plane**

- Problem – 1 to 4 Projection of different planes with different situations.

#### **Sheet 5 :- Orthographic projections**

- Problem – 1 to 3 Orthographic projection of different blocks

#### **Sheet 6 :- Problem 1 to 2 on Multi views**

#### **Sheet 7 :- Isometric Projections**

- Problem – 1 to 3 Isometric drawing

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### Note :-

- (1) Theory & Practical should be in First Angle Projections and IS Code should be followed wherever applicable.
- (2) The sketchbook containing all problems and solutions of sheets and sketches of fasteners, graph, charts is to be submitted with sheets.
- (3) A hand out containing applicable standards from IS Code should be given to each students by concerned teacher.

### 6. REFERENCES :-

1. Elements of Engg. Drawing – N.D. Bhatt
2. Engineering Drawing – P.J.Shah
3. Fundamentals of Engg. Drawing – W.J.Luzzadar
4. Fundamentals of Drawing – K.R.Gopalkrishna
5. Engg. Drawing – Parkinson & Zozzora
6. Machine Drawing – V. Laxminarayan & M.L.Mathur
7. Fundamentals of Engg. Drawing – French & Vierck

### 7. ASSESSMENT SCHEME :

Sr. No.	Topic	Percentage weightage
1.	Uses of Drawing Aids	05
2.	Planning & Layout of Drawing	05
3.	Lines, Lettering & dimensioning	05
4.	Engineering Curves	10
5.	Projection of points, Lines & Planes	15
6.	Orthographic Projections	20
7.	Isometric Projections	15
8.	Fasteners	10
9.	Graphs & Charts	10
10.	Modern methods of storing, reproduction of drawings	05
	TOTAL	100