

# C.U.SHAH UNIVERSITY – Wadhwan City



**FACULTY OF:** Technology and Engineering (Diploma Engineering)

**DEPARTMENT OF:** Mechanical Engineering

**SEMESTER:** - II      **CODE:** - 2TE02END1

**NAME –** Engineering Drawing

## Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme								
		Th	Tu	Pr	Total		Theory				Practical (Marks)				Total Marks
							Sessional Exam		University Exam		Internal		University		
							Marks	Hours	Marks	Hours	Pr	TW	Pr		
<u>2TE02END1</u>	<b>Engineering Drawing</b>	2	0	4	6	4	30	1.5	70	03	30	20	----	150	

### Objectives: -

- To understand Engineering Drawing
- To understand Lines, Lettering and Dimensioning,
- To get knowledge of projection like front view, top view, side view, bottom view and rear view.
- To understand method of Projection.
- To understand orthographic and isometric projection.

### Prerequisites: -

- Basic knowledge of geometry

### Course Outlines:-

Sr. No.	Course Contents	Number of Hours
<b>1</b>	<b>Fundamental Of Engineering Drawing:</b> Introduction to Engineering Drawing, Drawing instruments and its applications-Drawing Board , T-Square, Mini Drafter, Set-Square, Instrument Box, Engineer’s Scales, Drawing board Clips, Pencils, Eraser, Protractor, French Curves, Duster, Drawing Papers, Title Block, Planning and Layout as per IS, Different types of Lines, Vertical and Inclined Letters-Single stroke and Gothic numerals and Alphabets, Dimensioning- Dimensioning systems, Dimensioning of circle, angles etc.	---
<b>2</b>	<b>Scales:</b> Introduction, Representative Fraction (RF), Definition with formula, Full scale, Reducing scale and Enlarging scale, To find out the RF for various lengths, Construction of Scales, Types of Scales-Plain scales, Diagonal scales, Comparative scales, Vernier scale and Scale of chord (Only name and applications), Plain scales-Method of onstruction and problems, Diagonal scales-Principle of diagonal scale, Methods of Construction and problems, Exercises.	<b>03</b>

3	<p><b>Geometric Construction:</b>          Geometric construction related with line-Bisecting a line, to draw perpendicular with a given line, divide a line into some equal divisions, to draw a parallel line to a given straight line to draw a parallel line passing through a point etc., Geometric construction related with circle and arc-to make 8 or 12 equal divisions using set-squares and compass, Bisect an arc etc., Geometric construction related with angle- Bisect an angle, trisect an angle, to draw an arc or circle of given radius into it, Construction of polygons-like Triangle, Square/Rectangle, Pentagon and Hexagon by general (universal) and special methods, To draw tangent, Exercises.</p>	03
4	<p><b>Engineering Curves:</b>          Introduction, Conic sections-Definition, Axis, Vertex and Focus, Types like Ellipse, Parabola and Hyperbola. Different methods of construction of Ellipse, Parabola and Hyperbola, Cycloid Curves-Cycloid, Epicycloids and Hypocycloid, Definition and methods of construction, Involutives- Definition and construction of Involutives of circle and polygons, Spiral- Definition, Archimedean spiral, method of construction, Exercises</p>	06
5	<p><b>Projection Of Points, Lines And Planes:</b>          Projection, Orthographic projection Concept of quadrant, Planes of projections, reference line etc., Projections of points-Position of points in different quadrant in reference to H.P and V.P., Conventions employed Exercises, Projections of Straight Lines-(a) Line parallel to one plane and perpendicular to the other, Line parallel to the HP and perpendicular to the VP. Line parallel to the VP and perpendicular to the HP (b) Line parallel to both the planes (HP and VP) (c) Line parallel to one plane and inclined to the other, Line parallel to the HP and inclined to the VP. Line parallel to the VP and inclined to the HP Line inclined to both the planes (HP and VP) Exercises Projections of Planes-Plane parallel to one plane and perpendicular to the other, Projection, Orthographic projection Concept of quadrant, Planes of projections, reference line etc., Projections of points-Position of points in different quadrant in reference to H.P and V.P., Conventions employed Exercises.</p>	06
6	<p><b>Orthographic Projections:</b>          Principle of projection, Types of projections-Parallel, Perspective and Oblique, Remember- Orthographic projection Concept of quadrant, Planes of projections, reference line etc., Methods of projection- First angle projection and Third angle projection, Symbols for methods of projection (BIS code of practice), Exercises.</p>	06
7	<p><b>Isometric Projections:</b>          Introduction, Isometric axis, Isometric lines and Isometric planes, Isometric views of plane geometric figures like Triangle, Pentagon, Hexagon etc., Difference between Isometric Drawing/View and Isometric Projection, Constructions of Isometric circle (Four centre method) and Isometric scale, Exercises.</p>	04

<b>8</b>	<b>Introduction To Computer Aided Drawing:</b> Introduction, Basic knowhow of computer hardware, software and peripherals, AutoCAD screen, library, symbols, templates in context of machine drawing, Simple 2D production drawings using AutoCAD	<b>02</b>
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### List of Experiments:

- **Sketch Book Work**

Demonstration of the following (Teacher will demonstrate)-

- (a) Drawing Instruments and its uses.
- (b) Planning and Layout as per IS –Border line, Margin, Title Block with detail and dimensions.
- (c) Dimensioning system and technique.

Draw following (Practice sheet)-

Problem -1, Draw Horizontal, Vertical and Inclined lines at 30°, 45°, 60° and 75° using Tee square, Set squares or Mini drafter.

Problem -2, Types of Lines.

Problem -3, Dimensioning system-Aligned, Unidirectional, Parallel and Chain dimensioning. Dimensioning of Arc, Circle and Angle.

Problem -4, Alphabets and Numerical (vertical and inclined As per IS).

- **Scale**

Problem -1 ,2 and 3 Construction of Plain scales

Problem -4 and 5 Construction of Diagonal scales

- **Geometric Construction**

Problem-1, To divide a circle into 12 equal parts (radial) using Set-squares and Compass (one each).

Problem-2, To divide a line into some equal parts.

Problem -3, 4 To draw parallel line to given line and through a given point.

Problem -5, 6 and 7, Construction of Polygons-Problem by Universal or General method, Problem by special Method, Problem by Inscribed circle.

Problem -8, Related to draw arcs and circles with different Geometric conditions and with line constraints.

- **Engineering Curves**

Problem -1, Draw an Ellipse by any one method.

Problem -2, Draw a Parabola by any one method.

Problem -3, Draw a Hyperbola by any one method.

Problem -4, Draw an Involute of a circle or a polygon .

Problem-5 Draw a Cycloid or Epicycloid and Hypocycloid.

Problem -6, Draw an Archimedean spiral..

- **Projections Of Points And Lines**  
Problem -1, Projection of points-for 8 various conditions.  
Problem-2 to 5 (Four problems), Projections of lines with Different conditions (Use 1<sup>st</sup> and 3<sup>rd</sup> quadrant only).
- **Projections Of Planes**  
Problem -1 to 4 (Four problems), Projections of planes with different conditions (square / rectangle, pentagon, Hexagon and circular planes one each).
- **Orthographic Projections**  
Problem -1 and 2 (Two problems)- Draw orthographic projections of different two objects (Draw Elevation, Plan, R.H Side view and/or L.H. Side view).
- **Isometric Drawings**  
Problem -1 and 2 (Two problems)-Draw isometric drawings from Given orthographic views
- **Computer Aided Drawings**  
Problem -1 and 2 (Two problems)-Draw simple 2D drawings using Auto-CAD software from Given views.

#### **Learning Outcomes:-**

- Drawing of object related to engineering stream.
- Know about IS Standard which are using in industries.
- Know about different types of shape are use in industries.
- Know about first and third angle drawing.

#### **Books Recommended:-**

- **N. D. Bhatt** “*Engineering Drawing*”, Charotar Publication
- **P. J. Shah** “*Engineering Graphics*”,
- **R.K.Dhavan** “*Engineering Drawing*” S Chand Publication
- **P.S.Gill** “*Engineering Drawing*” S.K.Kataria