

GANPAT UNIVERSITY					
FACULTY OF DIPLOMA ENGINEERING					
Programme	Diploma in Mechanical/Mechatronics/Auto/Civil/Petrochemical/ Chemical/Agriculture Engineering				
Semester	I&II		Version	1.0.0.0	
Effective from Academic Year		2025-26	Effective for the batch Admitted in		JULY 2025
Course code	1ES1101	Course Name	Engineering Drawing		

I.TEACHING-LEARNING AND ASSESSMENT SCHEME																		
Course Type	Course Code	Learning Scheme						Assessment Scheme										
		Actual Contact Hrs./Week			SLH	NLH	Credits	Theory				Practical			Based on SL		Total Marks	
		CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL	SLA			
								MAX	MAX	MAX	MIN	MAX	MAX	MAX	MIN	MAX		MIN
DSC	1ES1101	2	-	4	2	8	4	40	60	100	40	60	40	100	40	20	8	220

Abbreviation:	CL- Classroom Learning	TL - Tutorial Learning	LL - Laboratory Learning
	SLH - Self Learning Hours	NLH - Notional Learning Hours	SLA - Self Learning Assessment
	FA - Formative Assessment (Term work +Mid Sem Exam +Attendance)		SA - Summative Assessment

## II. PRE-REQUISITES

Engineering drawing is the universal language of engineers and technicians, serving as the primary means of communicating design ideas, specifications, and manufacturing instructions. Its rationale stems from several critical needs:

## III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES

Clearly show and understand design ideas through accurate technical pictures, ensuring everyone knows how to build things correctly.

## IV. COURSE LEARNING OUTCOMES

At the end of the course, students will be able to achieve the following course learning outcomes:

**CO1.** Learn to use various drawing instruments.

**CO2.** Draw geometrical figures and engineering curves.

**CO3.** Understand projections of points and lines.

**CO4.** Apply principles of orthographic projections for drawing given pictorial views.

**CO5.** Draw isometric views of a given component or from orthographic projections.

## V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:

Name of Unit	Theory Learning outcomes (TLO's) aligned to CO's	Learning Content mapped with Theory Learning outcomes (TLO's) & CO's	Marks	Hours
<b>Unit-1 Introduction</b>	<b>TLO 1.1</b> To know about the history of engineering drawing. <b>TLO 1.2</b> Prepare drawing using drawing instruments. <b>TLO 1.3</b> Use different I.S. Codes for planning and layout. <b>TLO 1.4</b> Use different types of dimensioning. <b>TLO 1.5</b> Use different types of lines. <b>TLO 1.6</b> Draw regular	<b>1.1</b> Explain the history of engineering drawing. (IKS) <b>1.2</b> Drawing Instruments and supporting material: Method to use them with applications, Standard sizes of drawing sheets (ISO-A series) <b>1.3</b> I.S. Codes for planning and layout. <b>1.4</b> Letters and numbers (single stroke vertical) <b>1.5</b> Convention of lines and their applications.	<b>06</b>	<b>02</b>

	geometrical figures. <b>TLO 1.7</b> Draw figures having tangency constructions.	<b>1.6</b> Scale - reduced, enlarged & full size <b>1.7</b> Dimensioning techniques as per SP-46 (Latest edition) – types and applications of chain, parallel and coordinate dimensioning.		
<b>Unit-2 Geometric Construction</b>	<b>TLO 2.1</b> Prepare Line using drawing instruments.  <b>TLO 2.2</b> Draw Angle using different drawing instruments. <b>TLO 2.3</b> Prepare polygons using drawing instruments.	<b>2.1</b> Geometric construction related examples with lines like bisecting a line, divide a line, etc. <b>2.2</b> Geometric construction related examples with angles like bisect an angle, trisect an angle, etc. <b>2.3</b> To construct polygons with different methods (Special method, General Method). <b>2.4</b> To draw tangents. <b>2.5</b> Geometric construction related example with circle and arc.	<b>06</b>	<b>03</b>
<b>Unit-3 Engineering Curves</b>	<b>TLO 3.1</b> Explain different engineering curves with areas of application. <b>TLO 3.2</b> Draw different conic sections.  <b>TLO 3.3</b> Draw involute and cycloidal curves.  <b>TLO 3.4</b> Draw helix and spiral curves from given data	<b>3.1</b> Concept and understanding of focus, directrix, vertex and eccentricity. Conic sections. <b>3.2</b> Methods to draw an ellipse by Arcs of circle method & Concentric circles method. <b>3.3</b> Methods to draw a parabola by Directrix-Focus method & Rectangle method <b>3.4</b> Methods to draw a hyperbola by Directrix-Focus method. <b>3.5</b> Methods to draw involutes: circle & pentagon <b>3.6</b> Methods to draw Cycloidal curve: cycloid, epicycloid and hypocycloid <b>3.7</b> Methods to draw Helix & Archimedean spiral.	<b>12</b>	<b>05</b>
<b>Unit-4 Projection of Points and Lines</b>	<b>TLO 4.1</b> Define and identify the principal planes of projection to Locate and represent the projections of a point in all four quadrants with respect to the HP and VP. <b>TLO 4.2</b> Draw the projections of a straight line when its inclinations to the HP and VP are given	<b>4.1</b> Introduction to principal planes of projections, Projections of points. <b>4.2</b> Projections of line with its inclination to HP and VP, True length.	<b>08</b>	<b>05</b>
<b>Unit-5 Projection of Planes</b>	<b>TLO 5.1</b> Draw projections of planes parallel to reference planes, and inclined to one reference plane and perpendicular to another.	<b>5.1</b> Types of Planes. <b>5.2</b> Projection of planes for following different conditions - a) Plane parallel to one of the reference planes.	<b>08</b>	<b>05</b>

		<b>b) Plane inclined to one reference plane and perpendicular to another plane.</b>		
<b>Unit-6 Orthographic Projections</b>	<b>TLO 6.1</b> Explain methods of orthographic projections. <b>TLO 6.2</b> Draw orthographic views of simple 2D entities containing lines, circles and arcs only. <b>TLO 6.3</b> Draw the orthographic views from given pictorial views.	<b>6.1</b> Introduction of projections - orthographic, perspective, isometric and oblique: concept and applications. <b>6.2</b> Introduction to orthographic projection, First angle and Third angle method, their symbols. Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces. (use First Angle Projection method)	<b>10</b>	<b>05</b>
<b>Unit-7 Isometric Projections</b>	<b>TLO 7.1</b> Prepare isometric scale. <b>TLO 7.2</b> Draw isometric views of simple 2D entities containing lines, circles and arcs only. <b>TLO 7.3</b> Interpret the given orthographic views. <b>TLO 7.4</b> Draw Isometric views from given orthographic views	<b>7.1</b> Introduction to Isometric projection. <b>7.2</b> Isometric scale and Natural Scale. <b>7.3</b> Isometric view and isometric projection. <b>7.4</b> Illustrative problems related to simple objects having plain, slanting, cylindrical surfaces and slots on slanting surfaces. <b>7.5</b> Conversion of orthographic views into isometric View/projection.	<b>10</b>	<b>05</b>

<b>VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL</b>			
<b>Sr. No.</b>	<b>Practical/Laboratory Learning Outcome (LLO)</b>	<b>Practical Titles</b>	<b>Relevant COs</b>
1	<b>LLO 1.1</b> Use of drawing instruments	Draw horizontal, vertical, 30°, 45°, 60° & 75° lines using Tee and Set squares / drafter.	CO1
2	<b>LLO 2.1</b> Use of IS code related to dimensioning standard	Draw different types of lines and dimensioning styles.	CO1, CO2
3	<b>LLO 3.1</b> Identify different engineering curves	Draw Different Engineering Curves with accurate use of drawing instruments.	CO1, CO2
4	<b>LLO 4.1</b> Solve problems with different positions of a line	Draw projections of the line and find out various parameters associated with it.	CO3
5	<b>LLO 5.1</b> Solve problems with different positions of a plane	Draw projections of the plane with inclination with HP and VP.	CO3
6	<b>LLO 6.1</b> Apply method of projection for drawing simple and complex orthographic views.	Draw problems on orthographic projections using first and third angle method of projection having plain surfaces, slanting surfaces, cylindrical surfaces, ribs and slots etc.-	CO1, CO4
7	<b>LLO 7.1</b> Draw simple isometric projections	Draw problems on Isometric Projection of objects having cylindrical surfaces and slots on slanting surfaces by using isometric scale.	CO5

## VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

Prepare models from different materials such as cardboard, thermocol or wood
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## VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD

1	Set of various industrial drawings being used by industries.
2	Drawing Table with Drawing Board of Full Imperial / A1 size.
3	Models of objects for orthographic / isometric projections
4	Drawing equipment and instruments for classroom teaching - large size: <ol style="list-style-type: none"> <li>T-square or drafter (Drafting Machine).</li> <li>Set squares (<math>45^\circ</math> and <math>30^\circ</math>-<math>60^\circ</math>)</li> <li>Protector.</li> <li>Drawing instrument box (containing set of compasses and dividers). Drawing sheets, drawing pencils, Eraser, Drawing pins / clips</li> </ol>
5	Models of objects for orthographic / isometric projections.

## IX. LIST OF REFERENCE BOOKS

Sr.No.	Title	Author	Publication
1	Engineering Drawing	P. J. Shah	S. Chand Publication
2	Elements of Engineering Drawing	N. D. Bhatt	Charotar Publishing House
3	Engineering Graphics	Arunoday Kumar	Tech-Max Publications

X. LINK OF LEARNING WEB RESOURCE	

1	<a href="https://www.youtube.com/watch?v=fvjk7PlxAuo">https://www.youtube.com/watch?v=fvjk7PlxAuo</a>
2	<a href="https://www.youtube.com/watch?v=3WXPanCq9LI">https://www.youtube.com/watch?v=3WXPanCq9LI</a>
3	<a href="https://www.youtube.com/watch?v=_MQScnLXL0M">https://www.youtube.com/watch?v=_MQScnLXL0M</a>
4	<a href="https://www.youtube.com/watch?v=8j711OWhMIE">https://www.youtube.com/watch?v=8j711OWhMIE</a>

## XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE

Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	Introduction	CO1	2	4	2	0	06
2	Geometric Construction	CO1, CO2	3	0	5	1	06
3	Engineering Curves	CO2	5	6	2	4	12
4	Projection of Points and Lines	CO3	5	2	4	2	08
5	Projection of Planes	CO3	5	2	2	4	08
6	Orthographic Projections	CO1, CO4	5	2	6	2	10
7	Isometric Projections	CO5	5	2	4	4	10
Grand Total			30	18	25	17	60

## XII. COs AND POs AND PSOs MAPPING

Course outcome (Cos)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
<b>CO1</b>	2	0	0	3	0	1	3	3	2	0
<b>CO2</b>	3	3	1	3	1	0	2	3	3	0
<b>CO3</b>	1	1	3	2	0	0	2	2	1	1
<b>CO4</b>	3	1	2	3	2	1	3	2	3	2
<b>CO5</b>	2	2	0	2	1	1	3	3	1	0

**Legends:** - 3- *High*      2-*Moderate/Medium*      1-*Slight/Low*      0-*None*