25ME102: Engineering Graphics

w. e. f. Academic Year:	**2025-26**
Semester:	**1/2**
Category of the Course:	**Engineering Science**
Prerequisite:	Zeal to learn the subject
Rationale:	Engineering Drawing is a powerful and effective language that enables engineers to communicate ideas with precision and clarity. It forms the foundational block that strengthens the entire engineering and technological framework. Beyond its technical utility, engineering drawing acts as a crucial link between conceptualization and realization — transforming abstract ideas into tangible, functional outcomes.

Course Outcomes:

After Completion of the Course, Student will able to:

	Course Outcome (CO)	**RBT Level (Cognitive Domain)**
CO1	Understand and apply the fundamentals of engineering graphics including drawing instruments, lines, lettering, dimensioning, and scales to create basic geometrical constructions.	Understand / Apply
CO2	Analyze and construct various engineering curves such as conics, cycloid, involutes, spirals, helix, and explain loci of points for mechanical mechanisms.	Analyze / Create
CO3	Apply the concepts of projection to represent points, lines, and planes in different quadrants, and determine their true length and inclinations using orthographic projection principles.	Apply / Evaluate
CO4	Classify and develop projections of solids including prisms, pyramids, cylinders, cones, and their sections; construct true shape of sections and develop surfaces using parallel and radial line methods.	Understand / Create
CO5	Demonstrate proficiency in first and third angle orthographic projections, including multi-view and sectional drawings, to accurately represent engineering objects.	Apply / Analyze
CO6	Convert orthographic projections to isometric views and projections, and use isometric scales to create 3D representations of engineering components.	Apply / Create

Teaching and Evaluation Scheme:

Teaching Scheme					**Examination Scheme**				
L	**T**	**P**	**C**	**Hrs/Week**	**IE**	**Theory**	**CIA**	**Practical**	**Total Marks**
2	-	4	4	6	40	60	30	20	150

IE: Internal Evaluation Theory: Theory Exam (End Semester)

CIA: Continuous Internal Assessment Practical: Practical Exam (End Semester)

Detailed Syllabus:

Topic		Hrs.	% of Weightage
UNIT: 1	**Fundamentals of Engineering Graphics & Scales**	**04**	**13**
Introduction to Engineering Graphics, Drawing Instruments, BIS SP: 46 Code, Types of Lines, Lettering, Dimensioning, Basic Geometrical Constructions, Types of Scales (Plane, Diagonal), Representative Fraction.			
UNIT: 2	**Engineering Curves and Loci of Points**	**04**	**13**
Classification and Construction of Engineering Curves: Conics (Ellipse, Parabola, Hyperbola), Cycloid, Involutes. Loci of Points for Mechanisms: Slider Crank Mechanism, Four Bar Chain, Pendulum, Rotating Disc, and Simple Mechanical Arrangements.			
UNIT: 3	**Projection of Points, Lines and Planes**	**06**	**20**
Principal Planes, Types of Projections, Projection of Points in all quadrants, Projection of Lines inclined to one or both reference planes, True Length and Inclinations. Projections of Planes with inclinations to one or both reference planes			
UNIT: 4	**Projection, Section and Development of Solids**	**06**	**20**
Classification of Solids, Projections of Solids (Prism, Pyramid, Cylinder, Cone) with inclinations, Frustum of Solids, Section of Solids, True Shape of Section, Development of Surfaces (Parallel and Radial Line Method)			
UNIT: 5	**Orthographic Projections**	**05**	**17**
First and Third Angle Projections, Multi-View Drawings (Front, Top, Side), Full Sectional Views.			
UNIT: 6	**Isometric Projections and Views**	**05**	**17**
Isometric Scale, Conversion from Orthographic to Isometric Views and Isometric Projections			
		30	

List of Practical:

Topic	Hrs
Practice Drawing	04
Scales	04
Loci of Points	04
Engineering Curves	06
Projection of Points	02
Projection of Lines	04
Projection of Planes	04
Projection of Solids	06
Section of Solids	06
Development of Solids	04
Orthographic Projections	08
Isometric Projections and Views	08
	60

Reference Books:

1. N.D.Bhatt, “Engineering Drawing”, 53rd Edition, 2014, Charotar Publishing house Pvt. Ltd. Anand and Gujarat.
2. P.J.Shah, “A Text Book of Engineering Graphics” S.Chand & Company Ltd. New Delhi.
3. P.S.Gill, “A Text Book of Engineering Drawing, S.K.Kataria & Sons, Delhi.
4. B. Agrawal and C M Agrawal, “Engineering Drawing”, Tata McGraw Hill, New Delhi

Course Outcomes Mapping:

CO	Course Outcome (CO)	POs/ PSOs Mapped	Cognitive Level (RBT)	Knowledge Category	Lecture (Hrs)	Lab (Hrs)
CO1	Understand and apply the fundamentals of engineering graphics including drawing instruments, lines, lettering, dimensioning, and scales to create basic geometrical constructions.	PO1, PO5, PSO2	Understand, Apply	Conceptual Procedural	04	08
CO2	Analyze and construct various engineering curves such as conics, cycloid, involutes, spirals, helix, and explain loci of points for mechanical mechanisms.	PO2, PO3, PO4, PSO1	Analyze, Apply	Procedural	04	10
CO3	Apply the concepts of projection to represent points, lines, and planes in different quadrants, and determine their true length and inclinations using orthographic projection principles.	PO1, PO2, PO5, PSO1, PSO2	Apply	Procedural	06	10
CO4	Classify and develop projections of solids including prisms, pyramids, cylinders, cones, and their sections; construct true shape of sections and develop surfaces using parallel and radial line methods.	PO2, PO3, PO5, PSO1	Analyze, Apply	Procedural Conceptual	06	16
CO5	Demonstrate proficiency in first and third angle orthographic projections,	PO1, PO3, PO10,	Apply	Procedural	05	08

	including multi-view and sectional drawings, to accurately represent engineering objects.	PSO2				
CO6	Convert orthographic projections to isometric views and projections, and use isometric scales to create 3D representations of engineering components.	PO1, PO3, PO5, PSO1, PSO2	Apply	Procedural	05	08

Mapping of COs with POs & PSOs:

CO	PO												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3				2									3
CO2		3	2	2									3	
CO3	3	2			3								2	2
CO4		2	3		2								3	
CO5	3		3							2				3
CO6	3		3		3								2	3

3: High, 2: Medium, 1: Low