

Code: 1BCEDME103/203**Course: Computer Aided Engineering Drawing for ME****Credits: 3****L:T:P 2:0:2****SEE: 50%****CIE: 50%****SEE Hours: 3****Max. Marks:100**

Learning objectives	<ul style="list-style-type: none"> To introduce engineering drawing as a fundamental language for communicating technical ideas in mechanical engineering. To develop proficiency in using both manual sketching and CAD software for creating, interpreting, and modifying engineering drawings. To apply geometric constructions, orthographic projections, isometric views, and surface development techniques to visualize and design engineering components. To integrate computer-aided design tools for real-world mechanical applications such as machine parts, sheet-metal components, and assemblies. To strengthen spatial visualization skills, design interpretation, and professional presentation of engineering drawings.
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Course Outcomes:*On the successful completion of the course, the student will be able to*

COs	Course Outcomes	Bloom's level
CO1	Interpret and construct engineering drawings using standard conventions (lines, scales, dimensions, symbols) through manual sketching and CAD tools.	Understand, Apply
CO2	Apply orthographic and isometric projection techniques to represent basic geometries accurately.	Apply, Analyze
CO3	Develop solids and generate their surface for practical applications	Apply, Analyze
CO4	Demonstrate the ability to prepare, organize, and present engineering drawings effectively for mechanical design communication and documentation.	Apply, Analyze

Mapping with POs and PSOs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11		PSO1	PSO2	PSO3	PO4
CO1	3	2	1	-	2	-	-	-	1	2	1		2	-	2	1
CO2	3	3	2	1	2	-	1	-	1	2	1		2	1	3	1
CO3	3	3	3	2	2	1	2	-	2	2	1		3	2	3	1
CO4	2	2	2	1	3	-	1	1	3	3	1		2	1	2	3

Mapping Strength: Strong– 3 Medium – 2 Low – 1

Course Structure

		No. of Lecture Hours	No. of Tutorial Hours	No. of Practical Hours
Module – 1				
1.1	Introduction to Computer Aided Sketching: Drawing Instruments and their uses, BIS conventions, Dimensioning, Drawing Scales and free hand practicing. (All sketching to be done on A4 Sheets)	2		
1.2	Introduction to Computer Aided Drafting Software i.e. Solid Edge standard tool bar/menus. Co-ordinate system, selection of drawing sheet size and scale. Commands and creation of Points, Lines, axis, poly-lines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet, curves, constraints viz. tangency, parallelism, inclination and perpendicularity. Dimensioning conventions.	2		1
1.3	Orthographic Projections of Points and Lines: Introduction to Orthographic Projections, Projections of points in all four quadrants, Orthographic projection of lines (Placed in first quadrant only). <i>Application on projection of Lines (For CIE only).</i>	5		3
Module – 2				
2.1	Orthographic Projections of Plane Surfaces: Orthographic projection of planes viz. regular polygons like triangle, square, rectangle, pentagon, hexagon, & circular laminae.	4		3
Module – 3				
3.1	Orthographic Projections of Solids: Orthographic Projections of right regular solids like prisms, pyramids, cylinders, cones, Cubes and tetrahedron (<i>Solids resting on HP only</i>).	5		4
3.2	Section of Solids: Introduction, Section planes, Sectional views: apparent shapes and true shapes, Sections of right regular prisms, pyramids, cylinders and cones resting with their base on HP. (Concepts only and No Problems for practice)	1		
Module – 4				
4.1	Development of Lateral Surfaces of solids: Development of lateral surfaces of right, regular prisms, cylinders, cones & pyramids resting with base on HP only. <i>Application problems related to development of lateral surfaces like funnels and trays (For CIE only).</i> <i>Sheet Metal & Surface Design: Automotive panels, HVAC ducting (For CIE only).</i>	3		3
Module – 5				
5.1	Isometric Projection: Isometric scale, Isometric projection of plane figures, solids: tetrahedron, hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres, Isometric projection of combination of two simple solids. <i>3D Modeling: Simple machine parts / engineering components. (Applying material properties and rendering for realistic visualization) (For CIE only).</i>	3		1
Total No. of Lecture Hours		25		
Total No. of Tutorial Hours				
Total No. of Practical Hours				15

Text Books:

1. Engineering Drawing by N.D. Bhatt & V.M. Panchal, 53rd edition, 2019-CharotarPublishing House, Gujarat.
2. Engineering Graphics by K.R. Gopalakrishna, 32nd edition, 2010- Subash Publishers Bangalore.

Reference Books:

1. Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production- by Luzadder Warren J. Economy Edition, 2005- Prentice Hall of India Pvt. Ltd., NewDelhi.

MOOC Resources:

1. <https://Intedutech.com/courses/engineering-graphics-and-design/> (SWAYAM Plus)

Online Resources:

1. Mechanical Engineering Department's YouTube channel:
<https://youtube.com/channel/UCXOY3X4xcbTFIczaNVhESQw>
2. Projections of Points:
<https://youtube.com/playlist?list=PLSYYrV4OuACSIPD3LHQBT5huxrb3o8HM1>
3. Projections of Lines:
<https://youtube.com/playlist?list=PLSYYrV4OuACSmvN5qnKdvM3yzldjp5238>
4. Projections of Planes:
<https://youtube.com/playlist?list=PLSYYrV4OuACTL9RO6NjXdrw3EktYjpfZX>
5. Projections of Solids:
<https://youtube.com/playlist?list=PLSYYrV4OuACSAbmbyoKV33NxB9gCDPsao>
6. Development of Surfaces:
<https://youtube.com/playlist?list=PLSYYrV4OuACTb68S2CT0ncIQl353poXo8>
7. Isometric projections: <https://youtube.com/playlist?list=PLSYYrV4OuACTGMtF0X3QGT-av0V02jnTr>