Semester: I/II			
Course Title	Computer Aided Engineering Drawing (CAED)	**CIE Marks**	50
Course Code	BMECAD103/203	**SEE Marks**	50
Course Type	Theory	**Total Marks**	100
Course Category	ESC	**SEE Duration**	03 hrs
Hours Per Week	2L : 0T : 2P	**SEE Type**	Written
Total Hours	40 hrs	**Credits**	03

Course Learning Objectives
This course will enable the students to
• Engineering drawing is the language of the engineers and technicians; therefore, the intent of this course is to introduce and equip the students with the basic principles of engineering drawing and conventions of engineering graphical communication with the aid of computer software.
• To enhance and acquaint with the basic knowledge, skills and capability to read, interpret and prepare digital drawings by applying 2D techniques of Computer Aided Drafting.
• To understand the concept of Orthographic projections and practice drawing the principal views of Points, Straight Lines, Plane surfaces and Solids, using First angle projections
• To understand and practice the concept of Isometric projections and Development of Lateral surfaces.
Pre-Requisites
• Computer literacy, Geometrical Constructions, Visualization

Module-1	**(10 hrs)**
Introduction: (for CIE only) Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Sizes of Drawing sheets, Dimensioning. Introduction to Orthographic projections, Principal Views and Principal Planes of Projections, Four Quadrant system of Projection. Introduction to Computer Aided Drafting software: Using all necessary Commands provided for Drawing, Editing, Modifying, and Dimensioning, Text, etc. Brief introduction of 2D/3D options **Projections of Points, Lines and Plane Surfaces**: Projections of points: Drawing all views of a Point when it is lying in all four quadrants. **Projections of Lines and Plane Surfaces** :(First Angle Projection Only): Projections of lines: Problems on Projections of Lines inclined to both HP and VP. (Mid-Point problem excluded) Projections of Plane Surfaces: Projections of Regular Plane surfaces viz triangle, square, rectangle, pentagon, hexagon, and circular lamina, using change of position method. (Plane surfaces Resting both on HP and VP). Simple application problems included.	
Module-2	**(12 hrs)**
Projection of Solids: Projection of right regular solids (Solids Resting on HP only): Prisms & Pyramids (Square, Pentagon, Hexagon), Cylinder, Cone, Cube & Tetrahedron. Pyramids resting on slant edge, slant triangular face and Cone resting on slant generator included. Problems of freely suspended square Prism and square Pyramid (For CIE only)	

Module-3	(8 hrs)
Isometric Projections: Isometric scale, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinder, cone, sphere, hemisphere and Frustum of pyramids and cone. Isometric projection of combination of two simple solids. Conversion of simple isometric drawings into orthographic views of simple machine components.	
Module-4	**(8 hrs)**
Development of Lateral Surfaces of Solids: Development of lateral surfaces of right regular prisms, cylinders, pyramids and cone resting with base on HP only. Development of lateral surfaces of their frustums. Problems on applications of development of lateral surfaces like funnel and tray. (For CIE Only)	
Module-5	**(2 hr)**
Multidisciplinary Applications & Practice (For CIE Only) **Drawing Simple Mechanisms;** Gear trains, Ratchets, Slider crank mechanism, four bar mechanism (Pantograph) to dimensions etc. **Electric Wiring and lighting diagrams;** Like Automatic fire alarm, Call bell system, UPS system, Basic power distribution system using suitable software **Basic Building Drawing;** Like Architectural floor plan, basic foundation drawing, steel structures-Frames, bridges, trusses using AutoCAD or suitable software, **Electronics Engineering Drawings**- Like, Simple Electronics Circuit Drawings, practice on layers concept. **Graphs & Charts:** Like Column chart, Pie chart, Line charts, Gantt charts, etc. using Microsoft Excel or any suitable software.	

Text Books:	
1.	"Engineering Drawing", N.D.Bhat, 54th Edition 2023, Charotar Publishing House Pvt Ltd.
2.	"Computer Aided Engineering Drawing: Engineering Graphics" with solid edge Limited, Reprint, 2022.
Reference Books:	
1.	"Engineering Visualization", S.N. Lal, & T Madhusudhan, 1st Edition, Cengage, Publication
2.	"Engineering Drawing", Parthasarathy N. S., Vela Murali, Oxford University Press,2015.
3.	"Electrical Engineering Drawing", Bhattacharya S. K., New Age International publishers, second edition 1998, reprint2005.
4.	"Printed Circuit Board Design using AutoCAD", Chris Schroder, Newnes,1997.
5.	"Design of steel structures", K S Sai Ram, Third Edition, Pearson
6.	"Design of foundation systems", Nainan P Kurian, Narosa publications
7.	"Electrical power distribution", A S Pabla, 6th edition, Tata McGraw-Hill

Course Outcome Statements: After the successful completion of the course, the student will be able to	
CO1	Apply Orthographic projections to draw projections of Points, Straight lines and Plane surfaces using a computer software.
CO2	Apply concept of orthographic projection to draw Principal views of Solids using a computer software.
CO3	Apply the concept of Isometric Projections to obtain pictorial view of an object and convert Isometric projections to Orthographic views using a computer software.
CO4	Apply the concept of Developments of lateral surfaces in engineering applications using a computer software.
CO5	Analyze to Interpret the concept of visualization and orthographic projections to draw engineering components or systems used in interdisciplinary engineering field.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	1	-	2	-	-	1	1	3	-	1
CO2	2	-	1	-	2	-	-	-	1	3	-	-
CO3	2	-	1	-	2	-	-	-	1	3	-	-
CO4	2	-	1	1	2	-	-	-	1	3	-	1
CO5	2	-	1	1	2	2	-	-	1	3	-	1
Avg.	**2**	**-**	**1**	**1**	**2**	**2**	**-**	**1**	**1**	**3**	**-**	**1**

3: High, 2: Medium, 1: Low