Semester: I/II			
Course Title	Computer Aided Engineering Drawing for CS Stream	**CIE Marks**	50
Course Code	BCSCAD113	**SEE Marks**	50
Course Type	Theory	**Total Marks**	100
Course Category	ESC	**SEE Duration**	03 hrs
Hours Per Week	2L: 0 T: 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: Significance of Engineering drawing, BIS Conventions of Engineering Drawing, Free hand sketching of engineering drawing, Scales. Introduction to Computer Aided Drafting software, Co-ordinate system and reference planes HP, VP, RPP & LPP of 2D/3D environment. Selection of drawing sheet size and scale. Commands and creation of Lines, coordinate points, axes, polylines, square, rectangle, polygons, splines, circles, ellipse, text, move, copy, off-set, mirror, rotate, trim, extend, break, chamfer, fillet and curves. **Orthographic Projections of Points, Lines and Planes:** Introduction to Orthographic projections, Orthographic projections of points in 1st and 3rd quadrants. Orthographic projections of lines (Placed in First quadrant only as per BIS) Orthographic projections of planes: triangular, square, rectangular, pentagonal, hexagonal and circular lamina (Placed in First quadrant only using change of position method).	
Module-2	**(10 hrs)**
Orthographic Projection of Solids: Orthographic projection of right regular solids (Resting on HP only and inclined to both the planes); Prisms, Pyramids, Cylinders & Cones.	
Module-3	**(08hrs)**
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) **Development of Lateral Surfaces of Solids:** Development of lateral surfaces of right regular Prisms, Pyramids, Cylinders & Cones and their frustums and truncations. Problems on applications of development of lateral surfaces like funnels and trays.	

Module-4:	(08 hrs)
Isometric Views: Introduction to Isometric views, Isometric projections, Isometric scale. Isometric view of hexahedron (cube), right regular prisms, pyramids, cylinders, cones and spheres, Isometric view of combination of two simple solids, step block. Conversion of simple isometric drawings into orthographic views: Problems on conversion of Isometric view of simple objects / engineering components into orthographic views.	
Module-5:	**(04 hrs)**
Computer Network Drawing (For CIE Only): 2D Network drawing with wired and wireless, Network topology - wired and wireless. 3D Modelling: Raspberry Pi / Arduino boards, Router & switches, IoT devices - Concept of converting to 3D printing format (stl) Concept of Industrial drawing.	

Text Books:	
1.	K. R. Gopalakrishna, & Sudhir Gopalakrishna: A Textbook of Computer Aided Engineering Drawing, 39th Edition, Subash Stores, Bangalore, 2017
2.	"Engineering Drawing", N.D. Bhat, 54th Edition 2023, Charotar Publishing House Pvt Ltd.
3.	"Computer Aided Engineering Drawing : Engineering Graphics" with solid edge Limited, Reprint.
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.	"Computer Aided Engineering Drawing", P.J. Shah, S. Chand Publishing, 2021
4.	"Engineering Drawing, M. B. Shah & B.C. Rana., Pearson Education, Revised Edition, 2009
5.	"Technical Drawing with Engineering Graphics" Frederick E. Giesecke, et al., , Prentice Hall, 2016

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 Planes 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 computet 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
CO1	2	-	1	-	2	-	-	1	1	3	1
CO2	2	-	1	-	2	-	-	-	1	3	-
CO3	2	-	1	-	2	-	-	-	1	3	-
CO4	2	-	1	-	2	-	-	-	1	3	-
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