SCHEME OF COURSE WORK

Course Details:

Course Title	**Engineering Drawing**		
Course Code	22ES11ED	**L T P C**	**1 0 4 3**
Program:	**B.Tech**		
Specialization:	**Mechanical Engineering (Robotics)**		
Semester	**II**		

Course Outcomes (COs): At the end of the course, the student will able to

CO1	Use engineering drawing instruments to draw various engineering curves (L3)
CO2	Show projections of lines, planes and solids (L3)
CO3	Draw conversion of orthographic to isometric views and vice versa (L3)
CO4	Model section of solids using CAD package (L3)
CO5	Model the development of surfaces and intersection of solids using CAD Package (L3)
CO6	Model isometric, orthographic and 3D solid models using CAD package (L3)

Program Outcomes (POs):

A graduate of mechanical engineering(robotics) will be able to

PO	Program Outcomes (POs)
1	Apply the knowledge of mathematics, science, engineering fundamentals to solve complex mechanical engineering problems including robotics applications.
2	Attain the capability to identify, formulate and analyze problems related to mechanical and robotics engineering.
3	Design solutions for mechanical and robotics system components and processes that meet the specified needs with appropriate consideration for public health and safety.
4	Perform analysis, conduct experiments and interpret data by using research methods such as design of experiments to synthesize the information and to provide valid conclusion.
5	Select and apply appropriate techniques and modern engineering software tools including prediction and modeling to complex mechanical and robotics systems.
6	Carry out their professional practice in mechanical engineering in particular robotics area by appropriately considering the issues related to society.
7	Understand the impact of the professional engineering solutions on environmental safety and legal issues.
8	Transform into responsible citizens by resorting to professional ethics and norms of the engineering practice.
9	Function effectively in individual capacity as well as a member in diverse teams and in multidisciplinary streams.
10	Communicate fluently with the engineering community and society; prepare reports; and make presentations effectively.
11	Apply knowledge of the engineering and management principles to deal with projects and their finance in multidisciplinary environments.
12	Engage themselves in independent and life-long learning for continuing professional practice in their specialized areas of mechanical and robotics engineering.

Course Outcome Versus Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	-	2	-	-	-	-	-	1	2	-	-
CO-2	3	-	2	-	-	-	-	-	1	2	-	-
CO-3	3	-	2	-	-	-	-	-	1	2	-	-
CO-4	3	-	2	-	-	-	-	-	1	2	-	-
CO-5	3	-	2	-	-	-	-	-	1	2	-	-
CO-6	3	-	2	-	-	-	-	-	1	2	-	-

1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), put -: No Correlation

Program Specific Objectives (PSOs):

The student must attain the knowledge and skills to

PSO-1	Design, analyze and develop mechanical and robotic systems that are cost effective and environment friendly using advanced tools and techniques.
PSO-2	Model, program and control safe and productive automation systems using various software tools and algorithms.
PSO-3	Apply domain knowledge of mechanical and robotics to provide solutions in interdisciplinary areas to meet current industrial and societal challenges.

Course Outcome Versus Program Specific Outcomes:

COs	PSO1	PSO2	PSO3
CO-1	3	1	-
CO-2	3	1	-
CO-3	3	1	-
CO-4	3	1	-
CO-5	3	1	-
CO-6	3	1	-

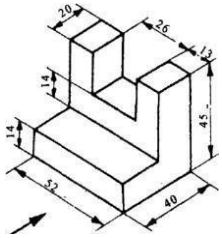
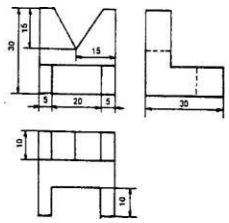
1: Slight (Low), 2: Moderate (Medium), 3: Substantial (High), put -: No Correlation

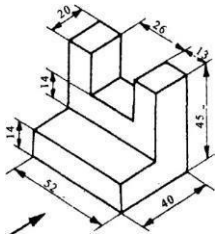
Assessment Methods:	Mid-Test / End Exam

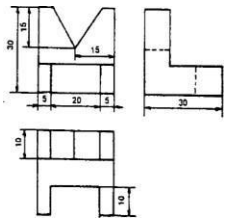
Teaching-Learning and Evaluation

Week	Topic / Contents	Course Outcomes	Sample Questions	*Teaching-Learning Strategy	Assessment Method & Schedule

1	Introduction to engineering graphics and their significance — Conventions in drawing,lettering and BIS conventions.	CO1	Explain the types of lines used in Engineering Practice	Lecture Drawing practice	Continuous Evaluation & Internal Examination
2	Construction of Conic sections including the rectangular hyperbola- general method only	CO 1	Construct a parabola, when the distance of the focus from the directrix is 50 mm and draw tangent and normal to it at a point 40 mm from focus	Lecture Drawing practice	Continuous Evaluation & Internal Examination
3	Cycloid, epicycloids, hypocycloid, involute of the circle	CO 1	A circle of 50 mm diameter rolls on the circumference of another circle of 175 mm diameter and outside it. Trace the locus of a point on the circumference of the Rolling circle for one complete revolution.Draw a tangent and a normal to the curve at a point 125 mm from the center of the directing circle	Lecture Drawing practice	Continuous Evaluation & Internal Examination
4	Projections of lines inclined to one plane Projections of lines inclined to both planes	CO 2	1. The length of the top view of a line parallel to the V.P. and inclined at 45° to the H.P. is 50 mm. One end of the line is 12 mm above the H.P. and 25 mm in front of the V.P. Draw the projections of the line and determine its true length. 2. A line PQ 75 mm long, has its end P in the V.P.and the end Q in the H.P. The line is inclined at 30° to the H.P. and at 60° to the V.P. Draw its projections.	Lecture Drawing practice	Continuous Evaluation & Internal Examination
5	Projections of planes inclined to one plane Projections of planes inclined to both the planes	CO 2	1. A regular pentagon of 25 mm side has one side on the ground. Its plane is inclined at 45° to the H.P. and perpendicular to the V.P. Draw its projections. 2. A rectangular plane surfaceof size L x W is positioned in the first quadrant and is inclined at an angle of 60° with the H.P. and 30° with the	Lecture Drawing practice	Continuous Evaluation & Internal Examination

			V.P. Draw its projection		
6	Projections of solids inclined to one plane Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone	C02	1. Draw the projections of a cylinder 75 mm diameter and 100 rnm long, lying on the ground with its axis inclined at 30° to the V.P. and parallel to the ground. 2. A hexagonal pyramid, base 30 mm side and axis 70 mm long is resting on its slant edge of the face on the horizontal plane.	Lecture Drawing practice	Continuous Evaluation & Internal Examination
7	Orthographic Projections: Systems of projections, conventions and application to orthographic Projections.	CO3	Draw orthographic projections of the given below Figure.  All dimensions are in mm	Lecture Drawing practice	Continuous Evaluation & Internal Examination
8	Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, p1anes, figures, simple and compound solids	CO3	Draw isometric projections of the given below Figure.  All dimensions are in mm	Lecture Drawing practice	Continuous Evaluation & Internal Examination
9	Lab internal exam 1				

10	Introduction to AutoCAD: Basic drawing and editing commands, Dimensioning principles and conventional representations.	CO4	Functional Keys and Menus of AutoCAD	Lecture Drawing practice	Continuous Evaluation & Internal Examination
11	Section planes and sectional view of right regular solids-prism, cylinder, pyramid and cone	CO 4	A hexagonal pyramid, base 30 mm side and axis 70 mm long is resting on its slant edge of the face on the horizontal plane using Auto CAD	Lecture Drawing practice	Continuous Evaluation & Internal Examination
12	Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.	CO 5	Draw the development of the lateral surface of the frustum of the square pyramid of side of base 30 mm and axis 40 mm, resting on HP with one of the base edges parallel to V.P. It is cut by a horizontal cutting plane at a height of 20 mm using Auto CAD.	Lecture Drawing practice	Continuous Evaluation & Internal Examination
13	Intersection of solids in simple positions	CO 5	A vertical square prism, base 50 mm side, is completely penetrated by a horizontal square prism, base 35 mm side, so that their axes intersect. The axis of the horizontal prism is parallel to the prism., while the faces of the two prisms are equally inclined to the prism. Draw the projections of the solids, showing lines of intersection.	Lecture Drawing practice	Continuous Evaluation & Internal Examination
14	Orthographic Projections: Systems of projections, conventions and application to orthographic Projections.	CO-6	Draw orthographic projections of the given below Figure.  All dimensions are in mm	Lecture Drawing practice	Continuous Evaluation & Internal Examination

15	Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, p1anes, figures, simple and compound solids	CO-6	Draw isometric projections of the given below Figure.  All dimensions are in mm	Lecture Drawing practice	Continuous Evaluation & Internal Examination
16	Backlog Session				
17	Lab internal exam II				