



Subject Code: 01ME0105

Subject Name: Engineering Drawing and CAD

B. Tech. Year – I (Semester II)

Objective:

Engineering Drawing is an effective language of engineers. It is the Foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization.

Credits Earned: 04 Credits

Course Outcomes: After completion of this course, student will be able to:

1. Interpret engineering drawings using fundamental technical mathematics.
2. Construct basic and intermediate geometry.
3. To improve their visualization skills so that they can apply these skills in developing new products.
4. To improve their technical communication skill in the form of communicative drawings.
5. To sketch engineering objects in freehand mode.
6. To create 3D computer model and its realization using FDM based 3D printing.

Pre-requisite of course: NA

Teaching and Examination Scheme:

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial / Practical Marks		Total Marks
				E	I		V	T	
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term Work	
2	0	4	4	50	30	20	25	25	150



Contents:

Unit	Topics	Contact Hours
1	Introduction to Engineering Drawing & Sketching Drawing instruments and accessories, BIS –SP 46 and Use of Plane Scale. construction of different polygon, divide the line and angle in parts.	6
2	Orthographic Projections Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method, full sectional view	8
3	Isometric Projections and Isometric View or Drawing Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing.	8
4	Perspective Sketching Introduction to perspective drawing, concept of Horizon, vanishing point and eye level, 1-Point, 2-Point perspective sketching, looking Up/Down/Straight ahead, Illumination source and shadow, Perspective distortion, perspective sketching by observation, perspective sketching by imagination, Basics of 3-Point perspective (Bird's eye view)	18
5	Basics of CAD & 3-D printing Introduction of CAD tools, Mesh, sketching, extruding using CAD tools, Basics of FDM based rapid prototyping.	12
Total Hours		52

Suggested Text books / Reference books:

1. Engineering Graphics by Dr. R.L.Jhala- Mc Graw Hill Education Publication, New Delhi.
2. A Text Book of Engineering Graphics by P.J.Shah S.Chand & Company Ltd., New Delhi
3. A text book of Engineering Drawing by R.K.Dhawan, S.Chand & Company Ltd., New Delhi
4. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi.
5. Perspective Drawing Handbook by Joseph DÁmelio, Dover Publication
6. Perspective Drawing for Beginners by Len A. Doust, Dover Publication
7. Perspective Made Easy by Ernest Norling, Dover Publication

Software:

1. Autodesk Fusion 360
2. Google Sketchup
3. Ultimaker Cura



Suggested Theory distribution:

The suggested theory distribution as per Bloom’s taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
14%	22%	22%	14%	14%	14%

Suggested List of Experiments:

1. Practice sheet (which includes dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts)
2. Orthographic projection.
3. Isometric projection.
4. Freehand sketching with 1-Point perspective by observation and imagination.
5. Freehand sketching with 2-Point perspective by observation and imagination.
6. Freehand sketching with 3-Point perspective by observation and imagination.
7. Incorporating shadow and reflection in perspective sketching.
8. CAD tool-based design of simple 3D solid geometry.
9. Design project including Ideation, Visualization, Sketching, CAD modelling and 3D Printing.

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, field activity, Quiz, brainstorming.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses.