



Subject: Mechanical Drafting -DETME12202

Type of course: Engineering Technology - Diploma

Prerequisite: Geometry

Rationale:

The students of mechanical engineering programs are mainly involved in drafting, manufacturing, inspection and planning activities (such as preparing process plans, preparing bill of materials, etc.) at industries. For all such activities, a reference document is the drawing of components/assemblies to be manufactured. In this context, it is of utmost priority to prepare, read and interpret these drawings correctly for production of components and assemblies accurately and precisely. The industrial practices of drafting are also important for the students to make them aware of drafting practices, symbols, codes, norms and standards generally used in industries. Development of sketching ability also strengthens effective engineering communication & presentation.

Mechanical drafting is the process of creating drawings which communicate of how something can be constructed. It is a way of showcasing a 3D object on a 2D piece of paper and it shows how the model or part would look-like from each direction.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks					Total Marks
CI	T	P		Theory Marks		Practical Marks		CA	
			ESE	MSE	V	P	ALA		
3	0	4	5	60	30	10	20	30	150

Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Sectional Ortho graphics: Draw sectional view/s of an object. Interpret sectional views.	08	15%
2	Multi views Representation: Draw isometric and multi views of an object. Interpret multi views drawings.	08	15%
3	Projections and Sections of Solids: Draw sectional views of different solids. Interpret sectional views of different solids.	05	10%
4	Development of Surfaces Develop the surface requirement of a given application.	05	10%
5	Drafting Symbols Use & Interpret drafting symbols	05	10%
6	Welded Joints, Piping & Duct Layouts Draw & interpret weld joints, piping layout and duct drawings. Interpret Process flow diagram & piping isometrics	06	20%
7	Details & Assembly Prepare and interpret detail and assembly drawing. Workout material requirement from a given drawing.	04	10%
8	Fasteners Use appropriate fasteners for given situations. Draw sketches for different types of fasteners.	04	10%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Free hand Sketch-Multiview Select two objects. Student will measure and sketch* the same in sketchbook for the reference to draw in sheet. One for MULTIVIEW (Sheet No.1) and another for SECTIONAL VIEWS (Sheet No.3). (*Only freehand isometric sketch with dimensions).	10
2	Assembly Drawing Select one assembly having minimum 6-8 mechanical related components. Students will measure and sketch the same in the sketchbook for the reference to draw details and assembly sheets. This may be in a group of 3-4 students.	10

3	Quiz Quiz on following: Threading symbols. b: Machining symbols. c: Geometrical symbols d: Welding symbols. e: Piping symbols.	10
Total		30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom’s Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	30%	45%	25%	-	-	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	To draw and understand Draw sectional views of different solids.
CO2	To draw different types of surfaces of an object like square, prism, pyramid etc.
CO3	To understand different types of drafting symbols like piping isometrics & pipe schedule charts.
CO4	To understand & draw detail and assembly drawing.
CO5	To understand & draw Sketches of threads (square, acme, knuckle, Internal – external threads, Left hand – right hand threads, Single & multi start threads).

List of Practical

Sr. No	Descriptions	Hrs
1	MULTIVIEWS: a: Given the pictorial view, draw multi views.-Two problems. b: Select one object, measure it and draw multi views. The selected object has to be approved by the Teacher.	8
2	MISSING VIEWS: Given adequate number of minimum views, draw additional view/s as asked.-Three problems.	4
3	SECTIONAL VIEWS: a: Given the pictorial view with cutting plane/s, draw the views as asked including sectional view/s.-Two problems. b: Select one object, measure it and draw the views as asked including sectional view/s. The selected object has to be approved by the Teacher.	6
4	PROJECTIONS OF SOLIDS: Draw the projection of solids- 4 problems.(1-Prism, 1-Pyramid, 1- Cylinder and 1-Cone.). (With varied dimensions. Refer Note d.)	6
5	SECTIONS OF SOLIDS: Draw the sections of solids. Also draw the true shape of each sections-4 problems.(1-Prism,1-Pyramid,1-Cylinder and 1-Cone.)	6
6	SURFACE DEVELOPMENT: Draw development of surface of prism, pyramid, cylinder and cone – independent, sectioned and combination.-Total 4 problems. (With varied dimensions. Refer Note d.)	6
7	WELD JOINT ASSEMBLY: Draw the weld joint drawing with weld symbols and nomenclature. Take a minimum 3 parts for weld joint assembly.	2
8	PIPING LAYOUT: Prepare piping layout for given application/situation with piping symbols and nomenclature. Also prepare isometric piping layout for the same problem.	6
9	DETAILS: Draw the details of all parts for the assembly selected and sketched as student activity.	8
10	ASSEMBLY: Draw the assembly of all parts drawn for Sheet No.8. This includes a minimum one sectional view and also the parts list.	8
	Total	60

Instructional Method:

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

Reference Books:

- [1] Engineering Drawing. N.D.Bhatt. Charotar Publishing House, Anand.
- [2] Engineering Drawing. K.R.Gopalakrishna. Subhash Publications, Bangalore.
- [3] Engineering Drawing. P.J.Shah. S.Chand, New Delhi
- [4] Engineering Graphics. M.B.Shah, B.C.Rana. Pearsons
- [5] Machine Drawing. P. Sidheswar, P. Kannaiah & VVS Sastry. Tata-McGraw Hill Publishing Co.Ltd.-New Delhi