GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma in Engineering

Level: Diploma

Branch: Mechanical Engineering / Mechanical (CAD/CAM)/ Mechatronics Engineering

Course / Subject Code : DI02000121

Course / Subject Name : Mechanical Drafting

w. e. f. Academic Year:	2024-25
Semester:	2nd
Category of the Course:	PCC

Prerequisite:	Zeal to learn the subject.
Rationale:	The students of mechanical engineering programme 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, 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. 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. The advent of computers has made it easier to implement frequent changes as needed. This course has been designed to enhance students' manual drafting skills in alignment with CAD software.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Draw basic solids, sections, development of surfaces and prepare sectional orthographic views of complex mechanical parts.	U
02	Apply GD&T in production drawing.	A
03	Prepare assembly and detail drawing of various mechanical components.	N
04	Create and edit 2D drawings and Assemblies in AutoCAD.	A

**Revised Bloom's Taxonomy (RBT)*

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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial / Practical		
L	T	PR	C	ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
2	0	4	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hrs	% of Weightage
1.	**Introduction:** 1. Concept and need of mechanical drafting. Explain Drawing standards (IS-696 /SP 46). 2. Drawing of basic solids like prism, pyramid, cylinder and cone. 3. Sectional view of basic solids and their applications. 4. Surface development of solids and their uses in engineering field. (Only basic solids and their combinations are to be prepared.)	6	18
2.	**Sectional orthographic:** 1. Concept of orthographic reading. 2. Need of sections, section lines & cutting plane. 3. Types and applications of sections- full, half, revolved, removed, partial, off-set, aligned, etc. 4. Sectional view drawings from given isometrics drawing / physical object and cutting plane conditions.	3	10
3.	**Geometric & Dimensioning Tolerances (GD&T):** 1. Importance of limits and fits, hole basis system and shaft basis system, types of fits, tolerance grade and fundamental deviation. 2. Numerical based on limits and fits. (It is compulsory to ask numerical related to Limits and Fits, in Exam.)	2	7
4.	**Production drawings:** 1. Machining symbol, geometric symbol, weld joint symbols as per BIS-813, supplementary symbols, fluid and pipe fitting symbols, sketches of threads, studs, screws, nut, bolts, rivets, keys, etc.	4	15

	2. Productions drawing including GD&T and drafting symbols of simple mechanical assembly having minimum 5-6 components each made up of various manufacturing operations.		
5.	**Assembly and detail drawings:** 1. Concept of assembly drawing having 4-5 mechanical parts, drawing of orthographic projections for each component. 2. Fundamentals of detail drawing, Bill of Material (BOM) and assembly drawing. 3. Demonstrate and explain 1-2 industrial example assembly drawings.	5	15
6.	**Introduction to CAD software:** 1. Discuss about available software in CAD field and their capabilities 2. AutoCAD software window: Title bar, Ribbon tool bar, Quick Access Toolbar, View port, Command prompt, Draw tool bar, modify, UCS, status bar, etc. 3. File features: Opening new file, saving file, open drawing. 4. Setting up new drawing: Unit, limit, grid, snap, Dynmode, Orthomode, polar, snap, osnap, isodraft, dynamic USC, etc. 5. Co-ordinate system in AutoCAD:Absolute & Relative coordinates, Cartesian & Polar coordinates. 6. Concept of Layers, Blocks and Hatch with applications.	6	20
7.	**Dimensioning in Auto CAD and Annotation:** 1. Dimensioning in AutoCAD. 2. Dimension types: Linear, aligned, angular, radius, diameter, etc. 3. Dimension editing: Adding text, rotating the dimension text. 4. Text writing in AutoCAD: Single line, multi-line text.	4	15
	Total	**30**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
	10	**60**	**30**		

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Computer Aided Machine Drawing Practice, E-kumbh portal, AICTE, New Delhi.

(b) Open source software and website:

1. https://ekumbh.aicte-india.org/dbook.php
2. https://www.youtube.com/c/MechanicalEnggSubjectsGTU/playlists

Suggested Course Practical List:

1. Draw basic solids and their sectional views.
2. Draw development of solid surfaces.
3. Drawing of sectional orthographic views.
4. Draw production drawing with concept of GD&T and use of drafting symbols.
5. Draw assembly drawing with Bill of Materials - BOM.
6. Draw detail drawing.
7. Draw 2D drawing using AutoCAD (Preferred to prepare drawing in cad software as per details and assembly drawing sheet)

All the problems of practical no. 1 to 6 must be drawn in sketch book and then in drawing sheet of A2 size. Practical No. 7 must be prepared using AutoCAD software and plotted same.

List of Laboratory/Learning Resources Required:

Drawing paper, scale, 0.5 mm H and 2H lead pencil, angle protector, set square, etc.

Sr. No.	Equipment Name with Broad Specifications	PrO. No.
1.	CAD Workstation with 8 GB RAM and 512 GB hard disk drive with Windows -10 OS	4 to 8
2.	Autodesk AutoCAD (Educational stand alone or network licensed the latest Version).	4 to 8

Suggested Project List:

Student can prepare sheet metal work to learn development of solid surfaces.

AutoCAD drawing should be prepared for a machine or machine component.

Suggested Activities for Students:

Group activity to prepare drawing of any work piece available in workshop.

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