

GANPAT UNIVERSITY				
FACULTY OF DIPLOMA ENGINEERING				
Programme	Diploma in Mechanical/Mechatronics/Agriculture Engineering			
Semester	IV		Version	1.0.0.0
Effective from Academic Year	2026-27		Effective for the batch Admitted in	JULY 2025
Course code	1ME4104	Course Name	Computer Aided Design	

I. TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Type	Course code	Course Title	Teaching & Learning Scheme									Examination Scheme							
			Credit				Actual Contact Hrs/week			SLH	Total Learning Hrs/Week	TH			PR			SLA	Total
			CL	TL	LL	Total	CL	TL	LL			CE	SEE	Total	CE	SEE	Total		
DSC	1ME4104	Computer Aided Design	2	0	2	4	2	0	4	2	8	40	60	100	60	40	100	20	220

Abbreviation:	CL- Classroom Learning	TL - Tutorial Learning	LL - Laboratory Learning
	SLH - Self Learning Hours	SLA - Self Learning Assessment	CE – Continuous Evaluation
	SEE – Semester End Examination		

II. PRE-REQUISITES

Basic knowledge of Engineering Drawing and Mechanical Drafting

III. INDUSTRY / EMPLOYER EXPECTED OUTCOMES

Industry and employers expect CAD programmer to possess strong technical drawing skills, proficiency in CAD software, and a thorough understanding of drafting standards and geometric dimensioning and tolerance. They should also be able to create and analyse various types of machine components, including orthographic projections, 3D views, and assembly drawings.

IV. COURSE LEARNING OUTCOMES

At the end of the course, students will be able to achieve the following course learning outcomes:

CO1. Interpret Projection and sectional views of different parts and machine components.

CO2. Select type of modelling technique for given part or component.

CO3. Draw 3D drawings of given parts for various applications.

CO4. Develop Assembly drawings of machine parts.

CO5. Prepare and amend drawings as per different manufacturing techniques.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:

Name of Unit	Theory Learning outcomes (TLO's) aligned to CO's	Learning Content mapped with Theory Learning outcomes (TLO's) & CO's	Marks	Hours
Unit-1 Fundamentals of CAD	TLO 1.1 To know about the concept of basic drawing. TLO 1.2 Understand coordinate systems used for CAD software. TLO 1.3 Solve problems of Geometric transformation.	1.1 Computer graphics and its terminology, CAD definition 1.2 Concept & need, CAD process 1.3 Functional areas of CAD, Coordinate systems 1.4 Geometric transformation, concept and types, Two dimensional 2D geometric transformation 1.5 Translation, Scaling and rotation with numeric examples	10	05

Unit-2 CAD Hardware	TLO 2.1 Understand the use of input and output devices. TLO 2.2 Representation of CAD drawings.	2.1 CAD Workstation, types, functions and configuration 2.2 Input and output devices including voice, gesture 2.3 3 dimensional 3D printers, its types, configuration and applications	06	03
Unit-3 Geometric modelling	TLO 3.1 Understand concept of Geometric modelling. TLO 3.2 Practice use of different operations in case of parametric and non-parametric modelling. TLO 3.3 Aware for the use of pure primitives for simple components.	3.1 Difference between 2D & 3D models, Geometric modelling, concept 3.2 Types, features and applications, Solid modelling methods like Constructive Solid Geometry 3.3 Boolean operations like Union, Subtract, and Intersect 3.4 Feature base modelling, concept, Illustrative examples 3.5 Pure primitives like Box, Cylinder, Cone 3.6 Parametric & non parametric modelling 3.7 Concept, differences and illustration	14	07
Unit-4 3D Modelling using AutoCAD	TLO 4.1 Understand to create 3D solid model in non-parametric software. TLO 4.2 Understand to create 3D surface model. TLO 4.3 Understand requirement of drawings as per requirement of industries.	4.1 Introduction to AutoCAD, 3D features and 3D solid modelling like Extrude 4.2 Revolve, Sweep 4.3 Loft etc, 3D primitives 4.4 Types and defining parameters, User coordinate system UCS and its options 4.5 3D modify and editing such as Fillet Edges, Taper Faces 4.6 Shell etc, 3D sectioning like Section Plane 4.7 Add Jog etc, 3D viewing & views generation View Cube 4.8 Orbit 4.9 Zoom etc 4.10 Surface modelling commands 4.11 Surface modelling commands	22	11
Unit-5 3D Parametric modelling	TLO 5.1 Able to create 3D solid model in parametric software. TLO 5.2 Exercise to generate parts given in Practical session.	5.1 Introduction to parametric modelling software, Any one from Solid works, Creo, Unigraphics, CATIA, Solid Edge 5.2 Inventor etc, Concept of parametric modelling, Sketching interfacing overview, 3D working plane introductions, 3D modelling 5.3 Extrude, Revolve, Sweep, Pattern, Draft 5.4 Shell, Fillet etc, Assembly modelling, Views generation, Bill of material Part List Generation.	08	04

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL			
Sr. No.	Practical/Laboratory Learning Outcome (LLO)	Practical Titles	Relevant COs
1	LLO 1.1 To construct solid model from given various solid geometries.	To prepare 3D solid parts using AutoCAD command including Extrude, Revolve, Sweep and Loft.	CO1, CO3
2	LLO 2.1 Practice of preparing 2D orthographic drawing of solids.	To prepare part drawings in 2D sketcher environment for solid parts.	CO2
3	LLO 3.1 To construct solid model from given 2D drawings.	To prepare 3d solid models from 2D sketches.	CO3
4	LLO 4.1 Practice of assembling parts in non-parametric software. i.e. Auto CAD.	To prepare a mini assemblies and subassemblies from saved parts using various constraints.	CO3, CO4
5	LLO 5.1 Create accurate solid model from given orthographic projections (front, top, side views) in any parametric software. LLO 5.2 Practice of assembling parts in any parametric software.	To Prepare production drawings of parts and assemblies and its sections.	CO4
6	LLO 6.1 Practice of preparation of parts and assembly of actual industrial equipments.	MINI PROJECT & PRESENTATION 1. Prepare solid models of dismantled parts of an assembly 2. Assemble the parts. 3. Get orthographic production drawings of solid	CO4, CO5

VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)	
● To construct solid model from Engineering drawing or Mechanical drafting subject manual. ● Dismantle sub assembly of machinery and prepare drawing of any part by measuring its physical dimension. ● Generate various drawing as per the need of manufacturing department. <u>Mini project</u> ● Each student will prepare solid models of dismantled parts of an assembly. ● Assemble the parts with the use of suitable software. ● Get orthographic production drawings of solid.	

VIII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD	
1	Manual for all practicals.
2	Computer lab having CAD software.
3	Set of various industrial drawings being used by industries.
4	Models/charts/ animated video of intersections of various solids.

IX. LIST OF REFERENCE BOOKS			
Sr. No.	Title	Author	Publication
1	AutoCAD for engineers andDesigners	Sham Tickoo	Dreamtech press
2	Engineering Design and Graphicswith Solidworks	James D. Bethune	

