

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Diploma Engineering			Branch		MECHANICAL		
Semester		IV			Version		1.0.0.0		
Effective from Academic Year			2019-20		Effective for the batch Admitted in			June 2018	
Subject code		1ME2404	Subject Name		COMPUTER AIDED DESIGN				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	2	0	4	Theory	40	60	100
Hours	2	0	4	0	6	Practical	60	40	100

Pre-requisites:									
Students should be compatible to basics of computer systems operating, basics of engineering drawing and draftings, to perform AutoCAD two dimensional drawings, formal knowledge of limit, fit, tolerances and surface finish symbols.									

Course Learning Outcomes:									
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes:									
CO1. Select configuration of CAD workstation.									
CO2. Select type of modelling technique for given part.									
CO3. Design, develop and model the given part using various CAD software like- Solidworks, Creo/Catia /Unigraphics/Solid edge/Inventor/ AutoCAD, etc.									
CO4. Prepare solid models & assembly of mechanical parts.									

Course Content									
Name of UNIT	Unit Content				Unit Learning Outcomes			Marks	Hrs

<b>UNIT – 1</b> <b>Fundamentals</b> <b>of CAD</b>	1.1 Computer graphics & its terminology.	1a. State the need of CAD and its application.	<b>8</b>	<b>4</b>
	1.2 CAD definition, concept & need.			
	1.3 CAD process.			
	1.4 Functional areas of CAD.			
	1.5 Coordinate systems.			
	1.6 Geometric transformation- concept and types.	1b. Perform Geometric 2D transformation.		
	1.7 Two dimensional (2D) geometric transformation- translation, scaling and rotation with numeric examples.			

<p><b>UNIT- 2 CAD Hardware</b></p>	<p>2.1 CAD Workstation-types, functions and configuration.</p>	<p>2a. Describe functions of CAD Workstation, its types, and configuration.</p>	<p><b>6</b></p>	<p><b>3</b></p>
<p>2.2 Input and output devices (including voice, gesture, 3 dimensional (3D) printer, etc)-types, configuration and applications.</p>	<p>2b. Use input/output CAD devices.</p>			
<p><b>UNIT – 3 Geometric modelling</b></p>	<p>3.1 Difference between 2D &amp; 3D models.</p>	<p>3a.Explain types of solid modelling.</p>	<p><b>10</b></p>	<p><b>5</b></p>
<p>3.2 Geometric modelling – concept, types, features and applications.</p>				
<p>3.3 Solid modelling methods like Constructive Solid Geometry, (Boolean operations) like Union, Subtract, and Intersect.</p>				
<p>3.4 Feature base modeling-concept,</p>	<p>3b.Describe characteristics of features based CAD packages.</p>			

	<p>Illustrative examples.</p>			
	<p>3.5 Pure primitives like Box, Cylinder, Cone, etc.</p>			
	<p>3.6 Parametric &amp; non parametric modeling-concept, differences and illustration.</p>	<p>3c. Differentiate graphics packages used for modeling</p>		
<p><b>UNIT – 4</b> <b>3D Modelling using AutoCAD</b></p>	<p>4.1 Introduction to AutoCAD-3D features and 3D solid modelling like Extrude, Revolve, Sweep, Loft etc.</p>	<p>4a. Use appropriate UCS for the given situation.</p>	<p><b>16</b></p>	<p><b>8</b></p>
	<p>4.2 3D primitives-types and defining parameters.</p>			
	<p>4.3 User coordinate system (UCS) and its options.</p>			
	<p>4.4 3D modify and editing such as Fillet Edges, Taper Faces, Shell</p>	<p>4b. Prepare solid model of industrial parts and its</p>		

	etc.	assembly using Auto CAD.		
	4.5 3D sectioning like Section Plane, Add Jog etc.			
	4.6 3D viewing & views generation View Cube, Orbit, Zoom etc.			
	4.7 Surface modelling commands.			
	4.8 Surface modelling commands.	4c. Prepare simple surface model using AutoCAD.		
<b>UNIT – 5 3D Parametric modelling</b>	5.1 Introduction to parametric modeling software. (Any one from Solid works, Creo, Unigraphics, CATIA, Solid Edge, Inventor etc).	5a. Prepare solid model of industrial parts and its assembly using parametric modelling software.	<b>20</b>	<b>10</b>
	5.2 Concept of parametric modelling. Sketching interfacing overview.			

	5.3 3D working plane introductions.			
	5.4 3D modelling. (Extrude, Revolve, Sweep, Pattern, Draft, Shell, Fillet etc.)			
	5.5 Assembly modelling.			
	5.6 Views generation. Bill of material (Part List Generation)			

<b>List of Practical</b>		
The practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate course learning outcomes.		
<b>No.</b>	<b>Unit</b>	<b>Name of Practical</b>
1	1	To prepare 3D solid parts using AutoCAD command including Extrude, Revolve, Sweep and Loft.
2	2	To prepare part drawings in 2D sketcher environment for solid parts.

3	3	To prepare 3d solid models from 2D sketches.
4	4	To prepare a mini assemblies and subassemblies from saved parts using various constraints.
5	5	To Prepare production drawings of parts and assemblies and its sections.

List of Instruments / Equipment / Trainer Board	
1	CAD Workstations.
2	Laser printer-A3 size.
3	AutoCAD.
4	Latest educational network version of solid works Creo, Unigraphics, CATIA, Solid Edge, Inventor, software (Any one).

List of Reference Books			
No.	Title of Reference Books	Authors	Publication
1	AutoCAD for engineers and Designers	Sham Tickoo	Dreamtech press
2	Engineering Design and Graphics with Solidworks	James D. Bethune	
3	Creo 2.0 for designer and engineers	Sham Tickoo	Dreamtech press
4	Solidworks 2017 Black Book	Gaurav Verma	Matt Weber
5	Machine design	K.C.Jhon	PHI
6	CAD/CAM & Automation	Farazdak Haideri	Nirali
7	Machine drawing including AutoCAD	Ajeet Singh	McGraw-hill



Link of Learning Web Resource	
1	<a href="https://www.youtube.com/watch?v=WY0YuCkJWdw">https://www.youtube.com/watch?v=WY0YuCkJWdw</a>
2	<a href="https://www.youtube.com/watch?v=zoMW_usjaJo">https://www.youtube.com/watch?v=zoMW_usjaJo</a>
3	<a href="https://www.youtube.com/watch?v=fx6kt9djIpc">https://www.youtube.com/watch?v=fx6kt9djIpc</a>
4	<a href="https://www.youtube.com/watch?v=8wdOIHxICxw">https://www.youtube.com/watch?v=8wdOIHxICxw</a>
5	<a href="https://www.youtube.com/watch?v=rtjDfZXscrI">https://www.youtube.com/watch?v=rtjDfZXscrI</a>
6	<a href="https://www.youtube.com/watch?v=srnm--IKtI4">https://www.youtube.com/watch?v=srnm--IKtI4</a>

<b>PO'S/CO'S</b>		<b>CO1</b>	<b>CO2</b>	<b>CO3</b>	<b>CO4</b>
<b>PO1</b>	Proficiently applies concepts, theories and techniques of the relevant natural, physical sciences and knowledge in mathematics.	<b>MED</b>	<b>SUB</b>	<b>SUB</b>	<b>SUB</b>
<b>PO2</b>	Use basic principles of statics, dynamics, fluid mechanics, and engineering materials, strength of materials engineering standards and manufacturing processes to aid in the design, characterization, and analysis and troubleshooting of mechanical system.	<b>MED</b>	<b>SUB</b>	<b>SUB</b>	<b>SUB</b>
<b>PO3</b>	Apply their engineering knowledge, critical thinking and problem solving skills in professional engineering practice or in non-engineering fields, such as law, medicine or business.	<b>MED</b>	<b>SUB</b>	<b>SUB</b>	<b>SUB</b>
<b>PO4</b>	Continue their intellectual development, though, for example, graduate education or professional development courses.	<b>MED</b>	<b>MED</b>	<b>SUB</b>	<b>SUB</b>
<b>PO5</b>	Use of appropriate computer languages, modern tool and application software that pertain to Mechanical engineering technology systems.	<b>MED.</b>	<b>MED.</b>	<b>MED.</b>	<b>MED.</b>
<b>PO6</b>	Ability to identify problems, conducts experiments, gather data, analyse data and produce results.	<b>SLI.</b>	<b>MED.</b>	<b>MED.</b>	<b>SUB.</b>
<b>PO7</b>	Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century	<b>NONE</b>	<b>MED.</b>	<b>MED.</b>	<b>SUB.</b>
<b>PO8</b>	Design a system component or process to meet desired need within realistic constraints, such as economic, environmental and social.	<b>MED.</b>	<b>SUB.</b>	<b>SUB.</b>	<b>SUB.</b>
<b>PO9</b>	Values the need for, and demonstrates, ethical conduct and professional accountability.	<b>NONE</b>	<b>NONE</b>	<b>NONE</b>	<b>NONE</b>
<b>PO10</b>	Demonstrates effective communication to professional and wider audiences.	<b>SLI</b>	<b>SLI</b>	<b>SLI</b>	<b>SLI</b>
<b>PO11</b>	Appreciates entrepreneurial approaches to engineering practice.	<b>MED.</b>	<b>MED.</b>	<b>MED.</b>	<b>SUB.</b>
<b>PO12</b>	Apply commitment to quality, timeliness, and continuous improvement.	<b>SLI</b>	<b>MED.</b>	<b>MED.</b>	<b>MED.</b>