INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (MECHANICAL ENGINEERING)**
SEMESTER	**6**
COURSE TITLE	**COMPUTER AIDED DESIGN**
COURSE CODE	**09ME1602**
COURSE CREDITS	**4**

Objective:

1 The students of mechanical engineering are involved in modelling, designing, manufacturing, inspection and planning activities (such as preparing design and production drawing, process plans, preparing bill of materials, etc.) in industries. For all such activities, reference document is the modelling and drawing of component/assembly to be manufactured.The industrial practices of modelling and designing are also important for the students to make them aware of modelling and designing practices, symbols, codes, norms and standards generally used in industries.This course has been introduced at Diploma level in order to develop the skills in student so that they can generate various modelling and digital production drawings as required by industry using appropriate CAD software.

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

1 Perform geometric 2D transformation.

2 Describe functions of CAD workstation, its types and configuration.

3 Describe characteristics of features based CAD package.

4 Prepare simple surface model using AutoCAD.

5 AutoCAD-3D feature and 2D commands overview.

6 Prepare solid Model of industrial parts and its assembly using parametric modelling software.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Fundamentals of CAD** Terminology & Computer graphics CAD definition, concept & need. Process in CAD, Functional areas of CAD. Coordinate systems in CAD. Geometric transformation-concept and types, Dimensional (2D) geometric transformation- translation, scaling, rotation and mirror with numeric examples	6

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Contents : Unit	Topics	Contact Hours
2	**Hardware of CAD** CAD Workstation-types, functions and configuration , Input and output devices (including voice, gesture, 3 dimensional (3D) printer, etc.)-types , configuration and applications	6
3	**Geometric modeling** Difference of 2D & 3D models. Concept, types, features and applications of Geometric modeling , Solid modeling methods like Constructive Solid Geometry , Pure primitives & Boundary Representation , Example and concept of Feature based modeling. Parametric & non parametric modeling-concept	8
4	**3D Modeling using AutoCAD** Introduction to AutoCAD-3D features and 2D commands overview , 3D primitives-types and defining parameters , User coordinate system (UCS) and its options , 3D draw commands, modify and editing commands Viewing & views generation , CAD surface modeling commands	10
5	**3D parametric modeling** Introduction to parametric modeling software , Sketching interfacing overview , 3D working plane introductions , 3D modeling. Assembly modeling. Views generation	12
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment 1** Prepare a 2D drawing using different command in AutoCAD	4
2	**Experiment 2** Prepare 3D solid models using AutoCAD (Four mechanical components)	4
3	**Experiment 3** Prepare simple surface model using AutoCAD (Three mechanical components)	4
4	**Experiment 4** Prepare 3D solid model using 3D Modelling software (Three models that includes base features, Extrude/Protrude/Revolve)	4
5	**Experiment 5** Prepare 3D solid models using 3D modelling software (Four models that includes engineering features)	6
6	**Experiment 6** Bring Actual mechanical assembly from industry/real life/scrap shop/garage/etc. (made up of at least 4 to 5 mechanical components), dismantle the same, measure dimensions and sketch it in software	6
Total Hours		**28**

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Textbook :

1 Computer Aided Design, S. Y. Ragadia, Atul Prakashan, 2018

References:

1 CAD/CAM Theory and Practice, CAD/CAM Theory and Practice, Ibrahim Zaid, Tata McGraw Hill, 2010

2 Machine drawing including AutoCAD, Machine drawing including AutoCAD, Ajeetsingh, McGraw Hill, 2017

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as 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 / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
30.00	40.00	30.00	0.00		

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, role play, Quiz, brainstorming, MOOCs etc.

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, Virtual Laboratory

Supplementary Resources:

1 https://www.thesourcecad.com/autocad-tutorials/

2 https://support.ptc.com/help/creo/creo_pma/r9.0/usascii/index.html#page/tutorials_pma/pma_tutorials.html

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