GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

COURSE CURRICULUM

Course Title: Drafting Application
(Code: 3322002)

Diploma Programmes in which this course is offered	Semester in which offered
Mechatronics Engineering	Second Semester

1. RATIONALE

The market driven economy demands frequent changes in product design to suit the customer needs. With the introduction of computers and computer aided drafting software, the task of incorporating frequent changes in the drawing as per requirement is becoming simpler. This course has been introduced at Diploma level in order to impart basic knowledge and develop skills in the students so that they can generate various 2D and 3D digital drawings as required using various drafting software.

2. COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

- **Prepare 2D and 3D drawing using drafting software.**
- **Edit & Modify existing Digital drawings using drafting software.**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PA	ESE	PA	100
0	0	4	4	0	0	40	60	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Student Activity; **P** - Practical; **C** – Credit;; **ESE** - End Semester Examination; **PA** - Progressive Assessment.

Note: It is the responsibility of the institute heads that marks for **PA of theory** & **ESE and PA of practical** for each student are entered online into the GTU Portal at the end of each semester within the dates specified by GTU.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit–1 **Introduction to AutoCAD, workspace and drawing fundamentals**	1a. Get aquatinted with AutoCAD interface. 1b. Use Navigation commands. 1c. Use different drawing methods to draw 2d drawings.	1.1 Introduction to AutoCAD and its interface. 1.2 How to start, save and open existing drawing in AutoCAD. 1.3 Pan & zoom command practice with keyboard shortcuts. 1.4 Customize workspace setting. 1.5 Different drawing methods in AutoCAD using line command (Absolute co-ordinate, Relative Rectangle method, and Relative polar method & direct distance entry method). 1.6 Importance of object snapping and tracking and polar settings.
Unit – 2 **Drawing & Modifying commands**	2a. Use various 2d drawing & modifying commands.	2.1 Basic drawing commands i.e. line, circle, rectangle, ellipse, arc, polyline, 2.2 Spline, x-ray, construction line, hatch Modifying commands-move, copy, rotate, mirror, fillet, chamfer, trim, extend, offset, explode, scale, stretch, erase, array 2.3 Advance modifying commands- break, polyline edit
Unit-3 **Orthographic drawing**	3a. Prepare orthographic views using draw and modifying commands.	3.1 Concept of orthographic views. 3.2 Drawing ortho views in AutoCAD using advanced Draw & Modify commands like x-ray and construction line.
Unit-4 **Isometric drawing**	4a. Draw isometric view	4.1 Use of Iso-Grid, Iso-Circle 4.2 Changing cursor shape for TV, FV & SV 4.3 Draw isometric views from given orthographic views. 4.4 Dimensioning of an Isometric view
Unit-5 **Annotation**	5a. Annotate given drawing.	5.1 Creating text (single line, multiline) 5.2 Dimensioning the drawing 5.3 Creating table & linking from excel
Unit-6 **Layer management, blocks & attributes**	6a. Create layers, block & attributes	6.1 Concept and use of layer 6.2 Create, modify and deleting a layer 6.3 Concept of Block 6.4 Creating block with attributes
Unit-7 **Plotting**	7a. Plot a drawing from model and viewport with page setup 7b. Make title block with template	7.1 Plotting drawing from model space and layout 7.2 Create page setup 7.3 Creating viewport 7.4 Plotting drawing with annotative style 7.5 Need of title block with template
Unit-8	8a. Apply tool palettes to find properties of	8.1 importance of property palette & design center 8.2 Learn various miscellaneous commands like

Palettes & Miscellaneous commands	drawing entities 8b. Use Inquiry command to find Geometric & Mass properties	inquiry, purge, multiline, area, Massprop
Unit-9 **Introduction to 3D Solid Modeling**	9a. Prepare 3d solid modeling of given object using solid modeling and editing commands	9.1 Basics of 3D solid modeling 9.2 Switching from 2d to 3d workspace 9.3 Solid primitive commands like box, cylinder ,sphere, wedge, pyramid, torus. 9.4 Creating solid from sketch using extrude, revolve, loft and sweep command. 9.5 Modifying solid model using various solid editing commands.
Unit-10 **Rendering 3D solid model**	10a. Render given solid model using various lights	10.1 concept of rendering 10.2 material assigning to solid model & rendering it

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No	Unit Title	Teaching Hours	Distribution of theory Marks			
			R Level	U Level	A Level	Total
1	Introduction to AutoCAD, workspace and drawing fundamentals	1	Not applicable			
2	Drawing & Modifying commands	3				
3	Orthographic drawing	1				
4	Isometric drawing	1				
5	Annotation	1				
6	Layer management, blocks & attributes	1				
7	Plotting	1				
8	Palettes & Miscellaneous commands	0.5				
9	Introduction to 3D Solid Modeling	2				
10	Rendering 3D solid model	1				

Legends: R = Remember; U = Understand; A = Apply and above levels (Bloom's revised taxonomy)

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

6. SUGGESTED LIST OF EXERCISES /PRACTICALS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the above mentioned expected competency. Following is the list of minimum experiments to be performed.

Ex. No.	Unit No.	Practical/Exercises	Approx Hours Required
1	1	Draw given 2d sketches using basic drawing methods and commands like line, circle, rectangle etc.	04
2	2	Five problems on different geometrical shapes	
3	2	Draw at least 5 drawings of given parts using various drawing and modifying commands.	08
4	3	Draw at least 2 orthographic drawings of given parts.	08
5	4	Create isometric drawing of given parts.	02
6	5	Draw and provide dimensions for given part drawing.(at least 2)	08
7	6	Prepare drawing of given part using layers and blocks.	04
8	1 to 6	Construction of common templates for all the following assignments with institute's logo & standard title block.	
9	1 to6	Print two sheets based on orthographic views for various Industrial components such as machines, Automobiles, Jigs & fixtures, Press tools, fasteners etc with dimensioning, Tolerancing, Text, title block etc	
10	7	Plot drawings created in previous exercises in A4/A2 size	06
11	8	Make a drawing of given part using design center.	02
12	9	Make 3d solid model of at least 5 given parts.	12
13	10	Render the models created in practical no:12	02
		Total	**56**

7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities.

S. No.	STUDENT ACTIVITY
1	Collect drawings of parts from various industries.
2	Analyse drawing and make list of AutoCAD commands used.
3	Download tutorials on various topics from internet
4	Refer help file provided in software.

8. SUGGESTED LEARNING RESOURCES

A. List of Books

S.No.	Author	Title of Books	Publication
1	Prof. Sham Tickoo	AutoCAD2012: A problem solving approach	CADCIM technologies
2	Randy H. Shih	AutoCAD2011 Tutorials	SDC Publication
	David Frey	AutoCAD no experience required	AutoDesk

3			
4	James D Bethune	Engineering Graphics with AutoCAD	PHI Learning Pvt. Ltd.
5	Prof. Sham Tickoo	AutoCAD2012: For Engineers and Designers	CADCIM technologies
6	D Raker and H. Rice	Inside AutoCAD	BPB Publication
7	Kelvin Chang	AutoCAD 2013 Tutor for Engineering Graphics	Cengage
1	P. Nageswara Rao	AutoCAD For Engineering Drawing Made Easy	Tata McGraw Hill
2	George Omura	Mastering AutoCAD	BPB publication

B. List of Major Equipment/ Instrument

1. Latest version of AutoCAD software
2. Computer systems compatible for software
3. A-2 size plotter

C. List of Software/Learning Websites

www.autodesk.com

www.cadtutor.net

www.autocadmark.com

www.cadcim.com

www.lynda.com

Free videos on internet

9. COURSE CURRICULUM DEVLOPMENT COMMITTEE

Faculty Members from Polytechnics

- **Prof. K P Patel**, H.O.D., Mechanical Engg Dept., B.S.Patel Polytechnic, Kherva.
- **Prof. J.M. Patel**, Sr. Lect., Mechanical Engg Dept., B.S.Patel Polytechnic, Kherva

Co-ordinator and Faculty Member from NITTTR Bhopal

- **Dr. Sharad Pradhan**, Associate Professor, Dept. of Mechanical Engineering,