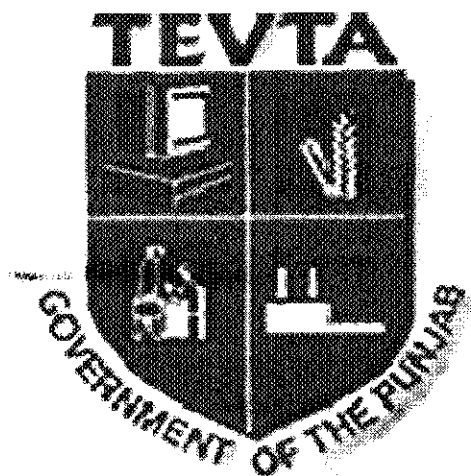GOVERNMENT OF THE PUNJAB

TECHNICAL EDUCATION & VOCATIONAL TRAINING AUTHORITY

CURRICULUM FOR

2D & 3D DRAFTING USING AUTOCAD

(03 – Months Course)

Evaluated July, 2016

CURRICULUM SECTION

ACADEMICS DEPARTMENT

96-H, GULBERG-II, LAHORE

Ph # 042-99263055-9, 99263064

gm.acad@tevta.gop.pk, manager.cur@tevta.gop.pk

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Date: 03 - 08 - 16
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TRAINING OBJECTIVES:

The course aims at making the trainee handy at creating 2D simple drawing by using basic drawing and modifying tool bars, improving visualization ability of machine components and assemblies before their actual fabrication through modeling, animation, shading & coloring. The course will also help trainee to understand the possible applications of CAD in engineering systems.

The pupil will be able to manipulate full-scale CAD software systems designed for geometric modeling of mechanical components & automatic generation of manufacturing information and create 3D drawings of mechanical parts in conceptual mode.

CURRICULUM SALIENTS:

Name of the Course	:	2D & 3D Drafting Using AutoCAD
Entry level	:	Matric
Duration of course	:	3-Months
Total training hours	:	400 Contact Hours
Training Methodology	:	Practical 80 %
		Theory 20 %
Medium of Instruction	:	English / Urdu

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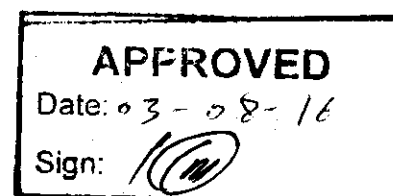
SKILL COMPETENCY DETAILS:

The trainee of this course will be able to:

1. Manipulate AutoCAD workspace and user interface.

2. Use basic drawing, editing, and viewing tools efficiently.

3. Construct drawing objects on layers.

4. Insert reusable symbols.

5. Prepare a layout to be plotted.

6. Add text, hatch and show dimensions.

7. Apply advanced editing and construction techniques.

8. Create local and global blocks.

9. Set up layers, styles and templates.

10. Prepare 2D/3D drafts using AutoCAD.

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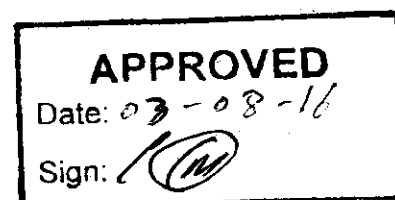## KNOWLEDGE PROFICIENCY DETAILS:

The trainee of this course will be able to:

1. Identify basic drawing, editing, and viewing tools.

2. Recall advanced editing and construction techniques.

3. Understand the designing and drafting of basic designs.

4. Describe 2D / 3D drafts using AutoCAD.

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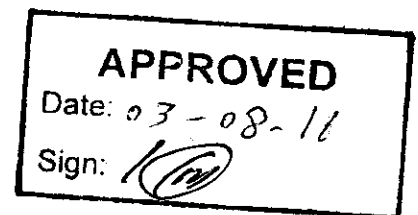
SCHEME OF STUDIES

2D & 3D DRAFTING USING AUTO CAD
(3 – Months Course)

Sr. No	Main Topics	Theory Hours	Practical Hours	Total Hours
1.	Fundamentals of Computer and Software	03	08	11
2.	Window Awareness and Coordinate Systems	03	66	69
3.	Draw & Modify Tools Bar	11	80	91
4.	Object Snap, Layers & Dimensions	11	40	51
5.	3D Solids & Editing	33	85	118
6.	IT Fundamentals	15	25	40
7.	Functional English	04	16	20
	Total	**80**	**320**	**400**

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DETAIL OF COURSE CONTENTS
(3– Months Course)

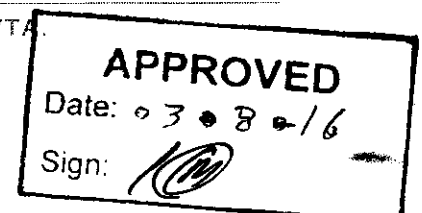| Sr. No	Detail of Topics	Theory Hours	Practical Hours
1.	**Fundamentals of Computer and Software** 1.1 A Brief History of Computer & Software 1.2 Hardware 1.3 Software	03	08
2.	**Window awareness and Coordinate Systems** **2.1 Window Awareness** 2.1.1 Getting familiar with the AutoCAD Window II i-e Drawing Area 2.1.2 Crosshair / Cursor 2.1.3 Command Line V. Status Line 2.1.4 UCS Icon 2.1.5 Origin 2.1.6 Function Keys 2.1.7 Special Key Functions Pull-down 2.1.8 Menu Bar Dialog Box 2.1.9 Methods of Entering Commands 2.1.10 Shortcut Menus for Drawing Lines **2.2 Starting Auto CAD** 2.2.1 Starting a new drawing 2.2.2 Saving a drawing 2.2.3 Back up files 2.2.4 Opening an existing drawing file 2.2.5 Exiting AutoCAD 2.2.6 Exercises **2.3 Coordinates Systems** 2.3.1 Cartesian Coordinate System 2.3.2 Absolute Coordinate System 2.3.3 Incremental Coordinate System 2.3.4 Polar Coordinate System	03	66

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| 3.	**DRAW & Modify Tool Bars**	11	80

	3.1 DRAW
	3.1.1 Line
	3.1.2 Construction Line
	3.1.3 Poly line
	3.1.4 Rectangle
	3.1.5 Polygon
	3.1.6 Circle
	3.1.7 Arc
	3.1.8 Spline
	3.1.9 Ellipse
	3.1.10 Ellipse arc
	3.1.11 Region
	3.1.12 Gradient
	3.1.13 Hatch
	3.1.14 Point
	3.1.15 Make block
	3.1.16 Insert block
	3.1.17 Table
	3.1.18 Multiline Text
	
	3.2 Modify Tool Bar
	3.2.1 Erase
	3.2.2 Copy
	3.2.3 Mirror
	3.2.4 Offset
	3.2.5 Array
	3.2.6 Move
	3.2.7 Rotate
	3.2.8 Stretch
	3.2.9 Scale
	3.2.10 Trim
	3.2.11 Extend
	3.2.12 Explode
	3.2.13 Fillet
	3.2.14 Chamfer
	3.2.15 Break at one point Break at two point
	3.2.16 Inquire Tools
	    a. Distance
	    b. Area
	    c. Mass
	3.2.17 Point locate		

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4.	**Object Snap, Layers, Dimension**	**11**	**40**
	4.1 Object Snap		
	4.1.1 Object Snap		
	4.1.2 Node		
	4.1.3 Mid-Point		
	4.1.4 Start Point		
	4.1.5 End Point		
	4.1.6 Insertion		
	4.1.7 Perpendicular		
	4.2 Layers		
	4.2.1 What is layer		
	4.2.2 Creation of layers		
	4.2.3 Settings of layers		
	4.3 Dimensioning		
	4.3.1 What is Dimensioning		
	4.3.2 Types of Dimensioning		
	4.3.3 Dimensions tool bar		
	4.3.4 Linear		
	4.3.5 Baseline		
	4.3.6 Continue		
	4.3.7 Angular		
	4.3.8 Radial		
	4.3.9 Horizontal		
	4.3.10 Dimension styles		
	4.3.11 Creating dimension styles		
	4.3.12 Setting of dimension styles		
5.	**3D Solids & Editing**	**33**	**85**
	5.1 3D Solids		
	5.1.1 Box		
	5.1.2 Sphere		
	5.1.3 Cylinder		
	5.1.4 Extrude		
	5.1.5 Revolve		
	5.1.6 Slice		
	5.1.7 Section		
	5.1.8 Cone		
	5.1.9 Tours		
	5.2 3D Editing		
	5.2.1 Union		
	5.2.2 Subtract		
	5.2.3 Intersect		

	5.2.4 Extrude faces 5.2.5 Move faces 5.2.6 Copy faces 5.2.7 Color faces 5.2.8 Color edges 5.2.9 Offset faces 5.2.10 Move faces 5.2.11 Taper faces 5.2.12 Delete faces 5.2.13 Rotate faces 5.2.14 Copy edges **5.3 Visual Styles** 5.3.1 2D wireframe 5.3.2 3D wireframe 5.3.3 Hidden 5.3.4 Flat shaded 5.3.5 Conceptual **5.4 3D Orbit** 5.4.1 3D pan 5.4.2 3D zoom 5.4.3 3D orbit 5.4.4 Continuous orbit 5.4.5 3D Swivel 5.4.6 3D adjust distance		
6.	**IT Fundamentals**	15	25
7.	**Functional English**	04	16
	Total	80	320

LIST OF PRACTICALS

1. Use of Change Command for drawing Two Horizontal lines.
2. Practice the Rotate command by moving object with in drawing.
3. Practice the Breaking command for circle.
4. Draw a Hollow Cylinder.
5. Draw Bush pattern using Auto Cad.
6. Draw Conical Bush pattern.
7. Draw Pipe Reducer pattern using Auto CAD.
8. Draw a Pulley.
9. Draw a Wheel pattern.
10. Draw different mechanical parts.
11. Use of Layer command in complicated parts etc.

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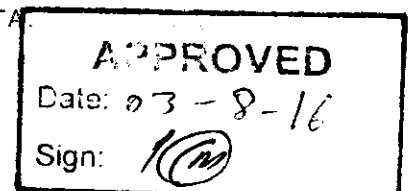
LIST OF LABS REQUIRED FOR THE COURSE

(For class of 25 students)

Sr. No	Name of Lab
1.	Computer Lab

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LIST OF TOOLS AND EQUIPMENT

(For class of 25 students)

Sr. No.	Tool / Equipment	Quantity
1.	Desktop Workstations (Specifications as per notification issued by MIS Section, TEVTA)	26 (1 for each student & 1 for the teacher)
2.	UPS 12V, 600VA-360W with dry battery	26
3.	Multimedia Projector with Screen, trolley / hanger	01
4.	Splitter	01
5.	Latest version of 'AutoCAD' Software	--

Sr. No.	Furniture	Quantity
1.	Computer Chairs	26
2.	Computer Tables	26

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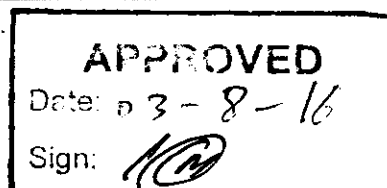
MINIMUM QUALIFICATION OF INSTRUCTOR

Minimum qualification criteria of instructors are as follows:

1. B.Sc. in Mechanical/Metallurgical/Industrial Engineering with at least one year experience in Manufacturing industry in relevant field or one year teaching / Instructor experience in the field of Auto CAD will be preferred.

2. B-Tech / BS-Tech Mechanical Technology with at least one year experience in manufacturing industry in relevant field or one year teaching / Instructor experience in the field of Auto CAD will be preferred.

3. DAE Mechanical Technology / CM &FT Technology with at least 2 years' experience in manufacturing industry in relevant field or 2 years teaching / Instructor experience in the field of Auto CAD will be preferred.

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EMPLOYABILITY OF PASS-OUTS

The pass outs of this course may find job / employment opportunities in the following areas / sectors:

- ➤ Private Sector Engineering Concerns
- ➤ Public Sector Organizations
- ➤ Manufacturing industries
- ➤ Design and development projects.
- ➤ Small and Medium Enterprises
- ➤ Self-employability etc.

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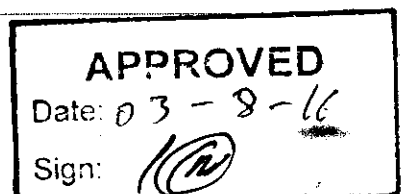
REFERENCE BOOKS

o Mastering CAD/CAM by Ibrahim Zeid, ISBN 978-0-07-286845-6, McGraw-Hill.

o Solid Works 2011 for Designers by Prof. Sham Tickoo, ISBN: 978-1-932709-89-6,CAD Technologies, USA.

o Exercise Workbook for Beginning AutoCAD by Professor Cheryl R. Shrock.

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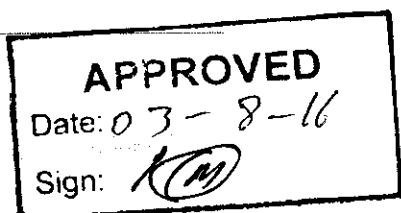
CURRICULUM EVALUATION COMMITTEE

Mr. Muhammad Hafeez   Convener
Chief Instructor (Mechanical),
GCT Railway Road, Lahore.

Mr. Azhar Mahmood Sharif   Member
Instructor (Mechanical),
GCT Railway Road, Lahore

Engr. M. Akram Sarfraz   Member
Instructor (Mechanical),
GCT Railway Road, Lahore

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