



Technical Program

Specialization	All Engineering Programs
Course Number	020000171
Course Title	AutoCAD
Credit Hours	2
Theoretical Hours	0
Practical Hours	6

Brief Course Description:

Introduction to AutoCAD, application of AutoCAD, commands, geometric entities. geometric construction. dimensioning, free –hand sketching, object representation, orthographic drawing and projections.

Detailed Course Outline:

Part1: Computer-Aided Drafting (CAD)

Introduction to Computer-Aided Drafting

Learning Objectives:

- Describe the new skills needed to be a CAD drafter.
 - Explain the CAD environment.
 - Discuss and evaluate CAD equipments, including monitors .computers, input devices, storage and software.
 - Explain the use of different CAD materials. supplies and media.
 - Get started with CAD.
1. What is CAD?
 2. Developing new skills.
 - Motor skills.
 - Mental skills.
 3. Computer drafting equipment.
 - Monitors.
 - The computer.
 - Input devices.
 - Keyboard (illustrate most common keys, Enter, Escape, Cursor keys, home, Backspace, Control, Function keys, Calculator keypad).
 - Mouse (mouse movement, select buttons, Enter buttons, clicking, and double clicking.
 - Output Devices:
 - Pen plotter.
 - Printers.
 - Storage devices.
 - CD ROMs.
 - Software:
 - AutoCAD 2007R package.
 4. Getting started with AutoCAD.

-
- AutoCAD coordinate systems:
 - Absolute.
 - Relative.
 - Polar.

 - How to start AutoCAD.

 - Starting a new drawing.

 - Understanding the AutoCAD interface.
 - The AutoCAD main window.

 - Toolbars

 - Dock or undock a toolbar.

 - Close a toolbar.

 - Menu

 - Cursor Menu.

 - The Command Window.

 - The text Window.

 - 5. Accessing Commands.
 - Using a Toolbar.
 - Using a Menu.
 - Using the Command Line.

 - 6. Correcting mistake.
 - Undo the most recent action.
 - Undo a specific number of actions.

 - 7. Refreshing the screen display.
 - Redraw the screen.
 - Regenerate the screen.
-

8. Saving drawing and opening existing drawings.
9. Existing AutoCAD.

Creating Objects in AutoCAD

1. Drawing Lines.
 - Drawing line objects.
 - Drawing Polylines.
 - Drawing Multlines.
 - Drawing Polygons.
 - Drawing Rectangles.
2. Drawing Curved objects.
 - Drawing circles
 - Drawing Arcs.
 - Drawing Ellipses.
 - Drawing donuts.
3. Drawing Point objects.
 - Setting point style and size.
4. Hatching areas.
 - Defining Hatch boundaries'.
 - Using Hatch styles.
 - Using Hatch patterns.

Working with Precision

1. Showing and using Grid
2. Using Ortho Mode.
3. Snapping to geometric point on objects.
4. Calculating distance and angle.
5. Calculating areas.
6. Displaying coordinate and locating points.

Controlling the Drawing Display

1. Using Zoom and Pan..
 2. Using Arial view.
-

Editing Methods

1. Editing object using Object Properties Toolbar.
2. Copying objects
 - Copying within drawing.
 - Multi copying using grips.
 - Copying with clipboard.
 - Offsetting objects.
 - Mirroring objects.
 - Arraying objects.
3. Moving objects.
 - Moving without changing.
 - Rotating objects.
 - Aligning objects.
4. Erasing objects.
5. Resizing objects.
 - Stretching objects.
 - Scaling objects.
 - Extending objects.
 - Lengthen the objects.
 - Trimming the objects.
 - Joining the objects
6. Inserting breaks in objects.
7. Exploding objects.
8. Editing Polylines.
9. Chamfering objects.
10. Filletting objects
 - Setting the fillet radius.
 - Filletting circles and arcs.

Using layers, Colors, and Linetypes

1. Working with Layers.
 2. Working with Colours.
 3. Working with Linetype.
 4. Assigning Layers, Colours, Linetype to objects.
-

Adding Text Drawing

1. Working with Text Style.
2. Using Line Text.
3. Using Multiline Text.
4. Checking spelling.

Dimensioning

1. Dimensioning concepts.
2. Creating Dimensions.
3. Adding Dimensions.
4. Editing Dimensions.
5. The Fourth Dimension

Blocks

1. Creation Blocks.
2. Manipulation Blocks.
 - Block command.
 - Insert command.
3. Using Blocks.
4. Symbols Library.
5. WBlock.
6. Dynamic Blocks.
7. Block Editor.

Pictorial Views (Isometric)

1. Create Isometric Drawing.
 - Isoplane command.
 - Ellipse, Isocircle command.

Sections and Conventional Breaks

1. Sectioning.
2. Cutting plane lines.
3. Section lines.
4. Full section.

5. Half Section.
6. Offset Section.
7. Broken Section.
8. Unsectional feature.
9. Conventional breaks

Picking and Plot

1. Manipulate AutoCAD to achieve an output to printer/plotter of varying sizes and colour
 - Plot command.
 - Plot Style command.

Projecting An Image

- Image command
- Image, Frame command
- Image, Clip command
- Image, Adjust command
- Image, Quality command
- Image, Transparency command

A Proper Point of Reference

- Xref command
- Xclip command
- Xclipframe command

A Palettable Situation

- Tool Palette
- Table Style command
- Table command

User Coordinate System

- Drawing using WCS and UCS
- UCS Command
- Introduction to 3D Modeling

Part2: Manual Drawing

1. Useful Geometrical Constructions.

- Find geometrically the centre of the an arc to touch tangentially two given straight lines not at right angle.
- Find geometrically the centre of the an arc to touch tangentially two given lines and given arc.
- Find geometrically the centre of the an arc to touch tangentially two given straight line and given arc.
- Find geometrically the centre of the an arc to touch tangentially two given arcs including them both.
- Find geometrically the centre of the an arc to touch tangentially two given arcs excluding them both.
- Find geometrically the centre of the an arc to touch tangentially two given arcs excluding one and and including the other.
- Find geometrically the centre of the an arc which passes three given points.
- Drawing perpendicular bisector to given straight line.
- Dividing line into a number of equal parts.
- Drawing tangent to circle from any point P on its circumference.
- Drawing tangent to circle from any point P which is outside the circle.
- Construction of ellipse.
- Drawing a reverse curve tangent to two lines and to third secant line.

2. Orthographic Drawings.

- Multiviews.
- First angle projection
- Third angle projection.

3. Isometric construction techniques

Evaluation Strategies:

Exams		Percentage	Date
Exams	Lab. Works and Homeworks	30%	
	Midterm Exam	20%	
	Final Exam	50%	

Text Book

References:

1. The AUTOCAD 2D TUTOR 1 & 2 R 2007.
European Computer Driving License.
Authors: Clive Osmond, Jim van Nice 2006.
2. Engineering Drawing Workbook.
Prepared by: Dr Ahmed A. Mostafa.