



# Mastering AutoCAD 2D

## **Course description:**

Design and shape the world around you with the powerful, flexible features found in AutoCAD® software, one of the world's leading 2D design applications. With robust tools that can create almost any shape imaginable, AutoCAD helps you intuitively create stunning designs. It offers innovations that can increase design and documentation efficiency, and enables you to more securely, accurately, and smoothly share those designs with colleagues. Connect with the cloud to collaborate on designs and download apps. With these capabilities and more, AutoCAD delivers the power and flexibility needed to take documentation and design further.

## **Objectives:**

Enable trainees to do the following:

- Draw & Modify all 2D shapes with accurate dimensions
- Make any annotations as dimensions, text, hatch etc ...
- Make typical symbols & library
- Understanding the concept of layers and use it
- Print and convert the drawings.
- File maintenance, collaboration, connecting to external databases
- Implementing CAD Standards

## **Course outline**

### **A glance of history**

- What is CAD
- A glance of CAD history
- Telling Autodesk story

### **Introduction**

- What is AutoCAD
- How to open
- AutoCAD desk top contents

### **Coordinating systems**

- Absolute coordinating systems
- Relative coordinating systems
- Polar coordinating systems

### **Drawing Aids**

- Object snapping
- Ortho

### **Draw objects**

- Line, Rectangle, Polygon
- Circle, Arc, Ellipse, Donut
- Polyline, Spline
- Revision Cloud
- Ray, Construction line
- Boundary

### **Navigation**

- Zoom (Z) & Pan (P)

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### How to select an object

- Selection by click, window selection, crossing window selection, fence selection, wp selection & cp selection
- Deselecting

### Modify Menu:

- Erase
- Copy, Move, Rotate, Mirror, Array, Align
- Offset, Scale, Stretch, Lengthen, Break, Join, Explode
- Chamfer, Fillet
- Trim, Extend

### Text:

- Multi line text & Single line text
- Text Style

### Inquiries

- Distance, Area, List, Id

### Hatch & Gradient

- Hatch &
- Gradient

### Layers

- Layers' concept
- How to create a layer, draw on a layer, making it current & delete it
- Layers toolbar
- Layers' naming rules
- Layer options
  - On & Off, Freeze & thaw, Color, Line type, Line weight, Plot & no plot
- Move object from layer to layer

### Properties menu

- Properties menu
- Match properties
- By layer & by object

### Dimension Menu:

- Linear, Aligned, Arc length, Ordinate
- Radius, Jogged, Diameter, Angular
- Baseline, Continue
- Leader, Center mark
- Oblique, Align text
- Dimension style

### Blocks:

- What is block
- File as a block, Write block & Draw → block → make
- Block inserting, redefining & editing
- Blocks & layers
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### Points:

- What is a point
- Point style
- Divide
- Measure
- Point & blocks



### **Plotting**

#### **Publish**

Specifies drawing sheets that you can assemble, reorder, rename, copy, and save for publishing as a multi-sheet drawing set. You can publish the drawing set to a DWF, DWFx, or PDF file or send it to the plotter named in the page setup for hardcopy output or as a plot file. You can save this list of drawing sheets as a DSD (Drawing Set Descriptions) file. Saved drawing sets can replace or be appended to the current list for republishing.

#### **eTransmit**

With eTransmit, you can package a set of files for Internet transmission. Drawing files in the transmittal package automatically include all related dependent files such as xrefs and font files.

#### **Attributes**

An attribute is a label or tag that attaches data to a block. The tag is equivalent to a column name in a database table. Attribute

information extracted from a drawing can be used in a spreadsheet or database to produce a parts list or a bill of materials. You can associate more than one attribute with a block, provided that each attribute has a different tag. Attributes also can be "invisible." An invisible attribute is not displayed or plotted; however, the attribute information is stored in the drawing file and can be written to an extraction file for use in a database program.

#### **Data extraction:**

Using the Data Extraction wizard, you can extract property information from objects in drawings, including blocks and their attributes and drawing properties, such as drawing name and summary information. The extracted data can be linked with information in a Microsoft Excel spreadsheet and output to a table or an external file.

#### **Fields:**

A field is updatable text that is set up to display data that may change during the life cycle of the drawing. When the field is updated, the latest value of the field is displayed.

#### **CAD Standard:**

It is about how you can create a standards file to define common properties in order to maintain consistency throughout your drawing files. Standards define a set of common properties for named objects such as layers and text styles. You or your CAD manager can create, apply, and audit standards in drawings to enforce consistency. Because standards make it easier for others to interpret drawings, standards are particularly useful in collaborative environments, where many individuals contribute to the creation of a drawing.

#### **Multi**

##### **Leaders:**

A leader object is a line or a spline with an arrowhead at one end and a multiline text object or block at the other. In some cases, a short horizontal line, called a landing, connects text or blocks and feature control frames to the leader line. The multileader style can specify formatting for landing lines, leader lines, arrowheads, and content. We should also know how to create, add, remove, align & collect leaders.

##### **Scale list:**

How to determine your own scale list according to your drawing units. It will appear in all commands using scale lists as printing and view ports.

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**Dynamic blocks:**

When you add dynamic behavior to a block definition, you add flexibility and intelligence to the block geometry. Instead of being a fixed part of a drawing, a dynamic block reference can be changed or manipulated as you work in a drawing.

**Tables:**

A table is an object that contains data in rows and columns. A table object can be created from an empty table or table style. A table can also be linked to data in a Microsoft Excel spreadsheet.

**Design center:**

With DesignCenter, you can organize access to drawings, blocks, hatches, and other drawing content. You can drag content from any source drawing to your current drawing. You can drag drawings, blocks, and hatches to a tool palette. Source drawings can be on your computer, on a network location, or on a website. In addition, if you have multiple drawings open, you can use DesignCenter to streamline your drawing process by copying and pasting other content, such as layer definitions, layouts, and text styles between drawings.

**Tool Palettes:**

Tool palettes are tabbed areas within the Tool Palettes window that provide an efficient method for organizing, sharing, and placing blocks, hatches, and other tools. Tool palettes can also contain custom tools provided by third-party developers.

**External references:**

You can attach an entire drawing to the current drawing as a referenced drawing (*xref*). With xrefs, changes in the referenced drawing are reflected in the current drawing. Attached xrefs are linked to, but not actually inserted in, another drawing.

Therefore, with xrefs you can build drawings without significantly increasing the drawing file size.

**Layer tools:**

A new menu in AutoCAD contains many new tools which make us control layers easier as layer walk, delete, merge & etc....

**Layer state manager:**

You can save layer settings as named layer states., restore, edit, import them from other drawings and files, and export them for use in other drawings.

**Filter & sort the list of layers:**

You can control which layer names are listed in the Layer Properties Manager and sort them by name or by property, such as color or visibility. A layer filter limits the display of layer names in the Layer Properties Manager and in the Layer control on the Layers toolbar. In a large drawing, you can use layer filters to display only the layers you need to work with.

**Quick calculator:**

With the QuickCalc calculator, an interface that looks and functions like a hand-held calculator, you can perform mathematical, scientific, and geometric calculations, convert units of measurement, manipulate the properties of objects, and evaluate expressions.

**Annotative objects**

Instead of creating multiple annotations at different sizes and on separate layers, you can turn on the annotative property by object or by style, and set the annotation scale for layout or model viewports. The annotation scale controls the size of the annotative objects relative to the model geometry in the drawing.



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### **Geometric constrains**

You can specify geometric constraints between 2D objects or points on objects. When you later edit the constrained geometry, the constraints are maintained. Thus, using geometric constraints, you have a method of including design requirements in your drawing

### **Dimensional constrains**

Dimensional constraints maintain specified distances and angles between geometric objects or points on objects.

### **Action Recorder**

You use the Action Recorder to record an action macro. After an action macro is recorded, you save the recorded commands and

input to an action macro, which has the file extension

ACTM.

### **Paper & Model Space (working with layouts)**

How to print many views from the same file on many sheets & how to print many scales on the same paper.

And many other

benefits

### **UCS & WCS**

There are two coordinate systems: a fixed system called the world coordinate system (WCS) and a movable system called the

user coordinate system (UCS). By default, t

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