

# SKKK 1021

# Engineering Drawing

Introduction to AutoCAD

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# Introduction

- Overview & background
- Starting, interface & file system
- Basic drawing commands
- Basic editing commands
- View command

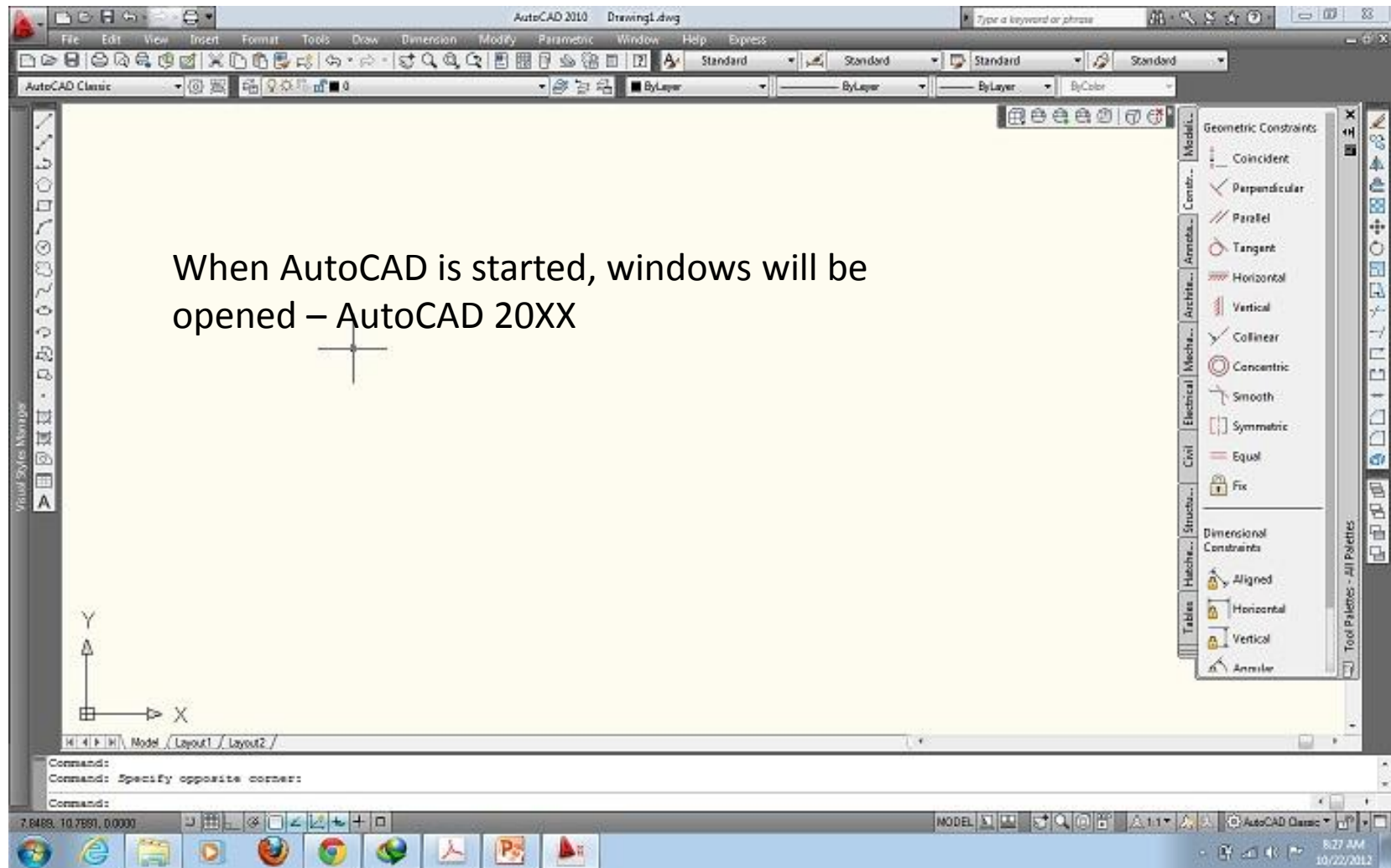
# • Why use AutoCAD?

- Wide of Use – more than 20,000 Installation World-wide
- More than 5 million user world wide
- More than 2 million student user world wide
- Excellent Intro. To CAD - Cost Effectiveness - Sufficiently Complex
- Can be linked to Other Softwares - e.g. ANSYS, 3DStudio Max, etc.
- Customized Application using high level programming language Auto-LISP

# How AutoCAD is used?

- Electronic Paper with Drawings and Editing Tools - Analogous to Manual Drafting
- Valuable and More Efficient in Modifying Drawings. Object can be moved, copied, rotated, erased, redrawn, etc. Editing in AutoCAD is faster than in manual drawing.
- Drawing Layers to Enhance Drawing and Visibility. AutoCAD provides a set of drawing layer which is equivalent to the engineering layers on working drawings.
- Storage/database of Commonly used Object.
- Complex objects that are frequently used can be stored as symbol in the library. This would increase the productivity in the drafting work.

# Starting with AutoCAD 20XX



# Start the Drawing

## 1. Start a drawing from scratch)

- opens a new drawing based on the measurement system you choose English (inches) or Metric (meters)

## 2. Use a Template (Start a drawing based on a template)

- - opens a new drawing based on a template you select from a list. It displays template files (.dwt extension) that exist in the Drawing Template File location as specified in the Options Dialog Box. Template files store all the settings for a drawing and can also include predefined layers, dimension styles, and views.
- Steps:
  - > Select the Use a Template button
  - > Scroll down the list of template files and highlight one that you are interested in.
  - An image preview of that template will be displayed.
  - > Click OK. A new drawing comes up based on the chosen template

### 3. Open a Drawing (Open an existing drawing)

- - opens an existing drawing you select from a list of the four most recently opened drawings.
- Also, it displays the Browse button that you choose to look for another file.
  
- Steps:
  - > Click the Open a Drawing button
  - > The middle of the dialog box now displays a list of drawings that have been opened recently.
  - Highlight one of the names in the list to see a preview image of that particular drawing file.
  - > If the drawing you want is not in the list, click the browse button to choose a drawing from the available on your file system by another user.

#### **4. Use a Wizard (Use a wizard to help you setup your drawing)**

- - opens a drawing that you set up using either the Quick Setup Wizard or the Advanced Setup Wizard.
- Steps:
  - > Click the Use a Wizard button
  - > Highlight Quick Setup and click OK
  - > Click on a unit of measurement, and then click Next.
  - > Enter a width and length for your drawing sheet. Then click Finished.
  - > A new drawing comes up. It has the units and Area that you set with the wizard



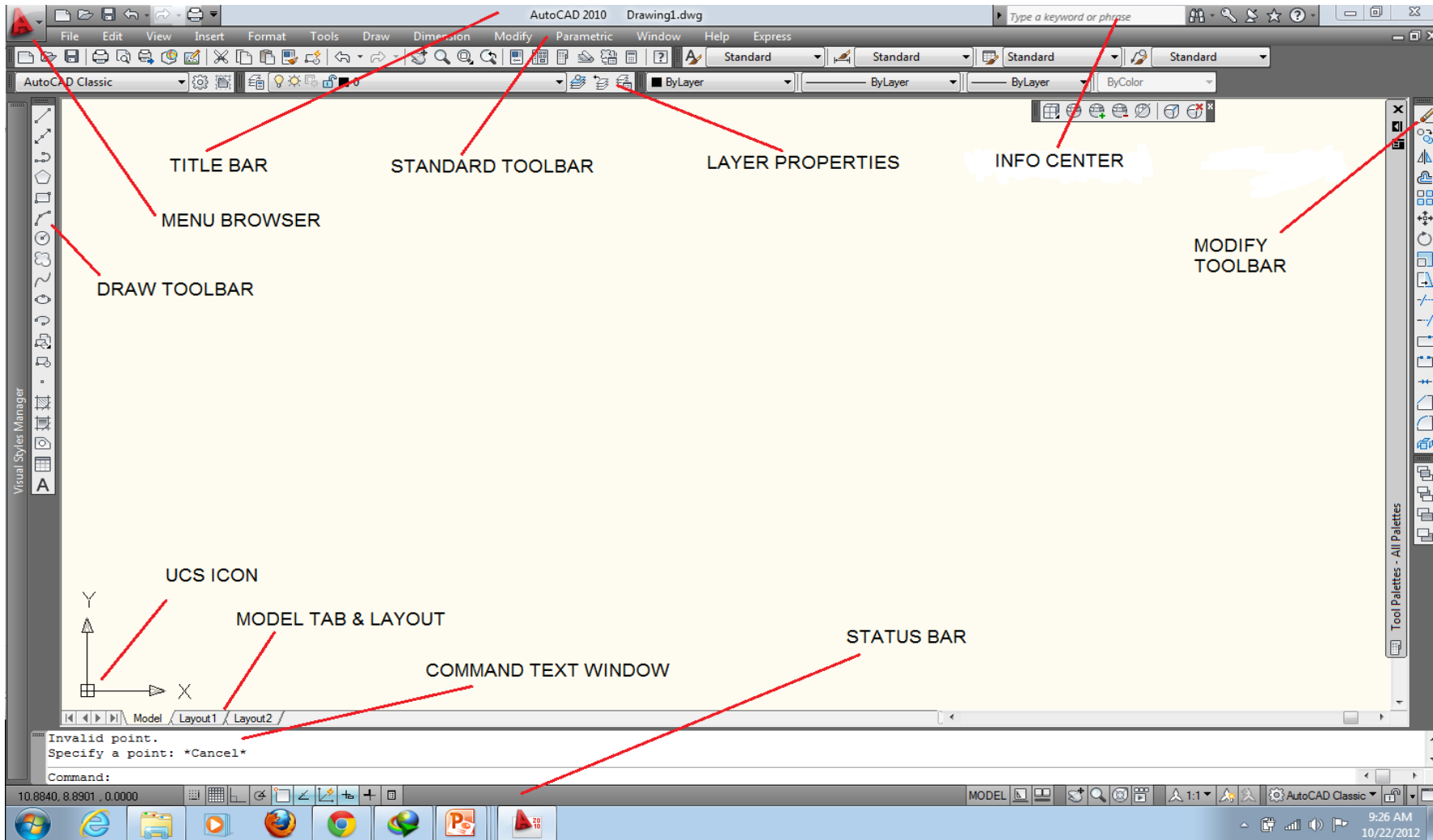
# Setting Up the Measurement

- Set the AutoCAD unit of measurement to millimeters
- - to ensure that any drawing made and inserted will have uniformed international Metric (meters) units
- - to easily control plotting in scale
  
- STEP A:
  1. Go to **FORMAT** menu
  2. Go to **UNITS**
  3. In the dialog box; Drawing Units for Design Center Blocks portion, set it to meters

- STEP B:
- 1. Go to **TOOLS** menu
- 2. Go to **OPTIONS**
- 3. Select **USER PREFERENCE** tab
- 4. In the AutoCAD Design Center portion set:
  - - Source Content Units = meters
  - - Target Drawing Units = meters
- 5. Then click OK to close the dialog box

- **NOTE:**

*You will do this each time you start a new drawing file not unless you create your own standard office-drawing template*



# General Commands

## **ESC and ENTER button**

- pressing either Esc or Enter button terminates the current command
- Pressing Esc button twice deselect a selected object
- Pressing Enter once accepts a typed in command or value

# General Commands

## The Mouse

### Left click

- pick or point button
- used to specify a point/ location/ position/ selection

### Right click

- Return or Enter or Properties button
- to either open the shortcut menu or repeat last command

# REPEATING COMMANDS

- ➔ if no command is active, you can repeat the previous command by pressing ENTER or SPACEBAR
- ➔ or by right clicking in the drawing area and choosing the Repeat Command Name option from the shortcut menu.

# Navigation

*Navigate the following:*

- FILE MENU
- EDIT MENU- insert and link excel worksheet into AutoCAD
- VIEW MENU- practice zooming and adding viewport
- INSERT MENU
- FORMAT MENU
- TOOL MENU
- DRAW MENU
- DIMENSION MENU
- MODIFY MENU
- EXPRESS MENU
- WINDOW MENU
- HELP MENU

# SUMMARY OF DRAW COMMANDS

## A. Liners

- Line
- Trace
- PLine
- Sketch
- MLine (Multiline)
- Ray
- XLINE (Construction Line)



## B. Curves

- Circle
- Donut
- Ellipse
- Spline
- Arc

## C. Special Objects

- Rectangle
- Polygon
- Hatch
- Gradient fills

## D. Point

## E. Text/Dtext/Mtext

# 1. Commands to Duplicate

- COpY
- Offset
- ARray
- MIrror (set MIRRTEXT=0)

## 2. Commands to clean corners

- Fillet
- Chamfer

## 3. Commands to edit Plines

- Explode
- PEdit

## 4. Commands to edit text

- Spell
- DDedit
- Ddmodify

## 5. Commands to edit attributes

- Attedit
- Ddatte

## 6. Commands to change position of endpoints

- Trim
- Extend
- Lengthen
- Grip(stretch)
- Stretch
- Change point

## 7. Commands to mark/measure linears/curves

- Measure
- Divide

## 8. Use grips

## 9. Others

- SScale
- RRotate
- Move
- Erase

# COMMANDS TO EDIT TEXT

## COMMANDS TO EDIT TEXT

- 1.SPELL(sp)** - command to check text spelling
- 2.DDEDIT(ed)** - command to edit text value
- 3.DDMODIFY** - command to edit text  
LOCATION,HEIGHT,ANGLE & VALUE



## COMMANDS TO MARK/MEASURE

POINT(po), MEASURE(me) and DIVIDE(div)

## OTHER MODIFICATION COMMANDS

- 1.SCALE (sc) - enlarges or reduces selected objects equally in the x,y, and z directions
- 2.ROTATE (ro) - rotate selected objects at specified base point and angle
- 3.MOVE (m) - relocate selected objects

## WORKING WITH LAYERS AND PROPERTIES

Layers(la)-an electronic overlay similar to acetate. Layers are the equivalent of the overlays used in paper-based drafting or manual animation. Every layer has an associated color and linetype.

Advantages of using a Layer

- 1.Easy editing
- 2.Easy selecting
- 3.Control of regeneration
- 4.Selective printing

## Capabilities of Layers

1. **OFF**-objects in layer turned off are invisible on screen or in plotting, but included in REGENeration. Use on to restore visibility.
2. **ON**-turn on layers
3. **FREEZE**-same effect using OFF, Frozen objects are not included in REGENeration thus improve your production speed.
4. **UNFREEZE**-disable FREEZE
5. **LOCK**-you cannot edit objects on locked layers. However they are still visible if the layer is on.
6. **UNLOCK**-objects can be edited again when unlocked
7. **PLOT/NO PLOT**-prevents the selected layers from being plotted

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# Dimensioning

- Dimensioning is the process of adding measurement annotation to a drawing. You can create dimension styles to format dimensions in your drawing conform to industry or project standards.



