AutoCAD Lab 1
Basics
and
Drawing Fundamentals

EGS 1007
Engineering Concepts and Methods
Will the Computer Ever REPLACE Pencil and Paper Drawings?

Maybe someday…

- When a computer becomes as light, small, and economically accessible as a pencil and a tablet…
- Presently, hand sketching remains one of the most important skills that an engineer can master and it can be done ANYWHERE!
AutoCAD by Autodesk, Inc.

The first and most widely used drafting software in the world…

- CAD: Computer-Aided Design
- CADD: Computer-Aided Design and Drafting
- CAM: Computer-Aided Manufacturing
- CIM: Computer-Integrated Manufacturing
AutoCAD Systems Offer:

- Increased accuracy
- Increased drawing speed
- Easy to revise
- Better design analysis
- Better presentation
- Libraries of drawing aids
- Improved filing
Drawing Elements May Be Invoked By:

- Using the pull-down menu
- Using the toolbars…
  - Click on View → Toolbars
  - Check commands you’ll need for your drawing
- Typing the commands directly in the command line
- Typing the first letter of command in the command line (see Figure 1.6)
Basic Drawing Commands

- Arc (A)
- Circle (C)
- Dimstyle (D)
- Distance (DI)
- Erase (E)
- Fillet (F)
- Insert (I)
- Line (L)
- Layer (LA)
- List (LS)
- Linetype (LT)
- Move (M)
- Mspace (MS)
- Offset (O)
- Osnap (OS)
- Pan (P)
- Pedit (PE)
- Pspace (PS)
- Pline (PL)
- Redraw (R)
- Regen (RE)
- Rotate (RO)
- Mtext (T)
- Explode (X)
- Zoom (Z)
AutoCAD Command Input Coordinates

Input (coordinates) may be entered:

- Through dialog windows (depending on the command).
- Through the command line.
- Using dynamic input on the boxes that appear near the cursor location. (The DYN status button must be selected)
Three Ways to Repeat Past Commands:

1. Arrow up or down to see past commands
   (To see more than just the last command entered…)
2. Press Enter
   (To see LAST command entered)
3. Press Space Bar
   (To see LAST command entered)
Helpful AutoCAD Hints

To change the background color...

- Right click on screen
- Select Options
- Go to Display tab
- Click on Colors
- Change color
- Apply and close
Helpful AutoCAD Hints

To modify Grid and Snap settings:

- Right click on Grid tab
- Select settings
- Enter new Grid settings in “Grid X spacing”
- Enter new Snap settings in “Snap X spacing”
- Hit OK
Helpful AutoCAD Hints

To modify global linetype scale factor:

- Type \texttt{ltscale} in command line
- Type in new \textit{linetype} scale factor
Helpful AutoCAD Hints

Hit $F6$ to change from:
Absolute (XYZ) Coordinate System

to

turn off Coordinate Display
Helpful AutoCAD Hints

- Hit enter to end a command sequence
- To undo something, type \texttt{U} and hit enter
- To get out of a command immediately, hit the escape key
Helpful AutoCAD Hints

To turn off the user coordinate system icon:

- Type `ucsicon`
- Then type `off`
Helpful AutoCAD Hints

To check a length of something:

- Use **Distance** Command
- Use List Command
Open the AutoCAD software through the Autodesk folder under “programs” or by double-clicking on the desktop shortcut:

- *Drawing1.dwg* is an empty AutoCAD drawing that opens by default.
- Explore the pull-down menu.
- Read the tool-tips by moving the cursor over the toolbars.
- Notice the status buttons on the bottom of the screen.
Start a new drawing by selecting “File” -> “New” from the pull-down menu.

The “Select Template” dialog box appears.

Select the acad.dwt default template.

Save the file by selecting “File” -> “Save” from the pull-down menu.

Browse to a working folder (create if necessary).

Type the name “Lab 1 Shapes” (the .dwg extension is appended automatically) and click “Save”.

Try some AutoCAD features:

- Turn the **GRID ON** by pushing the GRID status button.
- Turn the **SNAP ON** by pushing the SNAP status button.
- **ZOOM** in a section of the screen by using the toolbars.
- Type **ZOOM** on the command line and type _a_ for ALL.
Now try some AutoCAD drawing commands:

- Draw lines by either selecting “Draw” -> “Line” from the pull-down menu, typing “Line” or “L” on the command line, or by selecting the “line icon” from the toolbar.

- Click on different positions along the grid and use the “ESC” key when you are ready to exit the command.

- Now erase everything by typing “Erase” or “E” on the command line and selecting the objects on the screen.
Now turn OFF the SNAP and the GRID.

Let’s try to draw a set of lines by entering coordinates.

Select “Line” and specify the first point: 2.15,1.1

Next point: 5.15,1.1

Next point: 5.15,7.1

Next point: 8.15,7.1 and press “ESC”

These are absolute coordinates.
- Erase all the objects on the screen.
- Select a “line” again.
- Enter the first point: 2.15,1.1
- Enter next point: @3<0
- Enter next point: @6<90
- Enter next point: @3<0 and press “ESC”
- These are relative polar coordinates.
AutoCAD Tour
Erase all the objects on the screen.

Type “Undo” or “U” to undo the erase command. Type “Redo” to execute the erase command again.

Turn ON the GRID again.

Set new drawing limits by selecting “Format” -> “Drawing Limits” from the pull-down menu or by typing “Limits”.

Specify <0,0> for the lower left corner and <50,40> for the upper right corner.

Now ZOOM -> All…
AutoCAD Tour
Change the GRID density and SNAP movement by right-clicking on the GRID status button.

Select x = 2.0 and y = 2.0.

Try the “line” command, the “rectangle” command and the “circle” command to resemble the shapes below:
Type “Text” in the command line, specify the start point close to the rectangle, specify a height of 1.0, and specify 0 angle of rotation. Type the word “House” and press enter.

Similarly, specify “Trees” close to the circles.

Use the “Copy” command to copy the text object “Trees” to other locations.

Save your drawing.
AutoCAD Tour
But WAIT, there’s even MORE AutoCAD FUN ahead…

Open your AutoCAD textbook and complete Drawings 1, 2, and 3 within Chapter 1:

- Save Drawing 1 as “Lab 1 Grate.dwg”
- Save Drawing 2 as “Lab 1 Design.dwg”
- Save Drawing 3 as “Lab 1 Shim.dwg”