



AutoCAD Lab 2



AutoCAD Construction and Editing Techniques

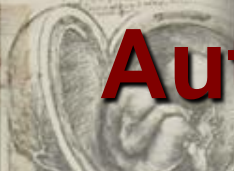
EGS 1007

Engineering Concepts and Methods



AutoCAD Construction

- Go to our course webCT, .
- Look under *Lectures – AutoCAD* folder.
- Save *Subdivis.dwg* and *Subdiv2.dwt* to your desktop.
- In AutoCAD, open the *Subdivis.dwg*
- From the pull-down menu, click on *File -> Save As* and save the file in your working directory using the same name (*Subdivis.dwg*).
- Turn off the grid.



AutoCAD Construction

AutoCAD 2006 - EDUCATIONAL VERSION - [D:\edivo\AutoCAD_Lab02\Subdivis.dwg]

File Edit View Insert Format Tools Draw Dimension Modify Express Window Help

NOTES

CENTERLINE ByLayer ByLayer ByLayer

Wannabe Heights Estates

Command:
Automatic save to C:\Documents and Settings\EDivo\Local Settings\Temp\Subdivis_1_1_7084.sv\$...
Command:

202.8438, 1034.5829, 0.0000 SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL



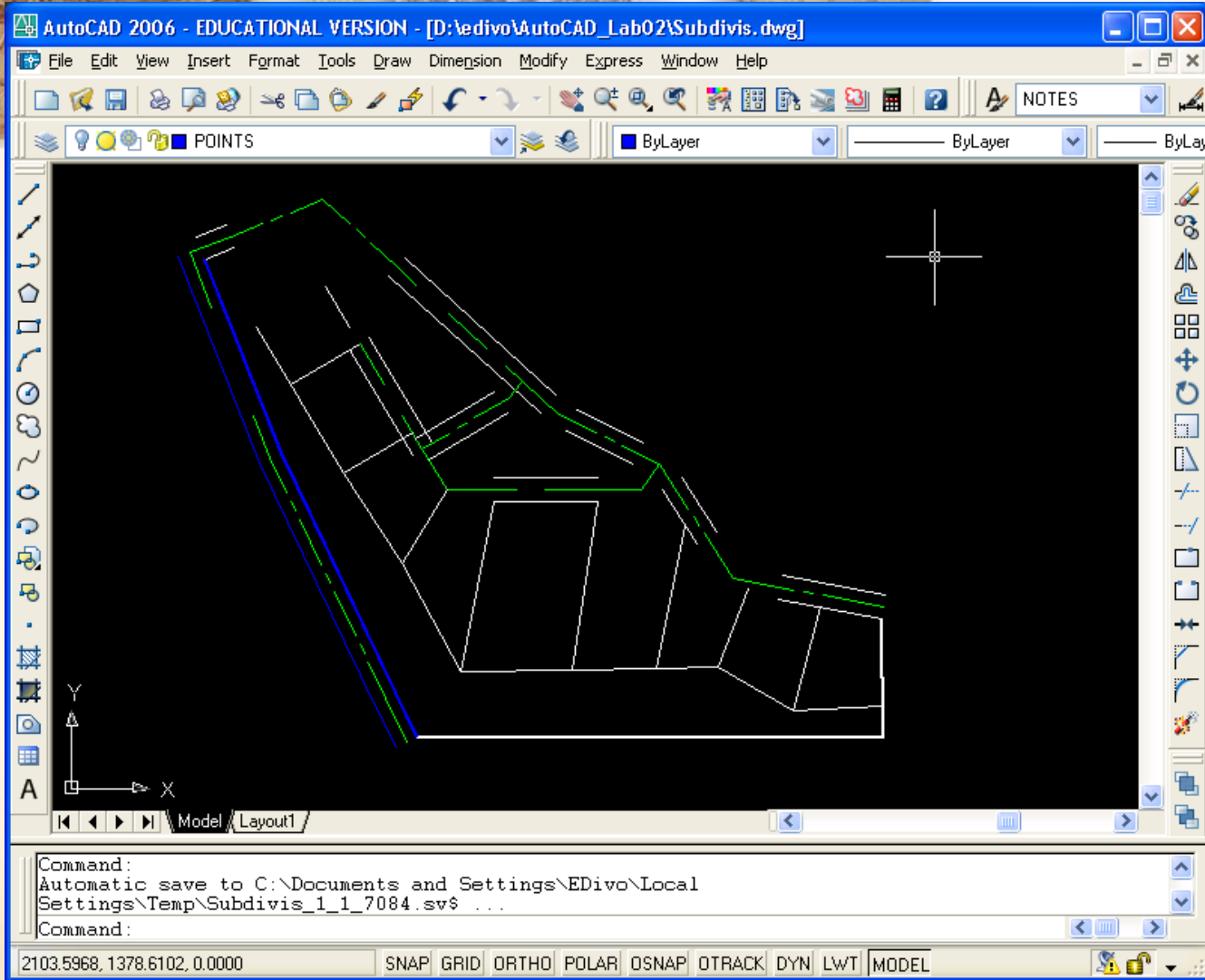
AutoCAD Construction Layers

This drawing is organized in layers: **0**, **centerline**, **existing_road**, **hiway**, **lotlines**, **points**, and **text**.

- These layers were created to facilitate editing and visualization of different features in the drawing.
- For example, click on the layer toolbar and **turn off** layers points and text by clicking on the **light bulb**.
- This does not mean that you erased the points and text content. You just temporarily turned them off to concentrate in other content.
- To work on a layer, it must be **current**.
- Layer's color, line type and line weight can be selected for each layer.

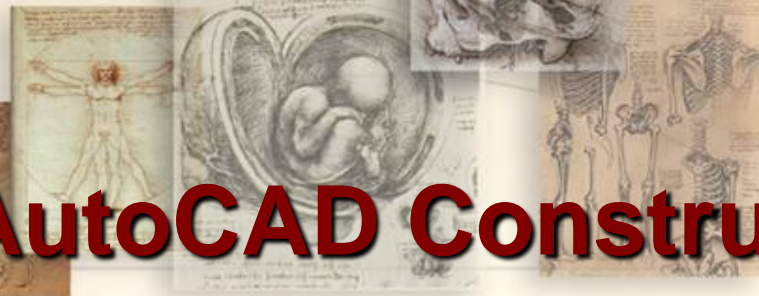


AutoCAD Construction Layers





AutoCAD Construction Layers



Other aspects of the drawing you can control through layers:

- **Freeze/Thaw** to turn the layer off/on and to prevent regeneration or redraw for speed-up.
- **Lock/Unlock** to prevent editing of old and new objects on a layer.
- **Change properties By-Layer** such as: color, line-type, etc.
- You can *create* as many **layers** as you wish to organize your drawing objects and facilitate future editing.



AutoCAD Object Snap

Another important feature of AutoCAD is its ability to ***track existing objects locations*** to snap new objects at exact locations:

- Turn ON the ***Object Snap*** feature by clicking on the ***OSNAP*** status button.
- You can select the ***different types of object snap*** modes available by right-clicking on the button and selecting '***settings***'.
- These modes are: ***Endpoint, Midpoint, Center, Node, Intersection, Extension, Perpendicular, Tangent***, etc.



AutoCAD Object Snap

Let's insert a new object by using the object snap feature

- Make sure the “**CENTERLINE**” layer is current.
- Turn back on the “**points layer**” and the “**text layer**”.
- Turn ON **OSNAP** and from settings select only the “**Node**” mode.
- **Type Arc (A)** on the command line or **select the Arc icon** and select the three blue nodes on the top-left of the drawing.
- Erase the two green straight lines on that section.



AutoCAD Arcs

Let's add more Arcs using different modes:

- From the pull-down menu select: *draw -> Arc -> Start-End-Angle* mode.
- Select the two *nodes* on lot 3 and lot 4 and specify an angle of *59d12'30"* on the command window.
- From the pull-down menu select: *draw -> Arc > Start-Center-Length* mode.
- For *start* select the *node* on the bottom right of lot 10, for *center* select the point above to the right of lot 10, specify an arc length of *169.4253* on the command window.
- Erase the straight lines in between.



AutoCAD Arcs

The screenshot shows the AutoCAD 2006 Educational Version interface. The title bar reads "AutoCAD 2006 - EDUCATIONAL VERSION - [D:\edivo\AutoCAD_Lab02\Subdivis.dwg]". The menu bar includes File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Express, Window, and Help. The toolbar contains various drawing and editing tools. The command line at the bottom shows the following text: "Specify corner of window, enter a scale factor (nX or nXP), or [All/Center/Dynamic/Extents/Previous/Scale/Window/Object] <real time>:", "Specify opposite corner:", and "Command:". The status bar at the bottom displays coordinates (921.1462, 1508.5026, 0.0000) and various system variables (SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DYN, LWT, MODEL). The drawing area shows a road layout with several arcs and straight lines. Labels in red text include "ECSTASY ROAD", "BROWN TN ROAD", "GARRET", and "CIRCLE". There are also red numbers 1, 2, 3, and 10 scattered throughout the drawing. The drawing is on a black background with white and green lines.



AutoCAD Circles

Let's add a circle at the end of lot 1:

- Change the current layer to **LOTLINES**.
- Modify the **OSNAP** settings to include the **Endpoint mode**.
- Type **Circle (C)** in the command line and select the **2-point (2p)** option.
- Select the points at the end of the boundaries of lot 1.
- Additional circle modes include: **center-radius**, **3-point**, **tangent-tangent-radius**, etc.
- **Ellipses** can be similarly added.



AutoCAD Circles

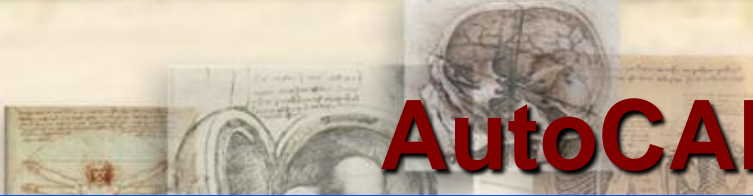
The screenshot displays the AutoCAD 2006 interface with a technical drawing. The drawing features several geometric elements: a large blue circle labeled '1', a green circle labeled 'CIRCLE', and a green arc labeled '10'. Lines are labeled 'ECSTASY ROAD', 'ROAD', and 'CARPET'. The command line at the bottom shows the following commands: Command: Command: Command: _qsave Command: The status bar at the bottom indicates the current coordinates as 741.6744, 1412.2458, 0.0000 and lists various system variables like SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DYN, LWT, and MODEL.



AutoCAD Templates

Now let's work on a different drawing starting from a template:

- **Save and Close the current drawing.**
- **Select New from the File pull-down menu.**
- **Browse to the tutorial data directory.**
- **Select the template file: *Subdiv2.dwt*.**
- **Select Save As from the *File* pull-down menu and save the current file in your working directory as *MySubDiv.dwg*.**



AutoCAD Templates

The image shows the AutoCAD 2006 Educational Version interface. The title bar reads "AutoCAD 2006 - EDUCATIONAL VERSION - [Drawing2.dwg]". The menu bar includes File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Express, Window, and Help. The toolbar contains various drawing and editing tools. The command line at the bottom shows the following text: "AutoCAD Express Tools Copyright © 2002-2004 Autodesk, Inc.", "AutoCAD menu utilities loaded.", "Command: <Grid off>", and "Command:". The status bar at the bottom displays coordinates (2543.7683, 1651.9892, 0.0000) and various system variables (SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DYN, LWT, MODEL). The drawing area shows a mechanical part with a blue outline, a green dashed centerline, and a large green circle. The interface is in the Model space.



AutoCAD Editing

We will now edit some of the objects in the current drawing:

- Zoom into the area around the circle on the right.
- Make sure the current layer is **CENTERLINE**.
- Type **Trim** in the command line or select the **Trim icon** under the “**Modify**” toolbar.
- Now select the **cutting edges**: select the line to the bottom of the circle and select the line to the left of the circle, then press enter.
- Select the circle as the object to trim. Make sure you select the circle at a point away from the cutting edges.



AutoCAD Editing

Continue trimming other objects in the drawing:

- **Trim** the remaining lines around the circle you just trimmed by selecting the trimmed circle as the cutting edge.
- Zoom All or Zoom Extents
- Make the **LOTLINES** layer current.
- **Trim** the circles on the top left of the drawing by selecting the proper cutting edges.
- Now **trim** the remaining lines by selecting the trimmed circles as the cutting edge.



AutoCAD Editing

The screenshot shows the AutoCAD 2006 interface. The title bar reads "AutoCAD 2006 - EDUCATIONAL VERSION - [D:\edivo\AutoCAD_Lab02\MySubDiv.dwg]". The menu bar includes File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Express, Window, and Help. The toolbar contains various drawing and editing tools. The main workspace displays a 2D drawing of a mechanical part with a blue outline and green dashed lines. The command line at the bottom shows the following commands: Command: _qsave, Command: r, REDRAW, and Command: |. The status bar at the bottom indicates the current coordinates (154.1407, 1488.2814, 0.0000) and various system variables like SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DYN, LWT, and MODEL.



AutoCAD Editing

Now let's try the *Offset command*:

- Make **CENTERLINE** the current layer.
- Type **Offset** in the command line or click on the **Offset icon** under “**Modify**” toolbar.
- Specify an **offset distance** of 30.
- Select the **curve** on the top left of the drawing (centerline of the highway).
- **Pick** any point below the curve, **reselect** the **curve**, and **pick** a point above the curve.
- **Trim** the lines around these curves.



AutoCAD Editing

The screenshot displays the AutoCAD 2006 interface. The title bar reads "AutoCAD 2006 - EDUCATIONAL VERSION - [D:\vedivo\AutoCAD_Lab02\MySubDiv.dwg]". The menu bar includes File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Express, Window, and Help. The toolbar contains various drawing and editing tools. The drawing area shows a complex geometric shape with green and blue lines. The command line at the bottom displays the following text: "Specify corner of window, enter a scale factor (nX or nXP), or [All/Center/Dynamic/Extents/Previous/Scale/Window/Object] <real time>: Specify opposite corner: Command: 921.5656, 1449.8246, 0.0000". The status bar at the bottom shows "SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL".



AutoCAD Editing

Let's change some of the properties of the objects in the drawing.

- Select the newly created (**offset**) arcs and select **HIWAY** from the layer list. This changes the current objects to the proper layer.
- Select all of the outer highway lines (currently white) and change them to the **HIWAY** layer.
- Other properties may be modified through the **property dialog box** by clicking on the **property icon** on the toolbar or from the **Modify -> Properties** pull-down menu.



AutoCAD Editing

AutoCAD 2006 - EDUCATIONAL VERSION - [D:\edivo\AutoCAD_Lab02\MySubDiv.dwg]

File Edit View Insert Format Tools Draw Dimension Modify Express Window Help

CENTERLINE ByLayer ByLayer

Model/Layout1

ZOOM
Specify corner of window, enter a scale factor (nX or nXP), or
[All/Center/Dynamic/Extents/Previous/Scale/Window/Object] <real time>: a
Command:

2171.7332, 1113.8866, 0.0000 SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL



AutoCAD Editing

Let's ret the Fillet command:

- Zoom around the **central, upper** area of the drawing and let's complete some more highway lines using the **Fillet Command** to round the corners...
- **Offset** centerlines anywhere you see missing outside lines and then change outside line property to "**HIWAY**".
- Type **Fillet** in the command line or click on the **Fillet icon**.
- Specify a fillet **radius** of 10.
- Click on the **highway lines** around the corners.
- The **Chamfer** command can be similarly used to specify angled corners.



AutoCAD Editing

The screenshot shows the AutoCAD 2006 interface. The title bar reads "AutoCAD 2006 - EDUCATIONAL VERSION - [D:\vedivo\AutoCAD_Lab02\MySubDiv.dwg]". The menu bar includes File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Express, Window, and Help. The toolbar contains various drawing and editing tools. The drawing area shows a complex shape defined by blue and green lines. The command line at the bottom displays the following text: [Fence/Crossing/Project/Edge/eRase/Undo]: Select object to trim or shift-select to extend or [Fence/Crossing/Project/Edge/eRase/Undo]: *Cancel* Command: 1470.0975, 985.2933, 0.0000. The status bar at the bottom shows various settings: SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DYN, LWT, and MODEL.



AutoCAD Polyline

Let's add a pond to the drawing:

- **Make 0** the current layer.
- Type ***Polyline (PL)*** and click on several points on the upper right part of the plan to *specify* the boundary of the pond.
- Use the ***Pedit*** command under the “***Modify II***” toolbar to modify the current ***Polyline***. Specify the ***Spline*** mode and notice that the corners are now automatically ***curved/fillet***.
- Finish the remaining parts of the plan by extending, offsetting, and trimming what is necessary to complete the highway around the subdivision...



AutoCAD Editing

The image shows the AutoCAD 2006 software interface. The title bar reads "AutoCAD 2006 - EDUCATIONAL VERSION - [D:\vedivo\AutoCAD_Lab02\MySubDiv.dwg]". The menu bar includes File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Express, Window, and Help. The toolbar contains various drawing and editing tools. The drawing area shows a 2D model of a chair with a blue outline and a green dashed line. The command line at the bottom shows the following text: "Command:", "Command: Specify opposite corner: *Cancel*", "Command: *Cancel*", and "Command:". The status bar at the bottom displays coordinates "2374.2495, 1868.8658, 0.0000" and various system variables like SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DYN, LWT, and MODEL.



AutoCAD Drawing Information

To obtain information about the current drawing:

- The **text layer**...
- The Area command from the **Tools -> Inquiry -> Area** can be used to specify line intersections and corners and AutoCAD will automatically *provide the surface area* in between.
- **Other Inquiry** commands can be used for similar purposes.
- In addition, the drawing may be setup for different *plotting/printing* configurations ranging from regular *letter-size* printing to *Blueprint* plan plotting.
- **Find the area of each lot...which is the biggest lot?...which is the smallest lot?**



Save it!

- **Make sure to save this file.**
- **We will use it next lab**