

General Course Syllabus for AutoCAD 2000 Tutor

Usability

This general course outline follows the concepts and chapters that are presented in the text. The syllabus can assist in the planning and set-up of a CAD course or be used as a benchmark in an existing course. It is based on the estimates of presentation / application hours of each chapter / topic. This chapter based outline should be converted into a week by week outline based on the individual course's contact hours.

It must be noted that these estimates may not reflect similar specialized emphasis areas that need to be included in a specific region of the country.

Objective of Course

This course is designed to introduce a student to the utilization of Computer Aided Design tools to create drawings. A combination of sketching skills and CAD drafting applications will be integrated into several chapters. Skill development in the 3D solids area, with emphasis in creation, editing and output is also a focus since industry moving from a 2D based drawing environment to a 3D solids design environment.

Pre-requisites

- Knowledge of basic computer operation and file management
- Some engineering graphics interpretation work (reading and working with drawings) is needed.

Outline

Basic Drawing Creation Tools

Chapter 1

Getting Started with AutoCAD 2000

Time Estimate: 2-3 Contact hours

Chapter Objectives

Identifying the areas of the ACAD 2000 screen interface

Locating and using the function keys

Entering commands through various methods

Managing Coolbars

Beginning a new drawing through the start from scratch start-up wizard

Locating and opening an existing drawing

- Creating a line through several accurate input techniques
- Setting up running Object Snaps
- Using Polar Tracking in line creation
- Combining Object Snaps and Polar Tracking to locate points on a drawing
- Creating a basic circle
- Erasing objects
- Saving drawings
- Exiting an AutoCAD 2000 Drawing session

Chapter 2

Drawing Setup and Organization

Time Estimate: 3 - 4 contact hours

Chapter Objectives

- Setting up drawings that utilize different types of measurement units
- Creating a drawing sheet that reflects the appropriate scaling properties of the object being drawn
- Using set-up Wizards to begin a drawing session
- Applying Grid and Snap to a drawing sheet
- Using the appropriate linetypes in a drawing
- Locating and opening an existing drawing
- Assigning colors, lineweights, and linetypes to drawing layers
- Applying LTSCALE to properly scale linetypes in a drawing
- Setting a current layer, and modifying settings in the layer control area on the Object Properties Toolbar
- Applying a Layer Filter to a list of layer
- Knowing how the Layer Express features are used

Chapter 3

AutoCAD Display and Selection Operations

Time Estimate: 2-3 contact hours

Chapter Objectives

- Increasing and decreasing the magnification of a drawing through several methods
- Applying the usage of the aerial viewer into a drawing
- Shifting of the image using the PAN command
- Use of the Microsoft Intellimouse™ functions to combine the use ZOOM and PAN
- Save magnified drawing states as separate named views
- Applying selection methods in a drawing
- Using the Erase command effectively
- Cycling through as object selection set

Using the Quick Select tool
Applying the Express Tools for selection purposes

Chapter 4

Modify Commands

Time Estimate: 2-3 contact hours

Chapter Objectives

Methods of Selecting Modify Commands
Creating Rectangular Arrays
Creating Polar Arrays
Understanding the Different Modify Commands

BREAK Command

CHAMFER Command

COPY Command

EXPLODE Command

EXTEND Command

FILLET Command

LENGTHEN Command

MIRROR Command

MOVE Command

OFFSET Command

PEDIT Command

ROTATE Command

SCALE Command

STRETCH Command

TRIM Command

Using Express Tools Applications for Modifying

Using Multiple Entity Stretch

Using Move Copy Rotate

Using Cookie Cutter Trim (Extended Trim)

Using Polyline Join

Using Multiple Pedit

Chapter 5

Geometric Constructions

Time Estimate: 2 – 4 contact hours

Chapter Objectives

Creating objects using basic drawing commands

Arc and its options

Boundary

Circle, Donut, Ellipse, Point
Multi-Line, Polygon, Spline, Xline, Ray
Using editing tools to create geometric constructions
Dividing, Measuring, and Ogee curves

Chapter 6

Adding Text to your Drawings

Time Estimate: 1 Contact hour

Chapter Objectives

Creating single line dynamic text
Creating multi-line text (paragraph style)
Changing text style changes (fonts, height)
Using text justification options
Using special text characters
Editing existing text in a drawing
Finding and replacing text in a drawing

Chapter 7

Object Grips and Changing the Properties of Objects

Time Estimate: 1 - 2 contact hours

Chapter Objectives

Using Object Grips
Understanding and Using Object Grip Modes
Activating the Grip Cursor Menu
Modifying the Properties of Objects
Using the Layer Control Box to Modify Object Properties
Matching the Properties of Objects

Chapter 8

Shape Description and Multiview Projection

Time Estimate: 2 contact hours

Chapter Objectives

Identifying where drawing views originate from
Applying the relationships between the views

Choosing the most appropriate view and the number of views needed to describe a part
Using basic linetypes in drawings
Applying runouts to linear / circular surface intersections

Output Tools

Chapter 9

An Introduction to Drawing Layouts

Time Estimate: 1 contact hour and some additional practice!

Chapter Objectives

Understanding Drawing Layouts
Understanding Model Space
Creating Viewports in Model Space
Understanding Model Space and Paper Space
Creating a Paper Space Layout
Creating Viewports with the MVIEW Command
Using Wizards to Create Layouts
Arranging Architectural Drawings in Paper Space
Typical Architectural Drawing Scales
Arranging Metric Drawings in Paper Space
Creating Multiple Drawing Layouts
Using the Options Dialog Box to Control Layouts
Retaining the Visibility of Layers in Paper Space

Chapter 10

Plotting your Drawings

Time Estimate: 30 minutes -1 hour

Chapter Objectives

Configuring / setup of a plotting device
Output of your drawing to printer / plotter
 From Paper space / Layouts
 From Model space
Applying lineweights to a plot
Controlling how the plot looks
Creating and modifying a color dependant Plot Style
Output a drawing to a Eplot (Web format)

Dimensioning Tools

Chapter 11

Dimensioning Basics

Time Estimate: 4 hours

Chapter Objectives

- Understanding Dimensioning Basics
- Placing Dimensions and Extension Lines
- Grouping Dimensions
- Dimensioning to Visible Features
- Dimensioning to Centerlines
- Dimensioning Arrowheads
- Dimensioning Systems
- Using Repetitive Commands
- Methods of Choosing Dimension Commands
- Using Basic Dimension Commands
 - Linear Dimensions*
 - Continue Dimensions*
 - Baseline Dimensions*
 - The QDIM Command*
- Using Basic Dimension Commands
 - Radius and Diameter Dimensioning
 - Using QDIM for Radius and Diameter Dimensions
 - Leader Lines
 - The QLEADER Command
 - Dimensioning Angles
 - Dimensioning Slots
- Ordinate Dimensioning
- Editing Dimensions
- Understanding Tolerances
- Geometric Dimensioning and Tolerancing (GD&T)
- General Dimensioning Symbols
- Character Mapping for Dimension Symbols
- Grips and Dimensions

Chapter 12

The Dimension Style Manager

Time Estimate: 1-2 hours

Chapter Objectives

Apply the major areas of the dimension style manager

- Lines and Arrows*

Text

Fit

Primary Units

Alternate Units

Tolerances

Modify and apply dimension style changes to new and existing dimensions

Getting More Out Of Your Drawings

Chapter 13

Analyzing 2D Drawings

Time Estimate: 1-2 hours

Chapter Objectives

Retrieving area distances from linear and non-linear object shapes

Calculating the total area of an object with using subtraction

Interpreting distance and ID information

Analyzing the differences between objects when using the List command

Understanding the usage of the status command to determine free disk area and other properties

Determining how long a drawing file took to be created through the Time command

Specialty Area Drawing Creation

Chapter 14

Section Views

Time Estimate: 1 - 2 Contact hours

Chapter Objectives

Applying section views to drawings

Creating drawings using various types of section views

Full

Half

Assembly

Aligned

Offset

Sectioning ribs

Broken out

Revolved

Removed

Creating Isometric sections

Creating Architectural sections

Using the BHATCH command to apply hatch patterns to various types of objects and configurations

Editing existing hatch patterns

Chapter 15 Auxiliary Views

Time Estimate: 1 - 2 Contact hours

Chapter Objectives

- Creating an auxiliary view as one of the primary views in a multi-view drawing
- Setting up the Snap to assist in creating auxiliary views
- Understanding the relationship between orthographic views and auxiliary views

Chapter 16 Isometric Drawings

Time Estimate: 2 Contact hours

Chapter Objectives

Creating an isometric drawing

Using the isoplane modes to draw

Applying the Isometric Aids in the Drafting Settings Dialog Box

Creating Isometric Circles, Angles, and Ellipses

Drawing Integration Tools

Chapter 17

Block Creation, AutoCAD DesignCenter, and MDE

Time Estimate: 3 Contact hours

Chapter Objectives

Creating a symbol block for use in both a current drawing and a separate drawing

Inserting a block into a drawing

Applying block express tools for special applications

Redefining a block's occurrence and rename it

Applying measurement and inquiry tools to blocks

Utilizing the AutoCAD design center for block management

Using the MDE – Multiple Design Environment

Chapter 18

External References

Time Estimate: 1 hour

Chapter Objectives

Creating an External Reference Link

Managing External Reference Layers and block objects

Using the XBIND to edit layers and blocks

Applying in place reference editing to modify nested blocks or XREF's

Using the AutoCAD DesignCenter to attach XREF's into a drawing

Chapter 19

Multiple Viewport Drawing Layout

Time Estimate: 2 Contact hours

Chapter Objectives

Creating and arranging multiple views in a layout

Applying and scaling dimensions in a layout

Controlling the visibility of the layers in separate viewports

Creating detail drawings in Paper Space with the aid of External References

Understanding Layer 0 issues in Paper Space (Layouts)

3D Solids Tools

Chapter 20

Solid Modeling Fundamentals

Time Estimate: 6-8 Contact hours

Chapter Objectives

Understanding the differences between 3D drawing creation options

Using the UCS to change and develop drawing planes

Understanding the differences between different types of drawing representations

Orthographic projections

Isometric

3D wireframe

3D surface

3D solid models

Applying the use of primitives in solid model creation

Incorporating the use of Boolean Operations to develop models that use more than one object

Union

Subtract

Intersection

Utilizing the different User Coordinate System options to change the drawing plane on 3D objects

Viewing 3D models in a variety of 3D viewing options:

3D Orbit

Viewpoint and it's many options

Preset isometric viewing angles

Applying EXTRUDE and REVOLVE commands to polyline objects to develop 3D solids

Modifying 3D solids through the FILLET and CHAMFER commands

Creating Sections and Slices from solid models

Obtaining information about the solid through Mass Properties

Checking for interference between solids with the INTERFERE command

Changing the smoothness of models using Isolines and Facetres

Using viewports to assist in the construction of solids models

Using the various styles of shading techniques depending on the desired results

Hide

Flat shade

2D Wireframe

3D Wireframe

Gouraud Shaded

Chapter 21

Editing Solids Models

Time Estimate: 2-3 Contact hours

Chapter Objectives

Aligning and moving solid model through object snaps

Rotating solid models into the correct orientation

Editing the face of the solid through adding and removing features based on the face of a solid object

Extruding

Moving

Rotating

Offset

Taper

Copying

Deleting

Editing the body of a solid through imprinting, separating, shelling and cleaning objects

Chapter 22

Creating Orthographic Views from a Solid Model

Time Estimate: 2 Contact hours

Chapter Objectives

Utilizing the SOLVIEW command to develop 2D orthographic views from 3D Solids Models

Section views

Auxiliary views

Orthographic

Applying the SOLDRAW command to the viewport to detail the images in the viewports

Managing the layers that are created through the SOLVIEW command

Applying dimensions to the orthographic views using the specific layers for each view

Creating a section view

Creating an auxiliary view

Creating an isometric view in a separate viewport

Matrix Breakdown of Chapter Contact Hours

<u>Chapter</u>	<u>Contact Hours</u>	<u>Topic</u>
1	2.5	Getting Started with AutoCAD 2000
2	3.5	Drawing Setup and Organization
3	2.5	AutoCAD Display and Selection Operations
4	2.5	Modify Commands
5	3.0	Geometric Constructions
6	1.0	Adding Text to your Drawings
7	1.5	Object Grips and Changing the Properties of Objects
8	2.0	Shape Description and Multiview Projection
9	1.5	An Introduction to Drawing Layouts
10	1.0	Plotting your Drawings
11	4.0	Dimensioning Basics
12	1.5	The Dimension Style Manager
13	1.5	Analyzing 2D Drawings
14	1.5	Section Views
15	1.5	Auxiliary Views
16	2.0	Isometric Drawings
17	3.0	Block Creation, AutoCAD DesignCenter, and MDE
18	1.0	External References
19	2.0	Multiple Viewport Drawing Layout
20	7.0	Solid Modeling Fundamentals
21	2.5	Editing Solids Models
22	2.0	Creating Orthographic Views from a Solid Model
Total Hours		50.5

There is some variability in the matrix, some chapters have ranges of contact hours. Those chapters have the median hours displayed.