

Mercer County Community College

Arts and Communication Division

ABT 132

ARCHITECTURAL COMPUTER DRAFTING

COURSE DESCRIPTION:

Students will learn to use AutoCAD® 2002 and Architectural Desktop 2 to draw and prepare a simple, two-story house as an acceptable architectural document as well as a three-dimensional entity. Advanced AutoCAD techniques including x-refs, 3D Modeling, Rendering and Dimensioning will also be introduced.

Text (s): **Instructor Handouts**

Prerequisites: **DRA190 or permission of instructor**

Corequisites: **None**

Credits: 2

Lecture Hours: 1

Studio/Lab Hours: 2

**Food and Drink are Strictly prohibited in Classrooms as per Health and Safety Laws.
Students may not bring in chemicals or cleaning fluids without the appropriate MSD
Sheets.**

Course Coordinator: John Santosuosso

Latest Review: Summer 2005

UNIT 1: INTRODUCTION

Students in ABT132, Architectural Computer Drafting, will learn to use AutoCAD® 2000 and Architectural Desktop 2 to draw and prepare a simple, two-story house as an acceptable document as well as a three-dimensional entity. Advanced AutoCAD techniques including blocks, x-refs, 3D Modeling, rendering and advanced dimensioning will also be introduced.

1. Discuss Program Applications and Uses

2. Introduce First Project: Using Architectural Desktop 2, students will complete a two-story house assembled with doors, windows, stairs, roofs, etc., and learn to view the model three-dimensionally.

Topics covered include:

- Setting up the drawing environment
- Exterior and Interior Walls
- Doors and Windows
- Stairs
- Roofs
- Symbols, Annotations, Schedules, and Dimensions

3. Starting AutoCAD® 2000 with Architectural Desktop 2: In this section, students will start AutoCAD and create a new drawing to use with the Auto-Architect tutorial.

Topics covered include:

- Using Templates
- Saving Files
- Setting up AEC and Softdesk Programs
- Selecting a Prototype

4. Specifying Scale, Units and Borders

Topics covered include:

- Formatting Units to Imperial Architectural
- Setting the scale to 1/4"=1'-0"
- Using a Predefined Border

5. Defining and Setting Levels

Students will define two levels and set floor elevations.

Topics covered include:

- Working with layers and levels
- Setting levels
- Restoring layers

UNIT 1: INTRODUCTION (continued)

6. Review coordinates and dimensions

Topics covered include:

- How to enter coordinates (AutoCAD defaults all entries to inches unless otherwise specified)
- Nominal vs. Actual dimensions

Begin the Auto-Architect (Softdesk 8) tutorial.

UNIT 2: WALLS, DOORS AND WINDOWS, STAIRS AND ROOFS

- 1. Walls:** This section covers the main aspects of the Auto-Architect Walls commands. Students will draw walls by a variety of methods, and create and edit different wall styles.

Topics covered include:

- Wall Settings
- Wall Styles
- Drawing Walls
- Cleaning Wall Intersections
- Levels
- Viewing in 3D

- 2. Doors and Windows:** Students will place doors and windows in existing walls by a variety of methods. These will include the full doors and windows library, the Quick doors and windows library and the swap command.

Topics covered include:

- Door and Window Settings
- Configuring Doors and Windows
- Placing Doors
- Creating Wall Openings
- Placing Windows
- Quick Doors and Windows
- Exchanging Doors and Windows
- Removing Doors and Windows

- 3. Stairs:** Students will create a straight run stair using the Stair Calculator and various options to set all of the necessary stair creation parameters.

Topics covered include:

- Stair Settings
- Drawing the Stair run
- Viewing in 3D

UNIT 2: WALLS, DOORS AND WINDOWS, STAIRS AND ROOFS (continued)

4. Roofs: In this section, students will configure and draw gable roofs.

Topics covered include:

- Levels
- Configuring Roofs
- Drawing Roofs
- Viewing in 3D

UNIT 3: SYMBOLS, ANNOTATIONS, SCHEDULES, AND DIMENSIONS

This unit covers working with symbols, annotations, schedules and dimensions. Students will insert kitchen and bathroom symbols, annotate doors and windows with callouts, generate schedules from the door and window annotations, add a keynote, and dimension the front of the residence.

1. Symbols: Students will insert 2D symbols, then convert them to 3D symbols.

Topics covered include:

- Symbol Settings
- Inserting Symbols
- Inserting Fixtures
- Converting from 2D to 3D

2. Annotations, Schedules and Dimensions: Students will insert tags with attribute information, then extract this information to create schedules.

Topics covered include:

- Locating Door Tags
- Locating Window Tags
- Generating Door and Window Schedules
- Adding Keynotes
- Placing Dimensions

This completes the Auto-Architect tutorial.

The following units utilize only AutoCAD 2000.

UNIT 4: MANAGING COLLECTIONS OF OBJECTS

1. **WBLOCK:** In this lesson, students will use AutoCAD's WBLOCK command to turn symbols created for use in one drawing into symbols they can use in any drawing. They will also learn how AutoCAD stores these global symbols on hard disks and file servers, as well as in drawing files in which they have been used. Finally, they will master techniques for modifying these symbols, first in one drawing, and then in all the drawings that use that symbol. By the time they complete this lesson, they should feel comfortable developing their own symbol libraries, as well as using symbol libraries developed by others.

Topics covered include:

- Creating Wblocks from Blocks
- Creating a Wblock without a Block
- Inserting Wblocks with the DDINSERT Command
- Inserting Wblocks with the INSERT Command
- Modifying Wblocks
- Updating Drawings to Reflect Changes in Wblocks

2. **External References:** In this lesson, students will learn how to use external references to create a dynamic link between two drawing files. Changes in the externally referenced component drawing will automatically appear each time they load the assembly drawing.

Topics covered include:

- Attaching External References to a Drawing File
- Making Changes to Externally Referenced Files
- Changing the Color Assigned to the Layer of an Attached Drawing
- Choosing Between Overlays and Attachments
- Binding External References

UNIT 5: CREATING AND RENDERING 3D MODELS WITH AUTOCAD

In this Unit, students will learn to use AutoCAD's 3D wire frame, surface and solid modeling commands. They will also learn how to create and apply materials to objects, use lights to illuminate them, and render images of these models for use in presentations or design studies.

1. **Creating 3D Architectural Models with Hollow Walls:** In this lesson, students will learn to convert a 2D floor plan into a 3D building. They will learn how to increase the Z-depth of wall lines, and learn techniques for creating 3D door and window headers as well as windowsills and 3D doors.

Topics covered include:

- Changing the Thickness of 2D Wall Lines
- Drawing 3D Headers and Sills
- Hiding the Gaps Between Hollow Walls
- Drawing Glass for 3D Windows

UNIT 5: CREATING AND RENDERING 3D MODELS WITH AUTOCAD (continued)

- 2. Creating 3D Architectural Models with Solid Walls:** Students will create walls, doors, windows; headers and sills using solid components, and then create sections and cutaway views of their models.

Topics covered include:

- Creating Solid Walls
- Creating Solid Headers and Sills
- Creating Solid Ceilings and Floors
- Removing Lines Between Objects in a solid Building Model
- Creating a Cutaway View of a Building

- 3. Creating 3D Architectural Models Using Facades:** In this lesson, students will convert 2D elevations into profile lines and then extrude them into solids. They will learn how to subtract doors and windows from walls, and how to assemble the finished building using the facades and a floor plan. They will learn how to view the building from every side, and how to create a 3D roof. Finally, students will learn how to create their own User Coordinate Systems.

Topics covered include:

- Creating 3D Facades from Elevations
- Rotating Facades
- Placing Facades

- 4. Surface Modeling for Mechanical Applications:** In this lesson, students will master a number of surface modeling commands.

Topics covered include:

- Displaying Multiple Drawing Views in Model Space
- Using RULESURF
- Using EDGESURF
- Using REVSURF
- Creating Primitive Surfaces

- 5. Creating Mechanical Solid Models:** In this lesson, students will learn how to create and combine solids to create a mechanical assembly. They will also learn how to use the SLICE command to create cutaway views of their model, and how to use the RENDER command to render views of their model.

Topics covered include:

- Revolving Closed Polylines to Create Solids
- Creating Solid Cylinders and Spheres
- Using UCS and ARRAY to Copy Objects Around a Center Point
- Slicing and Rendering a Solid Assembly

UNIT 5: CREATING AND RENDERING 3D MODELS WITH AUTOCAD (continued)

6. Rendering a Simple Mechanical Part: Students will learn how to render 3D objects in AutoCAD using the built-in rendering engine.

Topics covered include:

- Selecting materials from the Material Library
- Placing Lights in Drawing
- Rendering an Image

UNIT 6: DIMENSIONING WITH AUTOCAD

In this Unit, students will learn to create linear, angular, radial, continuous and baseline dimensions, as well as use dimension styles to determine what those dimensions look like.

1. Dimensioning Fundamentals: Students will become familiar with the terminology AutoCAD which is used to describe dimensions, and the methods by which dimensions are created and formatted.

Topics covered include:

- Anatomy of a Dimension
- Dimension Styles
- Dimension Families
- Importing Dimension Styles
- Creating Drag and Drop Dimension Style Web Pages
- Dimension Scale Factors
- Dimension Overrides

2. Dimensioning and Tolerancing for Mechanical Applications: In this lesson, students will learn how to create a variety of dimensions, including linear, radial, angular and toleranced dimensions. They will also learn how to create geometric tolerances and leader lines.

Topics covered include:

- Creating Simple Dimensions
- Creating Toleranced Dimensions and Geometric Tolerances

3. Dimensioning for Architectural and Related Applications: Students will learn to create linear, angular, radial, baseline, and continuous dimensions, as well as leaders.

Topics covered include:

- Creating Linear, Continuous and Baseline Dimensions
- Section Marks, Leaders, and Angular and Radial Dimensions

GRADING

Architectural Desktop Project	25%
Rendering Project	15%
Assignments and Class Participation	15%
Quiz #1	10%
Quiz #2	10%
Final Exam	20%
Attendance	5%