COURSE OUTLINE

COMPUTER – AIDED DRAFTING 1   **AD 210**

Course Title   Dept. & Course No.

I.   COURSE DESCRIPTION:

This course introduces the student to computer aided design/drafting (CAD) using AutoCAD. At the completion of this course the student will have the AutoCAD skills necessary to complete a basic set of AutoCAD drawings for a simple house of their own design.

II.   SEMSTER CREDITS: 3

III. CONTACT HOURS PER WEEK: 2   3   5   .
                                    Lecture   Lab   Total

IV.   PREREQUISITE: CS100, and BP115 or AD120

V. STUDENT LEARNING OUTCOMES:	**VI. COURSE CONTENT:**
Upon completion of this course, the student will be able to, with 65% accuracy to:	

1. Identify CAD hardware and computer procedures. Describe and use the basic terms, concepts and techniques of computer aided drafting.	A. CAD hardware lab procedure
	1. AutoCAD structure:
	   a. Standard Screen Layout
	   b. Menu Bar & Toolbars
	   c. Dialogue Boxes
	   d. Introduction to Ergonomics

2. Use keyboard, mouse and video graphics terminal Draw lines and basic shapes, zoom, and save drawing	B. Drawing Lines 1. Commands: Lines, Erase, Undo, Zoom, and Save
3. Start a drawing in imperial measure (feet and inches) Set up drawing units, and drawing aids	C. Starting a Drawing 1. Commands: Format Units Tools: osnap, and ortho
4. Use alternative drawing and editing commands	D. Drawing and Editing 1. Commands: Multiline, Polygon Rectangle, Circle, Ellipse, Arc, Construction Line, Polyline, Spline, Point, Hatch, Copy, Move, Rotate, Trim, Extend, Explode, Mirror, Offset, Chamfer, and Fillet

5.	Make and insert blocks into the drawing	E.	Making and Inserting Blocks 1. Commands: Make Block, and Insert Block
6.	Place text on drawings	F.	Placing Text 1. Commands: Text
7.	Place dimensions on drawings	G.	Dimensioning a Drawing 1. Commands: Dimension
8.	Create, manage and use layers	H.	Using Layers 1. Commands: Format Layers
9.	Insert and use external references	I.	Using External References 1. Commands: Insert Ex Ref
10.	Use paper space to set up sheets for plotting Create and use viewports, plot/print drawings	J.	Creating a Drawing Sheet and Plotting Drawings 1. Tool: Paper Space/Model Space 2. Command: Insert Viewport, Plot
11.	Draw three dimensional objects	K.	Drawing Three Dimensional Objects

VI. EQUIPMENT AND MATERIALS

1. Computers
2. AutoCAD LT 2011 Lab software program, (10 users from Hearlihy, Pittsburg)
3. Projector
4. Plotter/photocopier (wide format – A1 & A2)
5. Printer (double letter capability)
6. Teacher's manual - AutoCAD 2011 Bible & No Experience Required
7. Toner, black & color
8. Plotter paper
9. Routine classroom materials

VIII. TEXT AND REFERENCE

Required Text:

Instructor's made handouts.

Supplementary References:

Gindlis, Elliot *Up and Running with AutoCAD 2011 2D and #d Drawing and Modeling,* 2011.
Shrock, Cheryl R. *Beginning AutoCAD 2011: Exercise Workbook*, New York: Industrial Press,
2010.

IX. METHODS OF INSTRUCTION

1. Lecture
2. Demonstration
3. Discussion
4. Laboratory Work

X. METHOD OF EVALUATION

Lecture presentation is tested by written tests. Lab evaluation is based on skill development and knowledge acquisition.

Four criteria used in evaluating projects and operation performance are:

1. Accuracy
2. Techniques
3. Appearance
4. Completion

The components used in the computation of the final grades are:

1. Classwork/participation.....................................10%
2. Homework/assignments...................................20%
3. Quizzes...10%
4. Midterm and final test.................................... 30%
5. Final assignment..30%

The transmutation of percentages to letter grades are:

90 – 100%..	A
80 – 89%..	B
70 – 79%..	C
65 – 69%..	D
0 – 64%..	F

AD210 COMPUTER AIDED DRAFTING   Credits

	2	1	48
	Lecture	Lab	Total Lab Hrs.

TASK	TIME

Objective #1   2

1. Measure and adjust computer workstations to suit each individual
2. Freehand sketch and/or describe any recommendations to improve the ergonomics of the computer workstations/classroom.

Objective #2   12

1. Use the **Line** command to draw lines and basic geometric shapes using absolute, relative, and polar coordinate point entry systems
2. Use the **Erase**, **Undo**, and **Redo** commands for editing
3. Canceling a command
4. Use the **Zoom** commands for negotiating the drawing
5. Apply the use of **Save** (& Ctrl S), and **Save As** including naming of drawings
6. Use the **Tools** > **Options** > **Open and Save** to set automatic save for every 10 minutes

Objective #3   2

1. Use the **Format** > **Units** command to establish units of measure
2. Line conventions
3. Use the **Format** > **Linetype** command to create different line types
4. Set **OSNAP** modes, use toggle (F3) to turn on and off to assist with drawing
5. Use toggle (F8) to turn **Ortho** on and off

Objective #4   8

5. Use the **Polygon**, **Rectangle**, **Circle**, and **Ellipse** commands to draw basic geometric shapes
6. Use the **Multiline**, **Construction Line**, **Arc**, **Polyline**, **Spline**, **Hatch,** and **Point** commands
7. Use the **Copy**, **Move**, **Rotate**, **Trim**, **Extend**, **Explode**, **Mirror**, **Offset**, **Chamfer**, and **Fillet** commands for editing
8. On an assigned project, make changes and modifications using appropriate editing commands

Objective #5   4

1. Use **Make Block** to create a new symbol to save to a file
2. Use **Insert Block** to add a symbol into a drawing
3. Edit a block and update it in a drawing

Objective #6   2

   1.   Select appropriate text styles using **Format > Text Style**
   2.   Use the **Text** command to add text to a drawing,
   3.   Make multiple lines of text with the **mtext** command
   4.   Use the **dt** command to display text on the screen while typing
   5.   Identify and use the pull down menu for creating and drawing text.
   6.   Edit existing text on drawings

Objective #7   4

   1.   Identify and set variables that affect the appearance of dimensions
   2.   Set appropriate units and decimal places for dimension numbers
   3.   Use the **Leader** command place general notes on drawings
   4.   On an assigned project, select appropriate dimension styles to dimension
   5.   Edit dimensions on a drawing

Objective #8   4

   1.   Create and manage layers using a dialogue box

Objective #9   2

   1.   Insert and use external references

Objective #10   4

   1.   Use paper space to set up sheets for plotting
        Create and use viewports, plot/print drawings

Objective #11   4

   1.   Draw three dimensional objects

Total Hours   48

During the course experience, the course learning outcomes (CLOs) will be assessed through the use of signature assignments. A rating scale will be used to determine the students' proficiency level of each CLO using specifically aligned assignments. The numerical ratings of 3, 2, and 1 are not intended to represent the traditional school grading system of A, B, C, D, and F. The descriptions associated with each of the numbers focus on the level of student performance of each of the course learning outcomes listed below:

Rating Scale

4	Exceeds Expectations
3	Meets Expectations
2	Developing
1	Below Expectations

CLO 1:   Start a drawing and draw and edit lines and geometric shapes.

Numerical Value	
4	Start the computer, open AutoCAD, format units, draw lines and **complex** geometric shapes using absolute, relative **and** polar coordinate point entry systems, and edit using toolbar, pull down menu **and** hot key commands.
3	Start the computer, open AutoCAD, format units, draw lines and **complex** geometric shapes using absolute, relative **or** polar coordinate point entry systems, and edit using toolbar, pull down menu **or** hot key commands.
2	Start the computer, open AutoCAD, format units, draw lines and **simple** geometric shapes using absolute, relative **and** polar coordinate point entry systems, and edit using toolbar, pull down menu **or** hot key commands.
1	Start the computer, open AutoCAD, format units, draw lines and **simple** geometric shapes using absolute, relative **or** polar coordinate point entry systems, and edit using toolbar, pull down menu **or** hot key commands.

CLO 2:   Make and insert blocks.

Numerical Value	
4	Make a block using toolbar, pull down menu **and** hot key commands; name block, select objects, convert or retain objects, and pick point; insert block using toolbar, pull down menu **and** hot key commands. Insert blocks to appropriate scale and orientation.
3	Make a block using toolbar, pull down menu **and** hot key commands; name block, select objects, convert or retain objects, and pick point; insert block using toolbar, pull down menu **or** hot key commands. Insert blocks to appropriate scale and orientation.
2	Make a block using toolbar, pull down menu **or** hot key commands; name block, select objects, and pick point. Insert block using toolbar, pull down menu **or** hot key commands; insert blocks to appropriate scale and orientation.
1	Make a block using toolbar, pull down menu **or** hot key commands; name block, select objects; insert block using toolbar, pull down menu **or** hot key commands. Insert blocks to appropriate scale and orientation.

CLO 3:   Place text on a drawing.

Numerical Value	
4	Format text style to appropriate style, font, font style, font height, and width; create multiline **and** single line text using toolbar, pull down menu **and** hot key commands; create text with appropriate properties (height, bold , italics, underline, stacked fractions, justify, line spacing, rotation, width).
3	Format text style to appropriate style, font, font style, font height, and width; create multiline **and** single line text using toolbar, pull down menu **or** hot key commands; create text with appropriate properties (height, bold , italics, underline, stacked fractions, justify, line spacing, rotation, width).
2	Create multiline **and** single line text using toolbar, pull down menu **or** hot key commands; create text with appropriate properties (height, bold, italics, underline, stacked fractions, justify, line spacing, rotation, width).
1	Create multiline **or** single line text using toolbar, pull down menu **or** hot key commands; create text with appropriate properties (height, bold, italics, underline, stacked fractions, justify, line spacing, rotation, width).

CLO 4: Place dimensions on a drawing.

Numerical Value	
4	Format dimension style: dimension lines color and line weight, baseline spacing, extension lines color and line weight, extension lines extend beyond dimension lines, extension lines offset from origin, arrow head style, text style and color, text height, text fraction scale height, text placement, text alignment, unit format and precision, fraction format, zero suppression, angular dimensions format. Create dimensions using toolbar, **and** pull down menu; create linear, aligned, and angular dimensions, create continuous dimensions, create leaders for text, position dimensions in appropriate location.
3	Format dimension style: dimension lines color and line weight, baseline spacing, extension lines color and line weight, extension lines extend beyond dimension lines, extension lines offset from origin, arrow head style, text style and color, text height, text fraction scale height, text placement, text alignment, unit format and precision, fraction format, zero suppression, angular dimensions format. Create dimensions using toolbar, **or** pull down menu; create linear, aligned, and angular dimensions, create continuous dimensions, create leaders for text, position dimensions in appropriate location.
2	Format dimension style: arrow head style, text style and color, text height, text fraction scale height, text placement, text alignment, unit format and precision, fraction format, zero suppression. Create dimensions using toolbar, **or** pull down menu; create linear, aligned, and angular dimensions, create continuous dimensions, create leaders for text.
1	Format dimension style: arrow head style, text placement, text alignment, unit format and precision. Create dimensions using toolbar, **or** pull down menu; create linear, aligned, and angular dimensions, create continuous dimensions, create leaders for text.

CLO 5: Create, manage and use layers.

Numerical Value	
4	Create new layer, name new layer, format color, line type, and line weight, edit color, line type, and line weight as appropriate, freeze, lock **and** switch layers on/off, and use appropriate layers for drawing information.
3	Create new layer, name new layer, format color, line type, and line weight, edit color, line type, and line weight as appropriate, and freeze, lock **or** switch layers on/off.
2	Create new layer, name new layer, format color, line type, and line weight, and freeze, lock **or** switch layers on/off.
1	Create new layer, name new layer, and format color, line type, and line weight.

CLO 6: Insert and manage external references.

Numerical Value	
4	Select file and insert external reference as attachment or overlay at appropriate scale, rotation, and location, detach reference.
3	Select file and insert external reference as attachment or overlay at appropriate scale, rotation, and location.
2	Select file and insert external reference at appropriate scale and location.
1	Cannot insert external reference.

CLO 7: Use paper space for creating drawings.

Numerical Value	
4	Select layout, select appropriate plot device, pen assignment, paper size, page orientation, plot scale, add viewport in DefPoints layer, scale viewport image in model space, adjust view port, add and edit title block in paper space, plot to appropriate scale and plot options using window or layout to select plot area, preview.
3	Select layout, select appropriate plot device, paper size, page orientation, plot scale, add viewport in DefPoints layer, scale viewport image in model space, adjust view port, add and edit title block in paper space, plot to appropriate scale and plot options using window or layout to select plot area.
2	Select layout, select appropriate plot device, paper size, page orientation, plot scale, add viewport, scale viewport image in model space, adjust view port, add and edit title block in paper space, plot to appropriate scale and plot options using window or layout to select plot area.
1	Select layout, select appropriate plot device, paper size, page orientation, plot scale, add viewport, scale viewport image in model space, adjust view port, add and edit title block in paper space, plot to appropriate scale using window or layout to select plot area.