

COURSE OUTLINE **AutoCAD Basics**

Course Description: EN107. AutoCAD Basics. 3 hours credit. This course will enable the student to understand the basics of AutoCAD and its various applications. The student will learn how to set up AutoCAD and utilize basic commands that are necessary to create quality drawings. Basic knowledge of computers and keyboarding skills are required.

Course Relevance: The skills learned in this class will provide the student with the basics of AutoCAD to continue with his/her education in more advanced AutoCAD courses.

Required Materials:

Grabowski, R. (2009). *Using AutoCAD 2009: Bundle SP + 6*. ITP.

Supplementary Materials:

The student will provide one 16 MB jumpdrive

Learning Outcomes:

The intention is for the student to be able to:

1. Demonstrate basic AutoCAD skills
2. Apply basic AutoCAD skills to create quality drawings

Primary Learning PACT Skills that will be DEVELOPED and/or documented in this course:

Through the student involvement in this course, he/she will develop his/her ability in the following primary PACT skill areas:

1. Field Related Technology
 - Through the use of AutoCAD, the student will know how to apply basic AutoCAD skills used in the industry to produce high quality drawings.

Secondary skills (developed but not documented):

- Problem solving
- Reading
- Computer literacy
- Nonverbal communication

Major Summative Assessment Task(s):

These learning outcomes and primary Learning PACT skills will be demonstrated by:

1. Completing a final project demonstrating the utilization and implementation of basic AutoCAD skills

Course Content:

- I. Themes – Key recurring concepts that run throughout this course:
 - A. AutoCAD
 - B. Design
- II. Issues – Key issues that will be addressed in this course: areas of conflict that must be understood in order to achieve the intended outcome:
 - A. Basic AutoCAD commands
 - B. Drawing legibly
 - C. Drawing accurately
- III. Concepts – Key concepts that must be understood to address the issues:
 - A. AutoCAD setup and integration
 - B. Text size
 - C. Drawing scale
 - D. Line weight
 - E. Dimensioning
- IV. Skills / Competencies – Actions that are essential to achieve the course outcomes:
 - A. Draw setup
 - B. Draw basic shapes
 - C. Create layers setup
 - D. Create text styles
 - E. Demonstrate the use of chamfers, fillets and rounds
 - F. Demonstrate the use of radius
 - G. Demonstrate the use of a diameter
 - H. Assign line types
 - I. Assign line weight
 - J. Set up dimensions
 - K. Dimension drawings
 - L. Set up multiple views
 - M. Demonstrate the difference between paper/model space
 - N. Set up drawing templates
 - O. Assign drawings to correct paper size
 - P. Scale drawings
 - Q. Plot drawings to assigned printer

Learning Units:

- I. Introduction to AutoCAD
 - A. The tools of AutoCAD
 - B. The applications of AutoCAD
 - C. Starting AutoCAD
 - D. The graphics window
 - E. Selecting commands
 - F. Getting help
 - G. Keys and buttons

- II. Starting and Setting Up Drawings
 - A. Planning your drawing
 - B. Starting a new drawing
 - C. Changing drawing settings
 - D. Opening an existing drawing

- III. Introduction to Drawings and Saving Drawings
 - A. Establishing a grid on the screen
 - B. Introduction to drawing lines
 - C. Canceling a command
 - D. Setting increments for cursor movement
 - E. Using drawing templates
 - F. Saving drawings
 - G. Opening existing drawings
 - H. Closing a drawing
 - I. Exiting AutoCAD
 - J. Determining the drawing status

- IV. Drawing Lines, Erasing Objects, Using Layers, and Making Prints
 - A. Line conventions
 - B. Drawing lines with AutoCAD
 - C. Introduction to editing
 - D. An introduction to layers
 - E. Introduction to the LAYER command
 - F. Changing object properties
 - G. Overriding layer settings
 - H. Reusing drawing content
 - I. Introduction to printing and plotting

- V. Drawing Basic Shapes
 - A. Watching objects drag into place
 - B. Drawing circles
 - C. Drawing arcs
 - D. Drawing ellipses
 - E. Drawing regular polygons
 - F. Drawing rectangles
 - G. Drawing donuts and solid circles

- VI. Object Snap, Geometric Constructions, and Multi-view Drawings
 - A. Snapping to specific features
 - B. Object snap modes
 - C. Setting running object snaps
 - D. AutoSnap settings
 - E. Using temporary tracking to locate points
 - F. Using AutoTracking to locate points

- G. Drawing parallel lines and curves
 - H. Drawing points
 - I. Orthographic multi-view drawings
 - J. Drawing auxiliary views
 - K. Drawing construction lines
- VII. Using the Geometry Calculator
- A. Using the geometry calculator
- VIII. Placing Text on Drawings
- A. Text standards
 - B. Scale factors for text height
 - C. Text composition
 - D. Using AutoCAD to draw text
 - E. AutoCAD text fonts
 - F. AutoCAD text styles
 - G. Special characters
 - H. Revising text with DDEDIT
 - I. Changing text with PROPERTIES
 - J. Checking your spelling
 - K. Finding and replacing text
 - L. Additional text tips
- IX. Drawing Display Options
- A. Redrawing and regenerating the screen
 - B. Getting close to your work
 - C. Moving around the display screen
 - D. Setting view resolution for quick displays
 - E. Creating your own working views
 - F. Using transparent display commands
 - G. Using the aerial view
 - H. Model space and paper space
 - I. Tiled viewports
- X. Layouts, Plotting, and Printing
- A. Plotting procedure
 - B. Layout and plotting terms
 - C. Layout settings
 - D. Plot device selection and management
 - E. Plot styles
 - F. Plotting settings
- XI. Basic Editing Commands
- A. Drawing chamfers
 - B. Drawing rounded corners
 - C. Removing a section from an object

- D. Trimming sections of lines, circles, and arcs
 - E. Extending lines
 - F. Changing lines and circles
 - G. Moving an object
 - H. Copying objects
 - I. Drawing a mirror image of an object
 - J. Rotating existing objects
 - K. Moving and rotating an object at the same time
 - L. Changing the size of an object
 - M. Stretching an object
 - N. Changing the length of an object
 - O. Selecting objects for future editing
- XII. Automatic Editing
- A. Automatic editing with grips
 - B. Basic editing vs. automatic editing
 - C. Using the properties window
 - D. Changing the properties of an object at the command: Prompt
 - E. Editing between multiple drawings
 - F. Matching properties
- XIII. Creating Multiple Objects with Array
- A. Arranging objects in a rectangular pattern
 - B. Arranging objects around a center point
- XIV. Working with AutoCAD Files
- A. Types of file names
 - B. Importing and exporting files
- XV. Introduction to Polylines and Multilines
- A. Introduction to drawing polylines
 - B. Using the UNDO command
 - C. Redoing the undone
 - D. Filling polylines and traces
 - E. Drawing multilines
 - F. Editing multilines
 - G. Sketching with AutoCAD
- XVI. Drawing and Editing Polylines and Splines
- A. Drawing polylines arcs
 - B. Revising polylines using the PEDIT command
 - C. Revising a polyline as one unit
 - D. Converting a polyline into individual line and arc segments
 - E. Additional methods for smoothing polylines
 - F. Drawing curves using the SPLINE command
 - G. Editing splines

- H. Creating a polyline boundary
- XV. Obtaining Information about the Drawing
- A. Finding the area of shapes and objects
 - B. Listing drawing data
 - C. Finding the distance between two points
 - D. Identifying point locations
 - E. Checking the time
- XVI. Basic Dimensioning Practices
- A. Dimension arrangement
 - B. Drawing dimensions with AutoCAD
 - C. Drawing linear dimensions
 - D. Dimensioning angled surfaces and auxiliary views
 - E. Dimensioning angles
 - F. Dimensioning practices
 - G. Location dimensions
 - H. Datum and chain dimensioning
 - I. Including symbols with dimension text
 - J. Drawing center dashes or centerlines in a circle or arc
 - K. Dimensioning circles
 - L. Dimensioning arcs
 - M. Drawing leader lines
 - N. Alternate dimensioning practices
 - O. Layout dimensioning
 - P. Dimension styles
 - Q. Creating dimension styles
 - R. Making your own dimension styles
 - S. Overriding existing dimensioning variables
- XIX. Editing Dimensions
- A. Selecting dimensions for editing
 - B. Editing dimension text values
 - C. Editing dimensions with the QDIM command
 - D. Editing dimension text placement
 - E. Using the DIMEDIT command
 - F. Shortcut menu options
 - G. Copying dimension styles between drawings
 - H. Using the properties window to edit dimensions
 - I. Using the MATCHPROP command
 - J. Editing associative dimensioned objects
 - K. Making changes to dimension elements
 - L. Dimension definition points
- XX. Dimensioning with Tolerances
- A. Tolerancing fundamentals

- B. Assigning decimal places to dimensions and tolerances
- C. Setting primary units
- D. Setting tolerance methods

XXI. Drawing Graphic Patterns

- A. Drawing section lines and hatch patterns
- B. Hatching from the command: Prompt
- C. Editing hatch patterns
- D. Drawing objects with solid fills

Learning Activities:

The student will complete assigned problems with the aid of AutoCAD.

Grade Determination:

The student will be graded on completion of course competencies, attendance, adequate participation (discussion), and the final group project.