# COURSE OUTLINE

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<td>Introduction to Computer-Aided Drafting</td>
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**Hours:**
- Lecture/Lab/Other: 1/2

**Co- or Pre-requisite Implementation:**
- FALL/2010

## Catalog description (2009-2011) Catalog

**DRA 190 - Introduction to Computer-Aided Drafting**

Introduction to the use of the computer as a drafting tool. Includes concepts, terminology, and basic commands necessary to prepare drawings using CAD software. Requires basic knowledge of the computer keyboard.

1 lecture/2 laboratory hours

## Required texts/other materials:

AutoCad and Its Applications – Basics
Authors: Shumaker and Madsen
Publisher – Goodheart/Wilcox

## Revision date: 2010  
**Course coordinator:** Garry Perryman  ext. 3357  perryg@mccc.edu

## Information resources:

**Required Materials**
- Removable storage media, such as USB flash memory drive.

## Other learning resources:

Student Access to Software and Tutorials on line @ students.autodesk.com through mccc mail.
Course Competencies/Goals:

Students will be able to…
Become proficient in the use of the AutoCAD 2-D commands.
Produce elementary and moderately complex drawings on IBM compatible personal computers.

After completing this course, the student will be able to:

1. Use the AutoCAD interface and a keyboard, cursor pointing device, and graphics terminal to put drawing information into a computer.
2. Describe and use the basic terms, concepts, and techniques of computer-aided drafting.
3. Set up drawings, use drawing aids, save drawings, and get help when needed.
4. Draw lines, basic shapes, and geometric constructions, and edit drawings.
5. Place text on drawings and insert and edit tables.
6. Use display options to increase drawing flexibility.
7. Use proper drafting standards and practices.
8. Dimension drawings and use dimension styles properly.
9. Construct blocks with attributes and use them in a drawing.
10. Make multiview layouts and plot or print drawings.

II. Course-Specific General Education Knowledge Goals and Core Skills.

General Education Knowledge Goals
Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

MCCC Core Skills
Goal B. Critical Thinking and Problem-solving. Students will use critical thinking and problem solving skills in analyzing information.
Goal C. Ethical Decision-Making. Students will recognize, analyze and assess ethical issues and situations.
Goal E. Computer Literacy. Students will use computers to access, analyze or present information, solve problems, and communicate with others.
Goal F. Collaboration and Cooperation. Students will develop the interpersonal skills required for effective performance in group situations.

III. Specific Objectives

Unit I: Introduction

The AutoCAD software structure, drawing planning, interface, starting and exiting AutoCAD, and commonly used terms and definitions. Starting and opening a drawing, drawing file names, setting up a drawing template, working with grid and snap modes, and changing units.

The student should be able to…

• Define computer-aided design and drafting and typical AutoCAD applications.
• Demonstrate how to start and exit AutoCAD.
• Start a new drawing, save, close files and open saved files.
• Create drawing templates.
• Determine and specify drawing units and limits.
• Describe the Cartesian coordinate system.
• Determine and specify drawing snap and grid.
• Draw given objects using the **LINE** tool.
• Demonstrate an ability to use dynamic input and the command line.
• Use direct distance entry with polar tracking and **Ortho** mode.
• Revise objects using the **ERASE** tool.
• Create selection sets using various selection options.

**Unit II: Basic Drawing and Plotting**

Drawing circles, arcs, ellipses, polygons, rectangles, polylines, splines, and donuts. Drawing rectangles. Line standards, drawing objects on separate layers, creating and managing layers, assigning linetypes and lineweights, changing object properties.

*The student should be able to...*

- Draw circles using the **CIRCLE** tool options.
- Draw arcs using the **ARC** tool options.
- Use the **ELLIPSE** tool to draw ellipses and elliptical arcs.
- Use the **PLINE** tool to draw polylines.
- Draw polygons using the **POLYGON** tool.
- Draw rectangles using the **RECTANGLE** tool options.
- Draw donuts and filled circles using the **DONUT** tool.
- Draw true spline curves using the **SPLINE** tool.
- Describe basic line conventions.
- Create and manage layers.
- Draw objects on separate layers.
- Print and plot your drawings.

**Unit III: Display and Viewports**

Using tools transparently, real time zooming and panning, using navigation wheels, and creating views. Model space, paper space, and tiled viewports. Object snap and Offset.

*The student should be able to...*

- Increase and decrease the displayed size of objects.
- Adjust the display window to view other portions of a drawing.
- Use SteeringWheels for 2D applications.
- Create named views that can be recalled instantly.
- Create multiple viewports in the drawing window.
- Set running object snap modes for continuous use.
- Use object snap overrides for single point selections.
- Select appropriate object snaps for various drawing tasks.
- Use **AutoSnap** features to speed up point specifications.
- Use the **OFFSET** tool to draw parallel objects.
- Create orthographic multiview drawings.

**Unit IV: MTEXT**


*The student should be able to...*

- Describe and use proper text standards.
- Calculate drawing scale and text height.
- Develop and use text styles.
- Use the **MTEXT** tool to create multiline text objects.
- Use the **TEXT** tool to create single-line text.
- Check your spelling.
- Edit existing text.
• Create and modify table styles.
• Insert tables into a drawing.
• Edit tables.

Unit IV  EDITING
Drawing chamfers and fillets, using basic editing tools, and joining objects together. Editing polylines and splines. Moving and copying objects. Creating mirror images, aligning objects, scaling and arraying objects.

The student should be able to...

• Use the FILLET tool to draw fillets, rounds, and other rounded corners.
• Place chamfers and angled corners with the CHAMFER tool.
• Separate objects using the BREAK tool and combine objects using the JOIN tool.
• Use the TRIM and EXTEND tools to edit objects.
• Modify objects using the STRETCH and LENGTHEN tools.
• Change the size of objects using the SCALE tool.
• Use the EXPLODE tool.
• Create polyline boundaries.
• Edit splines with the SPLINEDIT tool.
• Convert polylines and splines.
• Relocate objects using the MOVE tool.
• Change the angular positions of objects using the ROTATE tool.
• Use the ALIGN tool to simultaneously move and rotate objects.
• Make copies of objects using the COPY tool.
• Draw mirror images of objects using the MIRROR tool.
• Use the REVERSE tool.
• Create patterns of objects using the ARRAY tool.

Unit V:  GRIPS
Using grips to edit with STRETCH, COPY, MOVE, ROTATE, SCALE, and MIRROR. Using the Properties palette, copying objects between drawings, and matching properties.

The student should be able to...

• Use grips to stretch, move, rotate, scale, mirror, and copy objects.
• Adjust object properties using the Quick Properties panel and the Properties palette.
• Use the MATCHPROP tool to match object properties.
• Edit between drawings.
• Create selection sets using the Quick Select dialog box.

Unit IV:  DIMENSIONING
Drawing scale and dimensions, creating and using dimension styles, dimensioning practices and standards. Editing dimensions, changing dimension styles, importing existing dimension styles, and editing objects with associative dimensions.

• Describe common dimension standards and practices.
• Create and Manage dimension styles.
• Set a dimension style current.
• Add linear and angular dimensions to a drawing.
• Draw datum and chain dimensions.
• Dimension circles and arcs.
• Control the appearance of existing dimensions and dimension text.
• Update dimensions to reflect the current dimension style.
• Override dimension style settings and match dimension properties.
• Change dimension line spacing and alignment.

Unit IV:  Blocks
Creating and standard blocks, creating a symbol library, inserting entire drawings, using tool palettes to insert blocks, and editing blocks in place.

- Create and save blocks.
- Insert blocks into a drawing.
- Edit a block and update the block in a drawing.
- Create blocks as drawing files.
- Construct and use a symbol library of blocks.
- Purge unused items from a drawing.

IV. Evaluation of Student Learning / Course Grading
While the exact procedures for course grading will be left up to the individual instructor, the following guidelines will apply:
Assignments: All assignments will be graded on an A to F basis. Late assignments will be subject to grade reductions of one letter grade per class session. Assignments not turned in will be recorded as a zero grade. (30% of final grade)

Quizzes: Quizzes may be given at any time during the class. They may be written or performance based, and students may or may not be given prior notice. Quizzes missed because of student absence may not be made up and will be recorded as a zero. (30% of final grade)

Final Plots: Several comprehensive drawings will be constructed, annotated, and plotted. These projects will be due during the last class. No late final plots will be accepted. (40% of final grade)

Final Grade Calculation: Your final grade will be calculated by averaging all of your grades and weighing them as indicated above.

V. Academic Integrity Statement:
Students are expected to comply with the college-wide requirements for academic integrity. Mercer County Community College is committed to Academic Integrity—the honest, fair, and continuing pursuit of knowledge, free from fraud or deception. This implies that students are expected to be responsible for their own work. Presenting another individual’s work as one’s own and receiving excessive help from another individual will qualify as a violation of Academic Integrity. The entire policy on Academic Integrity is located in the Student handbook and is found on the college website (http://www.mccc.edu/admissions_policies_integrity.shtml).

VI. Special Needs Students Statement
Any student in this class who has special needs because of a disability is entitled to receive accommodations. Eligible students at Mercer County Community College are assured services under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. If you believe you are eligible for services, please contact Arlene Stinson, the Director of Academic Support Services. Ms. Stinson’s office is LB221, and she can be reached at (609) 570-3525.