COURSE OUTLINE

Course Number **DRA190**	Course Title **Introduction to Computer-Aided Drafting**	Credits **2**
Hours: Lecture/Lab/Other **1/2/0**	Co- or Pre-requisite **none**	Implementation Semester & Year **Spring 2022**

Catalog description:
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.

General Education Category: Not GenEd	**Course coordinator:** James Maccariella, 609-570-3462, maccarij@mccc.edu

Required texts & Other materials:

AutoCad and Its Applications - Basics, latest edition
Shumaker and Madsen
Goodheart/Wilcox
ISBN-13: 978-1635638646

Course Student Learning Outcomes (SLO):
Upon successful completion of 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. [Supports ILG 1, 4, 11; PLO 4]
2. Describe and use the basic terms, concepts, and techniques of computer-aided drafting. [Supports ILG 1, 4, 11; PLO 4]
3. Set up drawings, use drawing aids, save drawings, and get help when needed. [Supports ILG 1, 4, 11; PLO 4]
4. Draw lines, basic shapes, and geometric constructions, and edit drawings. [Supports ILG 1, 4, 11; PLO 4]
5. Place text on drawings and insert and edit tables. [Supports ILG 1, 4, 11; PLO 4]
6. Use display options to increase drawing flexibility. [Supports ILG 1, 4, 11; PLO 4]
7. Use proper drafting standards and practices. [Supports ILG 1, 4, 11; PLO 4]
8. Dimension drawings and use dimension styles properly. [Supports ILG 1, 4, 11; PLO 4]
9. Construct blocks with attributes and use them in a drawing. [Supports ILG 1, 4, 11; PLO 4] Make multi-view layouts and plot or print drawings. [Supports ILG 1, 4, 11; PLO 4]

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.
Institutional Learning Goal 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.
Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Civil Engineering Technology (PLO)

1. Prepare designs for highways, buildings, and bridges.
2. Perform route/construction surveys using survey equipment and methods.
3. Test and analyze various construction materials.
4. Prepare design drawings.

Units of study in detail – Unit Student Learning Outcomes:

Unit I   Introduction [Supports Course SLO #1, 2, 3, 4, 5, 6, 7, 8, 9]

Learning Objectives
The student will 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 [Supports Course SLO #1, 2, 3, 4, 5, 6, 7, 8, 9]

Learning Objectives
The student will 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 [Supports Course SLO #1, 2, 3, 4, 5, 6, 7, 8, 9]

Learning Objectives
The student will 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 AutoSnapfeatures to speed up point specifications.
- Use the OFFSET tool to draw parallel objects.
- Create orthographic multiview drawings.

Unit IV   MText [Supports Course SLO #1, 2, 3, 4, 5, 6, 7, 8, 9]

Learning Objectives
The student will 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.
- Edit existing text.
- Create and modify table styles.
- Insert tables into a drawing.
- Edit tables.

Unit V   Grips [Supports Course SLO #1, 2, 3, 4, 5, 6, 7, 8, 9]

Learning Objectives
The student will 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 VI   Dimensioning [Supports Course SLO #1, 2, 3, 4, 5, 6, 7, 8, 9]

Learning Objectives
The student will be able to:
- 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 VII   Blocks [Supports Course SLO #1, 2, 3, 4, 5, 6, 7, 8, 9]

Learning Objectives
The student will be able to:
- 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.

Evaluation of student learning:

Course student learning outcomes will be assessed by the following activities:

Drawings and Projects	30%
Quizzes and Homework	30%
Final Project	40%