FUNDAMENTALS OF COMPUTER AIDED DRAFTING & DESIGN
Course Syllabus

Course Number: TTC-0365
OCAS Code: 8905
Course Length: 120 Hours
Career Cluster: Architecture and Construction, Manufacturing
Career Pathway: Design/Pre-Construction, Manufacturing Production Process Development
Career Major(s): Advanced CAD Drafter-Architectural Emphasis

Pre-requisite(s): This course is the basic CAD software course. Topics covered are safety, tools, equipment, media and reproduction, sketching, scale usage, drawing formats, alphabet of lines, lettering and geometric construction, computer literacy through CAD, operating systems and file utilities, software functions, office functions, hardware applications, coordinates, drawing environment, plotting, printing, multi-view drawing environment, geometry modifications and dimensioning, symbol library development, introduction to parametric and software, introduction to multiple CAD software used to manipulate text and graphics, and basic CAD applications.

Textbooks: TBA

Course Objectives:

A. Complete Administration Forms & Requirements.
   1. Complete administrative requirements for enrollment.
   2. Discuss school and class policies and procedures in the student handbook(s).
   3. List work habits that are graded on a daily basis.
   4. Discuss the requirements for testing and a competency certificate.

B. Operate Major Equipment in Drafting.
   1. Discuss major equipment used in the drafting trade.
   2. Identify major equipment.

C. Operate Minor Equipment in Drafting.
   1. Discuss minor equipment used in the drafting trade.
   2. Identify minor equipment.
   3. Discuss the care requirements of equipment.
   4. Discuss cost of equipment.
   5. Operate a drafting table.
   6. Operate a parallel track drafting machine.
   7. Operate the ammonia blueline machine.

D. Demonstrate Use of Drafting Hand Tools.
   1. Identify drafting hand tools.
   2. Discuss use of drafting hand tools.
   3. Use drafting hand tools.

E. Perform Lettering.
   1. Explain the importance of good lettering.
   2. Demonstrate the strokes of vertical gothic lettering.
   3. Reproduce the strokes of vertical gothic lettering.

F. Demonstrate Use of Ames Lettering Guide.
   1. Demonstrate the use of the Ames lettering guide.
   2. Demonstrate the ability to produce guidelines using the Ames lettering guide.

G. Demonstrate Use of Alphabet of Lines.
1. Describe the alphabet of lines.
2. Reproduce the alphabet of lines on vellum.
3. Reproduce a 2-view drawing on vellum.

**H. Demonstrates Geometric Constructions.**
1. Discuss the major geometric constructions.
2. Demonstrate the ability to lay out the following geometric constructions:
   a. Bisect a line and arc
   b. Transfer an angle
   c. Draw parallel lines
   d. Divide a line into multiple equal parts
   e. Draw an inscribed hexagon
   f. Draw a pentagon
   g. Draw an octagon
   h. Draw a tangent to a circle thru a point
   i. Draw a tangent to two circles
   j. Draw an arc tangent to two lines

**I. Demonstrates Use of a Variety of Scales.**
1. Describe the scales on the engineers scale.
2. Use a mechanical engineers scale on assigned projects.
3. Describe the scale on the metric scale.
4. Use a metric scale on assigned projects.
5. Use a standard scale on assigned projects.

**J. Discuss Overview of CAD.**
1. Explain how CAD has helped the communication process.
2. Name some applications of CAD.
3. Explain why CAD is more flexible than table drafting.
4. Describe why CAD work is more consistent than table drafting.
5. Explain why CAD is more accurate in scaling a drawing.
6. Explain how programs that interact with CAD can be useful for engineering.
7. Discuss some of the special application software such as mechanical desktop inventor, solid works, etc.
8. Discuss the editing process.

**K. Discuss Components of a System.**
1. Define peripheral hardware.
2. Explain the differences of different types of plotters.
   a. ink jet
   b. thermal
   c. electrostatic

**L. Demonstrates Basic Use of the Computer.**
1. Identify the basic parts of a computer.
2. Define the proper care of data storage disks.
3. Explain how data is stored in directories and subdirectories.
4. Discuss the importance of back-up files.

**M. Complete Introduction to CAD**
1. Operate the AUTOCAD menuing system.
2. Analyze the methodology of placing entities into a drawing.
3. List the basic 3-D capabilities of AUTOCAD.

**N. Operate AUTOCAD**
1. Locate the default setting on command prompts and identify it.
2. Locate the draw and edit commands from the pull down icon menu.
3. Demonstrate the PAN command.
4. Define units.
5. Define zoom.
O. **Draw with AUTOCAD**
   1. Discuss the ACAD main menu.
   2. Explain how to begin a drawing.
   3. Manipulate the ACAD screen and pull down menu system.
   4. Observe the use of dialogue and icon boxes.
   5. Locate and use the help command.
   6. Manipulate the toggle keys.

P. **Demonstrate Use of Coordinate System Drafting.**
   1. Explain the coordinate geometry system.
   2. Demonstrate absolute coordinates.
   3. Demonstrate relative coordinates.
   4. Demonstrate polar coordinates.
   5. Use different combinations to make a single view ACAD drawing.
   6. Make a three-view ACAD drawing.
   7. Make a 3-D Solid Model Drawing.

Q. **Demonstrate Use of Drawing Assistance.**
   1. Evaluate the UNDO and REDO commands.
   2. Activate the GRID and SNAP commands.
   3. Demonstrate basic commands.
   4. Demonstrate the procedure in saving and discarding your work.

R. **Demonstrate Use of Text, Fonts, and Styles.**
   1. Explain placing text in a drawing.
   2. Describe the commands to build new text styles.
   3. Use text modifiers.
   4. Demonstrate the use of special text characters.

S. **Demonstrate Ability to Edit Work.**
   1. List the basic editing commands.
   2. Identify the object selection process.
   3. Select the size of the pickbox.
   4. Restore entities that have been erased.

T. **Set Up A Drawing.**
   1. Demonstrate the different types of units used in CAD drafting.
   2. Manipulate the dimensions of the working space.
   3. Describe orally the concept of drawing scales.
   4. Compare the use of AUTOCAD's commands to obtain status information on current drawings.

U. **Demonstrate Ability to Use Drawing Aids and Modes.**
   1. Use SNAP and Object SNAP to place points in a drawing.
   2. Use the ortho mode.
   3. Activate an object running mode.

V. **Demonstrate Ability to Use Inquiry and Utility Commands.**
   1. List information on points or entities in a drawing.
   2. Calculate areas within a drawing.
   3. Select the time management facility.

W. **Complete Introduction to Dimensioning.**
   1. Identify the basic elements of dimensioning.
   2. Interpret the manner in which dimensions are placed in a drawing.
   3. List orally some of the special abilities of the dimensioning mode.

X. **Demonstrate Ability to Use Dimensioning with Autocad.**
   1. Demonstrate AUTOCAD's dimensioning techniques.
   2. Demonstrate the ability to build a first level of dimensioning experience.

Y. **Demonstrate Ability to Use Supplementary Draw Commands.**
   1. Demonstrate the text commands.
   2. Discuss the use of linetypes.
3. Acquaint the user with solid lines and areas.
4. Demonstrate procedures using the HATCH command.

Z. Demonstrate Ability to Plot the Work.
   1. List orally the advantages and disadvantages of different types of plotters.
   2. Demonstrate how to initiate a plot.
   3. Manipulate AUTOCAD’s plot commands.
   4. Describe plotting scales and limits.
   5. Plot a drawing of specified scale and paper size.

1 ODCTE Objective
All unmarked objectives are TTC instructor developed.

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and shop practice and performance.
   2. Each course must be passed with seventy (70%) percent or better.
   3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

Available Certifications/College Credit: The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility: The student must maintain a grade point average of 2.0 or better.