VIRGINIA WESTERN
COMMUNITY COLLEGE
WE'LL TAKE YOU THERE

SCHOOL OF SCIENCE, TECHNOLOGY, ENGINEERING AND MATHEMATICS

Revised Spring 2025

CAD 111
Technical Drafting I

Prerequisites:

Basic Computer Knowledge, MTE 1-3 or MDE 10

Course Description:

Introduces technical drafting from the fundamentals through advanced drafting practices. Teaches lettering, metric construction, technical sketching, orthographic projection, sections, intersections, development, fasteners, theory and applications of dimensioning and tolerances. Includes pictorial drawing, and preparation of working and detailed drawings. Part I of II. (Credit will not be awarded for both CAD 111 and DRF 111.)

Course utilizes AutoDesk CAD software and AutoDesk Certification materials.

Required Materials:

- Textbook
- Access to a current **64-bit** Laptop/PC with WINDOWS OS and a media player, webcam, microphone, and Snipping Tool
- AutoDesk AutoCad software
- Other software: GMetrix, Microsoft Word, PowerPoint.

NOTE: Software downloads are available for no cost to the student.

Recommended additional Materials:

- A computer mouse- recommended for laptops, but not required.
- USB portable - recommended, but not required

The following supplementary materials are available:

VWCC offers an open computer lab format available throughout each semester if needed.

Course Learning Outcomes (CLO):

1. The student will create 2D drafting industry geometric constructions using a computer-aided drafting (CAD) system.
2. The student will demonstrate their knowledge and usage of the AutoCAD software's 2D and 3D tools and commands.
3. The student will identify design intent for mechanical engineered models.
4. The student will apply American Society of Mechanical Engineers (ASME) guidelines to illustrate 3rd angle projection views created in the AutoCAD software and by 2D free-hand sketching techniques.
5. The student will create in the AutoCAD software ready-to-plot detailed drawings for the purpose of manufacturing.
6. The student will demonstrate the theory and application of ASME dimension guidelines.

Topical Descriptions and Course Map:

The CAD 111 Topical Descriptions will promote active learning and aid in preparing students to take the AutoCAD Certification Exam. Each topic below will be reviewed in a weekly Module and the learned materials will continue to build and have more relevancy to the mechanical engineering industry throughout the semester's progression. Each weekly Module will include Objectives, learning materials and assessments, such as assignments, a project, quizzes, and tests.

1. Course Introduction; Getting Started with AutoCad Fundamentals (CO #1, CO #2)
   - The student will analyze CAD and engineering fundamentals and apply these important theories to the weekly assessments.
   - The student will demonstrate their knowledge of the AutoCAD interface and terminology.
   - The student will create/draft a simple CAD 2D model by using AutoCAD tools and mechanical engineering basic guidelines.
2. AutoCad Drafting Objects with Precision and Accuracy

   Learning Objectives: (CLO #1, CLO #2)
   - The student will objects in AutoCAD with accuracy and precision.
   - The student will apply AutoCAD fundamentals to the week's assessments, including assignments and a Quiz.
3. AutoCad Drafting Geometrics

   Learning Objectives: (CLO #1, CLO #2, CLO #5)
   - The student will draft 2D geometric objects in AutoCAD.
   - The student will create a printable layout in Paper Space using an engineering industry scale.
   - The student will apply AutoCAD fundamentals to the week's assessments.

4. AutoCad Modification Tools and Text; Industry Standards

   Learning Objectives: (CLO #1, CLO #2, CLO #4)

   - The student will modify preexisting 2D objects in AutoCAD.
   - The student will create industry standard text by using the annotation (text) commands in AutoCAD.
   - The student will apply AutoCAD fundamentals to the week's assessments.
   - The student will prepare for TEST 1 by reviewing previously learned concepts and viewing graded assessments' comments.

5. AutoCad Drawing Organization and Template Creation

   Learning Objectives: (CLO #1, CLO #2, CLO #3)

   - The student will create a setup in AutoCAD using new fundamental organizational CAD skills along with previously and newly learned industry standard concepts.
   - The student will create industry standard 2D models through the application of layers.
   - The student will develop a new course template to be used for the remainder of the semester.
   - The student will apply AutoCAD fundamentals by interpreting the mechanical engineering standards in weekly assessments.

6. Industry Standards; Multi-Views; Sketching in Scale; ASME Dimensions

   Learning Objectives: (CLO #2, CLO #3, CLO #4; CLO #5)

   - The student will create 2D CAD models by using industry standard multi-views including orthographic, isometric, section, and auxiliary views.
   - The student will free-hand sketch industry standard 2D multi-views of a 3D object
   - The student will start to develop the understanding of how dimensions are applied to a multi-view or detailed drawing sheet.
   - The student will continue to apply AutoCAD fundamentals and previously learned skills to complete the weekly assessments.

7. Theory and Application of ASME Dimension Rules; Creating Dimensions in AutoCAD

   Learning Objectives: (CLO #2, CLO #3; CLO #4, CLO #5, CLO #6)

   - The student will study and evaluate the theory behind ASME dimensions.
   - The student will apply the ASME standard rules and guidelines to the weekly assessments.
   - The student will create detailed drawings that follow ASME rules and guidelines by using 2D AutoCAD dimension commands.

8. Reusing existing Content: Blocks, Hatching, and the Design Center

   Learning Objectives: (CLO #2, CLO #3; CLO #4, CLO #5)

   - The student will apply and reuse previously created setup and unique content from other files into the existing file.
   - The student will use AutoCAD's amazing Design Center to access organized drawings, blocks, hatches, and other drawing content.
   - The student will create section views and apply industry standard materials symbols to the views.

9. AutoCad 3D Modeling and Review
   Learning Objectives: (CLO #2, CLO #3; CLO #4, CLO #5, CLO #6)
   - The student will create 3D models using AutoCADs 3D workspace.
   - The student will apply new 3D concepts regarding the 3D Cartesian Coordinate System.
   - The students will submit a project proposal and prepare to start creating their project files.
10. Prepare for AutoDesk Certification User (ACU) Exam
    Learning Objectives: (CLO #2, CLO #3; CLO #4, CLO #5, CLO #6)
    - The student will review and apply all previously learned industry theories and AutoCad applications to given weekly assessments.
    - The student will complete GMetrix Practice Tests to prepare for the AutoDesk (AutoCAD) Certification Exam. These GMetrix Practice tests will also help the student to evaluate their course material knowledge and will aid in their studies.
    - The student will review and complete the course's TEST 2.
11. Project, Course Final Exam, and ACU Exam
    Learning Objectives: (CLO #2, CLO #3; CLO #4, CLO #5, CLO #6)
    - The student will complete and submit a project.
    - The student's project should reflect their learned knowledge and satisfy the project's rubric. The student will utilize all course materials, including the correct application of AutoCAD and ASME standards.
    - The student will complete the AutoCAD Certification Exam.
    - The student will finalize the course by completing and submitting the Course Final Exam.

Notes to Instructors:

Required in course materials:

- 3rd Angle projection
- Imperial vs Metric units
- ASME industry standards to prepare students for CAD 241 and CAD 242
- Each student is required to complete weekly assignments, assessments, and a special project.
- (AutoCad) ACU Certification materials should be used in course materials.

ADA Statement (PDF)
Title IX Statement (PDF)