

MECHANICAL DRAFTING AND DESIGN I

Mechanical Drafting and Design I provides students with a basic understanding of the detailing skills commonly used by drafting technicians. Areas of study include: lettering, sketching, proper use of equipment, geometric constructions with emphasis on orthographic (multi-view) drawings that are dimensioned and noted to ANSI standards. Another purpose of this course is to provide students with a basic understanding of the features and considerations associated with the operation of a computer-aided design (CAD) system. Students will gain valuable hands-on experience with Auto CAD. They will be expected to complete several projects (increasing in difficulty) relating to command topics. Topics include: 2D drawing commands, coordinate systems, editing commands, paper and model space, inquiry commands, layers, plotting, text, and basic dimensioning.

- DOE Code: 4836
- Recommended Grade Level: Grade 11-12
- Recommended Prerequisites: Computers in Design and Production Systems
- Credits: 2-3 credit per semester, maximum of 6 credits
- Counts as a Directed Elective or Elective for the General, Core 40, Core 40 with Academic Honors and Core 40 with Technical Honors diplomas
- This course is aligned with postsecondary courses for Dual Credit:
 - Ivy Tech
 - DESN 102 – Technical Graphics
 - DESN 103 - CAD Fundamentals
 - Vincennes University
 - DRAF 140 – Introduction to CAD

Dual Credit

This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course.

Application of Content and Multiple Hour Offerings

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

Career and Technical Student Organizations (CTSOs)

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in SkillsUSA, the CTSO for this area.

Content Standards

Domain – Utilizing the Design Process in Mechanical Drafting

Core Standard 1 Students apply and adapt the design process to challenges found in mechanical drafting.

Standards

- MDDI-1.1 Identify and utilize the design process
- MDDI-1.2 Recognize that budget constraints and customer needs are part of the design process
- MDDI-1.3 Interpret demographics in a given area and relate it to the design process
- MDDI-1.4 Use precision measuring tools to appropriately determine measurements

Domain – Drawing Methods in Mechanical Drafting

Core Standard 2 Students connect basic drafting standards to applications.

Standards

- MDDI-2.1 Sketch proportionately and recognizably a given object
- MDDI-2.2 Create vertical Gothic lettering to quality standards
- MDDI-2.3 Exhibit proper equipment usage
- MDDI-2.4 Demonstrate acceptable line work and construction techniques
- MDDI-2.5 Project and detail orthographic drawing to scale
- MDDI-2.6 Demonstrate effective understanding and usage of dimensions, symbols, and notations to ANSI standards
- MDDI-2.7 Use sectioning techniques to better illustrate complex detail drawings involving numerous line types
- MDDI-2.8 Create working 2D drawings

Domain – Utilization of CAD Software in Mechanical Drafting

Core Standard 3 Students select specific commands to develop drawings to meet industry standards.

Standards

- MDDI-3.1 Demonstrate competence in the use of CAD software through assignments
- MDDI-3.2 Use word processing and CAD file export commands when completing assignments
- MDDI-3.3 Identify and use multiple input methods to select commands on the CAD system
- MDDI-3.4 Retrieve and use help commands
- MDDI-3.5 Navigate through and identify various parts of the CAD environment
- MDDI-3.6 Modify drawing elements using editing commands
- MDDI-3.7 Create drawings using: grid, snap, tracking, layer, text, text styles, block, design center, tool palette, drawing setup, and dimensioning commands
- MDDI-3.8 Explain coordinate systems

Domain – Solving Design Challenges in Mechanical Drafting

Core Standard 4 Students develop mechanical knowledge to design and create solutions.

Standards

- MDDI-4.1 Draw orthographic views of mechanical objects
- MDDI-4.2 Apply tolerances to objects
- MDDI-4.3 Design assembly drawings
- MDDI-4.4 Create a title block
- MDDI-4.5 Plot drawings
- MDDI-4.6 Develop a parts list

MDDI-4.7 Create mechanical notes

Domain – Careers in Mechanical Drafting

Core Standard 5 Students confirm that there are mechanical careers and opportunities available.

Standards

MDDI-5.1 Research mechanical drafting careers

MDDI-5.2 Find mechanical drafting opportunities offered by a technical school or college

MDDI-5.3 Determine mechanical drafting occupation wages/salaries