

Course Title:	Computer-Aided Design (CAD)
Grade(s):	

Course Description
This course introduces students to mechanical design and the drafting process. Using Computer-Aided Drafting software, students will be introduced to basic layout, isometric and orthographic projections, section views, and dimensioning. Students will learn skills necessary to fully describe designs so that final working drawings will be sufficient to build or manufacture the design. Areas of specialization, related occupations, and postsecondary education within the STEM Career Cluster will be identified and integrated into classroom learning.
Approved Curricular Materials/Textbook(s)

Unit Title	Unit Description (Include Unit Objectives)	Unit Pacing
Unit 1: Review of Basic Drafting Concepts	Students will review the foundational principles of technical drafting and engineering graphics. Emphasis is placed on drafting standards, drawing organization, measurement techniques, scale usage, and the role of technical drawings in engineering and manufacturing. Students will be able to: • Explain the purpose of technical drawings in engineering and manufacturing. • Identify common drafting tools and their functions. • Apply proper drafting standards and conventions. • Use scales to create and interpret drawings accurately. • Demonstrate correct dimensioning practices. • Organize drawings according to industry standards. • Interpret basic engineering graphics and layouts.	2-4 weeks

	• Create technical drawings that communicate design intent clearly.	
Unit 2: Sketching	Students will develop freehand sketching skills used to communicate design ideas quickly and effectively. Students will learn techniques for creating proportional sketches, visualizing objects, and documenting concepts during the design process. Students will be able to: • Explain the role of sketching in the engineering design process. • Create freehand sketches of mechanical and architectural objects. • Maintain proper proportions and visual accuracy. • Use sketching techniques to communicate design concepts. • Add dimensions and notes to sketches appropriately. • Develop multiple design concepts through sketching. • Improve visual communication skills through practice. • Evaluate sketches for clarity and effectiveness.	2 weeks
Unit 3: Alphabet of Lines	Students will learn the standardized line types used in technical drawings and their importance in communicating design information. Students will apply proper line conventions to create professional engineering drawings. Students will be able to: • Identify the various line types used in technical drawings. • Explain the purpose of each line type. • Differentiate between visible, hidden, center, dimension, and cutting-plane lines. • Apply correct line weights and styles. • Interpret drawings using standard line conventions. • Create drawings that utilize the appropriate line types. • Recognize errors in line usage and correct them. • Demonstrate proficiency in engineering drawing standards.	1 week

Unit 4: Print Reading	Students will develop the ability to interpret and analyze engineering and manufacturing drawings. Emphasis is placed on understanding dimensions, notes, symbols, tolerances, and graphical information commonly found on technical prints. Students will be able to: • Read and interpret technical drawings accurately. • Identify key information contained on engineering prints. • Interpret dimensions, tolerances, and specifications. • Recognize common engineering symbols and abbreviations. • Analyze multiple views to visualize objects. • Extract manufacturing information from technical drawings. • Verify design requirements using print information. • Communicate findings using appropriate technical terminology.	1 week
Unit 5: 2D-3D Geometry	Students will explore geometric principles used in engineering graphics and design. Students will learn how two-dimensional shapes relate to three-dimensional objects and how geometry is used to create accurate technical drawings and models. Students will be able to: • Identify geometric shapes commonly used in engineering design. • Apply geometric construction techniques. • Relate two-dimensional representations to three-dimensional objects. • Calculate basic geometric properties of shapes and solids. • Visualize objects from different perspectives. • Create accurate geometric drawings using drafting standards. • Analyze geometric relationships within engineering designs. • Utilize geometry to support CAD modeling and drafting tasks.	2 weeks
Unit 6: Isometric Projection	Students will learn how to create and interpret isometric drawings that represent three-dimensional objects on a two-dimensional surface. Emphasis is placed on	2 weeks

	visualization skills and the communication of object form. Students will be able to: • Explain the purpose of isometric projection. • Identify the characteristics of isometric drawings. • Create isometric sketches of simple and complex objects. • Convert orthographic views into isometric representations. • Interpret dimensions and proportions in isometric drawings. • Visualize three-dimensional objects from two-dimensional information. • Apply drafting standards to isometric drawings. • Evaluate isometric drawings for accuracy and clarity.	
Unit 7: Multi-view Drawings	Students will develop the ability to create and interpret orthographic multi-view drawings. Students will learn how front, top, and side views work together to accurately communicate the size and shape of an object. Students will be able to: • Explain the purpose of orthographic projection. • Identify front, top, and side views in multi-view drawings. • Create accurate multi-view drawings from physical objects and models. • Interpret object features using multiple views. • Apply proper alignment and projection techniques. • Visualize three-dimensional objects from orthographic drawings. • Use dimensions and annotations appropriately. • Evaluate multi-view drawings for completeness and accuracy.	2 weeks
Unit 8: Assemblies and Views in 3-D Format	Students will learn how individual components are combined into assemblies and represented in three-dimensional formats. Students will create assembly drawings, exploded views, and 3-D models while developing an understanding of part relationships and design intent.	Ongoing

	Students will be able to: • Explain the purpose of assembly drawings and models. • Identify the components of a mechanical assembly. • Create and modify 3-D assembly models. • Apply assembly constraints and mates correctly. • Generate exploded assembly views. • Create assembly drawings with appropriate annotations and bills of materials. • Analyze component relationships within an assembly. • Evaluate assemblies for fit, function, and manufacturability. • Communicate assembly information using industry-standard documentation. • Demonstrate proficiency in 3-D modeling and assembly design techniques.	
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