

# Computer Aided Drafting

## Course Description

This course provides students with a broad introduction into Computer-Aided-Drafting (CAD). With hands-on exercises, assignments and projects, students gain the capability to use CAD to model projects and create and distribute industry-standard drawings.

## Course Code: 100140

## Program(s) of Study to which This Course Applies

- Manufacturing Production
- Manufacturing Process Development
- Design/Pre-construction
- Construction

Course Framework	Reference Standards	Academic Crosswalk
<p><b>Standard 1. Students will demonstrate proficiency in using drafting terminology, symbols, codes and standards.</b></p>		[TBD by NDE]
<p>Benchmark 1.1 Apply line conventions.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Produce drawings using appropriate line thicknesses, line types and line type scale.</li> </ul>	SkillsUSA 2.0	
<p>Benchmark 1.2 Apply drafting symbols as required by the drawing.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Identify AIA symbols.</li> <li>• Use AIA symbols in a drawing accurately.</li> <li>• Create AIA and ANSI symbols for a CAD drawing.</li> </ul>	SkillsUSA 2.0	[TBD by NDE]
<p>Benchmark 1.3 Adhere to industry codes and standards.</p>		

<p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>Identify appropriate codes and standards for assigned work.</li> </ul>		
<p><b>Standard 2. Students will demonstrate the ability to sketch 2D and 3D views.</b></p>		[TBD by NDE]
<p>Benchmark 2.1 Sketch orthographic views.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>Understand how sketching contributes to the design process.</li> <li>Sketch selected examples of items to be later drawn in CAD.</li> <li>Identify and utilize the equipment used in freehand sketching and board drafting.</li> </ul>	SkillsUSA 3.0	[TBD by NDE]
<p>Benchmark 2.2 Sketch isometric, obliquely and in perspective.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>Identify the differences between the various pictorial drawings.</li> <li>Produce examples of each pictorial drawing.</li> </ul>	SkillsUSA 3.0	
<p><b>Standard 3. Students will apply industry standards to basic dimensioning and notation practices.</b></p>		[TBD by NDE]
<p>Benchmark 3.1 Apply dimension/notation conventions to display dimensions.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>Identify proper dimension guidelines.</li> <li>Build dimension styles according to the guidelines.</li> <li>Use annotative/associative dimensioning, text, leaders.</li> </ul>	SkillsUSA 2.0	[TBD by NDE]
<p>Benchmark 3.2 Use linear, radial, and notation techniques to dimension drawings.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>Place specific dimensions to serve the drawing.</li> <li>Install dimensions to indicate all size and location of features.</li> <li>Create text styles for typical CAD drawings.</li> <li>Illustrate schedule requirements for typical CAD drawings.</li> </ul>	SkillsUSA 2.0	
<p><b>Standard 4. Students will use math skills to calculate scale factors and drawing sizes.</b></p>		[TBD by NDE]

<p>Benchmark 4.1 Compute drawing scale to place drawings on standard paper sizes.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Use proportions and ratios to solve practical problems.</li> </ul>	<p>SkillsUSA</p>	<p>[TBD by NDE]</p>
<p>Benchmark 4.2 Calculate text height according to drawing scale and industry standards.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Use proportions and ratios to solve practical problems.</li> </ul>	<p>NECC, MCC, WSC,</p>	
<p><b>Standard 5. Students will use a CAD system to create and plot drawings.</b></p>		<p>[TBD by NDE]</p>
<p>Benchmark 5.1 Demonstrate the ability to use drawing tools.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Draw geometric shapes.</li> <li>• Draw using absolute, relative, and polar coordinate systems.</li> </ul>	<p>SkillsUSA 3.0</p>	<p>[TBD by NDE]</p>
<p>Benchmark 5.2 Demonstrate the ability to use modify tools.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Apply editing techniques.</li> </ul>	<p>SkillsUSA 3.0</p>	
<p>Benchmark 5.3 Plot drawings and demonstrate plot styles.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Plot a hardcopy to a specified scale.</li> <li>• Create a plot style so all line work prints black.</li> <li>• Application of modelspace and paperspace.</li> </ul>	<p>SkillsUSA 3.0</p>	
<p>Benchmark 5.4 Create layers using AIA and ANSI layer conventions.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Develop layers with proper nomenclature.</li> <li>• Assign properties to layers.</li> </ul>	<p>AIA, ANSI</p>	
<p>Benchmark 5.5 Create and use blocks or groups.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Make a collection of drawing entities (line, arc and text) to create a block.</li> <li>• Import and export blocks to and from a drawing.</li> </ul>	<p>NECC</p>	

<p>Benchmark 5.6 Create, remove, and retrieve files.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Save a file.</li> <li>• Rename a file.</li> <li>• Relocate a file.</li> <li>• Delete a file.</li> <li>• Reference a file.</li> <li>• Create a folder and place into a directory.</li> </ul>	<p>NECC, MCC</p>	
<p>Benchmark 5.7 Demonstrate the ability to import, export, files of various types.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Place a raster image in a drawing.</li> <li>• Place a vector file in a drawing.</li> <li>• Place text and spreadsheet files into a drawing.</li> <li>• Import and export .dxf files.</li> </ul>	<p>NECC, MCC</p>	
<p>Benchmark 5.8 Use multiple CAD commands to effectively produce working drawings.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Use keyboard entry.</li> <li>• Use Icon entry.</li> <li>• Use Pull-down menus.</li> <li>• Identify keyboard shortcuts.</li> </ul>	<p>NECC</p>	
<p>Benchmark 5.9 Create and use templates.</p> <p><u>Sample performance indicators:</u></p> <ul style="list-style-type: none"> <li>• Develop drawing templates to standards.</li> <li>• Retrieve and use templates from a variety of libraries.</li> </ul>	<p>NECC, MCC</p>	

*Reference Standards Sources*

- SkillsUSA = 2010 SkillsUSA Championships Technical Standards for Drafting
- MCC = Metro Community College ARCH 1100
- NECC = Northeast Community College ARCH 1240 and 1250
- WSC = Wayne State College ITE 109 Drafting and Design

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## Other Information

Suggestions for innovative teaching and learning strategies:

- Job Shadow
- Guest Speaker
- Portfolio Development
- Interdisciplinary Collaboration

Related assessments:

- Skills USA competition
- Home Builder Associations competition
- Post Secondary competitions

Extended learning opportunities:

- Internship
- Dual Credit