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 to Common Core Standards	Academic Crosswalk to Nebraska Standards	Comments
Standard 1. Students will demonstrate proficiency in using drafting terminology, symbols, codes and standards.				
Benchmark 1.1 Apply line conventions. Sample performance indicators: • Produce drawings using appropriate line thicknesses, line types and line type scale.	SkillsUSA 2.0	ELA.WHST.11-12.6	LA.12.2.1.f	
Benchmark 1.2 Apply drafting symbols as required by the drawing. Sample performance indicators:	SkillsUSA 2.0	ELA.WHST.11-12.6	LA.12.2.1.f	

• Identify AIA symbols. • Use AIA symbols in a drawing accurately. • Create AIA and ANSI symbols for a CAD drawing.				
Benchmark 1.3 Adhere to industry codes and standards. <u>Sample performance indicators:</u> • Identify appropriate codes and standards for assigned work.		ELA.WHST.11-12.4	LA.12.2.2.a	
Standard 2. Students will demonstrate the ability to sketch 2D and 3D views.				
Benchmark 2.1 Sketch orthographic views. <u>Sample performance indicators:</u> • Understand how sketching contributes to the design process. • Sketch selected examples of items to be later drawn in CAD. • Identify and utilize the equipment used in freehand sketching and board drafting.	SkillsUSA 3.0	ELA.WHST.11-12.6	LA.12.2.1.f	
Benchmark 2.2 Sketch isometric, obliquely and in perspective. <u>Sample performance indicators:</u> • Identify the differences between the various pictorial drawings. • Produce examples of each pictorial drawing.	SkillsUSA 3.0	ELA.WHST.11-12.6	LA.12.2.1.f	
Standard 3. Students will apply industry standards to basic dimensioning and notation practices.				
Benchmark 3.1 Apply dimension/notation conventions to display dimensions. <u>Sample performance indicators</u>: • Identify proper dimension guidelines. • Build dimension styles according to the guidelines.	SkillsUSA 2.0	ELA.WHST.11-12.6	LA.12.2.1.f	

• Use annotative/associative dimensioning, text, leaders.				
Benchmark 3.2 Use linear, radial, and notation techniques to dimension drawings. Sample performance indicators: • Place specific dimensions to serve the drawing. • Install dimensions to indicate all size and location of features. • Create text styles for typical CAD drawings. • Illustrate schedule requirements for typical CAD drawings.	SkillsUSA 2.0	ELA.WHST.11-12.6	LA.12.2.1.f	
Standard 4. Students will use math skills to calculate scale factors and drawing sizes.				
Benchmark 4.1 Compute drawing scale to place drawings on standard paper sizes. Sample performance indicators: • Use proportions and ratios to solve practical problems.	SkillsUSA	ELA.WHST.11-12.6 MTH.G.MG.3	LA.12.2.1.f MA 12.1.3.a MA.12.2.4.b	Alignment presumes that students will use geometric models involving proportions to compute drawing scales and make simple computations. (CC: MTH.G.MG.3; NE: MA.12.1.3.a, MA.12.2.4.b).
Benchmark 4.2 Calculate text height according to drawing scale and industry standards. Sample performance indicators: • Use proportions and ratios to solve practical problems.	NECC, MCC, WSC,	ELA.WHST.11-12.4 MTH.G.MG.3	LA.12.2.2.a MA 12.1.3.a MA.12.2.4.b	Alignment presumes that students will use geometric models involving proportions to calculate text height according to drawing scales. (CC: MTH.G.MG.3; NE: MA.12.1.3.a, MA.12.2.4.b).
Standard 5. Students will use a CAD system to create and plot drawings.				
Benchmark 5.1 Demonstrate the ability to use drawing tools. Sample performance indicators: • Draw geometric shapes. • Draw using absolute, relative, and polar coordinate systems.	SkillsUSA 3.0	ELA.WHST.11-12.6 MTH.G.MG.1	LA.12.2.1.f MA.12.2.4.a	Alignment presumes that students will use geometric shapes to demonstrate ability to use drawing tools (CC: MTH.G.MG.1; NE: MA.12.2.4.a).

Benchmark 5.2 Demonstrate the ability to use modify tools. Sample performance indicators: • Apply editing techniques.	SkillsUSA 3.0	ELA.WHST.11-12.6	LA.12.2.1.f	
Benchmark 5.3 Plot drawings and demonstrate plot styles. Sample performance indicators: • Plot a hardcopy to a specified scale. • Create a plot style so all line work prints black. • Application of modelspace and paperspace.	SkillsUSA 3.0	ELA.WHST.11-12.6 MTH.G.MG.1	LA.12.2.1.f MA.12.2.4.a	Alignment presumes that students will use geometric shapes to plot drawings (CC: MTH.G.MG.1; NE: MA.12.2.4.a).
Benchmark 5.4 Create layers using AIA and ANSI layer conventions. Sample performance indicators: • Develop layers with proper nomenclature. • Assign properties to layers.	AIA, ANSI	ELA.WHST.11-12.6	LA.12.2.1.f LA.12.3.2 LA.12.1.6.k	
Benchmark 5.5 Create and use blocks or groups. Sample performance indicators: • Make a collection of drawing entities (line, arc and text) to create a block. • Import and export blocks to and from a drawing.	NECC	ELA.WHST.11-12.6	LA.12.2.1.f	
Benchmark 5.6 Create, remove, and retrieve files. Sample performance indicators: • Save a file. • Rename a file. • Relocate a file. • Delete a file. • Reference a file. • Create a folder and place into a directory.	NECC, MCC	ELA.WHST.11-12.6	LA.12.2.1.f LA.12.3.2 LA.12.1.6.k	
Benchmark 5.7 Demonstrate the ability to import, export, files of various types. Sample performance indicators: • Place a raster image in a drawing. • Place a vector file in a drawing.	NECC, MCC	ELA.WHST.11-12.6	LA.12.2.1.f LA.12.3.2 LA.12.1.6.k	

• Place text and spreadsheet files into a drawing. • Import and export .dxf files.				
Benchmark 5.8 Use multiple CAD commands to effectively produce working drawings. <u>Sample performance indicators:</u> • Use keyboard entry. • Use Icon entry. • Use Pull-down menus. • Identify keyboard shortcuts.	NECC	ELA.WHST.11-12.6	LA.12.2.1.f	
Benchmark 5.9 Create and use templates. <u>Sample performance indicators:</u> • Develop drawing templates to standards. • Retrieve and use templates from a variety of libraries.	NECC, MCC	ELA.WHST.11-12.6	LA.12.2.1.f	

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

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