




Legend:

**X** The standard is clearly addressed by program activities.

- This standard potentially could be addressed as part the program either by actions that the coach or teacher takes when working with the students or by conditions established by the program.

	Computers in Design and Production DOE Code: 4800 Recommended Grade Level: 9-10 Recommended Prerequisites: None				
<b>Domain</b>	<b>Core Concepts</b>				
	<b>Students apply concepts of the design process using writing, math, and CAD skills for solving a design problem.</b>				
<b>Core Standard 1</b>	CPD-1.1	Identify components related to the design process.	X	X	X
	CPD-1.2	Describe the steps in the design process.	X	X	X
	CPD -1.3	Describe the elements and principles of design.	X	X	X
	CPD -1.4	Make and use measurements in both traditional and metric units.	X	X	X
	CPD -1.5	Apply and adapt the design process from conception through verification of a simple component or system.	X	X	X
	CPD-1.6	Review CAD drawing design.	X	X	X
	CPD-1.7	Demonstrate drafting concepts and the use of drafting tools.	-	-	-
	CPD-1.8	Develop an understanding of geometry related to technical drawing and actual production objects. Computers in Design and Production.	X	X	X
	CPD-1.9	Apply concepts of 3D CAD drawing and animation during the design process.	X	X	X
	CPD-1.10	Use “real world” measuring tools and teaming concepts to create production models.	X	X	X
	CPD-1.11	Solve technical mathematical problems.	X	X	X
	CPD-1.12	Create multi-view drawings using 2D and 3D CAD.	X	X	X
	CPD-1.13	Develop 3-D product models using solid modeling and parametric CAD software.	X	X	X
	CPD-1.14	Understand concept sketching.	X	X	X
	CPD-1.15	Create a presentation of a design using various methods.	X	X	X
	CPD-1.16	Utilize Computer Aided Drafting (CAD) skills to produce drawings.	X	X	X
	CPD-1.17	Identify common terms and definitions relating to Computer Aided Drafting.	X	X	X

	CPD-1.18	Write a descriptive report on some aspect of the design process and how it relates to a project.	x	x	x
<b>Domain</b>	<b>Electronics</b>				
<b>Core Standard 2</b>	<b>Students verify electronic concepts for use in electronic schematics.</b>				
	CPD-2.1	Design basic electronic schematics.	-	x	x
	CPD-2.2	Identify and describe basic electronic laws.	-	-	x
	CPD-2.3	Describe AC/DC concepts.	-	x	x
	CPD-2.4	Apply basic logic found in electronics.	-	x	x
	CPD-2.4	Identify symbols used in creating schematics.	-	x	x
	CPD-2.5	Recognize and explain the functions of electronic components.	x	x	x
<b>Domain</b>	<b>Advanced Manufacturing</b>				
<b>Core Standard 3</b>	<b>Students integrate advanced manufacturing concepts in the design process to develop projects.</b>				
	CPD-3.1	Apply the principles of mold design for a variety of products.	-	-	x
	CPD-3.2	Identify necessary mold materials, stress and strength calculations, machining, fabricating, and testing in processing equipment needed to produce a product.	-	-	x
	CPD-3.3	Describe the design of the manufacturing process as required by product design specifications.	-	-	x
	CPD-3.4	Identify the selection of processes, tooling, work-holding, gauging, routing, and material handling, as developed for a manufacturing production simulation.	-	-	x
	CPD-3.5	Demonstrate process planning; cost and efficiency analysis.	x	x	x
	CPD-3.6	Demonstrate planning for ergonomics, robotics, machine tools, coordinate-measuring machines, and custom automation for a product.	x	x	x
	CPD-3.7	Use simulation software to design a factory layout and material-flow simulation.	-	-	-
	CPD-3.8	Design for product-ability and manufacturing ease.	x	x	x
	CPD-3.9	Understand how robots operate in a work cell.	x	x	x
	CPD-3.10	Incorporate print reading for applications.	-	-	-
<b>Domain</b>	<b>Precision Machining</b>				
<b>Core Standard 4</b>	<b>Students choose precision machining concepts to use in creating a solution.</b>				
	CPD-4.1	Explain the practical considerations associated with the use of FEA (Finite Element Analysis) with respect to product stress and strain analysis.	-	-	x
	CPD-4.2	2 Identify geometric dimensioning and tolerancing, and surface texture specifications.	-	-	x

CPD-4.3	3 Identify a wide range of rapid prototyping technologies and materials.	-	-	x
CPD-4.4	Explain why rapid prototyping is a useful technique in designing a product.	-	x	x
CPD-4.5	Convert/create products using modeling software, convert drawings using appropriate software and produce a product using a rapid prototyping technique.	x	x	x
CPD-4.6	Demonstrate the ability to model/prototype to scale.	x	x	x
CPD-4.7	Understand and practice orthographic projection drawings as related to practical applications.	x	x	x
CPD-4.8	Understand and practice axonometric projection drawings as related to practical applications.	x	x	x
CPD-4.9	Demonstrate robotics programming and CAD/CAM/CNC programming for producing the instruction codes necessary to manufacture parts with NC machine tools are emphasized.	-	-	x
CPD-4.10	Incorporate precision tool reading for applications.	-	-	-
CPD-4.11	Show understanding of coordinate systems.	x	x	x

**Domain Welding**

**Core Standard 5**

**Students recommend welding methods to be used on a particular type of material in accordance to the use of the product.**

CPD-5.1	CPD-5.1 Identify welding types through finite/stress analysis.	-	-	-
CPD-5.2	Incorporate print reading for applications.	-	-	-
CPD-5.3	Identify welding symbols used on drawings.	-	-	-
CPD-5.4	Describe different types of welding.	-	-	-

**Domain Architecture**

**Core Standard 6**

**Students integrate architecture concepts in the design process to develop projects.**

CPD-6.1	Demonstrate an understanding of various historical house styles.			
CPD-6.2	Assess space planning for occupant use.			
CPD-6.3	Recognize and explain how building codes and ordinances affect design.			
CPD-6.4	4 Identify the drawings required for residential construction.			
CPD-6.5	Create architectural blueprints.			
CPD-6.6	Select the appropriate scale using an architect's scale.			
CPD-6.7	Identify and apply architectural symbols used on drawings.			
CPD-6.8	Identify the proper use of site analysis.			

CPD-6.9	Demonstrate knowledge of roof systems, terminology, style, and construction.			
CPD-6.10	Identify various styles of roof systems.			
CPD-6.11	Explain the purpose of elevations.			
CPD-6.12	Evaluate different foundation systems and terminology.			
CPD-6.13	Analyze mechanical systems present in residential construction.			

<b>Domain</b>	<b>Careers in Electronics, Advanced Manufacturing, Precision Machining, Welding, and Architecture.</b>			
---------------	--	--	--	--

<b>Students evaluate potential career opportunities in electronics, advanced manufacturing, precision machining, welding, and architecture.</b>
---

<b>Core Standard 7</b>	CPD-7.1	Research electronics, advanced manufacturing, precision machining, welding, and architecture careers.	-	x	-
	CPD-7.2	Find electronics, advanced manufacturing, precision machining, welding, and architecture opportunities offered by a technical school or college.	-	x	-
	CPD-7.3	Determine electronics, advanced manufacturing, precision machining, welding, and architecture occupation wages/salaries.	-	x	-
	CPD-7.4	Research electronics, advanced manufacturing, precision machining, welding, and architecture job outlook information.	-	x	-