CURRICULUM MAP

Cluster: Maintenance, Installation and Repair Cluster

CTE Program of Study: MA2235 Advanced Manufacturing (Advanced Careers)

STANDARD	%	SKILL SET/COMPETENCY Workplace Readiness Test Code: 3033	REQUIRED CORE COURSES FOR COMPLETION			
			1st Course AC Advanced Manufacturing I **1575**	2nd Course AC Advanced Manufacturing II **1576**	3rd Course AC Advanced Manufacturing III **1577**	4th Course AC Advanced Manufacturing IV **1578**
Communication:	**24%**	Apply strategies to enhance effectiveness of all types of communications in the workplace	X	X	X	X
Communicate in multiple modes to address needs within the career technical field		Apply reading strategies as needed for a variety of purposes	X	X	X	X
		Evaluate information contained in documents	X	X	X	X
		Apply basic communication skills when writing	X	X	X	X
		Write technical materials	X	X	X	X
		Develop presentations using appropriate technologies (e.g., tables, charts, and visual graphics)	X	X	X	X
		Apply oral communication skills	X	X	X	X
		Deliver presentations	X	X	X	X
		Apply active listening skills	X	X	X	X
		Apply nonverbal communication skills	X	X	X	X
		Communicate with others in a workforce of diversity (e.g., age, ethnicity, religion, gender)	X	X	X	X
		Share information using a range of appropriate communications technologies	X	X	X	X

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Problem Solving and Critical Thinking:	**19%**	Define the problem	X	X	X	X
Solve problems using critical thinking		Analyze the problem	X	X	X	X
		Research reliable information relevant to the problem	X	X	X	X
		Investigate alternatives based on reasoned criteria	X	X	X	X
		Identify appropriate solutions	X	X	X	X
		Make recommendations	X	X	X	X
		Implement solutions	X	X	X	X
		Evaluate solutions	X	X	X	X
Information Technology Applications:	**8%**	Identify efficient, effective, and ethical uses of technology in the workplace	X	X	X	X
Apply information technology resources in the workplace		Use information technology tools to access, manage, integrate, and create new information	X	X	X	X
		Use writing/publishing/presentation applications	X	X	X	X
Systems:	**9%**	Demonstrate an understanding of how business and industry systems function within the economy	X	X	X	X
Work within organizational culture and technological systems		Demonstrate an understanding of the functions of systems in an organization (e.g., management, human resources, production and services)	X	X	X	X
		Demonstrate principles of internal/external customer service	X	X	X	X

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		Apply industry quality standards and practices	X	X	X	X
Safety, Health, and Environment:	**9%**	Ensure safe working conditions	X	X	X	X
Ensure safe and healthful working conditions		Demonstrate safe use of tools and equipment	X	X	X	X
		Ensure healthful working conditions	X	X	X	X
		Practice environmental conservation and safety	X	X	X	X
Leadership and Teamwork:	**11%**	Demonstrate leadership skills	X	X	X	X
Enhance work outcomes through leadership, management, and teamwork		Organize work	X	X	X	X
		Apply management techniques	X	X	X	X
		Demonstrate group process techniques	X	X	X	X
		Perform work tasks in a team	X	X	X	X
Ethics and/or Legal Responsibilities:	**6%**	Apply professional and ethical standards to workplace conduct	X	X	X	X
Practice professional, ethical, and legal behavior consistent with workplace standards		Adhere to established laws, policies, and procedures	X	X	X	X
Employability and/or Career Development:	**14%**	Develop a career plan			X	X
Progress on a purposeful career		Seek employment				X

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path through application of employability skills						
		Apply for employment				X
		Evaluate job offers				X
		Demonstrate employability skills needed to keep a job			X	X
		Demonstrate personal qualities appropriate to the work environment			X	X
		Assess alternative occupational opportunities (e.g., working conditions, benefits, and opportunities for change)			X	X
Literacy and Numeracy		literacy and numeracy skills required to solve complex.	X	X	X	X
		real-world problems associated with their career/technical content area.	X	X	X	X
		improve their thinking and reasoning skills.	X	X	X	X
		utilize a variety of technical sources (e.g., Internet, manuals, journals, directions, reports, etc.) to complete career/technical assignments and projects.	X	X	X	X
		demonstrate writing skills required to complete career/technical assignments and projects.	X	X	X	X
		demonstrate accuracy in calculating and measuring graphical work required to complete career/technical assignments and projects.	X	X	X	X

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		analyze tables, charts, graphs and multiple data sources to complete career/technical assignments and projects.	X	X	X	X
Advanced Manufacturing I		Apply the design and problem solving process as an iterative process incorporating sciences, mathematics and engineering to optimally convert resources to meet a stated objective.	X			
		Create models that are mathematical or physical systems set up to obey certain specified conditions whose behavior is used to understand study or evaluate a design or system	X			
		Conduct model documentation as the process of recording details such as size, material composition, and instructions for assembling, installation and servicing, analysis, development process that describes a model for the purpose of communication of ideas	X			
		Apply the principles of design for manufacturing enabling the efficient and effective production of products	X			
		Communicate solutions utilizing technical writing skills including correct spelling, proper grammar and dependent vocabulary	X			

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		Design a system of elements that manage power to accomplish a task that involves defined movement	x			
		Construct systems that efficiently utilize a fluid (liquid or gas) under pressure to generate, control and transmit power	X			
		Design and analyze an electrical system to convert, transform and transmit electricity to where it is needed with the goal of reducing energy consumption	X			
		Investigate and specify the size of the motor necessary to provide needed power	X			
		Design the control system to vary the speed and performance of a motor by utilizing feedback from the system to gain the most efficiency possible	X			
		Develop a logical argument for selecting the tools, machines and labor necessary to produce finished goods from raw materials	X			
		Design a system involving the integration of machines, machine tools, specialized dies, jigs, fixtures, and instruments used in production creating needed parts to make jigs, fixtures, alignment and drill guides, gauges, and other manufacturing and assembly tools with a rapid	X			

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		prototyping/additive manufacturing device				
		Create a strategy to increase efficiency and decrease waste by receiving goods only as they are needed in the production process, thereby reducing inventory costs and reducing the impact of water and natural resource consumption	X			
		Form a virtual design team to critique and propose solutions to shared design issues	X			
		Accurately collect, analyze code and categorize data using a database and a variety of data collection tools/methods	X			
		Design an online method of collaboration to conduct research with other individuals or groups at a different location	x			
Advanced Manufacturing II		Apply the design and problem solving process as an iterative process incorporating sciences, mathematics and engineering to optimally convert resources to meet a stated objective		X		
		Create models that are mathematical or physical systems set up to obey certain specified conditions whose behavior is used to understand study or evaluate a design or system		X		

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		Conduct model documentation as the process of recording details such as size, material composition, and instructions for assembling, installation and servicing, analysis, development process that describes a model for the purpose of communication of ideas		X		
		Design and create a model using additive manufacturing technology sometimes called a rapid prototyping system		X		
		Conduct model analysis using FEA and simulations as a detailed examination of the elements, structure or behavior of a physical system under certain imposed conditions		X		
		Apply the green principles of design for eventual disassembly and resource recovery		X		
		Investigate systems to transmit electrical impulses to be able to recreate designs, toolpaths, and other model information at a new location		X		
		Analyze the presence and flow of electric charge in a system		X		
		Select and defend a material for use in a product, explaining material properties and characterization, based upon manufacturing processes, chemical composition, internal defects,		X		

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		temperature, previous loading, dimensions and other factors				
		Create a process for treating a material by heating and cooling in controlled environments to produce desired properties or conditions		X		
		Investigate the analysis and synthesis of materials and the systems used to transform matter in the nanoscale range (1-10 nanometers).		X		
		Design a system of elements that manage power to accomplish a task that involves defined movement		X		
		Design and analyze an electrical system to convert, transform and transmit electricity to where it is needed with the goal of reducing energy consumption		X		
		Investigate and specify the size of the motor necessary to provide needed power		X		
		Design the control system to vary the speed and performance of a motor by utilizing feedback from the system to gain the most efficiency possible		X		
		Utilize rapid prototyping/additive manufacturing to create highly complex parts designed in a CAD system		X		
		Develop a logical argument for selecting the tools, machines and labor		X		

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		necessary to produce finished goods from raw materials				
		Design a system involving the integration of machines, machine tools, specialized dies, jigs, fixtures, and instruments used in production creating needed parts to make jigs, fixtures, alignment and drill guides, gauges, and other manufacturing and assembly tools with a rapid prototyping/additive manufacturing device		X		
		Formulate a system to utilize data collection and analysis to maintain and improve product quality and provide adequate confidence that the product will satisfy design requirements		X		
		Investigate activities that a business conducts with the intention of making a discovery that can either lead to the development of new products or procedures, or to improvement of existing products or procedures and to know the new approaches of rapid development and deployment that saves time and is more efficient		X		
		Construct and critique a plan for an assembly line or work cell		X		
		Create a strategy to increase efficiency and decrease waste by receiving goods only as they are needed in the		X		

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		production process, thereby reducing inventory costs and reducing the impact of water and natural resource consumption				
		Create a quality management plan including quality planning, quality control, quality assurance and quality improvement for an advance manufacturing environment		X		
		Form a virtual design team to critique and propose solutions to shared design issues		X		
		Accurately collect, analyze code and categorize data using a database and a variety of data collection tools/methods		X		
		Design an online method of collaboration to conduct research with other individuals or groups at a different location		X		

Advanced Manufacturing III **MA 1577**

In order to access content skill sets for Advanced Manufacturing III, teachers must attend Summer Teacher Training Institute (STTI) in Kentucky.

http://www.sreb.org/page/1608/Advanced_Career.html

Advanced Manufacturing IV **MA 1578**

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