

CURRICULUM MAP
Cluster: Manufacturing
CTE Program of Study: MA1900 Machine Tool Technology

STANDARD	%	SKILL SET/COMPETENCY	REQUIRED CORE COURSES FOR COMPLETION			
			1 st Course 1903 Fundamentals of Machine Tool Technology	2 nd Course 1905 Fundamentals of Machine Processes	3 rd Course 1907 Machine Tool Operations	4 th Course 1909 Metal Trades Processes and Applications
Organization and Shop Safety Practices	10%	Demonstrate safe work habits and operating procedures	X			
		Clean and maintain personal work area and equipment	X			
		Select and appropriately use cutting fluids	X			
		Identify and appropriately use Personal Protective Equipment (PPE)	X			
		Identify environmental and safety considerations established by the EPA, OSHA, and listed in SDS publications	X			
Measurement and Inspection	9%	Identify, select, and calibrate precision and semi-precision measuring tools	X			
		Measure workpiece to verify compliance with print specifications	X			
Metallurgical Processes and Heat Treating	6%	Identify the properties and characteristics of common metals and their effect on machinability	X			
		Identify the AISI/SAE and UNS steel identification systems	X			
		Identify heat treating processes and objectives	X			
Blueprint Interpretation and Process Planning	6%	Interpret blueprints including geometric dimensioning and tolerancing (GD&T) symbols	X			
		Develop an order of operations (process plan) based on blueprint specifications	X			
Layout and Benchwork	7%	Identify and appropriately use hand tools	X			

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		Identify and safely use power hand tools	X			
		Grind and shape tools using a pedestal/bench grinder		X		
		Perform semi-precision and precision layout	X			
Band Saw Machines	6%	Identify parts and preventive maintenance of a band saw		X		
		Explain safe principles of operation		X		
		Set up and perform band saw machine operations		X		
Lathes	17%	Identify parts and preventive maintenance of a lathe			X	
		Explain safe principles of operation			X	
		Select and maintain appropriate tools			X	
		Calculate appropriate cutting speed, feed rate, and depth of cut			X	
		Grind and form lathe tools		X	X	
		Demonstrate knowledge of various workholding methods (e.g., independent and universal chucks, collets, faceplate, between centers, steady and follower rests)			X	
		Set up and perform lathe machine operations (e.g., turning, boring, threading, taper turning, knurling, grooving and cut-off, drilling and tapping, _ling, polishing)			X	
		Identify appropriate uses for carbide inserts			X	
Milling Machines	17%	Identify parts and preventive maintenance of a mill			X	
		Explain safe principles of operation			X	
		Select and maintain appropriate tools			X	
		Calculate appropriate cutting speed, feed rate, and depth of cut			X	

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		Explain various workholding methods (e.g., mill vise, table set-ups, angle plates, indexing heads, v-blocks)			X	
		Set up milling machines (e.g., head alignment, vise alignment, tool holder selection, establishing a part zero, set DRO use)			X	
		Perform milling operations (e.g., pocketing, slotting, hole-making, peripheral and face milling)			X	
Surface Grinding	7%	Identify parts and preventive maintenance of a surface grinder				X
		Select appropriate grinding wheel				X
		Explain safe principles of operation (e.g., wheel mounting and dressing, ring testing, workholding, grinding parallel and perpendicular surfaces)				X
Computer Numerical Control (CNC) Programming, Preparation, Operations	10%	Demonstrate knowledge of the axis and coordinate systems				X
		Read and write basic G and M codes				X
		Perform basic setup and operation for CNC lathe (e.g., work offset, tool offset, workholding devices, toolholding devices)				X
		Perform basic setup and operation for CNC mill (e.g., work offset, tool offset, workholding devices, toolholding devices)				X
Drill Press	5%	Identify parts and preventive maintenance of a drill press	X			
		Determine appropriate tooling and workholding devices	X			

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		Explain safe principles of operation (e.g., drilling, reaming, countersinking, counterboring, tapping)				X