Competency Task List – Secondary Component
Engineering Technologies/Technicians CIP 15.9999
High School Graduation Years 2024, 2025, 2026

100 Engineering Safety

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
101	Implement a safety plan, including first aid procedures.		
102	Operate lab equipment and electrical lab machines according to safety guidelines.		
103	Use personal protective equipment.		
104	Comply with OSHA and Environmental Protection Agency regulations for a safe work site.		
	RESERVED (105)		
106	Maintain safe working practices around tools and equipment.		
107	Participate in classroom, laboratory management and clean-up activities.		
	RESERVED (108)		
109	Execute lockout/tag out procedures.		

200 Knowledge of Engineering

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
201	Research the fields of engineering.		
202	Investigate engineering careers, training, and associated opportunities.		
	RESERVED (203)		

300 Ethics in Engineering

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
301	Discuss and research current professional engineering codes of ethics.		
302	Analyze ethical engineering issues.		
303	Analyze and explain ethical and technical issues contributing to an engineering disaster.		

400 Reserved

500 Teamwork

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
	RESERVED (501)		
502	Apply constructive feedback.		
503	Develop and apply a plan for conflict resolution.		
504	Apply active listening techniques.		
505	Communicate verbally and in writing.		
506	Explain an idea to team members.		
	RESERVED (507)		
	RESERVED (508)		
509	Perform evaluations (e.g., peer, self, and management).		
510	Participate in a variety of roles on an engineering team.		

600 Engineering Graphics

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
601	Use graphics equipment and tools.		

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
602	Read and interpret various types of drawings.		
603	Perform metric to U.S. system conversions.		
604	Interpret scale on a drawing.		
605	Prepare freehand sketches.		
606	Apply line conventions.		
607	Prepare orthographic projection drawings.		
608	Prepare additional views to clarify the design.		
609	Apply principles of dimensioning and annotation.		
610	Prepare drawings for product assembly, fabrication, or construction.		
611	Create schematics.		
612	Revise an existing drawing to meet modifications or changes.		

700 Engineering Problem Solving and Design Processes

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
701	Apply the steps of an iterative design process.		
702	Create an engineering solution that meets a given design brief.		
	RESERVED (703)		
704	Generate a design improvement to address specific flaws or failures.		
705	Create a proposal for an engineering project.		
706	Participate in a design review.		
707	Prepare a schedule and/or a material list for a design project.		
708	Write an engineering problem statement.		

800 Modeling

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
801	Identify the three areas of modeling (e.g., physical, conceptual, and mathematical).		
802	Create a scale model, working prototype, or simulation.		
803	Evaluate a scale model, a working prototype, or simulation.		
	RESERVED (804)		
	RESERVED (805)		

900 Manufacturing and Industrial Systems

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
	RESERVED (901)		
	RESERVED (902)		
903	Describe procedures used in manufacturing.		
	RESERVED (904)		
905	Create and apply a flowchart that portrays a manufacturing process.		
906	Create a control system that replicates a factory cell.		
	RESERVED (907)		
908	Evaluate a product and the processes used in its manufacture.		

1000 Manufacturing Processes

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
	RESERVED (1001)		
1002	Determine the relationship of time and cost to manufacturing systems.		
1003	Determine if a manufacturing process is primary or secondary.		
1004	Evaluate and present a production line activity.		
1005	Analyze the product development process.		

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1006	Plan steps of production for a manufactured product.		
1007	List tools needed for a manufactured product.		
1008	Make a list of the production processes in manufacturing.		
1009	Apply manufacturing systems to develop and produce a product.		
	RESERVED (1010)		
1011	Write a step-by-step procedure for an assembly.		
1012	Identify methods and sources for obtaining materials and supplies.		
1013	Compile a materials list that includes vendors and costs for all required materials and equipment to build a prototype.		

1100 Computer Assisted Manufacturing (CAM)

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1101	Prepare a process, identify machines that will be used to carry out the process, and then describe the work that each machine performs.		
	RESERVED (1102)		
1103	Demonstrate how to use computer assisted manufacturing (CAM) software to create a program for a machine part.		

1200 Power and Energy

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1201	Differentiate between power, work, and energy.		
1202	Discuss the forms of potential and kinetic energy.		
1203	Design a prototype or scale model that stores and releases potential energy for propulsion.		
	RESERVED (1204)		

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1205	Calculate the efficiency of energy conversions, e.g., electrical, fluid, mechanical.		
	RESERVED (1206)		
1207	Name the laws of thermodynamics.		

1300 Mechanical Advantage and Mechanisms

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1301	Identify examples of the six simple machines, their attributes, and components.		
1302	Measure forces and distances related to mechanisms.		
1303	Calculate mechanical advantage and drive ratios of mechanisms.		
1304	Design, create, and test various drive systems.		
1305	Determine efficiency in a mechanical system.		
1306	Convert power between units.		
1307	Measure torque and use it to calculate power.		
	RESERVED (1308)		

1400 Fluid Power Systems

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1401	Design, create, and test a fluid power system.		
1402	Identify components of a fluid system.		
1403	Calculate values in a fluid power system using Pascal's law.		
1404	Calculate values in a pneumatic system using the ideal gas laws.		
1405	Calculate mechanical advantage in a fluid power system.		
	RESERVED (1406)		

1500 Green Energy

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1501	Produce mechanical power using alternative energy systems.		
1502	Research renewable and non-renewable energy sources.		
1503	Investigate energy efficiency and conservation.		
1504	Create a model that will utilize a renewable energy concept.		
	RESERVED (1505)		
	RESERVED (1506)		

1600 Machine Controls and Automated Systems

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1601	Choose appropriate machine control inputs and outputs based on the need of a technological system.		
	RESERVED (1602)		
1603	Differentiate between the characteristics of digital and analog devices.		
1604	Select between open and closed loop systems to solve a technological problem.		
1605	Create system control programs using flowchart logic.		
	RESERVED (1606)		
	RESERVED (1607)		
1608	Identify components needed to integrate computer controls for an automated system.		
1609	Plan, design, program, and construct an automated system based on given constraints.		
	RESERVED (1610)		
1611	Interface system output to another automated system.		
1612	Create and program a simulated work cell with simulation software.		
1613	Program timers, counters, and loops.		

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1614	Select appropriate motors for an application.		
1615	Interface output devices to a computer, microcontroller, or programmable logic controller.		

1700 Properties of Materials

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1701	Describe the properties of natural, composite, and synthetic materials.		
1702	Investigate methods used to alter materials.		
1703	Illustrate causes of failure in materials.		
1704	Calculate material properties relating to a stress strain curve.		
1705	Analyze and create a written report of material test evaluations.		
1706	Solve a problem, design a product, or a prototype that requires natural, composites, and/or synthetic materials.		

1800 Reserved

1900 Statics and Dynamics

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1901	Calculate the failure of a loaded structure.		
1902	Create free body diagrams of objects identifying all forces acting on the object.		
1903	Locate the centroid of a rectangle and a triangle.		
1904	Determine the moment of inertia.		
1905	Differentiate between scalar and vector quantities.		
1906	Identify magnitude, direction, and sense of a vector.		
1907	Calculate the X and Y components, given a vector.		
1908	Calculate moment forces given a specified axis.		

2000 Kinematics

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2001	Calculate distance, displacement, speed, velocity, and acceleration.		
2002	Calculate acceleration due to gravity based on data from a free-fall device.		
2003	Calculate the X and Y components of a projectile motion.		
2004	Determine the needed angle to launch a projectile a specific range given the projectile's initial velocity.		

2100 Total Quality Control

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2101	Explain the eight "M's" as they relate to quality control in the manufacturing industry: machines, methods, materials, manpower, measurement, milieu, management, and maintenance.		
2102	Demonstrate knowledge of industry quality standards.		
2103	Identify various diagrams, charts and sheets used in quality control and management.		
2104	Create a total quality control checklist for a product.		
	RESERVED (2105)		
2106	Correct and improve a finding from an inspection document.		
2107	Develop a report of inspection observations and findings.		

2200 Precision Measurement for Industry

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
	RESERVED (2201)		
2202	Make linear measurements to 1/16".		
2203	Use a micrometer to measure to .001".		

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2204	Use a dial caliper to measure to .001".		
2205	Perform angular measurement to the nearest one degree.		
2206	Use a height gauge to measure to .001".		
2207	Use inside micrometers and telescoping gauges to measure to .001".		
2208	Express numbers in scientific notation and engineering notation.		
2209	Use an engineer scale to measure a large-scale site plan.		

2300 Basic Electricity and Electronics

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
	RESERVED (2301)		
2302	Define and describe basic terms in electricity and electronics.		
2303	Identify electrical and electronic symbols on a schematic.		
2304	Follow a schematic and construct series and parallel electrical and electronic circuits.		
2305	Identify resistors by type and value.		
2306	Use various types of sensing and control devices.		
2307	Use a digital multimeter to measure circuit values of current, resistance, and voltage.		
2308	Compute values of current, resistance, and voltage using Ohm's law.		
2309	Compare DC and AC waveforms.		
2310	Analyze and measure values in AC circuits, including inductance, capacitance, reactance, and LRC circuits.		
2311	Calculate voltage, amperage, resistance, and power in all types of circuits.		
2312	Troubleshoot all types of circuits.		
2313	Identify functions, operation, and characteristics of grounding systems.		
	RESERVED (2314)		
	RESERVED (2315)		
2316	Identify electrical panel boards and switchboards.		

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2317	Identify and select over-current devices.		
	RESERVED (2318)		
2319	Explain transformer operation.		
2320	Describe and identify an oscillator.		
	RESERVED (2321)		
2322	Describe and identify an amplifier.		
2323	Construct a power supply circuit and verify operation.		
	RESERVED (2324)		
	RESERVED (2325)		

[1] Student Demonstrated Entry-Level Industry Proficiency as Indicated by (X)

Secondary CTE Instructor Signature _____ Date _____

Student Signature _____ Date _____