



MCKEESPORT AREA
School District

Engineering Technology CIP Code: 15.999

Pre-Engineering/Engineering Technology NOCTI Test #: 2475

1st Nine weeks		2nd Nine weeks		3rd Nine weeks		4th Nine weeks	
Engineering Safety 100		Problem Solving Ine Engineering 400		Engineering Graphics 600		1611	Interface system output to an other automated system.
101	Implement a safety plan.	401	Identify the engineering problem.	601	Proper use of graphics equipment and tools.	1612	Create and program a simulated work cell with simulation software.
102	Operate lab equipment according to safety guidelines.	402	Gather information about problems and solutions.	602	Describe various types of drawings.	1613	Demonstrate the ability to program timers, counters and loops.
103	Use appropriate personal protective equipment.	403	Identify information resources.	603	Perform metric-U.S. system conversions.	1614	Identify and explain various types of electrical motors.
104	Comply with OSHA and EPA regulations for a safe work site.	404	Apply steps in the problem solving method.	604	Use engineer's and architect's scales.	1615	Interface output devices to a computer, microcontroller or programmable logic controller
105	Identify emergency first aid procedures.	405	Identify the way numbers are expressed in scientific notation, engineering notation, and System International (SI) notation.	605	Prepare freehand sketches.	Knowledge of Manufacturing Systems 900	
106	Maintain safe working practices around tools and equipment.	Engineering Design Process 700		606	Apply line conventions.	901	Research the history of manufacturing and its milestones.
107	Participate in classroom and laboratory management and clean-up activities.	701	Identify the steps of an iterative design process.	607	Prepare orthographic projection drawings.	902	Research a topic in manufacturing.
108	Demonstrate a professional attitude toward classroom and laboratory activities.	702	Create an engineering solution for a real-world problem.	608	Prepare additional views to clarify the design.	903	Describe procedures used in manufacturing.
Knowledge of Engineering 200		703	Determine whether design is safe for a given user.	609	Apply principles of dimensioning and annotation.	904	Identify basic flowcharting and discuss their functions.
201	Demonstrate knowledge of the history of engineering.	704	Generate a design improvement to address specific flaws/failures.	610	Prepare drawings for product assembly, fabrication, or construction.	905	Create and apply a flowchart that portrays a manufacturing process.
202	Investigate engineering careers, training and associated opportunities.	705	Create a proposal for an engineering project.	611	Create schematics.	906	Create a control system that replicates a factory cell.
203	Explain the purpose and functions of an engineering team.	706	Participate in a design review.	612	Revise an existing drawing to meet modifications or changes.	907	Apply manufacturing systems to develop and produce a prototype for a product.
Ethics in Engineering 300		707	Prepare a schedule for a design project.	Precision Measurements for Industry 2200		908	Evaluate a product prototype and the processes used in its manufacture.
301	Analyze current Professional Engineering codes of ethics.	Basic Electricity and Electronics 2300		2201	Convert numbers between the hexadecimal or octal number systems and the decimal number system	Manufacturing Processes 1000	
302	Analyze ethical engineering issues.	2301	Identify and demonstrate safety rules in the use of electrical lab machines and equipment.	2202	Make linear measurements accurately to 1/16".	1001	Demonstrate how research is used in Engineering Economics.
303	Analyze and explain ethical and technical issues contributing to an engineering disaster.	2302	Define and describe basic terms in electricity and electronics.	2203	Use a micrometer to measure accurately to .001".	1002	Demonstrate the relationship of time and cost to manufacturing systems.
Teamwork 500		2303	Identify electrical and electronic symbols on a schematic.	2204	Use a dial caliper to measure accurately to .001".	1003	Explain the difference between primary and secondary manufacturing processes.
501	Actively participate as a member of an engineering project team.	2304	Follow a schematic and construct series and parallel electrical and electronic circuits.	2205	Use combination squares and protractors for angular measurement.	1004	Evaluate and present a production line activity.
502	Apply constructive feedback.	2305	Identify resistors by type and value.	2206	Use a height gauge to layout and measure part to measure accurately to .001".	1005	Outline the product-development process.

Engineering Year 1



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Engineering Year 1	503	Resolve conflict within the team.	2306 Describe various types of sensing and control devices.	2207 Use inside micrometers and telescoping gauges to measure accurately to .001".	1006 Plan steps of production for a manufactured product.	
	504	Demonstrate active listening techniques.	2307 Use a digital multi-meter to measure circuit values of current, resistance, and voltage.	Modeling 800		
	505	Demonstrate formal and informal speaking skills.	2308 Compute values of current, resistance and voltage using Ohm's Law.	801 Identify the three areas of modeling (i.e., physical, conceptual, and mathematical).	1007 List tools needed for a manufactured product.	
	506	Explain the importance of selling a project idea to team members.	2311 Calculate voltage, amperage, resistance, and power in all types of circuits.	802 Create a scale model or working prototype.	1008 Make a list of the production processes in manufacturing.	
	507	Identify ways to motivate, coach, counsel, and reward individuals and teams.	2319 Explain transformer operation.	803 Evaluate a scale model or a working prototype.	1009 Apply manufacturing systems to develop and produce a prototype for a product.	
	508	Perform a team peer review.	2322 Construct an amplifier circuit and verify the characteristics.	804 Identify methods and sources for obtaining materials and supplies.	1010 Evaluate a product prototype and the processes used in its manufacture.	
	509	Perform evaluations (e.g., self-evaluation and management evaluation).	2323 Construct a power supply circuit and verify operation.	805 Compile a materials list that includes vendors and costs for all required materials and equipment to build the prototype.	1011 Write a step-by-step procedure for an assembly.	
			2324 Use circuit simulation software to construct and analyze digital and microprocessor circuit characteristics.	Computer Assisted Manufacturing (CAM) 1100		
			2325 Identify and explain various types of motors, e.g. induction, etc., and the principles of their operation.	Machine Controls and Automated Systems 1600		
				1601 Choose appropriate machine control inputs and outputs, based on the need of a technological system.	1101 Prepare a process, identify machines that will be used to carry out the process, and then describe the work that each machine performs.	
				1602 Design and create a control system, based on given needs and constraints.	1102 Research the history and industrial use of CAM.	
				1603 Differentiate between the characteristics of digital and analog devices.	1103 Demonstrate how to use CAM software to create a program for a machine part.	
				1604 Select between open and closed loop systems to solve a technological problem.	Total Quality Control 2100	
				1605 Create system control programs using flowchart logic.	2101 Explain the eight "Ms" as they relate to total quality control in the manufacturing industry: Machines, Methods, Materials, Manpower.	
				1606 Define and discuss open and closed loop systems.	2102 Demonstrate knowledge of ISO quality standards.	
				1607 Create and use flowcharts.	2103 Demonstrate the application of the following Total Quality Management techniques: Cause and Effect Diagram	
				1608 Identify components needed to integrate computer controls for an automated system.	2104 Create a total quality control checklist for a product.	
				1609 Plan, design, and construct an automated system.	2105 Communicate total quality control expectations to user groups.	
			1610 Program an automated system using computer hardware and software.	2106 Identify how to correct, and improve, a finding from an inspection document.		
				2107 Develop a report of total quality control inspection observations and findings.		



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Engineering Safety 100		Mechanical Advantage and Mechanisms 1300		Basic Electricity and Electronics 2300		Green Energy 1500	
101	Implement a safety plan.	1301	Locate and explain examples of the six simple machines, their attributes and components.	2301	Identify and demonstrate safety rules in the use of electrical lab machines and equipment.	1501	Produce mechanical power, using alternative energy systems.
102	Operate lab equipment according to safety guidelines.	1302	Measure forces and distances related to mechanisms.	2302	Define and describe basic terms in electricity and electronics.	1502	Research renewable/non renewable energy sources.
103	Use appropriate personal protective equipment.	1303	Calculate mechanical advantage and drive ratios of mechanisms.	2303	Identify electrical and electronic symbols on a schematic.	1503	Study energy efficiency and conservation.
104	Comply with OSHA and EPA regulations for a safe work site.	1304	Design, create, and test various drive systems.	2304	Follow a schematic and construct series and parallel electrical and electronic circuits.	1504	Create a model that will utilize a renewable energy concept.
105	Identify emergency first aid procedures.	1305	Determine efficiency in a mechanical system.	2305	Identify resistors by type and value.	1505	Investigate bio-degradable materials for an alternative energy source.
106	Maintain safe working practices around tools and equipment.	1306	Convert power between units.	2306	Describe various types of sensing and control devices.	1506	Prepare a concept of an alternative energy for transportation.
107	Participate in classroom and laboratory management and clean-up activities.	1307	Measure torque, and use it to calculate power.	2307	Use a digital multi-meter to measure circuit values of current, resistance, and voltage.	Properties of Materials 1700	
108	Demonstrate a professional attitude toward classroom and laboratory activities.	1308	Demonstrate principles of mechanical systems as they relate to power transmission.	2308	Compute values of current, resistance and voltage using Ohm's Law.	1701	Describe the properties of materials.
Knowledge of Engineering 200		Kinematics 2000		2309	Compare DC and AC waveforms, using an oscilloscope.	1702	Investigate methods used to alter materials.
201	Demonstrate knowledge of the history of engineering.	2001	Given a set of data, calculate distance, displacement, speed, velocity, and acceleration.	2310	Analyze and measure values in AC circuits (including inductance, capacitance, reactance, and I RC circuits)	1703	Illustrate causes of failure in materials.
202	Investigate engineering careers, training and associated opportunities.	2002	Calculate acceleration due to gravity, based on data from a free-fall device.	2312	Troubleshoot all types of circuits.	1704	Calculate material properties relating to a stress strain curve.
203	Explain the purpose and functions of an engineering team.	2003	Calculate the X and Y components of a projectile motion.	2313	Identify functions, operation, and characteristics of grounding systems.	1705	Create a written report of material test evaluations.
Ethics in Engineering 300		2004	Determine the needed angle to launch a projectile a specific range, given the projectile's initial velocity.	2314	Interpret the NEC requirements for electrical installations.	Natural, Composite and Synthetic Materials 1800	
301	Analyze current Professional Engineering codes of ethics.	Fluid Power Systems 1400		2315	Demonstrate lockout/tag out procedures.	1801	Investigate various types of metals and application.
302	Analyze ethical engineering issues.	1401	Design, create, and test a fluid power system.	2316	Identify and install electrical panel boards and switchboards.	1802	Investigate various types of manufacturing wood and applications.
303	Analyze and explain ethical and technical issues contributing to an engineering disaster.	1402	Identify components of a fluid system.	2317	Identify, select, and install over-current devices.	1803	Investigate various types of ceramics and applications.
Teamwork 500		1403	Calculate values in a fluid power system, using Pascal's Law.	2318	Identify/install various ground fault circuit interrupter (AFCI & GFCI) and arc fault devices.	1804	Investigate various composite and synthetic materials.
501	Actively participate as a member of an engineering project team.	1404	Calculate values in a pneumatic system, using the ideal gas laws.	2320	Describe and identify types of oscillators.	1805	Solve a problem, design a product, or a prototype, that requires natural, composites and/or synthetic materials.
502	Apply constructive feedback.	1405	Calculate flow rate, flow velocity, and mechanical advantage in a fluid power system.	2321	Identify and describe semiconductor atomic structure and construction methods.		

Engineering Year 2



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Engineering Year 2	503	Resolve conflict within the team.	1406	Maintain a fluid power system.	2324	Use circuit simulation software to construct and analyze digital and microprocessor circuit characteristics.	Natural, Composite and Synthetics Materials 1800	
	504	Demonstrate active listening techniques.			2325	Identify and explain various types of motors, e.g. induction, etc., and the principles of their operation.		1901
	505	Demonstrate formal and informal speaking skills.			Power and Energy 1200		1902	Create free body diagrams of objects, identifying all forces acting on the object.
	506	Explain the importance of selling a project idea to team members.			1201	Define "What is Power."	1903	Locate the centroid of a rectangle and a triangle, using mathematics.
	507	Identify ways to motivate, coach, counsel, and reward individuals and teams.			1202	Discuss the forms of potential energy.	1904	Calculate the moment of inertia for a rectangular shape.
	508	Perform a team peer review.			1203	Design a vehicle that stores and releases potential energy for propulsion.	1905	Differentiate between scalar and vector quantities.
	509	Perform evaluations (e.g., self-evaluation and management evaluation).			1204	Discuss the forms of kinetic energy.	1906	Identify magnitude, direction, and sense of a vector.
					1205	Research methods of energy conversion (e.g., electrical, fluid, mechanical).	1907	Calculate the X and Y components, given a vector.
					1206	Define terms used in power systems.	1908	Calculate moment forces, given a specified axis.
					1207	Name the Laws of Thermodynamics.		