



Course Outline and Unit Highlights

UNIT	LEARNING CYCLE	BIG IDEA
Unit 1: Inventions and Innovations (21 hours)	Learning Cycle 1: The History of Technology (5 hours)	People are better able to understand the world around them when they explore how people of all times and places have used their unique skills to develop inventions and innovations.
	Learning Cycle 2: Inventions and Innovations: An Evolutionary Process (5 hours)	Inventions and innovations are the result of an evolutionary process through a series of improvements and refinements.
	Learning Cycle 3: The Role of Research and Development (6 hours)	Research and development is a problem-solving approach that allows businesses and industry to prepare products and systems for the marketplace.
	Learning Cycle 4: Advertising and Marketing Effects on Technology (5 hours)	Many factors, including advertising, the strength of the economy, goals of the company, and fads determined by society, have an impact on the demand and design of technology.
Unit 2: The Engineering Design Process (39 hours)	Learning Cycle 1: Engineering Design Process (8 hours)	The Engineering Design Process is a systematic, iterative problem-solving method that produces solutions to meet human needs and wants.
	Learning Cycle 2: Criteria and Constraints (3 hours)	Specifying criteria and identifying constraints is essential when defining a problem and determining the most appropriate solution.



	Learning Cycle 3: Design Principles (8 hours)	There are several factors that significantly influence the design process.
	Learning Cycle 4: Prototypes and Modeling (6 hours)	At various intervals of the engineering design process, conceptual, mathematical, and physical models are used to evaluate the design solution.
	Learning Cycle 5: Collecting and Processing Information (5 hours)	Computers assist organizing and analyzing data used in the Engineering Design Process.
	Learning Cycle 6: Documenting the Design Process 8 hours	Documentation of the engineering design process is essential so that the solution can be communicated to the intended audience.
Unit 3: The Designed World (40 hours)	Learning Cycle 1: Energy and Power (8 hours)	Advancements in the processing and controlling of energy have been an enabling factor in the development of technology.
	Learning Cycle 2: Manufacturing (8 hours)	Manufacturing is the process of producing goods and materials and ensuring that the properties of materials meet the desired function of the product.
	Learning Cycle 3: Construction (6 hours)	Construction is the systematic process of erecting structures that meet human needs while following specific processes and using available resources.
	Learning Cycle 4: Information and Communication (5 hours)	Information and communication systems greatly impact our quality of life and are an essential component of business and industry that is rapidly expanding.
	Learning Cycle 5: Agriculture and Transportation (10 hours)	Transportation plays a vital role in the operation of agricultural industries, which includes a combination of businesses that use a wide array of products and systems to produce, process, and distribute food, fiber, fuel, chemical, and other useful products.
	Learning Cycle 6: Telemedicine (3 hours)	Telemedicine reflects the convergence of technological advances in a number of fields, including medicine, telecommunications, virtual presence, computer engineering, informatics, artificial intelligence, robotics, materials science, and perceptual psychology.



Unit 4: Systems (30 hours)	Learning Cycle 1: Core Technologies (6 hours)	Every system and product is made up of one or more of the nine core technologies: bio-, electrical, electronic, fluid, material, mechanical, optical, structural, and thermal technology.
	Learning Cycle 2: Universal Systems Model (4 hours)	The universal systems model—input, process, output, and feedback—helps users isolate the components of a system so that they may be properly used and maintained.
	Learning Cycle 3: Reverse Engineering 3 hours	Systems are the building blocks of technology and users must properly maintain, troubleshoot, and analyze systems to ensure safe and proper function.
	Learning Cycle 4: Troubleshooting (17 hours)	Troubleshooting allows users to continue to use and maintain the proper operation of a system or product.
Unit 5: Lunar Plant Growth Chamber (21 hours)	Learning Cycle 1: Space Exploration (4 hours)	The Constellation Program employs two vehicles to continue the vision of space exploration.
	Learning Cycle 2: Intermodal Transportation (3 hours)	Land, air, water, and space means of transportation are integrated to move people and goods from one location to another.
	Learning Cycle 3: Transportation Cycle (6 hours)	In any system, large or small, checklists and a comprehensive testing program will ensure the best possibility of success.
	Learning Cycle 4: Decision Making and Management (7 hours)	Decision-making procedures assist in the proper operation and integration of systems.