

**Florida Department of Education  
Student Performance Standards**

**Course Title:** Engineering Technology I  
**Course Number:** 8600570  
**Course Credit:** 1

**Course Description:**

This course provides students with an introduction to the knowledge, human relations, and technological skills found today in technical professions.

01.0 Demonstrate an understanding of the characteristics and scope of technology. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [MA.912.A.5.1, MA.912.A.5.4, MA.912.A.10.1, STL.1.J – M]

- 01.01 Discuss the nature and development of technological knowledge and processes.
- 01.02 Explain the rapid increase in the rate of technological development and diffusion.
- 01.03 Conduct specific goal-directed research related to inventions and innovations.
- 01.04 Discuss current technological developments that are/were driven by profit motive and the market.

02.0 Demonstrate an understanding of the core concepts of technology. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [MA.912.A.2.3, STL.2.W, STL.2.X, STL.2.Z, STL.2.AA – EE]

- 02.01 Identify systems thinking logic and creativity with appropriate compromises in complex real-life problems.
- 02.02 Define technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems.
- 02.03 Identify resources involving trade-offs between competing values, such as availability, cost, desirability, and waste.
- 02.04 Identify the criteria and constraints of a product or system and determine how they affect the final design and development.
- 02.05 List strategies for optimizing a technological process or methodology of designing or making a product, dependent on criteria and constraints.
- 02.06 Identify new technologies that create new processes.
- 02.07 Describe a quality control process to ensure that a product, service or system meets established criteria.
- 02.08 Define a management system as the process of planning, organizing, and controlling work.

03.0 Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.3.G, STL.3.H, STL.3.J]

- 03.01 Identify technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function.
- 03.02 Identify technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields.
- 03.03 Identify technological progresses that promote the advancement of science and mathematics.

04.0 Demonstrate an understanding of the cultural, social, economic, and political effects of technology. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.4.H – K]

- 04.01 Identify changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious.
- 04.02 Classify the use of technology involving weighing the trade-offs between the positive and the negative effects.
- 04.03 Identify ethical considerations important in the development, selection, and use of technologies.
- 04.04 List the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another.

05.0 Demonstrate an understanding of the effects of technology on the environment. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.5.G, STL.5.H, STL.5.K, STL.5.L]

- 05.01 Select technologies to conserve water, soil, and energy through such techniques as reusing, reducing and recycling.
- 05.02 List trade-offs of developing technologies to reduce the use of resources.
- 05.03 Identify technologies devised to reduce the negative consequences of other technologies.
- 05.04 Discuss the implementation of technologies involving the weighing of trade-offs between predicted positive and negative effects on the environment.

06.0 Demonstrate an understanding of the role of society in the development and use of technology. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.6.I, STL.6.J]

- 06.01 Collect societal opinions and demands, as well as corporate cultures to use as a basis for deciding whether or not to develop a technology. STL.6.I
- 06.02 Identify a number of different factors, such as advertising, the strength of the economy, the goals of a company, and the latest fads as contributors to shaping the design of and demand for various technologies. STL.6.J

07.0 Demonstrate an understanding of the influence of technology on history. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.7.I, STL.7.J]

- 07.01 Define the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape.
- 07.02 Discuss that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how.

08.0 Demonstrate an understanding of the attributes of design. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.8.H – K]

- 08.01 Recognize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results.
- 08.02 Restate design problems that are seldom presented in a clearly defined form.
- 08.03 Check and critique a design continually, and improve and revise the idea of the design as needed.
- 08.04 List competing requirements of a design, such as criteria, constraints, and efficiency.

09.0 Demonstrate an understanding of engineering design. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.9.I – STL.9.L]

- 09.01 Identify design principles used to evaluate existing designs, to collect data, and to guide the design process.
- 09.02 Describe the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the Engineering Design process.
- 09.03 Construct a prototype or a working model used to test a design concept by making actual observations and necessary adjustments.
- 09.04 Identify factors taken into account in the process of engineering.

10.0 Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.10.I – STL.10.L]

- 10.01 Define research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace.
- 10.02 Identify research needed to solve technological problems.
- 10.03 Differentiate between technological and non-technological problems, and identify which problems can be solved using technology.
- 10.04 Utilize a multidisciplinary approach to solving technological problems.

11.0 Demonstrate the abilities to apply the design process. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [MA.912.A.2.3, MA.912.A.10.1, STL.11.M – STL.11.R]

- 11.01 Identify the design problem to solve and decide whether or not to address it.
- 11.02 List criteria and constraints and determine how these will affect the design process.
- 11.03 Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product.
- 11.04 Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed.
- 11.05 Develop a product or system using a design process.
- 11.06 Evaluate final solutions and communicate observations, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models.

12.0 Demonstrate the abilities to use and maintain technological products and systems. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.12.L – STL.12.P]

- 12.01 Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.
- 12.02 Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it.
- 12.03 Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision.
- 12.04 Operate systems so that they function in the way they were designed.
- 12.05 Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate.

13.0 Demonstrate the abilities to assess the impact of products and systems. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.13.J – STL.13.M]

- 13.01 Collect information and evaluate its quality.

- 13.02 Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and the environment.
- 13.03 Define assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology.
- 13.04 Identify forecasting techniques to evaluate the results of altering natural systems.

16.0 Demonstrate an understanding of and be able to select and use energy and power technologies. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.16.J, STL.16.K, STL.16.M, STL.16.N]

- 16.01 Discuss how energy cannot be created nor destroyed; however, it can be converted from one form to another.
- 16.02 Categorize types of energy into major forms: thermal, radiant, electrical, mechanical, chemical, nuclear, and others.
- 16.03 Classify energy resources as renewable or nonrenewable.
- 16.04 Construct a power system having a source of energy, a process, and loads.

17.0 Demonstrate an understanding of and be able to select and use information and communication technologies. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.17.L – STL.17Q]

- 17.01 Discuss information and communication technologies including the inputs, processes, and outputs associated with sending and receiving information.
- 17.02 Classify information and communication systems that allow information to be transferred as human to human, human to machine, machine to human, or machine to machine.
- 17.03 Use information and communication systems to inform, persuade, entertain, control, manage, and educate.
- 17.04 Identify components of a communications system, including source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.
- 17.05 Identify many ways to communicate information, such as graphic and electronic means.
- 17.06 Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli.

18.0 Demonstrate an understanding of and be able to select and use transportation technologies. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.18.J – STL.18.M]

- 18.01 Analyze the vital role played by transportation in the operation of other technologies, such as manufacturing, construction, communication, health and safety, and agriculture.

- 18.02 Define intermodalism as the use of different modes of transportation, such as highways, railways, and waterways as part of an interconnected system that can move people and goods easily from one mode to another.
- 18.03 Discuss how transportation services and methods have led to a population that is regularly on the move.
- 18.04 Identify processes and innovative techniques involved in the design of intelligent and non-intelligent transportation systems.

19.0 Demonstrate an understanding of and be able to select and use manufacturing technologies. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.19.L – STL.19.P, STL.19.R]

- 19.01 Service products to keep them in good operating condition.
- 19.02 Classify materials based on their qualities as natural, synthetic, or mixed.
- 19.03 Classify goods as durable goods designed to operate for a long period of time, or non-durable goods designed to operate for a short period of time.
- 19.04 Identify and classify manufacturing systems into types, such as customized production, batch production, and continuous production.
- 19.05 Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes.
- 19.06 Employ marketing techniques involving establishing a product's identity, conducting research on its potential, advertising it, distributing it, and selling it.

20.0 Demonstrate an understanding of and be able to select and use construction technologies. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [STL.20.J – STL.20.N]

- 20.01 Define infrastructure as the underlying base or basic framework of a system.
- 20.02 Identify a variety of processes and procedures used in constructing structures.
- 20.03 Identify requirements involved in the design of structures.
- 20.04 Recommend maintenance, alterations, or renovations to improve a structure or alter its intended use.
- 20.05 Identify prefabricated materials used in some structures.

21.0 Demonstrate safe and appropriate use of tools and machines in engineering technology. – The student will be able to:

- 21.01 Select appropriate tools, procedures, and/or equipment.
- 21.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment.
- 21.03 Follow laboratory safety rules and procedures.
- 21.04 Demonstrate good housekeeping at workstation within total laboratory.
- 21.05 Identify color-coding safety standards.
- 21.06 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 21.07 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

22.0 Demonstrate the ability to properly identify, organize, plan, and allocate resources. – The student will be able to:

- 22.01 Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
- 22.02 Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
- 22.03 Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
- 22.04 Display knowledge of the efficient use of human resources.

23.0 Demonstrate the functional characteristics of the engineering design team. – The student will be able to:

- 23.01 Describe work breakdown organization.
- 23.02 Describe work group organization schemes including functional and hierarchical schemes.
- 23.03 Describe the function of management in general and project management in particular.
- 23.04 Describe a typical design project team structure.
- 23.05 Outline a research methodology.
- 23.06 Demonstrate brainstorming techniques.

24.0 Demonstrate technical knowledge and skills in the processes and systems related to engineering. – The student will be able to:

- 24.01 Assemble, operate, and identify the parts of a fluid system.
- 24.02 Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to fluid systems.
- 24.03 Assemble, operate, and identify the parts of a thermal system.
- 24.04 Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to thermal systems.
- 24.05 Assemble, operate, and identify the parts of an electrical system.
- 24.06 Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to electrical systems.
- 24.07 Assemble, operate, and identify the parts of a mechanical system.
- 24.08 Demonstrate and apply principles of force, work, rate, resistance, energy, power, and force transformers relating to mechanical systems.

25.0 Demonstrate technical knowledge and skills in the designing, engineering, and analysis of constructed works. – The student will be able to:

This standard supports the following Next Generation Sunshine State Standards and Standards for Technology Literacy (STL): [MA.912.A.1.8, MA.912.A.2.4, MA.912.A.2.13, MA.912.A.3.1, MA.912.A.3.3, MA.912.A.3.4, MA.912.A.3.5, MA.912.A.3.8, MA.912.A.3.9, MA.912.A.3.10, MA.912.A.3.12, MA.912.A.3.13, MA.912.A.3.14, MA.912.D.7.2, MA.912.G.1.4, MA.912.A.7.1, MA.912.A.7.10, MA.912.A.3.11, MA.912.A.3.15, MA.912.A.7.2, MA.912.A.7.8, MA.912.A.10.2]

- 25.01 Define terminology associated with engineering products and systems.

- 25.02 Define and describe the experimental method as it is applied to design.
  - 25.03 Describe simulation.
  - 25.04 Prepare a model of a design solution to an engineering problem.
  - 25.05 Prepare a graphical solution to an engineering problem.
  - 25.06 Prepare a mathematical solution to an engineering problem (using either a calculator or computer).
  - 25.07 Present a technical report on an engineering design problem, concept or issue.
- 28.0 Demonstrate language arts knowledge and skills. – The student will be able to: AF 2.0
- 28.01 Locate, comprehend and evaluate key elements of oral and written information. AF2.4
  - 28.02 Draft, revise, and edit written documents using correct grammar, punctuation and vocabulary. AF2.5
  - 28.03 Present information formally and informally for specific purposes and audiences. AF2.9
- 29.0 Demonstrate mathematics knowledge and skills. – The student will be able to: AF3.0
- 29.01 Demonstrate knowledge of arithmetic operations. AF3.2
  - 29.02 Analyze and apply data and measurements to solve problems and interpret documents. AF3.4
  - 29.03 Construct charts/tables/graphs using functions and data. AF3.5
- 30.0 Demonstrate science knowledge and skills. – The student will be able to: AF4.0
- 30.01 Discuss the role of creativity in constructing scientific questions, methods and explanations. AF4.1
  - 30.02 Formulate scientifically investigable questions, construct investigations, collect and evaluate data, and develop scientific recommendations based on findings. AF4.3



