

**Florida Department of Education  
CURRICULUM FRAMEWORK**

**Program Title:** Integrated Technology Studies  
**Occupational Area:** Technology Education  
**Program Numbers:** 8600000  
**CIP Number:** 0821.0122EX  
**Grade Level:** Secondary 6-9, & 30, 31  
**Standard Length:** 0.5 Credits  
**Facility Design Code:** 240, Related 803, 808, 849, 851, 852  
**CTSO:** Florida Technology Student Association (FL-TSA)  
**Certification:** I ART-TEC 1 @2  
 IND ARTS @4 @6  
 ENG 7G

- I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of the applications of technology and its effect upon our lives and the choosing of an occupation. The content and activities will also include the study of safety, and leadership skills. This program focuses on transferable skills and stresses understanding and demonstration of the technological tools, machines, instruments, materials, processes and systems in business and industry.

The emphasis of this program is on developing awareness of future needs, developing technological competence, confidence and awareness through interaction with technologies, developing awareness of other career programs, interacting with business, industry and community organizations, applying basic skills in learning activities, and developing self-awareness of individual abilities, needs and interests. The courses are intended to help students develop their problem-solving skills and creativity while learning about technology and careers. Students will learn to gather data through research and testing, as well as to document their results and processes.

The content includes introductory studies in areas of technology which introduce students to the development of abilities to calculate, make important observations, analyze and solve problems using manipulative skills while working cooperatively with others in team activities.

Listed below are the courses that make up this program at the secondary level followed by the laboratory design code appropriate for each course:

8600010 - Introduction to Technology  
 8600020 - Exploring Technology\*  
 8600030 - Exploration of Communications Technology  
 8600040 - Exploration of Production Technology  
 8600050 - Exploration of Aerospace Technology  
 8600250 - Exploration of Power & Energy Technology  
 8600240 - Exploration of Transportation Technology

*\* The Exploring Technology course has been approved and has provisions for optionally integrating the learning outcomes of the Career Exploration and Decision-Making Course (#1700060). This option is only available if the district does not provide*

*the Career Exploration and Decision-Making Course as a standalone course. Integration of the course meets the requirements of Section 1003.4156, Florida Statutes. Learning outcomes are listed at the end of the Exploring Technology framework.*

- II. **LABORATORY ACTIVITIES:** Instruction and learning activities are provided in a laboratory setting using hands-on experiences with technology equipment, tools and materials appropriate to the course content.
- III. **SPECIAL NOTE:** The Florida Technology Student Association (FL-TSA) is the appropriate Career Student Organization for providing leadership training experiences and reinforcing specific academic and career skills. Career Student Organizations shall be an integral part of the career instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC. FL-TSA information can be obtained from the web site at <http://www.floridatsa.com>.

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Adult students with disabilities must self-identify and request such services. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

The student should demonstrate an understanding of prior grade specific knowledge covered in the national *Standards for Technological Literacy\** (STL) and the Florida *Sunshine State Standards*. Benchmarks followed by a reference code indicate alignment with one or both of these documents.

\* *Standards for Technological Literacy: Content for the Study of Technology.* Copyright 2000 by the International Technology Education Association. Reston, VA.

- IV. **INTENDED OUTCOMES:** After successfully completing a course the student will be able to:

**TECHNOLOGICAL LITERACY STANDARDS**

- 01.0 Demonstrate an understanding of the characteristics and scope of technology.
- 02.0 Demonstrate an understanding of the core concepts of technology.
- 03.0 Demonstrate an understanding of the relationships among technologies and the connection between technology and other fields of study.
- 04.0 Demonstrate an understanding of the cultural, social, economic, and political effects of technology.
- 05.0 Demonstrate an understanding of the effects of technology on the environment.
- 06.0 Demonstrate an understanding of the role of society in the development and use of technology.
- 07.0 Demonstrate an understanding of the influence of technology on history.

- 08.0 Demonstrate an understanding of the attributes of design.
- 09.0 Demonstrate an understanding of engineering design.
- 10.0 Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- 11.0 Demonstrate the abilities to apply the design process.
- 12.0 Demonstrate the abilities to use and maintain technological products and systems.
- 13.0 Demonstrate the abilities to assess the impact of products and systems.
- 14.0 Demonstrate an understanding of and be able to select and use medical technologies.
- 15.0 Demonstrate an understanding of and be able to select and use agricultural and related biotechnologies.
- 16.0 Demonstrate an understanding of and be able to select and use energy and power technologies.
- 17.0 Demonstrate an understanding of and be able to select and use information and communications technologies.
- 18.0 Demonstrate an understanding of and be able to select and use transportation technologies.
- 19.0 Demonstrate an understanding of and be able to select and use manufacturing technologies.
- 20.0 Demonstrate an understanding of and be able to select and use construction technologies.

#### **TECHNICAL CONTENT STANDARDS**

- 21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
- 22.0 Exhibit positive human relations and leadership skills.
- 23.0 Discuss individual interests, aptitudes, and opportunities as they relate to a career.
- 24.0 Demonstrate an application of basic electronic publishing techniques.
- 25.0 Identify, describe and utilize the major types of printing techniques used in print production.
- 26.0 Identify and demonstrate the role of electronic communication.
- 27.0 Identify and demonstrate the role of optical technology.
- 28.0 Identify evolving technologies of Production Systems.
- 29.0 Perform special skills unique to Manufacturing Technology.
- 30.0 Express knowledge of factors that impact Manufacturing Technologies and practices.
- 31.0 Perform special skills unique to Construction Technology.
- 32.0 Express knowledge of factors that impact Construction Technology and practices.
- 33.0 Demonstrate knowledge of the basic principles of aerostatics and aerodynamics.
- 34.0 Identify and demonstrate knowledge of both liquid and solid propellant rocket propulsion systems.
- 35.0 Define and describe the stages and forms of interference in basic satellite communication systems.
- 36.0 Perform special skills unique to power and energy technologies.
- 37.0 Express a knowledge of the industries that deal with power and energy technology.
- 38.0 Perform special skills unique to transportation technologies.
- 39.0 Express a knowledge of the industries that deal with transportation technology.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Course Number:** 8600010  
**Course Title:** Introduction to Technology  
**Course Credit:** 0.5

**COURSE DESCRIPTION:** The purpose of this course is to give students an introduction to the areas of technology and to introduce students to the design and problem solving processes using manipulative skills while working cooperatively with others in team activities.

**STUDENT PERFORMANCE STANDARDS:**

01.00 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

- 01.01 Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F, LA.C.3.3, MA.B.3.3, SS.D.2.3
- 01.02 Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G, LA.B.2.3, LA.D.2.3, SC.H.3.3
- 01.03 Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H, LA.D.2.3, MA.D.1.3

02.00 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

- 02.01 Identify technological systems including input, processes, output, and, at times, feedback. STL.2.M, MA.E.1.3
- 02.02 Define systems thinking, involving considering how every part relates to others. STL.2.N, LA.A.2.3, LA.D.1.3, MA.D.1.3, MA.E.1.3, SC.H.1.3, SS.B.1.3, SS.B.2.3
- 02.03 Identify control systems having no feedback path and requiring human intervention, and control system using feedback. STL.2.O
- 02.04 Identify how technological systems can be connected to one another. STL.2.P, MA.D.1.3
- 02.05 Diagnose malfunctions of any part of a system that may affect the function and quality of the system. STL.2.Q, SC.H.1.3, SC.H.2.3
- 02.06 Identify requirements or parameters placed on the development of a product or system. STL.2.R, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.C.1.3, MA.D.1.3, MA.E.2.3, MA.E.3.3, SC.H.3.3, SS.D.1.3, SS.D.2.3
- 02.07 Identify trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S, LA.A.2.3, MA.E.2.3, MA.E.3.3
- 02.08 Identify different technologies that involve different sets of processes. STL.2.T, LA.A.2.3
- 02.09 Define maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U

- 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:
- 03.01 Explain how technological systems interact with one another. STL.3.D, MA.D.1.3, SS.B.2.3
  - 03.02 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F, LA.A.1.3, SC.H.3.3, SS.B.2.3
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:
- 04.01 Identify the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D, SC.H.3.3, SS.B.1.3, SS.B.2.3
  - 04.02 Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E, LA.A.2.3
  - 04.03 Identify ethical issues associated with the development and use of technology. STL.4.F, SC.H.3.3
  - 04.04 Identify the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G, SC.H.3.3
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:
- 05.01 Describe the management of waste produced by technological systems as an important societal issue. STL.5.D, SC.D.2.3, SC.G.1.3, SC.G.2.3, SS.B.2.3
  - 05.02 Identify how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E, SC.D.1.3, SC.G.1.3
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:
- 06.01 Identify the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D, LA.B.2.3, SC.H.3.3, SS.B.2.3, SS.D.2.3
  - 06.02 Identify changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E, SC.H.3.3, SS.B.2.3
- 07.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF HISTORY ON TECHNOLOGY.--The student will be able to:
- 07.01 Identify inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 07.02 Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D

- 08.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--The student will be able to:
- 08.01 Use design as a creative planning process that leads to useful products and systems. STL.8.E
  - 08.02 Explain why there is no perfect design. STL.8.F, LA.D.2.3
  - 08.03 Identify criteria and constraints that are requirements for a design. STL.8.G, LA.A.2.3, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.2.3, MA.E.3.3, SC.H.3.3
- 09.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:
- 09.01 Document the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 09.02 Define brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G, LA.A.2.3
  - 09.03 Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H
- 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:
- 10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F
  - 10.02 Define invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G
  - 10.03 Identify technological problems that are best solved through experimentation. STL.10.H
- 11.0 DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:
- 11.01 Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H, LA.A.2.3
  - 11.02 Specify criteria and constraints for the design. STL.11.I, LA.A.2.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.D.1.3, SC.H.3.3
  - 11.03 Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J, LA.C.2.3, MA.C.1.3, MA.C.2.3, MA.C.3.3
  - 11.04 Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.1.3
  - 11.05 Make a product or system and document the solution. STL.11.L, LA.B.1.3, LA.B.2.3, MA.D.1.3, MA.D.2.3
- 12.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:
- 12.01 Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H, LA.A.1.3, LA.A.2.3

- 12.02 Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I
  - 12.03 Use computers and calculators in various applications. STL.12.J, MA.B.4.3
  - 12.04 Operate and maintain systems in order to achieve a given purpose. STL.12.K
- 13.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:
- 13.01 Design and use instruments to gather data. STL.13.F, LA.A.2.3, LA.B.2.3, MA.B.4.3, MA.E.1.3
  - 13.02 Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G, LA.A.1.3, LA.A.2.3, MA.E.1.3, MA.E.2.3, MA.E.3.3
  - 13.03 Identify trends and monitor potential consequences of technological development. STL.13.H, MA.E.3.3
  - 13.04 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I, LA.A.1.3, LA.A.2.3, SS.A.1.3
- 14.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MEDICAL TECHNOLOGIES.--The student will be able to:
- 14.01 Identify how sanitation processes used in the disposal of medical products help to protect people from harmful organisms and disease, and shape the ethics of medical safety. STL.14.H
  - 14.02 Explain how the vaccines developed for use in immunization require specialized technologies to support environments in which a sufficient amount of vaccines are produced. STL.14.I
- 15.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE AGRICULTURAL AND RELATED BIOTECHNOLOGIES.--The student will be able to:
- 15.01 Identify technological advances in agriculture directly affecting the time and number of people required to produce food for a large population. STL.15.F, SS.B.2.3
  - 15.02 Identify how a wide range of specialized equipment and practices is used to improve the production of food, fiber, fuel, and other useful products and in the care of animals. STL.15.G
  - 15.03 Explain how biotechnology applies the principles of biology to create commercial products or processes. STL.15.H
- 16.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:
- 16.01 Define energy as the capacity to do work. STL.16.E, SC.B.1.3
  - 16.02 Explain how energy can be used to do work, using many processes. STL.16.F, SC.B.1.3
  - 16.03 Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G, MA.B.1.3, SC.B.1.3
  - 16.04 Define power systems used to drive and provide propulsion to other technological products and systems. STL.16.H
  - 16.05 Explain how much of the energy used in our environment is not used efficiently. STL.16.I, SC.B.1.3, SC.B.2.3

- 17.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:
- 17.01 Identify information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H, LA.B.1.3, LA.B.2.3
  - 17.02 Define communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I
  - 17.03 Identify factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J, LA.C.1.3, LA.C.2.3, LA.C.3.3, LA.D.2.3
  - 17.04 Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K, LA.C.2.3, LA.D.2.3, MA.A.1.3, MA.D.2.3
- 18.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:
- 18.01 Describe how transporting people and goods involves a combination of individuals and vehicles. STL.18.F
  - 18.02 Identify subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and support that must function together for a system to work effectively. STL.18.G
- 19.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES.--The student will be able to:
- 19.01 Define manufacturing systems using mechanical processes that change the form of materials through processes of separating, forming, combining, and conditioning them. STL.19.F
  - 19.02 Classify manufactured goods as durable and non-durable. STL.19.G
  - 19.03 Document the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H
  - 19.04 Define manufacturing technologies that are used to modify or alter manufactured products. STL.19.I
  - 19.05 Explain that materials must first be located before they can be extracted from the earth through processes such as harvesting, drilling, and mining. STL.19.J
- 20.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES.--The student will be able to:
- 20.01 Research building laws and codes. STL.20.F, LA.A.2.3
  - 20.02 Identify factors such as style, convenience, cost, climate, and function in the selection of designs for structures. STL.20.F, MA.A.3.3, MA.A.4.3
  - 20.03 Explain that structures rest on a foundation. STL.20.G
  - 20.04 Classify structures as temporary or permanent. STL.20.H
  - 20.05 Identify subsystems of a building. STL.20.I

21.0 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

- 21.01 Follow laboratory safety rules and procedures.
- 21.02 Demonstrate good housekeeping at workstations within a total laboratory.
- 21.03 Conduct laboratory activities and equipment operations in a safe manner.
- 21.04 Exercise care and respect for all tools, equipment, and materials.
- 21.05 Identify color-coding safety standards.
- 21.06 Safely use hand tools and power equipment.
- 21.07 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 21.08 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

22.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:

- 22.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- 22.02 Work cooperatively with others.

23.0 DISCUSS INDIVIDUAL INTERESTS, APTITUDES, AND OPPORTUNITIES AS THEY RELATE TO A CAREER.--The student will be able to:

- 23.01 Describe individual strengths and weaknesses.
- 23.02 Discuss individual interests related to a career.
- 23.03 Identify careers within specific areas of technology.
- 23.04 Explore careers within specific areas of interest.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Course Number:** 8600020  
**Course Title:** Exploring Technology  
**Course Credit:** 0.5

**COURSE DESCRIPTION:** The purpose of this course is to give students an opportunity to explore the areas of technology and associated careers available in technical fields. Students will be given the opportunity to solve technological problems while gaining an understanding of the effects of technology on our everyday lives.

*Special Note: \*This course has been approved and has provisions for optionally integrating the learning outcomes of the Career Exploration and Decision-Making Course (#1700060). This option is only available if the district does not provide the Career Exploration and Decision-Making Course as a standalone course. Integration of the course meets the requirements of Section 1003.4156, Florida Statutes. Learning outcomes are listed at the end of this framework.*

**STUDENT PERFORMANCE STANDARDS:**

01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

- 01.01 Develop new products and systems to solve problems or to help do things that could not be done without the help of technology.  
STL.1.F, LA.C.3.3, MA.B.3.3, SS.D.2.3
- 01.02 Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G, LA.B.2.3, LA.D.2.3, SC.H.3.3
- 01.03 Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H, LA.D.2.3, MA.D.1.3
- 01.04 Demonstrate how corporations can often create demand for a product by bringing it onto the market and advertising it.  
STL.1.I, LA.C.2.3, LA.D.2.3, SS.D.2.3

02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

- 02.01 Describe technological systems including input, processes, output, and, at times, feedback. STL.2.M, MA.E.1.3
- 02.02 Apply systems thinking, involving considering how every part relates to others. STL.2.N, LA.A.2.3, LA.D.1.3, MA.D.1.3, MA.E.1.3, SC.H.1.3, SS.B.1.3, SS.B.2.3
- 02.03 Identify control systems having no feedback path and requiring human intervention, and control systems using feedback. STL.2.O
- 02.04 Explain how technological systems can be connected to one another. STL.2.P, MA.D.1.3
- 02.05 Repair malfunctions of any part of a system that may affect the function and quality of the system. STL.2.Q, SC.H.1.3, SC.H.2.3
- 02.06 Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R, MA.A.4.3, MA.B.1.3,

- MA.B.3.3, MA.B.4.3, MA.C.1.3, MA.D.1.3, MA.E.2.3, MA.E.3.3,  
SC.H.3.3, SS.D.1.3, SS.D.2.3
- 02.07 Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S, LA.A.2.3, MA.E.2.3, MA.E.3.3
- 02.08 Describe different technologies that involve different sets of processes. STL.2.T, LA.A.2.3
- 02.09 Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U
- 02.10 Utilize controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V, LA.B.2.3
- 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:
- 03.01 Modify the way technological systems interact with one another. STL.3.D, MA.D.1.3, SS.B.2.3
- 03.02 Apply a product, system, or environment developed for one setting in another setting. STL.3.E, MA.A.1.3, SS.B.1.3, SS.B.2.3
- 03.03 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F, LA.A.1.3, SC.H.3.3, SS.B.2.3
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:
- 04.01 Describe ethical issues associated with the development and use of technology. STL.4.F, SC.H.3.3
- 04.02 Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G, SC.H.3.3
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:
- 05.01 Describe the management of waste produced by technological systems as an important societal issue. STL.5.D, SC.D.2.3, SC.G.1.3, SC.G.2.3, SS.B.2.3
- 05.02 Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E, SC.D.1.3, SC.G.1.3
- 05.03 Make decisions about the development and use of technologies that put environmental and economic concerns in direct competition with one another. STL.5.F, LA.A.2.3, SC.H.3.3
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:
- 06.01 Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D, LA.B.2.3, SC.H.3.3, SS.B.2.3, SS.D.2.3

- 06.02 Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E, SC.H.3.3, SS.B.2.3
  - 06.03 Describe social and cultural priorities and values that are reflected in technological devices. STL.6.F
  - 06.04 Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G, SS.B.2.3
- 07.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF HISTORY ON TECHNOLOGY.--The student will be able to:
- 07.01 Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 07.02 Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D
  - 07.03 Describe the design and construction of structures for service or convenience evolving from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships. STL.7.E, MA.B.1.3, MA.B.3.3, MA.B.4.3
- 08.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--The student will be able to:
- 08.01 Use design as a creative planning process that leads to useful products and systems. STL.8.E
  - 08.02 Explain why there is no perfect design. STL.8.F, LA.D.2.3
  - 08.03 Evaluate criteria and constraints that are requirements for a design. STL.8.G, LA.A.2.3, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.2.3, MA.E.3.3, SC.H.3.3
- 09.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:
- 09.01 Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 09.02 Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G, LA.A.2.3
  - 09.03 Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H
- 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:
- 10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F
  - 10.02 Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G
  - 10.03 Identify technological problems that are best solved through experimentation. STL.10.H

- 11.0 DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:
- 11.01 Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H, LA.A.2.3
  - 11.02 Specify criteria and constraints for the design. STL.11.I, LA.A.2.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.D.1.3, SC.H.3.3
  - 11.03 Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J, LA.C.2.3, MA.C.1.3, MA.C.2.3, MA.C.3.3
  - 11.04 Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.1.3
  - 11.05 Make a product or system and document the solution. STL.11.L, LA.B.1.3, LA.B.2.3, MA.D.1.3, MA.D.2.3
- 12.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:
- 12.01 Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H, LA.A.1.3, LA.A.2.3
  - 12.02 Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I
  - 12.03 Use computers and calculators in various applications. STL.12.J, MA.B.4.3
  - 12.04 Operate and maintain systems in order to achieve a given purpose. STL.12.K
- 13.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:
- 13.01 Design and use instruments to gather data. STL.13.F, LA.A.2.3, LA.B.2.3, MA.B.4.3, MA.E.1.3
  - 13.02 Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G, LA.A.1.3, LA.A.2.3, MA.E.1.3, MA.E.2.3, MA.E.3.3
  - 13.03 Identify trends and monitor potential consequences of technological development. STL.13.H, MA.E.3.3
  - 13.04 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I, LA.A.1.3, LA.A.2.3, SS.A.1.3
- 14.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MEDICAL TECHNOLOGIES.--The student will be able to:
- 14.01 Describe how advances and innovations in medical technologies are used to improve healthcare. STL.14.G
  - 14.02 Describe how sanitation processes used in the disposal of medical products help to protect people from harmful organisms and disease, and shape the ethics of medical safety. STL.14.H
  - 14.03 Explain how the vaccines developed for use in immunization require specialized technologies to support environments in which a sufficient amount of vaccines are produced. STL.14.I
  - 14.04 Describe genetic engineering involving modifying the structure of DNA to produce novel genetic make-ups. STL.14.J, SC.F.2.3

- 15.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE AGRICULTURAL AND RELATED BIOTECHNOLOGIES.--The student will be able to:
- 15.01 Describe technological advances in agriculture directly affecting the time and number of people required to produce food for a large population. STL.15.F, SS.B.2.3
  - 15.02 Describe how a wide range of specialized equipment and practices is used to improve the production of food, fiber, fuel, and other useful products and in the care of animals. STL.15.G
  - 15.03 Explain how biotechnology applies the principles of biology to create commercial products or processes. STL.15.H
  - 15.04 Create artificial ecosystems that are human-made complexes that replicate some aspects of natural environments. STL.15.I
  - 15.05 Explain how the development of refrigeration, freezing, dehydration, preservation, and irradiation provide long-term storage of food and reduce the health risks caused by tainted food. STL.15.J
- 16.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:
- 16.01 Define energy as the capacity to do work. STL.16.E, SC.B.1.3
  - 16.02 Explain how energy can be used to do work, using many processes. STL.16.F, SC.B.1.3
  - 16.03 Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G, MA.B.1.3, SC.B.1.3
  - 16.04 Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H
  - 16.05 Explain how much of the energy used in our environment is not used efficiently. STL.16.I, SC.B.1.3, SC.B.2.3
- 17.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:
- 17.01 Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H, LA.B.1.3, LA.B.2.3
  - 17.02 Describe communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I
  - 17.03 Consider factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J, LA.C.1.3, LA.C.2.3, LA.C.3.3, LA.D.2.3
  - 17.04 Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K, LA.C.2.3, LA.D.2.3, MA.A.1.3, MA.D.2.3
- 18.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:
- 18.01 Describe how transporting people and goods involves a combination of individuals and vehicles. STL.18.F
  - 18.02 Describe subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and

- support that must function together for a system to work effectively. STL.18.G
- 18.03 Identify governmental regulations that influence the design and operation of transportation systems. STL.18.H, SS.C.1.3
- 18.04 Identify processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions that are necessary for the entire transportation system to operate efficiently. STL.18.I
- 19.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES.--The student will be able to:
- 19.01 Describe manufacturing systems using mechanical processes that change the form of materials through processes of separating, forming, combining, and conditioning them. STL.19.F
- 19.02 Classify manufactured goods as durable and non-durable. STL.19.G
- 19.03 Employ the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H
- 19.04 Describe manufacturing technologies that are used to modify or alter manufactured products. STL.19.I
- 19.05 Explain that materials must first be located before they can be extracted from the earth through processes such as harvesting, drilling, and mining. STL.19.J
- 20.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES.--The student will be able to:
- 20.01 Research building laws and codes. STL.20.F, LA.A.2.3
- 20.02 Identify factors such as style, convenience, cost, climate, and function in the selection of designs for structures. STL.20.F, MA.A.3.3, MA.A.4.3
- 20.03 Explain that structures rest on a foundation. STL.20.G
- 20.04 Classify structures as temporary or permanent. STL.20.H
- 20.05 Describe subsystems of a building. STL.20.I
- 21.0 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:
- 21.01 Follow laboratory safety rules and procedures.
- 21.02 Demonstrate good housekeeping at workstations within a total laboratory.
- 21.03 Conduct laboratory activities and equipment operations in a safe manner.
- 21.04 Identify tools, machines, materials and equipment and describe their functions.
- 21.05 Select appropriate tools, machines, and equipment to accomplish a given task.
- 21.06 Demonstrate safe and correct use of tools, machines, and equipment.
- 21.07 Identify color-coding safety standards.
- 21.08 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 21.09 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

22.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

22.03 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).

22.04 Work cooperatively with others.

23.0 DISCUSS INDIVIDUAL INTERESTS, APTITUDES, AND OPPORTUNITIES AS THEY RELATE TO A CAREER--The student will be able to:

23.01 Identify individual strengths and weaknesses.

23.02 Discuss individual interests related to a career.

23.03 Identify careers within specific areas of technology.

23.04 Explore careers within specific areas of interest.

23.05 Form an understanding and appreciation for work after listening to or observing technology workers.

23.06 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.

23.07 Form an understanding and appreciation for the roles and work of co-workers.

### **Career Exploration and Decision-Making Course Integration (Optional)**

The purpose of this course is to enable students to explore careers/career clusters and make informed career choices. Activities enable students to increase self-awareness and develop the skills needed to successfully plan for postsecondary education and the workplace. Career assessment should include interests, aptitudes, and basic skills. Work-based learning strategies appropriate for this course include job shadowing, field trips, and mentors. Work-based activities allow students to evaluate their career choices as they relate to actual careers at the worksite.

**Special Note:** Integration of this course must include career exploration using CHOICES or a comparable cost-effective program and educational planning using the online student advising system known as Florida Academic Counseling and Tracking for Students at the Internet website FACTS.org; and shall result in the completion of a personalized academic and career plan (Section 1003.4156, Florida Statutes). Teachers are encouraged to creatively integrate the activities into their curriculum plans.

#### **A.0 Understanding the Workplace**

A.1 Describe how work relates to the needs and functions of the economy, society, and personal fulfillment.

A.2 Describe the influences that societal, economic, and technological changes have on employment trends and future training.

A.3 Describe the need for career planning, changing careers, and the concept of lifelong learning and how they relate to personal fulfillment.

A.4 Describe how legislation such as the Americans with Disabilities Act and Child Labor Laws regulates employee rights.

#### **B.0 Self-Awareness**

B.1 Use results of an interest assessment to describe their top interest areas and relate to careers/career clusters.

- B.2 Identify five values that they consider important in making a career choice.
  - B.3 Identify skills needed for career choices and match to personal abilities.
  - B.4 Demonstrate the ability to apply skills of self-advocacy and self-determination throughout the career planning process.
  - B.5 Identify strengths and areas in which assistance is needed at school.
  - B.6 Apply results of all assessments to personal abilities in order to make realistic career choices.
- C.0 **Exploring Careers**
- C.1 Demonstrate the ability to locate, understand, and use career information.
  - C.2 Use the Internet to access career and education planning information.
  - C.3 Identify skills that are transferable from one occupation to another.
  - C.4 Demonstrate use of career resources to identify occupational clusters, career opportunities within each cluster, employment outlook, and education/ training requirements.
  - C.5 Explain the relationship between educational achievement and career success.
- D.0 **Goal-Setting and Decision-Making**
- D.1 Identify and demonstrate use of steps to make career decisions.
  - D.2 Identify and demonstrate processes for making short and long term goals.
- E.0 **Workplace Skills**
- E.1 Demonstrate personal qualities (e.g. dependability, punctuality, responsibility, integrity, getting along with others) that are needed to be successful in the workplace.
  - E.2 Demonstrate skills to interact positively with others.
  - E.3 Demonstrate employability skills such as working on a team, problem-solving and organizational skills.
- F.0 **Career and Education Planning**
- F.1 Identify secondary and postsecondary school courses and major areas of interest that meet tentative career plans.
  - F.2 Identify advantages and disadvantages of entering various secondary and postsecondary programs for the attainment of career goals.
  - F.3 Demonstrate knowledge of varied types and sources of financial aid to obtain assistance for postsecondary education.
  - F.4 Identify inappropriate discriminatory behaviors that may limit opportunities in the workplace.
  - F.5 Develop a career and education plan that includes short and long-term goals, high school program of study, and postsecondary/work goals.
  - F.6 Describe how extracurricular programs can be incorporated in career and education planning.
  - F.7 Demonstrate knowledge of high school exit options (e.g., standard diploma, certificate of completion, special diploma, GED, etc.) and impact on post-school opportunities.
  - F.8 Describe high school credits and explain how GPAs are calculated.

G.0 **Job Search**

G.1 Demonstrate skills to complete a job application.

G.2 Demonstrate skills essential for a job interview.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Course Number:** 8600030  
**Course Title:** Exploration of Communications Technology  
**Course Credit:** 0.5

**COURSE DESCRIPTION:** The purpose of this course is to give students an opportunity to explore the area of communications technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of communications technology on our everyday lives.

**STUDENT PERFORMANCE STANDARDS:**

- 01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:
- 01.01 Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F, LA.C.3.3, MA.B.3.3, SS.D.2.3
  - 01.02 Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G, LA.B.2.3, LA.D.2.3, SC.H.3.3
  - 01.03 Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H, LA.D.2.3, MA.D.1.3
  - 01.04 (Explain, Demonstrate) how corporations can often create demand for a product by bringing it onto the market and advertising it. STL.1.I, LA.C.2.3, LA.D.2.3, SS.D.2.3
- 02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:
- 02.01 Identify technological systems including input, processes, output, and, at times, feedback. STL.2.M, MA.E.1.3
  - 02.02 Apply systems thinking, involving considering how every part relates to others. STL.2.N, LA.A.2.3, LA.D.1.3, MA.D.1.3, MA.E.1.3, SC.H.1.3, SS.B.1.3, SS.B.2.3
- 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:
- 03.01 Modify the way technological systems interact with one another. STL.3.D, MA.D.1.3, SS.B.2.3
  - 03.02 Apply a product, system, or environment developed for one setting in another setting. STL.3.E, MA.A.1.3, SS.B.1.3, SS.B.2.3
  - 03.03 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F, LA.A.1.3, SC.H.3.3, SS.B.2.3
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:

- 04.01 Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D, SC.H.3.3, SS.B.1.3, SS.B.2.3
  - 04.02 Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E, LA.A.2.3
  - 04.03 Describe ethical issues associated with the development and use of technology. STL.4.F, SC.H.3.3
  - 04.04 Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G, SC.H.3.3
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:
- 05.01 Describe the management of waste produced by technological systems as an important societal issue. STL.5.D, SC.D.2.3, SC.G.1.3, SC.G.2.3, SS.B.2.3
  - 05.02 Identify how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E, SC.D.1.3, SC.G.1.3
  - 05.03 Make decisions about the development and use of technologies that put environmental and economic concerns in direct competition with one another. STL.5.F, LA.A.2.3, SC.H.3.3
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:
- 06.01 Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D, LA.B.2.3, SC.H.3.3, SS.B.2.3, SS.D.2.3
  - 06.02 Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E, SC.H.3.3, SS.B.2.3
  - 06.03 Describe social and cultural priorities and values that are reflected in technological devices. STL.6.F
  - 06.04 Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G, SS.B.2.3
- 07.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF HISTORY ON TECHNOLOGY.--The student will be able to:
- 07.01 Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 07.02 Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D
  - 07.03 Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F, SC.H.3.3, SS.A.1.3
- 08.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--The student will be able to:

- 08.01 Use design as a creative planning process that leads to useful products and systems. STL.8.E
- 08.02 Explain why there is no perfect design. STL.8.F, LA.D.2.3
- 08.03 Evaluate criteria and constraints that are requirements for a design. STL.8.G, LA.A.2.3, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.2.3, MA.E.3.3, SC.H.3.3
  
- 09.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:
  - 09.01 Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 09.02 Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G, LA.A.2.3
  - 09.03 Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H
  
- 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:
  - 10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F
  - 10.02 Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G
  - 10.03 Identify technological problems that are best solved through experimentation. STL.10.H
  
- 11.0 DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:
  - 11.01 Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H, LA.A.2.3
  - 11.02 Specify criteria and constraints for the design. STL.11.I, LA.A.2.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.D.1.3, SC.H.3.3
  - 11.03 Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J, LA.C.2.3, MA.C.1.3, MA.C.2.3, MA.C.3.3
  - 11.04 Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.1.3
  - 11.05 Make a product or system and document the solution. STL.11.L, LA.B.1.3, LA.B.2.3, MA.D.1.3, MA.D.2.3
  
- 12.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:
  - 12.01 Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H, LA.A.1.3, LA.A.2.3
  - 12.02 Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I
  - 12.03 Use computers and calculators in various applications. STL.12.J, MA.B.4.3

- 12.04 Operate and maintain systems in order to achieve a given purpose.  
STL.12.K
- 13.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:
- 13.01 Design and use instruments to gather data. STL.13.F, LA.A.2.3, LA.B.2.3, MA.B.4.3, MA.E.1.3
  - 13.02 Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G, LA.A.1.3, LA.A.2.3, MA.E.1.3, MA.E.2.3, MA.E.3.3
  - 13.03 Identify trends and monitor potential consequences of technological development. STL.13.H, MA.E.3.3
  - 13.04 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I, LA.A.1.3, LA.A.2.3, SS.A.1.3
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- 17.01 Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H, LA.B.1.3, LA.B.2.3
  - 17.02 Describe communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I
  - 17.03 Consider factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J, LA.C.1.3, LA.C.2.3, LA.C.3.3, LA.D.2.3
  - 17.04 Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K, LA.C.2.3, LA.D.2.3, MA.A.1.3, MA.D.2.3
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- 19.01 Describe manufacturing systems using mechanical processes that change the form of materials through processes of separating, forming, combining, and conditioning them. STL.19.F
  - 19.02 Employ the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H
- 21.0 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:
- 21.01 Follow laboratory safety rules and procedures.
  - 21.02 Demonstrate good housekeeping at workstations within a total laboratory.
  - 21.03 Conduct laboratory activities and equipment operations in a safe manner.
  - 21.04 Identify tools, machines, materials and equipment and describe their functions.
  - 21.05 Select appropriate tools, machines, and equipment to accomplish a given task.

- 21.06 Demonstrate safe and correct use of tools, machines, and equipment.
- 21.07 Identify color-coding safety standards.
- 21.08 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 21.09 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
- 22.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:
  - 22.05 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
  - 22.06 Work cooperatively with others.
- 23.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER.--The student will be able to:
  - 23.01 Identify individual strengths and weaknesses.
  - 23.02 Discuss individual interests related to a career.
  - 23.03 List occupations, job requirements, and job opportunities in communication technology.
  - 23.04 List academic and career programs at the secondary levels in communication technology. LA.A.2.3.7; VA.E.1.3.2
- 24.0 DEMONSTRATE AN APPLICATION OF BASIC ELECTRONIC PUBLISHING TECHNIQUES.--The student will be able to:
  - 24.01 Utilize electronic publishing to combine input, editing, and output into a finished product. LA.B.2.3.4; LA.E.2.3.2; MA.B.4.3.1; VA.A.1.3.4
  - 24.02 Utilize the components of layouts including type, typography and illustration to electronically manipulate the elements of a published product. MA.C.3.3.1
  - 24.03 Develop a web page using appropriate electronic software. LA.D.2.3.7; LA.E.2.3.2; VA.A.1.3.4
  - 24.04 Create a document on an electronic publishing system by inputting existing digitized graphics or by digitizing original art or photographs on a digitizing scanner. LA.A.2.3.5; LA.B.1.3.2; LA.B.1.3.3; VA.B.1.3.3; VA.B.1.3.4; VA.D.1.3.3; MA.B.4.3.1
- 25.0 IDENTIFY, DESCRIBE AND UTILIZE THE MAJOR TYPES OF PRINTING TECHNIQUES USED IN PRINT PRODUCTION.--The student will be able to:
  - 25.01 Identify and explain standard printing processes including but not limited to: relief, gravure, screen process, and lithographic printing. LA.A.2.3.7; MA.E.1.3.1
  - 25.02 Utilize common design principles to create camera ready art. LA.A.2.3.5
  - 25.03 Produce a printed product using a current printing method. SC.C.2.3.4
  - 25.04 Utilize appropriate finishing techniques on a printed project. LA.A.2.3.5; VA.A.1.3.4; VA.B.1.3.3; VA.B.1.3.4; VA.D.1.3.3
- 26.0 IDENTIFY AND DEMONSTRATE THE ROLE OF ELECTRONIC COMMUNICATION.--The student will be able to:

- 26.01 Explain how to create code, transmit, and receive messages using electronic devices. MA.E.1.3.1; SC.B.1.3.6
- 26.02 List and explain the common communication categories. TH.E.1.3.1
- 26.03 Define and explain the use of telecommunications in everyday life. MA.E.3.3.2; MU.E.2.3.1
- 26.04 Utilize a telecommunications device to transmit and receive an electronic message. MA.B.4.3.2; SC.A.2.3.1; SC.C.1.3.2; MU.E.1.3.2
- 26.05 Produce an audio and/or visual product using electronic communication technology. LA.A.2.3.5; FL.A.2.3.1; FL.A.2.3.2; FL.A.2.3.3; FL.A.2.3.4; VA.A.1.3.4; VA.B.1.3.1; VA.B.1.3.4; VA.D.1.3.3; MU.1.3.3; TH.A.1.3.1; TH.A.2.33.1; TH.A.3.3.1; TH.A.3.3.2; TH.B.1.3.1; TH.D.1.3.3; TH.E.1.3.2; TH.E.1.3.4

27.0 IDENTIFY AND DEMONSTRATE THE ROLE OF OPTICAL TECHNOLOGY.--The student will be able to:

- 27.01 Identify the purposes and property of light as used in communication technology. SC.B.1.3.3
- 27.02 Explain how light signals are transmitted and received via different optical devices to include but not limited to: fiber optics, satellite communication, bandwidth, laser, and photography. SC.A.1.3.1; SC.B.1.3.1; SC.H.2.3.1; MA.B.4.3.2; MA.D.2.3.1; MA.D.2.3.2
- 27.03 Generate a product using optical technology. LA.A.2.3.5; VA.A.1.3.4; MA.E.1.3.1

**\*\*\* Minimum Equipment and Tool needs for an Exploration of Communications  
Technology Course \*\*\***

1. Affiliation to the Technology Student Association with Competitive Events Book
2. 15 computer stations (to create a 2 students/computer ratio) complete with built in zip drive; built in CD-ROM drive; appropriate furniture; lockdowns, and chairs
3. Class set plus 5 (33): textbooks; dictionaries; safety goggles; rubber aprons; rubber gloves; rulers; T squares; drafting tables; appropriate height stools; french curves; compasses; protractors; per each student each year: erasers, appropriate drawing pencils, tape, drafting brushes
4. Software (all to include site licenses): CAD; web page; publishing; design; word processing; office management; PhotoShop or equal; illustrator or equal; 3D animation
5. Two 11X17 color inkjet printers
6. Internet access to the entire lab
7. Safety video
8. Disinfecting cabinet (for safety goggles)
9. One teacher computer station with an ergonomic chair (height adjustable, cushioned, on wheels)
10. One teacher desk
11. One white board with a beginning set of multicolored board markers
12. One overhead projector
13. One RF Modulator (to turn TV into a computer screen)
14. One current Occupational Outlook Handbook
15. One scanner
16. Three digital cameras
17. Two video cameras
18. Video editing equipment package
19. Audio broadcast package
20. Risographic type printing equipment package
21. Vinyl sign maker with materials package
22. Thermal screen maker with materials package
23. Four color unit for screen printing
24. Screen printing dryer
25. Heat press for transfers
26. Fifteen 6-foot folding work tables or better
27. 30 chairs
28. One set of basic mechanics/carpenters hand tools with storage
29. 3-4 AV Carts
30. Class set of calculators
31. Binding Machine; binding coils and padding compound
32. Heavy-duty hole press for 100 pages.
33. Electric stapler
34. 6 electric pencil sharpeners
35. Paper cutter 110 x 170
36. Desktop copy machine
37. 3 Light Tables
38. Laser & Fiber Optic equipment

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Course Number:** 8600040  
**Course Title:** Exploration of Production Technology  
**Course Credit:** 0.5

**COURSE DESCRIPTION:** The purpose of this course is to give students an opportunity to explore the area of production technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of production technology on our everyday lives.

**STUDENT PERFORMANCE STANDARDS:**

01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:

- 01.01 Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F, LA.C.3.3, MA.B.3.3, SS.D.2.3
- 01.02 Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G, LA.B.2.3, LA.D.2.3, SC.H.3.3
- 01.03 Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H, LA.D.2.3, MA.D.1.3
- 01.04 Demonstrate how corporations can often create demand for a product by bringing it onto the market and advertising it. STL.1.I, LA.C.2.3, LA.D.2.3, SS.D.2.3

02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:

- 02.01 Describe technological systems including input, processes, output, and, at times, feedback. STL.2.M, MA.E.1.3
- 02.02 Apply systems thinking, involving considering how every part relates to others. STL.2.N, LA.A.2.3, LA.D.1.3, MA.D.1.3, MA.E.1.3, SC.H.1.3, SS.B.1.3, SS.B.2.3
- 02.03 Identify control systems having no feedback path and requiring human intervention, and control system using feedback. STL.2.O
- 02.04 Explain how technological systems can be connected to one another. STL.2.P, MA.D.1.3
- 02.05 Repair malfunctions of any part of a system that may affect the function and quality of the system. STL.2.Q, SC.H.1.3, SC.H.2.3
- 02.06 Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.C.1.3, MA.D.1.3, MA.E.2.3, MA.E.3.3, SC.H.3.3, SS.D.1.3, SS.D.2.3
- 02.07 Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S, LA.A.2.3, MA.E.2.3, MA.E.3.3
- 02.08 Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U

- 02.09 Utilize controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V, LA.B.2.3
- 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:
- 03.01 Modify the way technological systems interact with one another. STL.3.D, MA.D.1.3, SS.B.2.3
- 03.02 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F, LA.A.1.3, SC.H.3.3, SS.B.2.3
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:
- 04.01 Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D, SC.H.3.3, SS.B.1.3, SS.B.2.3
- 04.02 Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E, LA.A.2.3
- 04.03 Describe ethical issues associated with the development and use of technology. STL.4.F, SC.H.3.3
- 04.04 Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G, SC.H.3.3
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:
- 05.01 Describe the management of waste produced by technological systems as an important societal issue. STL.5.D, SC.D.2.3, SC.G.1.3, SC.G.2.3, SS.B.2.3
- 05.02 Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E, SC.D.1.3, SC.G.1.3
- 05.03 Make decisions about the development and use of technologies that put environmental and economic concerns in direct competition with one another. STL.5.F, LA.A.2.3, SC.H.3.3
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:
- 06.01 Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D, LA.B.2.3, SC.H.3.3, SS.B.2.3, SS.D.2.3
- 06.02 Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E, SC.H.3.3, SS.B.2.3
- 06.03 Describe social and cultural priorities and values that are reflected in technological devices. STL.6.F

- 06.04 Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G, SS.B.2.3
- 07.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF HISTORY ON TECHNOLOGY.--The student will be able to:
- 07.01 Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C, LA.A.2.3, LA.B.2.3, SC.H.1.3
- 07.02 Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D
- 07.03 Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F, SC.H.3.3, SS.A.1.3
- 08.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--The student will be able to:
- 08.01 Use design as a creative planning process that leads to useful products and systems. STL.8.E
- 08.02 Explain why there is no perfect design. STL.8.F, LA.D.2.3
- 08.03 Evaluate criteria and constraints that are requirements for a design. STL.8.G, LA.A.2.3, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.2.3, MA.E.3.3, SC.H.3.3
- 09.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:
- 09.01 Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F, LA.A.2.3, LA.B.2.3, SC.H.1.3
- 09.02 Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G, LA.A.2.3
- 09.03 Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H
- 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:
- 10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F
- 10.02 Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G
- 10.03 Identify technological problems that are best solved through experimentation. STL.10.H
- 11.0 DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:
- 11.01 Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H, LA.A.2.3
- 11.02 Specify criteria and constraints for the design. STL.11.I, LA.A.2.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.D.1.3, SC.H.3.3

- 11.03 Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J, LA.C.2.3, MA.C.1.3, MA.C.2.3, MA.C.3.3
  - 11.04 Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.1.3
  - 11.05 Make a product or system and document the solution. STL.11.L, LA.B.1.3, LA.B.2.3, MA.D.1.3, MA.D.2.3
- 12.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:
- 12.01 Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H, LA.A.1.3, LA.A.2.3
  - 12.02 Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I
  - 12.03 Use computers and calculators in various applications. STL.12.J, MA.B.4.3
  - 12.04 Operate and maintain systems in order to achieve a given purpose. STL.12.K
- 13.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:
- 13.01 Design and use instruments to gather data. STL.13.F, LA.A.2.3, LA.B.2.3, MA.B.4.3, MA.E.1.3
  - 13.02 Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G, LA.A.1.3, LA.A.2.3, MA.E.1.3, MA.E.2.3, MA.E.3.3
  - 13.03 Identify trends and monitor potential consequences of technological development. STL.13.H, MA.E.3.3
  - 13.04 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I, LA.A.1.3, LA.A.2.3, SS.A.1.3
- 19.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES.--The student will be able to:
- 19.01 Classify manufactured goods as durable and non-durable. STL.19.G
  - 19.02 Employ the manufacturing process including the designing, development, making, and servicing of products and systems. STL.19.H
  - 19.03 Describe manufacturing technologies that are used to modify or alter manufactured products. STL.19.I
- 20.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES.--The student will be able to:
- 20.01 Research building laws and codes. STL.20.F, LA.A.2.3
  - 20.02 Identify factors such as style, convenience, cost, climate, and function in the selection of designs for structures. STL.20.F, MA.A.3.3, MA.A.4.3
  - 20.03 Identify subsystems of a building. STL.20.I

- 21.0 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:
- 21.01 Follow laboratory safety rules and procedures.
  - 21.02 Demonstrate good housekeeping at workstations within a total laboratory.
  - 21.03 Conduct laboratory activities and equipment operations in a safe manner.
  - 21.04 Identify tools, machines, materials and equipment and describe their functions.
  - 21.05 Select appropriate tools, machines, and equipment to accomplish a given task.
  - 21.06 Demonstrate safe and correct use of tools, machines, and equipment.
  - 21.07 Identify color-coding safety standards.
  - 21.08 Explain fire prevention and safety precautions and practices for extinguishing fires.
  - 21.09 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
- 22.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:
- 22.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
  - 22.02 Work cooperatively with others.
- 23.0 DISCUSS INDIVIDUAL INTERESTS, APTITUDES, AND OPPORTUNITIES AS THEY RELATE TO A CAREER.--The student will be able to:
- 23.01 Identify individual strengths and weaknesses.
  - 23.02 Discuss individual interests related to a career.
  - 23.03 List occupations, job requirements, and job opportunities in production technology.
  - 23.04 List occupational training programs and academic programs at the secondary/postsecondary levels in production technology.
- 28.0 IDENTIFY EVOLVING TECHNOLOGIES OF PRODUCTION SYSTEMS.--The student will be able to:
- 28.01 List evolving technologies of manufacturing and construction industries.
  - 28.02 Discuss the evolution of technologies related to manufacturing systems and construction processes.
  - 28.03 Brainstorm futuristic production systems.
- 29.0 PERFORM SPECIAL SKILLS UNIQUE TO MANUFACTURING TECHNOLOGY--The student will be able to:
- 29.01 Design a product for custom or mass production manufacturing.
  - 29.02 Plan a mass production system for manufacturing a product.
  - 29.03 Perform materials forming practices such as casting or molding, and compressing or stretching.
  - 29.04 Perform materials separating practices such as shearing, chip removing, and other separating processes.
  - 29.05 Perform materials conditioning practices such as heat treating, physical conditioning, or through chemical reactions.

- 29.06 Combine components through mixing, coating, bonding, and mechanical fastening.
- 29.07 Assemble a product or a subassembly of a product.
- 30.0 EXPRESS KNOWLEDGE OF FACTORS THAT IMPACT MANUFACTURING TECHNOLOGY AND PRACTICES--The student will be able to:
  - 30.01 Explain economic factors that impact on manufacturing technology.
  - 30.02 Research and identify consumer demands for a manufactured product.
  - 30.03 Identify sources of raw materials and/or standard stock materials needed for a manufactured product.
  - 30.04 Interview, hire, train, or promote an applicant or employee for a simulated mass production manufacturing activity.
  - 30.05 Define the terms "organized labor" and "collective bargaining."
  - 30.06 Prepare a plan for marketing and distributing a manufactured product.
- 31.0 PERFORM SPECIAL SKILLS UNIQUE TO CONSTRUCTION TECHNOLOGY--The student will be able to:
  - 31.01 Interpret construction plans and blueprints.
  - 31.02 Identify construction materials.
  - 31.03 Apply carpentry skills.
  - 31.04 Apply plumbing skills.
  - 31.05 Apply electrical wiring skills.
  - 31.06 Apply masonry skills.
  - 31.07 Describe or demonstrate basic construction skills.
- 32.0 EXPRESS KNOWLEDGE OF FACTORS THAT IMPACT CONSTRUCTION TECHNOLOGY AND PRACTICES--The student will be able to:
  - 32.01 Explain economic factors that impact on construction technology.
  - 32.02 Research and identify types and styles of construction desired by consumers.
  - 32.03 List sources of raw materials and standard stock materials available to construction technology.
  - 32.04 Express knowledge of construction technology labor organizations and hiring practices.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8600050  
**Course Title:** Exploration of Aerospace Technology  
**Course Credit:** 0.5

**COURSE DESCRIPTION:** The purpose of this course is to give students an opportunity to explore the area of aerospace technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of aerospace technology on our everyday lives.

**STUDENT PERFORMANCE STANDARDS:**

- 01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:
- 01.01 Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F, LA.C.3.3, MA.B.3.3, SS.D.2.3
  - 01.02 Explain how technology is closely linked with creativity, which has resulted in innovation. STL.1.H, LA.D.2.3, MA.D.1.3
- 02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:
- 02.01 Describe technological systems including input, processes, output, and, at times, feedback. STL.2.M, MA.E.1.3
  - 02.02 Explain how technological systems can be connected to one another. STL.2.P, MA.D.1.3
  - 02.03 Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.C.1.3, MA.D.1.3, MA.E.2.3, MA.E.3.3, SC.H.3.3, SS.D.1.3, SS.D.2.3
  - 02.04 Describe different technologies that involve different sets of processes. STL.2.T, LA.A.2.3
- 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:
- 03.01 Modify the way technological systems interact with one another. STL.3.D, MA.D.1.3, SS.B.2.3
  - 03.02 Apply a product, system, or environment developed for one setting in another setting. STL.3.E, MA.A.1.3, SS.B.1.3, SS.B.2.3
  - 03.03 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F, LA.A.1.3, SC.H.3.3, SS.B.2.3
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:
- 04.01 Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about

- technology's development and use. STL.4.D, SC.H.3.3, SS.B.1.3, SS.B.2.3
- 04.02 Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E, LA.A.2.3
- 04.03 Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G, SC.H.3.3
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:
- 05.01 Describe the management of waste produced by technological systems as an important societal issue. STL.5.D, SC.D.2.3, SC.G.1.3, SC.G.2.3, SS.B.2.3
- 05.02 Describe how technologies can be used to repair damage and to break down waste from the use of various products and systems. STL.5.E, SC.D.1.3, SC.G.1.3
- 05.03 Make decisions about the development and use of technologies that put environmental and economic concerns in direct competition with one another. STL.5.F, LA.A.2.3, SC.H.3.3
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:
- 06.01 Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D, LA.B.2.3, SC.H.3.3, SS.B.2.3, SS.D.2.3
- 06.02 Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E, SC.H.3.3, SS.B.2.3
- 06.03 Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G, SS.B.2.3
- 07.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF HISTORY ON TECHNOLOGY.--The student will be able to:
- 07.01 Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C, LA.A.2.3, LA.B.2.3, SC.H.1.3
- 07.02 Describe the design and construction of structures for service or convenience evolving from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships. STL.7.E, MA.B.1.3, MA.B.3.3, MA.B.4.3
- 07.03 Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F, SC.H.3.3, SS.A.1.3
- 08.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--The student will be able to:
- 08.01 Use design as a creative planning process that leads to useful products and systems. STL.8.E
- 08.02 Explain why there is no perfect design. STL.8.F, LA.D.2.3

- 08.03 Evaluate criteria and constraints that are requirements for a design. STL.8.G, LA.A.2.3, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.2.3, MA.E.3.3, SC.H.3.3
- 09.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:
- 09.01 Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F, LA.A.2.3, LA.B.2.3, SC.H.1.3
- 09.02 Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G, LA.A.2.3
- 09.03 Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H
- 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:
- 10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F
- 10.02 Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G
- 10.03 Identify technological problems that are best solved through experimentation. STL.10.H
- 11.0 DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:
- 11.01 Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H, LA.A.2.3
- 11.02 Specify criteria and constraints for the design. STL.11.I, LA.A.2.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.D.1.3, SC.H.3.3
- 11.03 Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J, LA.C.2.3, MA.C.1.3, MA.C.2.3, MA.C.3.3
- 11.04 Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.1.3
- 11.05 Make a product or system and document the solution. STL.11.L, LA.B.1.3, LA.B.2.3, MA.D.1.3, MA.D.2.3
- 12.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:
- 12.01 Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H, LA.A.1.3, LA.A.2.3
- 12.02 Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I
- 12.03 Use computers and calculators in various applications. STL.12.J, MA.B.4.3
- 12.04 Operate and maintain systems in order to achieve a given purpose. STL.12.K

- 13.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:
- 13.01 Design and use instruments to gather data. STL.13.F, LA.A.2.3, LA.B.2.3, MA.B.4.3, MA.E.1.3
  - 13.02 Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G, LA.A.1.3, LA.A.2.3, MA.E.1.3, MA.E.2.3, MA.E.3.3
  - 13.03 Identify trends and monitor potential consequences of technological development. STL.13.H, MA.E.3.3
  - 13.04 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I, LA.A.1.3, LA.A.2.3, SS.A.1.3
- 19.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:
- 16.01 Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G, MA.B.1.3, SC.B.1.3
  - 16.02 Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H
  - 16.03 Explain how much of the energy used in our environment is not used efficiently. STL.16.I, SC.B.1.3, SC.B.2.3
- 19.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:
- 17.01 Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H, LA.B.1.3, LA.B.2.3
  - 17.02 Describe communication systems made up of a source, encoder, transmitter, receiver, decoder, and destination. STL.17.I
  - 17.03 Consider factors that influence the design of a message, such as the intended audience, medium, purpose, and nature of the message. STL.17.J, LA.C.1.3, LA.C.2.3, LA.C.3.3, LA.D.2.3
  - 17.04 Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K, LA.C.2.3, LA.D.2.3, MA.A.1.3, MA.D.2.3
- 18.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:
- 18.01 Describe subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and support that must function together for a system to work effectively. STL.18.G
  - 18.02 Employ processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions that are necessary for the entire transportation system to operate efficiently. STL.18.I
- 21.0 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:

- 21.01 Follow laboratory safety rules and procedures.
  - 21.02 Demonstrate good housekeeping at workstations within a total laboratory.
  - 21.03 Conduct laboratory activities and equipment operations in a safe manner.
  - 21.04 Identify tools, machines, materials and equipment and describe their functions.
  - 21.05 Select appropriate tools, machines, and equipment to accomplish a given task.
  - 21.06 Demonstrate safe and correct use of tools, machines, and equipment.
  - 21.07 Identify color-coding safety standards.
  - 21.08 Explain fire prevention and safety precautions and practices for extinguishing fires.
  - 21.09 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
- 22.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:
- 22.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
  - 22.02 Work cooperatively with others.
- 23.0 DISCUSS INDIVIDUAL INTERESTS, APTITUDES, AND OPPORTUNITIES AS THEY RELATE TO A CAREER.--The student will be able to:
- 23.01 Identify individual strengths and weaknesses.
  - 23.02 Discuss individual interests related to a career.
  - 23.03 Identify careers within specific areas of technology.
  - 23.04 Explore careers within specific areas of interest.
  - 23.05 Form an understanding and appreciation for work after listening to or observing technology workers.
  - 23.06 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
  - 23.07 Form an understanding and appreciation for the roles and work of co-workers.
  - 23.08 List occupations, job requirements, and job opportunities in communications technology.
  - 23.09 List occupational training programs and academic programs at the secondary/postsecondary levels in communications technology.
- 33.0 DEMONSTRATE KNOWLEDGE OF THE BASIC PRINCIPLES OF AEROSTATICS AND AERODYNAMICS.--The student will be able to:
- 33.01 Define terminology associated with aerostatics and aerodynamics.
  - 33.02 Explain how buoyancy principles affect an object in a fluid.
  - 33.03 Explain how Bernoulli's Principle applies to an object in flight.
  - 33.04 Identify and describe basic forces acting on an object in flight.
  - 33.05 Build an aerostatic vehicle.
  - 33.06 Build an aerodynamic vehicle.
- 34.0 IDENTIFY AND DEMONSTRATE KNOWLEDGE OF BOTH LIQUID AND SOLID PROPELLANT ROCKET PROPULSION SYSTEMS.--The student will be able to:

- 34.01 Define technical terminology associated with propulsion systems.
- 34.02 Identify parts of a solid-propellant rocket engine.
- 34.03 Identify parts of a liquid-propellant rocket engine.
- 34.04 Discuss the principle of rocket propulsion.
- 34.05 Compare the propulsion systems of solid and liquid-propellant rockets.
- 34.06 Describe the steps in a multi-stage rocket launch.
- 34.07 Construct a solid-propellant model rocket.

35.0 DEFINE AND DESCRIBE THE STAGES AND FORMS OF INTERFERENCE IN BASIC SATELLITE COMMUNICATIONS SYSTEMS.--The student will be able to:

- 35.01 State definitions of the terms communication and interference.
- 35.02 List and define the stages of a basic communications system.
- 35.03 Describe forms of interference that can occur at various stages in a basic communication system.
- 35.04 Discuss the importance of feed back in a basic communications system.
- 35.05 Define parts of the process in a basic communications system.
- 35.06 Describe the parts of the process in a satellite communications system.
- 35.07 Describe the parts of the process in a helium-neon laser communications system.

**Florida Department of Education  
STUDENT PERFORMANCE STANDARDS**

**Course Number:** 8600250  
**Course Title:** Exploration of Power & Energy Technology  
**Course Credit:** 0.5 credits

**COURSE DESCRIPTION:** The purpose of this course is to give students an opportunity to explore the area of power and energy technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of power and energy technology on our everyday lives.

**STUDENT PERFORMANCE STANDARDS:**

- 01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:
- 01.01 Develop new products and systems to solve problems or to help do things that could not be done without the help of technology.  
STL.1.F, LA.C.3.3, MA.B.3.3, SS.D.2.3
  - 01.02 Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G, LA.B.2.3, LA.D.2.3, SC.H.3.3
- 02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:
- 02.01 Explain how technological systems can be connected to one another. STL.2.P, MA.D.1.3
  - 02.02 Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors.  
STL.2.S, LA.A.2.3, MA.E.2.3, MA.E.3.3
  - 02.03 Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U
  - 02.04 Utilize controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V, LA.B.2.3
- 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:
- 03.01 Modify the way technological systems interact with one another.  
STL.3.D, MA.D.1.3, SS.B.2.3
  - 03.02 Apply a product, system, or environment developed for one setting in another setting. STL.3.E, MA.A.1.3, SS.B.1.3, SS.B.2.3
  - 03.03 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F, LA.A.1.3, SC.H.3.3, SS.B.2.3

- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:
- 04.01 Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D, SC.H.3.3, SS.B.1.3, SS.B.2.3
  - 04.02 Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E, LA.A.2.3
  - 04.03 Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G, SC.H.3.3
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:
- 05.01 Describe the management of waste produced by technological systems as an important societal issue. STL.5.D, SC.D.2.3, SC.G.1.3, SC.G.2.3, SS.B.2.3
  - 05.02 Describe how technologies can be used to repair damage and to break down waste from the use of various products and systems. STL.5.E, SC.D.1.3, SC.G.1.3
  - 05.03 Make decisions about the development and use of technologies that put environmental and economic concerns in direct competition with one another. STL.5.F, LA.A.2.3, SC.H.3.3
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:
- 06.01 Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D, LA.B.2.3, SC.H.3.3, SS.B.2.3, SS.D.2.3
  - 06.02 Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E, SC.H.3.3, SS.B.2.3
  - 06.03 Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G, SS.B.2.3
- 07.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF HISTORY ON TECHNOLOGY.--The student will be able to:
- 07.01 Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 07.02 Explain how the specialization of function has been at the heart of many technological improvements. STL.7.D
  - 07.03 Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F, SC.H.3.3, SS.A.1.3
- 08.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--The student will be able to:

- 08.01 Use design as a creative planning process that leads to useful products and systems. STL.8.E
- 08.02 Explain why there is no perfect design. STL.8.F, LA.D.2.3
- 08.03 Evaluate criteria and constraints that are requirements for a design. STL.8.G, LA.A.2.3, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.2.3, MA.E.3.3, SC.H.3.3
- 09.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:
  - 09.01 Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 09.02 Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G, LA.A.2.3
  - 09.03 Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H
- 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:
  - 10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F
  - 10.02 Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G
  - 10.03 Identify technological problems that are best solved through experimentation. STL.10.H
- 11.0 DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:
  - 11.01 Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H, LA.A.2.3
  - 11.02 Specify criteria and constraints for the design. STL.11.I, LA.A.2.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.D.1.3, SC.H.3.3
  - 11.03 Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J, LA.C.2.3, MA.C.1.3, MA.C.2.3, MA.C.3.3
  - 11.04 Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.1.3
  - 11.05 Make a product or system and document the solution. STL.11.L, LA.B.1.3, LA.B.2.3, MA.D.1.3, MA.D.2.3
- 12.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:
  - 12.01 Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H, LA.A.1.3, LA.A.2.3
  - 12.02 Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I
  - 12.03 Use computers and calculators in various applications. STL.12.J, MA.B.4.3

- 12.04 Operate and maintain systems in order to achieve a given purpose.  
STL.12.K
- 13.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:
- 13.01 Design and use instruments to gather data. STL.13.F, LA.A.2.3, LA.B.2.3, MA.B.4.3, MA.E.1.3
  - 13.02 Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G, LA.A.1.3, LA.A.2.3, MA.E.1.3, MA.E.2.3, MA.E.3.3
  - 13.03 Identify trends and monitor potential consequences of technological development. STL.13.H, MA.E.3.3
  - 13.04 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I, LA.A.1.3, LA.A.2.3, SS.A.1.3
- 21.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:
- 16.01 Define energy as the capacity to do work. STL.16.E, SC.B.1.3
  - 16.02 Explain how energy can be used to do work, using many processes. STL.16.F, SC.B.1.3
  - 16.03 Define power as the rate at which energy is converted from one form to another or transferred from one place to another, or the rate at which work is done. STL.16.G, MA.B.1.3, SC.B.1.3
  - 16.04 Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H
  - 16.05 Explain how much of the energy used in our environment is not used efficiently. STL.16.I, SC.B.1.3, SC.B.2.3
- 21.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES.--The student will be able to:
- 17.01 Create information and communication systems that allow information to be transferred from human to human, human to machine, machine to machine, and machine to human. STL.17.H, LA.B.1.3, LA.B.2.3
  - 17.02 Use symbols, measurements, and drawings to promote clear communication by providing a common language to express ideas. STL.17.K, LA.C.2.3, LA.D.2.3, MA.A.1.3, MA.D.2.3
- 21.0 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:
- 21.01 Follow laboratory safety rules and procedures.
  - 21.02 Demonstrate good housekeeping at workstation within total laboratory.
  - 21.03 Conduct laboratory activities and equipment operations in a safe manner.
  - 21.04 Identify tools, machines, materials and equipment and describe their functions.
  - 21.05 Select appropriate tools, machines, and equipment to accomplish a given task.

- 21.06 Demonstrate safe and correct use of tools, machines, and equipment.
- 21.07 Identify color-coding safety standards.
- 21.08 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 21.09 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
- 22.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:
  - 22.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
  - 22.02 Work cooperatively with others.
- 23.0 DISCUSS INDIVIDUAL INTERESTS, APTITUDES, AND OPPORTUNITIES AS THEY RELATE TO A CAREER.--The student will be able to:
  - 23.01 Identify individual strengths and weaknesses.
  - 23.02 Discuss individual interests related to a career.
  - 23.03 Identify careers within specific areas of technology.
  - 23.04 Explore careers within specific areas of interest.
  - 23.05 Form an understanding and appreciation for work after listening to or observing technology workers.
  - 23.06 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
  - 23.07 Form an understanding and appreciation for the roles and work of co-workers.
  - 23.08 List occupations, job requirements, and employment opportunities in power energy technology.
  - 23.09 List occupational training programs and academic programs available at the secondary and postsecondary levels in power and energy technologies.
- 36.0 PERFORM SPECIAL SKILLS UNIQUE TO POWER AND ENERGY TECHNOLOGIES.--The student will be able to:
  - 36.01 Disassemble and reassemble or perform maintenance on a human-powered device.
  - 36.02 Disassemble and reassemble or perform maintenance on a pneumatic or hydraulic device.
  - 36.03 Disassemble and reassemble or perform maintenance on an internal combustion engine.
  - 36.04 Disassemble and reassemble or perform maintenance on an electrical motor, generator, or alternator.
  - 36.05 Construct a water-powered, wind-powered, steam-powered, thermal-powered, or solar-powered device.
- 37.0 EXPRESS A KNOWLEDGE OF THE INDUSTRIES THAT DEAL WITH POWER AND ENERGY TECHNOLOGY.--The student will be able to:
  - 37.01 Identify the technologies that supply or control energy sources.
  - 37.02 Identify technologies that produce power systems.
  - 37.03 Describe power and energy applications in everyday life.
  - 37.04 List energy systems produced or used by industries.

Florida Department of Education  
STUDENT PERFORMANCE STANDARDS

**Course Number:** 8600240  
**Course Title:** Exploration of Transportation Technology  
**Course Credit:** 0.5 credits

**COURSE DESCRIPTION:** The purpose of this course is to give students an opportunity to explore the area of transportation technology and its associated careers. Students will be given the opportunity to solve technological problems using a variety of tools, materials, processes and systems while gaining an understanding of the effects of transportation technology on our everyday lives.

**STUDENT PERFORMANCE STANDARDS:**

- 01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY.--The student will be able to:
- 01.01 Develop new products and systems to solve problems or to help do things that could not be done without the help of technology. STL.1.F, LA.C.3.3, MA.B.3.3, SS.D.2.3
  - 01.02 Describe the development of technology as a human activity that is the result of individual or collective needs and the ability to be creative. STL.1.G, LA.B.2.3, LA.D.2.3, SC.H.3.3
- 02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY.--The student will be able to:
- 02.01 Apply systems thinking, involving considering how every part relates to others. STL.2.N, LA.A.2.3, LA.D.1.3, MA.D.1.3, MA.E.1.3, SC.H.1.3, SS.B.1.3, SS.B.2.3
  - 02.02 Identify control systems having no feedback path and requiring human intervention, and control systems using feedback. STL.2.O
  - 02.03 Explain how technological systems can be connected to one another. STL.2.P, MA.D.1.3
  - 02.04 Compare and contrast requirements or parameters placed on the development of a product or system. STL.2.R, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.C.1.3, MA.D.1.3, MA.E.2.3, MA.E.3.3, SC.H.3.3, SS.D.1.3, SS.D.2.3
  - 02.05 Compare and contrast trade-offs as a decision process recognizing the need for careful compromises among competing factors. STL.2.S, LA.A.2.3, MA.E.2.3, MA.E.3.3
  - 02.06 Perform basic maintenance as the process of inspecting and servicing a product or system on a regular basis in order for it to continue functioning properly, to extend its life, or to upgrade its capability. STL.2.U
  - 02.07 Identify controls and mechanisms or particular steps that people perform using information about the system that causes systems to change. STL.2.V, LA.B.2.3
- 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:

- 03.01 Modify the way technological systems interact with one another. STL.3.D, MA.D.1.3, SS.B.2.3
- 03.02 Apply a product, system, or environment developed for one setting in another setting. STL.3.E, MA.A.1.3, SS.B.1.3, SS.B.2.3
- 03.03 Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and systems. STL.3.F, LA.A.1.3, SC.H.3.3, SS.B.2.3
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY.--The student will be able to:
  - 04.01 Describe the ways that use of technology affects humans, including their safety, comfort, choices, and attitudes about technology's development and use. STL.4.D, SC.H.3.3, SS.B.1.3, SS.B.2.3
  - 04.02 Explain that technology, by itself, is neither good nor bad, but decisions about the use of products and systems can result in desirable or undesirable consequences. STL.4.E, LA.A.2.3
  - 04.03 Describe the economic, political, and cultural issues that are influenced by the development and use of technology. STL.4.G, SC.H.3.3
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE EFFECTS OF TECHNOLOGY ON THE ENVIRONMENT.--The student will be able to:
  - 05.01 Describe the management of waste produced by technological systems as an important societal issue. STL.5.D, SC.D.2.3, SC.G.1.3, SC.G.2.3, SS.B.2.3
  - 05.02 Describe how technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems. STL.5.E, SC.D.1.3, SC.G.1.3
  - 05.03 Make decisions about the development and use of technologies that put environmental and economic concerns in direct competition with one another. STL.5.F, LA.A.2.3, SC.H.3.3
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ROLE OF SOCIETY IN THE DEVELOPMENT AND USE OF TECHNOLOGY.--The student will be able to:
  - 06.01 Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies. STL.6.D, LA.B.2.3, SC.H.3.3, SS.B.2.3, SS.D.2.3
  - 06.02 Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations. STL.6.E, SC.H.3.3, SS.B.2.3
  - 06.03 Explain how meeting societal expectations is the driving force behind the acceptance and use of products and systems. STL.6.G, SS.B.2.3
- 07.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF HISTORY ON TECHNOLOGY.--The student will be able to:
  - 07.01 Describe inventions and innovations that have evolved by using slow and methodical processes of tests and refinements. STL.7.C, LA.A.2.3, LA.B.2.3, SC.H.1.3
  - 07.02 Describe the design and construction of structures for service or convenience evolving from the development of techniques for

- measurement, controlling systems, and the understanding of spatial relationships. STL.7.E, MA.B.1.3, MA.B.3.3, MA.B.4.3
- 07.03 Explain that in the past, an invention or innovation was not usually developed with the knowledge of science. STL.7.F, SC.H.3.3, SS.A.1.3
- 08.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN.--The student will be able to:
- 08.01 Use design as a creative planning process that leads to useful products and systems. STL.8.E
- 08.02 Explain why there is no perfect design. STL.8.F, LA.D.2.3
- 08.03 Evaluate criteria and constraints that are requirements for a design. STL.8.G, LA.A.2.3, MA.A.4.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.2.3, MA.E.3.3, SC.H.3.3
- 09.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN.--The student will be able to:
- 09.01 Utilize the design process involving a set of steps, which can be performed in different sequences and repeated as needed. STL.9.F, LA.A.2.3, LA.B.2.3, SC.H.1.3
- 09.02 Employ brainstorming as a group problem-solving design process in which each person in the group presents his or her ideas in an open forum. STL.9.G, LA.A.2.3
- 09.03 Model, test, evaluate and modify designs to transform ideas into practical solutions. STL.9.H
- 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:
- 10.01 Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system. STL.10.F
- 10.02 Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it. STL.10.G
- 10.03 Identify technological problems that are best solved through experimentation. STL.10.H
- 11.0 DEMONSTRATE THE ABILITIES TO APPLY THE DESIGN PROCESS.--The student will be able to:
- 11.01 Apply a design process to solve problems in and beyond the laboratory-classroom. STL.11.H, LA.A.2.3
- 11.02 Specify criteria and constraints for the design. STL.11.I, LA.A.2.3, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.D.1.3, SC.H.3.3
- 11.03 Make two-dimensional and three-dimensional representations of the designed solution. STL.11.J, LA.C.2.3, MA.C.1.3, MA.C.2.3, MA.C.3.3
- 11.04 Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed. STL.11.K, MA.B.1.3, MA.B.3.3, MA.B.4.3, MA.E.1.3
- 11.05 Make a product or system and document the solution. STL.11.L, LA.B.1.3, LA.B.2.3, MA.D.1.3, MA.D.2.3

- 12.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS.--The student will be able to:
- 12.01 Use information provided in manuals, protocols, or by experienced people to see and understand how things work. STL.12.H, LA.A.1.3, LA.A.2.3
  - 12.02 Use tools, materials, and machines safely to diagnose, adjust, and repair systems. STL.12.I
  - 12.03 Use computers and calculators in various applications. STL.12.J, MA.B.4.3
  - 12.04 Operate and maintain systems in order to achieve a given purpose. STL.12.K
- 13.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS.--The student will be able to:
- 13.01 Design and use instruments to gather data. STL.13.F, LA.A.2.3, LA.B.2.3, MA.B.4.3, MA.E.1.3
  - 13.02 Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a technology. STL.13.G, LA.A.1.3, LA.A.2.3, MA.E.1.3, MA.E.2.3, MA.E.3.3
  - 13.03 Identify trends and monitor potential consequences of technological development. STL.13.H, MA.E.3.3
  - 13.04 Interpret and evaluate the accuracy of the information obtained and determine if it is useful. STL.13.I, LA.A.1.3, LA.A.2.3, SS.A.1.3
- 21.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE ENERGY AND POWER TECHNOLOGIES.--The student will be able to:
- 16.01 Describe power systems used to drive and provide propulsion to other technological products and systems. STL.16.H
  - 16.02 Explain how much of the energy used in our environment is not used efficiently. STL.16.I, SC.B.1.3, SC.B.2.3
- 18.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE TRANSPORTATION TECHNOLOGIES.--The student will be able to:
- 18.01 Describe how transporting people and goods involves a combination of individuals and vehicles. STL.18.F
  - 18.02 Describe subsystems of transportation vehicles, such as structural, propulsion, suspension, guidance, control, and support that must function together for a system to work effectively. STL.18.G
  - 18.03 Identify governmental regulations that influence the design and operation of transportation systems. STL.18.H, SS.C.1.3
  - 18.04 Employ processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing, communicating, and using conventions that are necessary for the entire transportation system to operate efficiently. STL.18.I
- 21.0 DEMONSTRATE PROPER AND SAFE PROCEDURES WHILE WORKING WITH TECHNOLOGICAL TOOLS, APPARATUS, EQUIPMENT, SYSTEMS, AND MATERIALS.--The student will be able to:
- 21.01 Follow laboratory safety rules and procedures.

- 21.02 Demonstrate good housekeeping at workstations within a total laboratory.
  - 21.03 Conduct laboratory activities and equipment operations in a safe manner.
  - 21.04 Identify tools, machines, materials and equipment and describe their functions.
  - 21.05 Select appropriate tools, machines, and equipment to accomplish a given task.
  - 21.06 Demonstrate safe and correct use of tools, machines, and equipment.
  - 21.07 Identify color-coding safety standards.
  - 21.08 Explain fire prevention and safety precautions and practices for extinguishing fires.
  - 21.09 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
- 22.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS.--The student will be able to:
- 22.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
  - 22.02 Work cooperatively with others.
- 23.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER.-  
-The student will be able to:
- 23.01 Identify individual strengths and weaknesses.
  - 23.02 Discuss individual interests related to a career.
  - 23.03 Identify careers within specific areas of technology.
  - 23.04 Explore careers within specific areas of interest.
  - 23.05 Form an understanding and appreciation for work after listening to or observing technology workers.
  - 23.06 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
  - 23.07 Form an understanding and appreciation for the roles and work of co-workers.
  - 23.08 List occupations, job requirements, and job opportunities in production technology.
  - 23.09 List occupational training programs and academic programs at the secondary/postsecondary levels in production technology.
- 38.0 PERFORM SPECIAL SKILLS UNIQUE TO TRANSPORTATION TECHNOLOGIES--The student will be able to:
- 38.01 Disassemble and reassemble or perform maintenance on a muscle-powered bicycle.
  - 38.02 Disassemble and reassemble or perform maintenance on a pneumatic or hydraulic device.
  - 38.03 Disassemble and reassemble or perform maintenance on an internal combustion engine.
  - 38.04 Disassemble and reassemble or perform maintenance on an electrical motor, generator, or alternator.
  - 38.05 Construct, maintain, or repair a land, water, or air/space vehicle.

39.0 EXPRESS A KNOWLEDGE OF THE INDUSTRIES THAT DEAL WITH TRANSPORTATION TECHNOLOGY--The student will be able to:

- 39.01 Describe power and energy applications in transportation technology.
- 39.02 Identify transportation products that have been developed by industries.
- 39.03 List and describe transportation systems produced or used by industries.