

but also across the curriculum. See the (AAiT) framework for more information.

Work-Based Experience (WBE) - course number 8601800 is the appropriate course to provide Technology Education students with the opportunity, as Student Learners, to gain real world practical, first-hand exposure in broad occupational clusters or industry sectors through a structured, compensated or uncompensated experience. Work-Based Experience is also designed to give the Student Learners an opportunity to apply and integrate the knowledge, skills, and abilities acquired during their School-Based Experience to actual work situations independent of school facilities. At least one credit of a Technology Education program consisting of three credits must be completed before enrolling in WBE. See the (WBE) framework for more information.

The Intermediate and Advanced courses in this program may articulate into post-secondary Tech-Prep 2 + 2 programs when taken in sequence. Tech-Prep 2 + 2 programs require articulation agreements between secondary and post-secondary educational agencies.

Course substitutions as defined in the Comprehensive Course Table for this program area may be used to qualify a student for Florida's Gold Seal Vocational Scholarship, providing all other eligibility requirements are met. The comprehensive course table requirements are available online at <<http://nwrdc.fsu.edu/fnbpcm02>>. Gold Seal Vocational Scholarship requirements are available online at <<http://www.myfloridaeducation.com/brfuture/gsvrequire.htm>>.

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 this program, 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 influence of technology on history.
- 06.0 Demonstrate an understanding of the attributes of design.
- 07.0 Demonstrate an understanding of engineering design.
- 08.0 Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
- 09.0 Demonstrate abilities to apply the design process.
- 10.0 Demonstrate the abilities to use and maintain technological products and systems.
- 11.0 Demonstrate the abilities to assess the impact of products and systems.
- 12.0 Demonstrate an understanding of and be able to select and use information and communication technologies.
- 13.0 Demonstrate an understanding of and be able to select and use manufacturing technologies.
- 14.0 Demonstrate an understanding of and be able to select and use construction technologies.

TECHNICAL CONTENT STANDARDS

- 15.0 Demonstrate technical knowledge and skills about the use and care of drafting instruments, equipment, and materials.
- 16.0 Demonstrate technical skills and applications common to all types of drafting.
- 17.0 Demonstrate technical knowledge and skills for making basic orthographic drawings.
- 18.0 Demonstrate technical knowledge and skills for making pictorial drawings.
- 19.0 Demonstrate technical knowledge and skills for making auxiliary view drawings.
- 20.0 Demonstrate technical knowledge and skills for making sectional view drawings.
- 21.0 Demonstrate technical knowledge and skills for making working drawings.
- 22.0 Demonstrate technical knowledge and skills for making a basic residential drawing.
- 23.0 Demonstrate technical knowledge and skills for making architectural drawings to industry standards.
- 24.0 Demonstrate technical knowledge and skills for making a reverse engineered drawing (as built) from a solid object.
- 25.0 Demonstrate technical knowledge and skills for making technical illustrations.
- 26.0 Demonstrate technical knowledge and skills for making engineering drawings.
- 27.0 Demonstrate and present a research and design project.
- 28.0 Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8600810
Course Title: Drafting/Illustrative Design Technology I
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technical skills of drafting technology.

- 01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:
- 01.01 Discuss the nature and development of technological knowledge and processes. STL.1.J, LA.B.2.4, LA.C.3.4, SC.H.3.4
 - 01.02 Conduct specific goal-directed research related to inventions and innovations. STL.1.L, LA.A.2.4, LA.B.2.4
- 02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY--The student will be able to:
- 02.01 Identify systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W
 - 02.02 Define technological systems as the building blocks of technology, embedded within larger technological, social, and environmental systems. STL.2.X, LA.D.2.4
 - 02.03 Identify resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z
 - 02.04 Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4
 - 02.05 Define a management system as the process of planning, organizing, and controlling work. STL.2.EE, LA.B.2.4
- 03.0 DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:
- 03.01 Identify technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4
 - 03.02 Identify technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4
 - 03.03 Identify technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.A.1.4, LA.B.1.4, SC.H.3.4
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:
- 04.01 Identify changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H
 - 04.02 Classify the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I, LA.B.2.4

- 04.03 List the cultural, social, economic, and political changes caused by the transfer of a technology from one society to another. STL 4.K, LA.B.2.4, LA.E.1.4, SC.H.3.4
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY-
-The student will be able to:
- 05.01 Research how the evolution of civilization has been directly affected by, and has in turn affected the development and use of tools and materials. STL.7.H, LA.A.1.4, LA.A.2.4, LA.B.2.4, SC.H.3.4, SS.A.2.4
- 05.02 Define the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.D.2.4, SS.A.2.4
- 05.03 Define the Industrial Revolution and the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4
- 05.04 Define the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.0
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--The student will be able to:
- 06.01 Recognize the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H
- 06.02 Restate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4
- 06.03 Check and critique a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4
- 06.04 List competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4
- 07.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The student will be able to:
- 07.01 Identify design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I
- 07.02 Describe the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.1.4, SC.H.1.4
- 07.03 Construct a prototype or working model used to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4
- 07.04 Identify factors taken into account in the process of engineering design. STL.9.L, MA.A.2.4, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.E.1.4, SC.H.3.4

08.0 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:

- 08.01 Define research and development as a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I
- 08.02 Identify research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4
- 08.03 Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4
- 08.04 Utilize a multidisciplinary approach to solving technological problems. STL.10.L, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

09.0 DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:

- 09.01 Identify the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4
- 09.02 Identify criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4
- 09.03 Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, MA.B.1.4, MA.B.4.4
- 09.04 Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, SC.H.1.4, SC.H.3.4
- 09.05 Develop and produce a product or system using a design process. STL.11.Q
- 09.06 Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

10.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

- 10.01 Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.2.4, LA.B.1.4, LA.C.3.4
- 10.02 Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M
- 10.03 Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N
- 10.04 Operate systems so that they function in the way they were designed. STL.12.O
- 10.05 Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

- 11.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--
-The student will be able to:
- 11.01 Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4
 - 11.02 Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4
 - 11.03 Use assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4
 - 11.04 Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4
- 12.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES--Students will be able to:
- 12.01 Discuss information and communications technologies including inputs, processes, and outputs associated with sending and receiving information. STL.17.L
 - 12.02 Classify information and communications systems that allow information to be transferred human to human, human to machine, machine to human, and machine to machine. STL.17.M
 - 12.03 Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4
 - 12.04 Identify many ways to communicate information, such as graphic and electronics means. STL.17.P, LA.C.3.4
 - 12.05 Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q, LA.C.3.4, MA.A.1.4, SC.H.3.4
- 13.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:
- 13.01 Service products to keep them in good operating condition. STL.19.L
 - 13.02 Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P, MA.B.4.4
- 15.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT THE USE AND CARE OF DRAFTING INSTRUMENTS, EQUIPMENT, AND MATERIALS--The student will be able to:
- 15.01 Identify and demonstrate technical knowledge and skills about the use and care of drafting instruments and equipment. MA.B.2.4, MA.B.4.4
 - 15.02 Demonstrate technical knowledge and skills about the properties, specifications, and use of drafting materials and supplies. MA.B.1.4, MA.B.4.4, MA.C.1.4
- 16.0 DEMONSTRATE TECHNICAL SKILLS AND APPLICATIONS COMMON TO ALL TYPES OF DRAFTING--The student will be able to:
- 16.01 Apply lettering techniques. LA.B.1.4, LA.B.2.4, MA.A.1.4
 - 16.02 Make freehand sketches. MA.A.4.4

- 16.03 Use drafting symbols and alphabet of lines in accordance with technical standards and practices. MA.B.4.4
 - 16.04 Apply measuring techniques. MA.B.1.4, MA.B.2.4, SC.E.2.4
 - 16.05 Apply industry standard dimensioning techniques. MA.B.1.4, MA.B.4.4
 - 16.06 Apply geometric construction techniques. MA.C.1.4, MA.C.3.4
 - 16.07 Interpret information from drawings, prints, and sketches. MA.E.1.4
 - 16.08 Apply coordinate systems. MA.C.3.4
 - 16.09 Produce and reproduce drawings using modern technical methods for drafting reproduction.
- 17.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING BASIC ORTHOGRAPHIC DRAWINGS--The student will be able to:
- 17.01 Explain the theory of orthographic projection. MA.C.2.4
 - 17.02 Identify the six principal views of an object. MA.C.2.4
 - 17.03 Produce a three-view orthographic drawing. MA.C.2.4
 - 17.04 Produce a CAD three-view orthographic drawing. MA.C.2.4
- 18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING PICTORIAL DRAWINGS--The student will be able to:
- 18.01 Explain methods of pictorial drawing.
 - 18.02 Produce an isometric drawing. MA.C.2.4
 - 18.03 Produce a CAD isometric drawing. MA.C.3.4
 - 18.04 Produce an oblique drawing. MA.C.3.4
 - 18.05 Produce a CAD oblique drawing. MA.C.2.4
 - 18.06 Produce a perspective drawing. MA.C.2.4, MA.C.3.4
 - 18.07 Produce a CAD perspective drawing. MA.C.2.4, MA.C.3.4
- 19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING AUXILIARY VIEW DRAWINGS--The student will be able to:
- 19.01 Explain terminology and concepts associated with auxiliary view drawings. MA.C.2.4, LA.A.1.4
 - 19.02 Produce an auxiliary view drawing. MA.C.2.4
 - 19.03 Produce a CAD auxiliary view drawing. MA.C.2.4
 - 19.04 Develop a pattern using surface development techniques. MA.C.2.4
- 20.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING SECTIONAL VIEW DRAWINGS--The student will be able to:
- 20.01 Define sectional view and types of sectional views. LA.A.1.4, MA.C.2.4
 - 20.02 Illustrate the types of breaks and symbols used in drawing sectional views.
 - 20.03 Produce a sectional view drawing. MA.B.4.4, MA.C.2.4
 - 20.04 Produce a CAD sectional view drawing. MA.B.4.4, MA.C.2.4
- 21.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING WORKING DRAWINGS--The student will be able to:
- 21.01 Produce detailed machine drawings. MA.B.1.4, MA.B.4.4
 - 21.02 Produce detailed assembly drawings. MA.B.1.4, MA.B.4.4
 - 21.03 Produce a technical illustration. MA.B.1.4, MA.B.4.4

22.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING A BASIC RESIDENTIAL DRAWING--The student will be able to:

- 22.01 Produce a dimensioned floor plan. MA.B.1.4, MA.B.2.4, MA.B.4.4
- 22.02 Produce dimensioned elevation drawings. MA.B.1.4, MA.B.2.4, MA.B.4.4

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8600820
Course Title: Drafting/Illustrative Design Technology II
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an intermediate understanding of the knowledge, human relations, and technical skills of drafting and design technology.

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

- 01.01 Illustrate the nature and development of technological knowledge and processes. STL.1.J, SC.H.3.4
- 01.02 Explain the rapid increase in the rate of technological development and diffusion. STL.1.K, LA.C.3.4
- 01.03 Conduct specific goal-directed research related to inventions and innovations. STL.1.L, LA.A.2.4, LA.B.2.4

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

- 02.01 Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W
- 02.02 Discuss technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems. STL.2.X, LA.D.2.4
- 02.03 Select resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z
- 02.04 Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4
- 02.05 Utilize optimization as an ongoing process or methodology of designing or making a product dependent on criteria and constraints. STL.2.BB
- 02.06 Identify new technologies that create new processes. STL.2.CC
- 02.07 Implement a quality control process to ensure that a product, service, or system meets established criteria. STL.2.DD
- 02.08 Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE, LA.B.2.4

03.0 DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:

- 03.01 Discuss technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4
- 03.02 Explain technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4

- 03.03 Discuss technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.C.3.4, SC.H.3.4
- 04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:
- 04.01 Discuss changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H
- 04.02 Compare the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I
- 04.03 Debate the cultural, social, economic, and political changes caused by the transfer of technology from one society to another. STL.4.K, LA.C.3.4, SC.H.3.4
- 05.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:
- 05.01 Discuss how technological development has been evolutionary, the result of a series of refinements to a basic invention. STL.7.G
- 05.02 Discuss how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, SC.H.3.4, SS.A.2.4
- 05.03 Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.A.1.4, LA.A.2.4, SS.A.2.4
- 05.04 Discuss that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. STL.7.J
- 05.05 Define the Iron Age by the use of iron and steel as the primary materials for tools. STL.7.K
- 05.06 Define the Middle Ages by the development of many technological devices that produced long-lasting effects on technology and society. STL.7.L
- 05.07 Define the Renaissance, a time of rebirth of the arts and humanities, as an important development in the history of technology. STL.7.M
- 05.08 Define the Industrial Revolution as the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4
- 05.09 Define the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O
- 06.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--The student will be able to:
- 06.01 Describe the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H
- 06.02 Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4
- 06.03 Check and critique a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

- 06.04 Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4
- 07.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The student will be able to:
- 07.01 Investigate design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I
- 07.02 Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.2.4, SC.H.1.4
- 07.03 Construct a prototype or working model to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4
- 07.04 Evaluate factors taken into account in the process of engineering design. STL.9.L, MA.A.2.4, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.E.1.4, SC.H.3.4
- 08.0 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:
- 08.01 Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I
- 08.02 Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4
- 08.03 Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4
- 08.04 Utilize a multidisciplinary approach to solving technological problems. STL.10.L, SC.H.1.4, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4
- 09.0 DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:
- 09.01 Identify a design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4
- 09.02 Identify criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4
- 09.03 Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, MA.B.1.4, MA.B.4.4
- 09.04 Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4
- 09.05 Develop and produce a product or system using a design process. STL.11.Q
- 09.06 Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic,

quantitative, virtual, and written means, in addition to three-dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

10.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

- 10.01 Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.2.4, LA.B.1.4, LA.C.3.4
- 10.02 Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M
- 10.03 Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N
- 10.04 Operate systems so that they function in the way they were designed. STL.12.O
- 10.05 Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

11.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

- 11.01 Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4
- 11.02 Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4
- 11.03 Use assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4
- 11.04 Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

12.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES--The student will be able to:

- 12.01 Discuss information and communications technologies including inputs, processes, and outputs associated with sending and receiving information. STL.17.L
- 12.02 Classify information and communications systems that allow information to be transferred human to human, human to machine, machine to human, and machine to machine. STL.17.M
- 12.03 Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4
- 12.04 Identify many ways to communicate information, such as graphic and electronics means. STL.17.P, LA.C.3.4
- 12.05 Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q, LA.C.3.4, MA.A.1.4, SC.H.3.4

13.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

- 13.01 Service products to keep them in good operating condition.
STL.19.L
- 13.02 Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P, MA.B.4.4
- 14.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE CONSTRUCTION TECHNOLOGIES--The student will be able to:
 - 14.01 Identify a variety of processes and procedures used in constructing structures. STL.20.K
 - 14.02 Identify requirements involved in the design of structures.
STL.20.L
 - 14.03 Recommend maintenance, alterations, or renovations to improve a structure or alter its intended use. STL.20.M
- 23.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ARCHITECTURAL DRAWINGS TO INDUSTRY STANDARDS--The student will be able to:
 - 23.01 Produce a dimensioned floor plan showing walls, windows, doors, cabinets, stairs, appliances, fixtures, and other details.
LA.A.2.4, MA.B.2.4, MA.B.4.4
 - 23.02 Produce a dimensioned foundation plan with details. MA.B.2.4, MA.B.4.4, SC.B.1.4
 - 23.03 Produce an architectural electrical plan. MA.B.2.4, MA.B.4.4, SC.B.1.4
 - 23.04 Produce an architectural plumbing plan. MA.B.2.4, MA.B.4.4
 - 23.05 Produce an architectural climate control plan (HVAC). MA.B.2.4, MA.B.4.4, SC.B.1.4
 - 23.06 Produce a dimensioned roof plan with details. MA.B.2.4, MA.B.4.4
 - 23.07 Produce a detailed information sheet including wall section and schedules. MA.C.2.4, SC.B.1.4
 - 23.08 Produce a dimensioned plot plan. MA.B.2.4, MA.B.4.4, SC.D.1.4, SC.D.2.4, SC.G.2.4
 - 23.09 Produce dimensioned elevation drawings showing grade lines, floors, ceilings, windows, doors, and other details. MA.B.2.4, MA.B.4.4, SC.B.1.4
- 24.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING A REVERSE ENGINEERED DRAWING (AS BUILT) FROM A SOLID OBJECT--The student will be able to:
 - 24.01 Identify and apply advanced measuring tools and techniques.
MA.B.4.4, SC.E.2.4
 - 24.02 Apply precision dimensioning standards. MA.B.2.4, SC.A.1.4
 - 24.03 Produce a detailed multi view orthographic drawing. MA.C.2.4, MA.C.3.4
 - 24.04 Produce an enhanced pictorial drawing. MA.B.1.4, MA.B.2.4, MA.C.2.4, MA.D.1.4
 - 24.05 Produce an auxiliary view drawing. MA.C.2.4
 - 24.06 Produce a section view drawing. MA.C.2.4, MA.B.4.4
- 25.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING TECHNICAL ILLUSTRATIONS--The student will be able to:
 - 25.01 Produce a colored or shaded pictorial rendering for presentation.
MA.B.1.4, MA.B.2.4, MA.C.2.4, MA.D.1.4, LA.C.3.4
 - 25.02 Produce a labeled graph or chart for display. MA.E.1.4, LA.C.3.4

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8600830
Course Title: Drafting/Illustrative Design Technology III
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an advanced understanding of the knowledge, human relations and technical skills of drafting and design technology.

- 01.0 DEMONSTRATE AN UNDERSTANDING OF THE CHARACTERISTICS AND SCOPE OF TECHNOLOGY--The student will be able to:
- 01.01 Illustrate the nature and development of technological knowledge and processes. STL.1.J, SC.H.3.4
 - 01.02 Graph the rapid increase in rate of technological development and diffusion. STL.1.K
 - 01.03 Conduct specific goal-directed research related to inventions and innovations. STL.1.L, LA.A.2.4, LA.B.2.4
- 02.0 DEMONSTRATE AN UNDERSTANDING OF THE CORE CONCEPTS OF TECHNOLOGY
--The student will be able to:
- 02.01 Apply systems thinking logic and creativity with appropriate compromises in complex real-life problems. STL.2.W
 - 02.02 Assess technological systems, which are the building blocks of technology and are embedded within larger technological, social, and environmental systems. STL.2.X
 - 02.03 Compare resources involving trade-offs between competing values, such as availability, cost, desirability, and waste. STL.2.Z
 - 02.04 Identify the criteria and constraints of a product or system and determine how they affect the final design and development. STL.2.AA, MA.A.5.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.3.4, SC.H.1.4
 - 02.05 Propose strategies for optimization as an ongoing process or methodology of designing or making a product dependent on criteria and constraints. STL.2.BB
 - 02.06 Discuss new technologies that create new processes. STL.2.CC
 - 02.07 Recommend a quality control process to ensure that a product, service, or system meets established criteria. STL.2.DD
 - 02.08 Organize a management system as the process of planning, organizing, and controlling work. STL.2.EE, LA.B.2.4
- 03.0 DEMONSTRATE AN UNDERSTANDING OF THE RELATIONSHIPS AMONG TECHNOLOGIES AND THE CONNECTIONS BETWEEN TECHNOLOGY AND OTHER FIELDS OF STUDY--The student will be able to:
- 03.01 Create technology transfer occurring when a new user applies an existing innovation developed for one purpose in a different function. STL.3.G, SC.H.3.4
 - 03.02 Examine technological innovation resulting when ideas, knowledge, or skills are shared within a technology, among technologies, or across other fields. STL.3.H, SC.H.3.4
 - 03.03 Investigate technological progresses that promote the advancement of science and mathematics. STL.3.J, LA.C.3.4, SC.H.3.4

04.0 DEMONSTRATE AN UNDERSTANDING OF THE CULTURAL, SOCIAL, ECONOMIC, AND POLITICAL EFFECTS OF TECHNOLOGY--The student will be able to:

- 04.01 Discuss changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious. STL.4.H
- 04.02 Evaluate the use of technology involving weighing the trade-offs between the positive and negative effects. STL.4.I
- 04.03 Debate the cultural, social, economic, and political changes caused by the transfer of technology from one society to another. STL.4.K, LA.C.3.4, SC.H.3.4

05.0 DEMONSTRATE AN UNDERSTANDING OF THE INFLUENCE OF TECHNOLOGY ON HISTORY--The student will be able to:

- 05.01 Research how technological development has been evolutionary, the result of a series of refinements to a basic invention. STL.7.G
- 05.02 Assess how the evolution of civilization has been directly affected by, and has in turn affected, the development and use of tools and materials. STL.7.H, SC.H.3.4, SS.A.2.4
- 05.03 Research the history of technology as a powerful force in reshaping the social, cultural, political, and economic landscape. STL.7.I, LA.A.1.4, LA.A.2.4, SS.A.2.4
- 05.04 Debate that early in the history of technology, the development of many tools and machines was based not on scientific knowledge but on technological know-how. STL.7.J
- 05.05 Discuss the Iron Age as the use of iron and steel as the primary materials for tools. STL.7.K
- 05.06 Discuss the Middle Ages as the development of many technological devices that produced long-lasting effects on technology and society. STL.7.L
- 05.07 Discuss the Renaissance, a time of rebirth of the arts and humanities, as an important development in the history of technology. STL.7.M
- 05.08 Discuss the Industrial Revolution as the development of continuous manufacturing, sophisticated transportation and communication systems, advanced construction practices, and improved education and leisure time. STL.7.N, SS.A.5.4
- 05.09 Discuss the Information Age and its placement of emphasis on the processing and exchange of information. STL.7.O

06.0 DEMONSTRATE AN UNDERSTANDING OF THE ATTRIBUTES OF DESIGN--The student will be able to:

- 06.01 Implement the design process; including defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results. STL.8.H
- 06.02 Translate design problems that are seldom presented in a clearly defined form. STL.8.I, LA.D.1.4, LA.D.2.4
- 06.03 Evaluate a design continually, and improve and revise the idea of the design as needed. STL.8.J, SC.H.1.4

- 06.04 Analyze competing requirements of a design, such as criteria, constraints, and efficiency. STL.8.K, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4
- 07.0 DEMONSTRATE AN UNDERSTANDING OF ENGINEERING DESIGN--The student will be able to:
- 07.01 Select design principles used to evaluate existing designs, to collect data, and to guide the design process. STL.9.I
- 07.02 Examine the influence of personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly on the engineering design process. STL.9.J, LA.D.2.4, SC.H.1.4
- 07.03 Construct a prototype or working model to test a design concept by making actual observations and necessary adjustments. STL.9.K, MA.B.1.4, SC.H.1.4, SC.H.3.4
- 07.04 Evaluate factors taken into account in the process of engineering design. STL.9.L, MA.A.2.4, MA.A.4.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.E.1.4, SC.H.3.4
- 08.0 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:
- 08.01 Employ research and development as a specific problem solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace. STL.10.I
- 08.02 Conduct research needed to solve technological problems. STL.10.J, LA.A.1.4, LA.A.2.4
- 08.03 Differentiate between technological and non-technological problems, and identify which problems can be solved using technology. STL.10.K, SC.H.1.4
- 08.04 Utilize a multidisciplinary approach to solving technological problems. STL.10.L, SC.H.1.4, MA.A.1.4, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.E.1.4, MA.E.3.4, SC.H.1.4, SC.H.3.4
- 09.0 DEMONSTRATE ABILITIES TO APPLY THE DESIGN PROCESS--The student will be able to:
- 09.01 Interpret the design problem to solve and decide whether or not to address it. STL.11.M, SC.H.1.4
- 09.02 Evaluate criteria and constraints and determine how these will affect the design process. STL.11.N, MA.A.3.4, MA.B.1.4, MA.B.3.4, MA.B.4.4, MA.D.1.4, MA.D.2.4, MA.E.1.4, SC.H.1.4, SC.H.3.4
- 09.03 Refine a design by using prototypes and modeling to ensure quality, efficiency, and productivity of the final product. STL.11.O, MA.B.1.4, MA.B.4.4
- 09.04 Evaluate the design solution using conceptual, physical, and mathematical models at various intervals of the design process in order to check for proper design and to note areas where improvements are needed. STL.11.P, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4
- 09.05 Produce a product or system using a design process. STL.11.Q
- 09.06 Evaluate final solutions and communicate observation, processes, and results of the entire design process, using verbal, graphic, quantitative, virtual, and written means, in addition to three-

dimensional models. STL.11.R, LA.B.2.4, LA.C.3.4, MA.B.4.4, MA.D.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4, SC.H.1.4, SC.H.3.4

10.0 DEMONSTRATE THE ABILITIES TO USE AND MAINTAIN TECHNOLOGICAL PRODUCTS AND SYSTEMS--The student will be able to:

- 10.01 Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques. STL.12.L, LA.B.2.4, LA.B.1.4, LA.C.3.4
- 10.02 Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it. STL.12.M
- 10.03 Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision. STL.12.N
- 10.04 Operate systems so that they function in the way they were designed. STL.12.O
- 10.05 Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate. STL.12.P, LA.A.2.4, MA.E.1.4

11.0 DEMONSTRATE THE ABILITIES TO ASSESS THE IMPACT OF PRODUCTS AND SYSTEMS--The student will be able to:

- 11.01 Collect information and evaluate its quality. STL.13.J, LA.A.2.4, SC.H.1.4
- 11.02 Synthesize data, analyze trends, and draw conclusions regarding the effect of technology on the individual, society, and environment. STL.13.K, LA.A.2.4, SC.G.1.4, SC.G.2.4, SC.H.1.4
- 11.03 Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology. STL.13.L, LA.A.2.4, MA.E.1.4, MA.E.2.4, MA.E.3.4
- 11.04 Design forecasting techniques to evaluate the results of altering natural systems. STL.13.M, MA.E.3.4, SC.G.2.4

12.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE INFORMATION AND COMMUNICATION TECHNOLOGIES--The student will be able to:

- 12.01 Discuss information and communications technologies including inputs, processes, and outputs associated with sending and receiving information. STL.17.L
- 12.02 Classify information and communications systems that allow information to be transferred human to human, human to machine, machine to human, and machine to machine. STL.17.M
- 12.03 Use information and communication systems to inform, persuade, entertain, control, manage, and educate. STL.17.N, LA.B.1.4, LA.B.2.4, LA.C.1.4, LA.C.2.4, LA.C.3.4
- 12.04 Identify many ways to communicate information, such as graphic and electronics means. STL.17.P, LA.C.3.4
- 12.05 Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images, and languages that incorporate a variety of visual, auditory, and tactile stimuli. STL.17.Q, LA.C.3.4, MA.A.1.4, SC.H.3.4

13.0 DEMONSTRATE AN UNDERSTANDING OF AND BE ABLE TO SELECT AND USE MANUFACTURING TECHNOLOGIES--The student will be able to:

- 13.01 Service products to keep them in good operating condition.
STL.19.L
 - 13.02 Discuss the interchangeability of parts to increase the effectiveness of manufacturing processes. STL.19.P, MA.B.4.4
- 26.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ENGINEERING DRAWINGS--The student will be able to:
- 26.01 Produce an advanced detailed machine drawing with tolerances, hidden surfaces and other mechanical details. LA.A.1.4, LA.A.2.4, MA.B.1.4, MA.B.4.4, SC.A.1.4, SC.E.2.4
 - 26.02 Produce detailed electrical and electronic schematics with appropriate components. LA.A.1.4, LA.A.2.4, MA.B.1.4, MA.B.4.4, SC.B.1.4, SC.E.2.4
 - 26.03 Produce a contour map with a cut and fill drawing annotated in accordance with government codes. SS.B.1.4, LA.A.1.4, LA.A.2.4, MA.B.1.4, MA.B.4.4, SC.D.1.4, SC.E.2.4, SC.G.2.4
- 27.0 DEMONSTRATE AND PRESENT A RESEARCH AND DESIGN PROJECT--The student will be able to:
- 27.01 Identify and research a design problem related to one of the following technologies (medical, GIS, agriculture, energy & power, information & communication, transportation, manufacturing, and construction). LA.A.1.4, LA.A.2.4, SC.A.1.4, SC.D.2.4, SC.E.2.4, SC.H.1.4, SC.H.3.4
 - 27.02 Identify criteria and constraints. LA.A.1.4, SC.H.3.4
 - 27.03 Produce a virtual or physical model of the solution. MA.B.4.4, SC.E.2.4, SC.H.3.4
 - 27.04 Test and evaluate the solution. MA.E.3.4, SC.H.1.4, SC.H.3.4
 - 27.05 Deliver a professional quality presentation of the design process and solution (i.e., a rendering, walk-through, fly-over, or animation of a design). LA.A.1.4, LA.A.2.4, LA.C.3.4
- 28.0 DEMONSTRATE AN UNDERSTANDING OF CAREER OPPORTUNITIES AND REQUIREMENTS IN THE FIELD OF DRAFTING/ILLUSTRATIVE DESIGN TECHNOLOGY--The student will be able to:
- 28.01 Discuss individual interests related to a career in drafting/illustrative design technology. LA.B.2.4
 - 28.02 Explore career opportunities related to a career in drafting/illustrative design technology. LA.A.1.4, LA.A.2.4, LA.B.2.4
 - 28.03 Explore secondary education opportunities related to drafting/illustrative design technology. LA.A.1.4, LA.A.2.4, LA.B.2.4
 - 28.04 Conduct a job search. LA.A.1.4, LA.A.2.4
 - 28.05 Complete a job application form correctly. LA.B.2.4
 - 28.06 Demonstrate competence in job interview techniques. LA.C.1.4, LA.C.3.4, LA.D.1.4
 - 28.07 Create a professional resume and letter of introduction. LA.A.1.4, LA.A.2.4, LA.B.1.4, LA.B.2.4
 - 28.08 Solicit awards, letters of recommendation and recognition. LA.A.1.4, LA.A.2.4, LA.C.3.4, LA.D.1.4
 - 28.09 Organize work samples in a professional, presentable format. LA.B.2.4, LA.C.3.4, LA.D.1.4