

**Program Title:**                      **Engineering Technology**  
**Specialization Tract:**            **Digital Design and Modeling**

**Specialization Concepts and Content:** The purpose of this program is to prepare students for initial employment with an occupational title as computer aided design (CAD) specialists, industrial designers, product designers, architectural, civil, or mechanical drafters, technicians, or detailers in various specialized areas of industry that use digital design and modeling, or to provide supplemental training for persons previously or currently employed in these occupations.

**VI. INTENDED OUTCOMES:** After successfully completing this program, the student will be able to perform the following:

- 12.0 Demonstrate proficiency in advanced CAD commands.
- 13.0 Demonstrate proficiency in three-dimensional (3-D) drawings.
- 14.0 Demonstrate knowledge of using solid modeling software.
- 15.0 Demonstrate proficiency in digital engineering design fundamentals.
- 16.0 Demonstrate proficiency in digital modeling fundamentals.

### **Florida Department of Education**

#### **Student Performance Standards**

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12.0 DEMONSTRATE PROFICIENCY IN ADVANCED CAD COMMANDS --The student will be able to:

- 12.01 Select the correct command for specified 2 dimensional tasks.
- 12.02 Develop the attributes needed for generic information for specific drawing types.
- 12.03 Demonstrate proficiency in various CAD plotting and printing options.
- 12.04 Create the plots of selected parts or drawings.
- 12.05 Develop the attributes needed for generic information for specific drawings.
- 12.06 Implement existing CAD library files for new drawings.
- 12.07 Develop appropriate new library files when necessary.
- 12.08 Demonstrate model space and paper space commands.
- 12.09 Draw plot, floor, electrical and foundation plans.
- 17.10 Apply standard dimensioning rules.

13.0 DEMONSTRATE PROFICIENCY IN THREE-DIMENSIONAL (3-D) DRAWINGS --The student will be able to:

- 13.01 Implement the CAD commands for three-dimensional drawings.
- 13.02 Implement and apply the CAD three-dimensional coordinate system for three-dimensional objects.

- 13.03 Use CAD three-dimensional surface commands for 3-dimensional objects.
- 13.04 Implement and apply basic software utilities for arranging, detailing, and plotting views of an object.
- 13.06 Create basic building construction, architectural and object designs in three dimensions.
- 13.07 Align, rotate, and mirror three-dimensional objects.
- 13.08 Render a three-dimensional model.
- 13.09 Customize screen, toolbars, and pull down menus.

14.0 DEMONSTRATE KNOWLEDGE OF USING SOLID (3-D) MODELING SOFTWARE --  
The student will be able to:

- 14.01 Create a new part document and 2-D sketch views of a solid object.
- 14.02 Apply and edit dimensions on an object.
- 14.03 Create the standard drawing views to document the design procedures.
- 14.04 Perform analyses on the computer model and refine the design.
- 14.05 Measure and calculate properties of parts.
- 14.09 Enter and save data for an object drawing.
- 14.07 Create an assembly drawing.
- 14.08 Define parts of an assembly in a directory.
- 14.09 Apply basic solid modeling commands.
- 14.10 Apply orthographic projection principles to drawing's layouts
- 14.11 Plot solid modeling drawings.

15.0 DEMONSTRATE PROFICIENCY IN DIGITAL ENGINEERING DESIGN  
FUNDAMENTALS--The student will be able to:

- 15.01 Create and execute advanced templates.
- 15.02 Convert multiple sketches into construction lines.
- 15.03 Create and use multiple work planes for advanced functions.
- 15.04 Create and modify bottom up assemblies.
- 15.05 Create multiple configurations of an individual part.
- 15.06 Apply basic drawing concepts to molded parts.
- 15.07 Create basic sheet metal drawings.
- 15.08 Create two and three-dimensional drawings related to graphic and industrial design.
- 15.09 Define fundamental two-dimensional and three-dimensional concepts of graphic and industrial design.
- 15.10 Demonstrate basic design principles of visual and spatial form as applied to products.
- 15.11 Perform analyses and refine industrial design.
- 15.12 Apply design features to the two and three dimensional drawings.
- 15.13 Describe the fundamentals of product and system design as it relates to the manufacturing and structural considerations in design.
- 15.14 Describe the theories related to product and systems design.
- 15.15 Solve elementary problems related to the form and function of objects and structures.
- 15.16 Describe the fundamentals of material selection for product and system design.
- 15.17 Conduct a system design identifying the major phases.

16.0 DEMONSTRATE PROFICIENCY IN DIGITAL MODELING FUNDAMENTALS --The student will be able to:

- 16.01 Convert multiple sketches into extruded features.
- 16.02 Create the desired sketch to document the design procedures.
- 16.03 Perform analyses on the sketch procedures and refine the sketch design.
- 16.04 Create multiple parts using components of a design tree.
- 16.05 Perform advanced mating using multiple parts or sub-assemblies.
- 16.06 Define the type of analysis of machine elements of a part.
- 16.07 Combine 11-13 Perform and interpret finite element analysis on modeled objects.
- 16.08 Apply basic drawing concepts to molded parts.
- 16.09 Create detailed molds or die cavities of parts and assemblies.
- 16.10 Derive component parts from an edited mold base.
- 16.11 Choose and apply a type of material to use to render parts.
- 16.12 Create and insert render parts into the sheet environment of a solid modeling drawing.
- 16.13 Fabricate a part or an assembly using a rapid prototype machine.