**July 2010**

**Florida Department of Education**
**Curriculum Framework**

**Program Title:** **Computer-Aided Design and Drafting**
**Career Cluster:** **Manufacturing**

| CCC | |
|---|---|
| CIP Number | 0615000004 |
| Program Type | College Credit Certificate (CCC) |
| Program Length | 24 Credit Hours |
| CTSO | SkillsUSA |
| SOC Codes (all applicable) | 17-2051, 17-3019, 17-3012, 27-1029, 17-3026, 17-3013, 17-0000 |
| Targeted Occupation List | http://www.labormarketinfo.com/wec/TargetOccupationList.htm |

## Purpose

This certificate program is part of the Engineering Technology AS/AAS degree program (0615000001).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the manufacturing career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the manufacturing career cluster.

The content includes but is not limited to specialized courses in Applied Technology areas for design, assembly, and fabrication using various software packages.

## Laboratory Activities

Laboratory activities are an integral part of this program and include the proper use of software, computers, plotters, and rapid prototype machines.

These activities include instruction in the use of safety procedures for all equipment.

## Special Notes

**Career and Technical Student Organization (CTSO)**

SkillsUSA is the appropriate career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

Students are urged to join the local and national AutoCAD and Solid Modeling user groups.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following are required for each student: a training plan, signed by the student, teacher, and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a workstation that reflects equipment, skills and tasks that are relevant to the occupation which the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

## Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's IEP or 504 plan or postsecondary student's accommodations plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their postsecondary service provider. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. 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.

## Standards

After successfully completing this program, the student will be able to perform the following:

01.0 Demonstrate proficiency in advanced CAD commands.
02.0 Demonstrate proficiency in three-dimensional (3-D) drawings.
03.0 Demonstrate knowledge of using solid modeling software.
04.0 Demonstrate proficiency in digital engineering design fundamentals.
05.0 Demonstrate proficiency in digital modeling fundamentals.

**July 2010**

**Florida Department of Education**
**Student Performance Standards**

**Program Title:** **Digital Design and Modeling**
**CIP Number:** **0615000004**
**Program Length:** **24 Credit Hours**
**SOC Code(s):** **17-2051, 17-3019, 17-3012, 27-1029, 17-3026, 17-3013, 17-0000**

This certificate program is part of the Engineering Technology AS/AAS degree program (0615000001). At the completion of this program, the student will be able to:

01.0 Demonstrate proficiency in advanced CAD commands – The student will be able to:

- 01.01 Select the correct command for specified 2 dimensional tasks.
- 01.02 Develop the attributes needed for generic information for specific drawing types.
- 01.03 Demonstrate proficiency in various CAD plotting and printing options.
- 01.04 Create the plots of selected parts or drawings.
- 01.05 Develop the attributes needed for generic information for specific drawings.
- 01.06 Implement existing CAD library files for new drawings.
- 01.07 Develop appropriate new library files when necessary.
- 01.08 Demonstrate model space and paper space commands.
- 01.09 Draw plot, floor, electrical and foundation plans.
- 01.10 Apply standard dimensioning rules.

02.0 Demonstrate proficiency in three-dimensional (3-D) drawings – The student will be able to:

- 02.01 Implement the CAD commands for three-dimensional drawings.
- 02.02 Implement and apply the CAD three-dimensional coordinate system for three-dimensional objects.
- 02.03 Use CAD three-dimensional surface commands for 3-dimensional objects.
- 02.04 Implement and apply basic software utilities for arranging, detailing, and plotting views of an object.
- 02.05 Create basic building construction, architectural and object designs in three dimensions.
- 02.06 Align, rotate, and mirror three-dimensional objects.
- 02.07 Render a three-dimensional model.
- 02.08 Customize screen, toolbars, and pull down menus.

03.0 Demonstrate knowledge of using solid (3-D) modeling software – The student will be able to:

- 03.01 Create a new part document and 2-D sketch views of a solid object.
- 03.02 Apply and edit dimensions on an object.
- 03.03 Create the standard drawing views to document the design procedures.
- 03.04 Perform analyses on the computer model and refine the design.
- 03.05 Measure and calculate properties of parts.
- 03.06 Enter and save data for an object drawing.
- 03.07 Create an assembly drawing.

03.08 Define parts of an assembly in a directory.
03.09 Apply basic solid modeling commands.
03.10 Apply orthographic projection principles to drawing's layouts.
03.11 Plot solid modeling drawings.

04.0 Demonstrate proficiency in digital engineering design fundamentals – The student will be able to:

04.01 Create and execute advanced templates.
04.02 Convert multiple sketches into construction lines.
04.03 Create and use multiple work planes for advanced functions.
04.04 Create and modify bottom up assemblies.
04.05 Create multiple configurations of an individual part.
04.06 Apply basic drawing concepts to molded parts.
04.07 Create basic sheet metal drawings.
04.08 Create two and three-dimensional drawings related to graphic and industrial design.
04.09 Define fundamental two-dimensional and three-dimensional concepts of graphic and industrial design.
04.10 Demonstrate basic design principles of visual and spatial form as applied to products.
04.11 Perform analyses and refine industrial design.
04.12 Apply design features to the two and three dimensional drawings.
04.13 Describe the fundamentals of product and system design as it relates to the manufacturing and structural considerations in design.
04.14 Describe the theories related to product and systems design.
04.15 Solve elementary problems related to the form and function of objects and structures.
04.16 Describe the fundamentals of material selection for product and system design.
04.17 Conduct a system design identifying the major phases.

05.0 Demonstrate proficiency in digital modeling fundamentals – The student will be able to:

05.01 Convert multiple sketches into extruded features.
05.02 Create the desired sketch to document the design procedures.
05.03 Perform analyses on the sketch procedures and refine the sketch design.
05.04 Create multiple parts using components of a design tree.
05.05 Perform advanced mating using multiple parts or sub-assemblies.
05.06 Define the type of analysis of machine elements of a part.
05.07 Combine 11-13 Perform and interpret finite element analysis on modeled objects.
05.08 Apply basic drawing concepts to molded parts.
05.09 Create detailed molds or die cavities of parts and assemblies.
05.10 Derive component parts from an edited mold base.
05.11 Choose and apply a type of material to use to render parts.
05.12 Create and insert render parts into the sheet environment of a solid modeling drawing.
05.13 Fabricate a part or an assembly using a rapid prototype machine.