

July 2010

**Florida Department of Education  
Curriculum Framework**

**Program Title:** Pneumatics, Hydraulics and Motors for Manufacturing  
**Specialization Tract:** Advanced Manufacturing  
**Career Cluster:** Manufacturing

<b>CCC</b>	
CIP Number	0615061303
Program Type	College Credit Certificate (CCC)
Program Length	12 Credit Hours
CTSO	SkillsUSA
SOC Codes (all applicable)	17-3027
Targeted Occupation List	<a href="http://www.labormarketinfo.com/wec/TargetOccupationList.htm">http://www.labormarketinfo.com/wec/TargetOccupationList.htm</a>

### **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 maintenance techniques, computer aided drafting/design skills, technical communications, maintenance and operation of various industrial components, quality control and testing, material handling protocols, and proper usage of tools and instrumentation.

### **Laboratory Activities**

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

## **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.

### **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 course the student will be able to perform the following:

- 01.0 Demonstrate an understanding of industrial processes and material properties.
- 02.0 Demonstrate a fundamental understanding of electronics and electricity.
- 03.0 Operate, troubleshoot, and maintain pneumatic, hydraulic, and electromechanical components and/or systems.

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**Florida Department of Education  
Student Performance Standards**

**Program Title:** Pneumatics, Hydraulics and Motors for Manufacturing  
**Specialization Tract:** Advanced Manufacturing  
**CIP Number:** 0615061303  
**Program Length:** 12 Credit Hours  
**SOC Code(s):** 17-3027

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 knowledge of industrial processes and materials properties -- The student will be able to:
- 01.01 Demonstrate knowledge of current manufacturing processes.
  - 01.02 Demonstrate knowledge of the use of current manufacturing machines, operating systems and mechanisms.
  - 01.03 Estimate manpower needs and skills needed in assembly operations.
  - 01.04 Demonstrate knowledge of the criteria for tool design, maintenance, procurement and handling.
  - 01.05 Demonstrate knowledge of gage design, usage and limitations.
  - 01.06 Analyze and recommend the usage of jigs and fixtures, including effectors and special grippers for automated systems.
  - 01.07 Demonstrate knowledge of processes used to ensure that changes do not negatively impact production or product.
  - 01.08 Demonstrate knowledge of production timing to ensure customer satisfaction and on-time delivery.
  - 01.09 Demonstrate knowledge of time and motion to enhance productivity.
  - 01.10 Make continuous adjustments to equipment and procedures that result in improved productivity.
  - 01.11 Demonstrate knowledge of how raw materials are moved.
  - 01.12 Setup or modify new equipment per engineering specifications and documentations.
  - 01.13 Demonstrate an understanding of the importance and impact of routine maintenance of machines and equipment on operations.
- 02.0 Demonstrate a fundamental understanding of electronics and electricity - The student will be able to:
- 02.01 Use appropriate grounding techniques.
  - 02.02 Demonstrate knowledge of AC/DC theory.
  - 02.03 Solve circuit problems using unit conversion and scientific notation.
  - 02.04 Solve problems involving electric charge, electric current, potential difference, energy and Ohm's Law.
  - 02.05 Solve problems in electric circuits involving work and power.
  - 02.06 Solve problems involving series and parallel resistance circuits.
  - 02.07 Solve problems involving capacitance in DC circuits.
  - 02.08 Solve problems involving magnetic circuits.
  - 02.09 Solve problems involving inductance in DC circuits.

- 02.10 Solve A.C. problems involving peak value, instantaneous, average value and RMS value of a sine wave.
  - 02.11 Solve problems on factors governing reactance in A.C. circuits.
  - 02.12 Solve impedance problems in A.C. circuits.
  - 02.13 Prepare and complete concise, neat and accurate lab reports.
- 03.0 Operate, troubleshoot, and maintain pneumatic, hydraulic and electromechanical components and/or systems – The student will be able to:
- 03.01 Identify, classify and describe the function of pneumatic, hydraulic and electrical machines and components.
  - 03.02 Construct flow diagrams and of pneumatic, hydraulic, and electromechanical systems.
  - 03.03 Perform basic operation maintenance of pneumatic, hydraulic and electromechanical components, devices and/or machines.
  - 03.04 Troubleshoot errors, faults, and inconsistencies of pneumatic, hydraulic and electromechanical components, machines and/or systems.
  - 03.05 Define special applications of electromechanical, hydraulic and pneumatic machines and devices used process sheet metal, plastics, food and beverages, and other materials.
  - 03.06 Describe important limitations of electromechanical, pneumatic and hydraulic machinery.
  - 03.07 Operate independent pneumatic, hydraulic and electrical machines properly.
  - 03.08 Describe the important operating parameters of pneumatic, hydraulic and electrical machines and/systems.
  - 03.09 Identify and use appropriate monitoring gages for pneumatic, hydraulic, and electromechanical machines and/or systems.