

July 2009

Florida Department of Education
Curriculum Framework

Program Title: Automation
Specialization Tract: Advanced Manufacturing
Career Cluster: Manufacturing

CIP Number: PSVC
0615.061301
Grade Level: College Credit Certificate
Length: 12 credit hours
SOC Code: 17-3027

- I. **MAJOR CONCEPTS AND CONTENT:** The purpose of this certificate is to prepare students for initial employment with an occupational title as an Automation or Applied Automation Specialist in various specialized areas, or to provide supplemental training for persons previously or currently employed in these occupations.
- II. **PROGRAM STRUCTURE:** This certificate program requires a minimum of 12 credit hours of specialized courses in Process Control and Applied Automation. It is part of the Advanced Manufacturing Tract of the A.S./A.A.S. degree in Engineering Technology.
- III. **LABORATORY ACTIVITIES:** Laboratory activities are an integral part of the program. The tools, test equipment, materials, processes and safety practices used in these laboratory activities are similar to those used in industry. The activities provide instruction in 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.
- IV. **SPECIAL NOTE:** SkillsUSA is the appropriate career student organization (CTSO) for providing leadership training and for reinforcing specific vocational 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.

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.

- V. **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.
- VI. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:
- 14.0 Operate industrial automation systems.
 - 15.0 Troubleshoot industrial automation systems.
 - 16.0 Apply the principals of robotics to industrial automation systems.
 - 17.0 Use proficiently human machine interfaces to control automated systems

**Florida Department of Education
Student Performance Standards**

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14.0 OPERATE INDUSTRIAL AUTOMATION SYSTEMS - The student will be able to:

- 14.01 Chart and analyze ladder logic diagrams for industrial automation systems.
- 14.02 Identify PLC input and output module locations.
- 14.03 Match wiring harness identification to program addresses for input and output modules.
- 14.04 Identify active and passive states of each module.
- 14.05 Interpret flow charts to match field device components with the real devices.
- 14.06 Identify when a programmable controller is in run or program mode.
- 14.07 Integrate control systems and equipment with production and production support mechanisms.
- 14.08 Establish routine operations involving maintenance schedules.
- 14.09 Perform minor repair to industrial automation systems.
- 14.10 Integrate control systems and equipment with production and production support mechanisms.
- 14.11 Demonstrate automatic inventory accounting related monitoring and control systems.
- 14.12 Implement automatic tracking of materials and products using bar codes, machine vision and sensing, and/or infrared technologies.

15.0 TROUBLESHOOT INDUSTRIAL AUTOMATION SYSTEMS - The student will be able to:

- 15.01 Apply troubleshooting techniques to identify root cause, errors and faults of a problem.
- 15.02 Isolate systems for troubleshooting.
- 15.03 Develop a strategy for making system improvements based on troubleshooting activities.
- 15.04 Identify needed expertise to address the issue.
- 15.05 Participate in troubleshooting and resolution team effectively.

16.0 APPLY THE PRINCIPALS OF ROBOTICS TO AUTOMATED SYSTEMS - The student will be able to:

- 16.01 Define the essential components of a robotic system.

- 16.02 Choose appropriate robot equipments for specific tasks.
- 16.03 Describe methods of moving robotic parts.
- 16.04 Choose and implement appropriate sensors for robotic applications.
- 16.05 Choose and install appropriate actuators for robotic applications.
- 16.06 Program robotic devices for restricted movements.

17.0 USE PROFICIENTLY HUMAN MACHINE INTERFACES TO OPERATE
AUTOMATED SYSTEMS - The student will be able to:

- 17.01 Match computer graphic icons to real field equipment.
- 17.02 Route data flow between computer and controlled machines.
- 17.03 Identify the computer input and output signals and equipment destinations.
- 17.04 Implement manual override appropriately.
- 17.05 Perform computer based system and/or machine troubleshooting.
- 17.06 Define the essential components of an integrated HMI system.