July 2009

Florida Department of Education
Curriculum Framework

Program Title:	**Lean Manufacturing**
Specialization Tract:	**Advanced Manufacturing**
Career Cluster:	**Manufacturing**

	PSVC
CIP Number:	0615.061302
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 a Quality Specialist or Lean 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 Industrial 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:

05.0 Demonstrate proficiency in the use of quality assurance methods, quality control concepts
14.0 Identify and implement lean concepts in manufacturing environments.
18.0 Identify, implement and/or interpret supply chain and operations management concepts and techniques.

July 2009

Florida Department of Education
Student Performance Standards

Program Title: **Lean Manufacturing**
Specialization Tract: **Advanced Manufacturing**

05.0 DEMONSTRATE PROFICIENCY IN USE OF QUALITY ASSURANCE METHODS, QUALITY CONTROL CONCEPTS -- The student will be able to:

- 05.01 Monitor processes for quality.
- 05.02 Inspect product for quality.
- 05.03 Document quality measurements or observations by filling out quality charts and records.
- 05.04 Compare process measurements to standards.
- 05.05 Identify root causes using standard techniques.
- 05.06 Identify Corrective Action and Preventive Action.
- 05.07 Describe the concept of quality assurance in increasing productivity and promoting zero defects.
- 05.08 Apply data collection methods for productivity improvement and reporting.
- 05.09 Analyze data using tools and techniques for productivity and quality problems.
- 05.10 Analyze data using tools and techniques for cause and effect relationships.
- 05.11 Develop and apply quality improvement strategies.
- 05.12 Demonstrate an understanding of a quality process's capability and its applications.
- 05.13 Demonstrate knowledge of how to implement quality assurance principles and methods.
- 05.14 Demonstrate knowledge of quality assurance checks for inspections.
- 05.15 Demonstrate an understanding of internal and external supply chains.
- 05.16 Demonstrate understanding of the configuration of management.

13.0 IDENTIFY AND IMPLEMENT LEAN CONCEPTS IN MANUFACTURING ENVIRONMENTS - The student will be able to:

- 13.01 Demonstrate product manufacturing requirements and processing flow.
- 13.02 Demonstrate the role of management in production operations.
- 13.03 Integrate personnel, hardware, and software capabilities for timely completion of products and product orders.
- 13.04 Apply manufacturing resources planning, just-in-time concepts to production and process planning.
- 13.05 Demonstrate good examples of lean manufacturing principles of pull production, perfect first-time quality, waste minimization, continuous improvement, flexibility, and building long lasting relationships with suppliers and customers.

13.06 Implement minimization of wastes in the form of waiting time, inventory, processing, motion, over-production, transportation, and scrap.
13.07 Apply the 5S's: Sort, Set in Order, Shine, Standardize, and Sustain.
13.08 Apply six sigma criteria correctly.

18.0 IDENTIFY, IMPLEMENT, AND/OR INTERPRET SUPPLY CHAIN AND OPERATIONS MANAGEMENT CONCEPTS AND TECHNIQUES - The student will be able to:

18.01 Use appropriate software for supply chain management strategies.
18.02 Illustrate how efficiency and effectiveness are necessary attributes of good operations management.
18.03 Apply simulations used for layout and design of production operations.
18.04 Apply engineering economy factors in equipment justification.
18.05 Demonstrate warehouse throughput systems.
18.06 Demonstrate basic principles and methods of controlling work in progress.
18.07 Follow raw materials from their source to distribution of the product.
18.08 Demonstrate strategies to optimize production operations.
18.09 Demonstrate strategies to optimize raw materials and products inventories.