

July 2009

Florida Department of Education
Curriculum Framework

Program Title: Six Sigma Black Belt Certificate
Specialization Tract: Quality
Career Cluster: Manufacturing

CIP Number: PSVC
0615.070202
Grade Level: College Credit Certificate
Length: 12 credit hours
SOC Code: 17-3026

- I. **MAJOR CONCEPTS AND CONTENT:** The purpose of this certificate is to prepare students for initial employment with an occupational title as a Quality Assurance, Quality Control Specialist or Quality Analyst in various specialized areas, or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to the six sigma methodology of problem solving, strategic improvement, and business transformation. The specifics of this certificate program will focus on the theory and methods of Six Sigma and concentrates using facts and data to improve customer satisfaction, reduce cycle time, and reduce defects.

- II. **PROGRAM STRUCTURE:** This certificate program requires a minimum of 12 credit hours of specialized courses in Six Sigma. It is part of the Quality 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 (CSO) 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 this program, the student will be able to perform the following:

15.0 Demonstrate proficiency in Six Sigma theories.

16.0 Demonstrate proficiency in developing a Six Sigma project.

**Florida Department of Education
Student Performance Standards**

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Specialization Tract: Quality

15.0 DEMONSTRATE PROFICIENCY IN SIX SIGMA THEORIES--The student will be able to:

- 15.01 Apply the five steps of the DMAIC model.
- 15.02 Establish an advanced quality plan using the theories of Six Sigma.
- 15.03 Develop the basic cause-and-effect diagram (fishbone diagram).
- 15.04 Describe and develop the central limit theorem.
- 15.05 Develop a control plan to aid in production.
- 15.06 Define the cost-benefit analysis on the shop floor.
- 15.07 Define and describe the design of experiments (DOE) used in manufacturing processes.
- 15.08 Run the experiment.
- 15.09 Apply the DOE in a manufacturing process using the proper techniques.
- 15.10 Apply the techniques of Failure Modes and Effects Analysis (FMEA).
- 15.11 Define and describe Risk Assessment.
- 15.12 Implement the 5S method of sorting, setting in order, shining, standardizing, and sustaining.
- 15.13 Maintain and check the process through quality auditing.

16.0 DEMONSTRATE PROFICIENCY IN DEVELOPING A SIX SIGMA PROJECT--The student will be able to:

- 16.01 Defines and describe the economic evaluation of engineering alternatives and analysis of cost allocation in technical operations.
- 16.02 Calculate net profit, maximum profit and breakeven points when solving problems.
- 16.03 Solve problems involving alternative designs, materials, or methods.
- 16.04 Analyze the factor of equivalence in engineering economic problems.
- 16.05 Solve problems related to replacement versus augmentation for economic choices.
- 16.06 Discuss how capital projects are identified and evaluated.
- 16.07 Describe how final projects are selected.
- 16.08 Define the requirements of the project plan.
- 16.09 Develop the initial project schedule.
- 16.10 Describe each phase of the project as it relates to the budget.
- 16.11 Develop timeline charts for planning and tracking.
- 16.12 Apply the scheduling control systems.
- 16.13 Identify the voice of the customer as the feedback mechanism.

- 16.14 Define and describe the scheduling techniques when applied in the project environment.
- 16.15 Define and describe the issues surrounding a problem to provide paths for a solution.
- 16.16 Describe the project life cycle.
- 16.17 Solve problems related to capacity factor, load factor, and diversity factors.
- 16.18 Define and describe the concepts and methods for implementing Six Sigma project management utilizing Six Sigma methodologies.
- 16.19 Develop a Six Sigma project by utilizing the Six Sigma methodologies.
- 16.20 Describe and define the design phase for a Six Sigma project.
- 16.21 Describe and define the verification phase for a Six Sigma project.
- 16.22 Describe and define the implementation phase for a Six Sigma project.
- 16.23 Close out a Six Sigma project.
- 16.24 Benchmark a Six Sigma project.