

July 2009

Florida Department of Education  
Curriculum Framework

**Degree Title:** Engineering Technology  
**Program Title:** Engineering Technology Support Specialist  
**Career Cluster:** Manufacturing

PSV  
CIP Number: 0615.061304  
Grade Level: College Credit Certificate  
Length: 18 credit hours  
SOC Code: 17-3029

- I. **MAJOR CONCEPTS AND CONTENT:** The purpose of this program is to prepare students for initial employment with an occupational title as Engineering Support Specialist or Engineering Specialist in various specialized areas, or to provide supplemental training for persons previously or currently employed in these occupations. **This certificate program is the core of the Engineering Technology degree program.**

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, technical competency, safe and efficient work practices and a combination of theory and laboratory activities to gain the necessary cognitive and manipulative skills to perform preventive and corrective maintenance and support for engineering design, processes, production, testing, and/or maintaining product quality. This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Engineering Technology and Industrial Applications: production materials and processes, quality, computer-aided drafting, electronics, mechanics, instrumentation and safety.

- II. **PROGRAM STRUCTURE:** As part of an Associate in Science (A.S.) Degree and an Associate in Applied Science (A.A.S.) Degree, there is a major component of general education requirements which allows the student to more easily relate the technical knowledge gained to a theoretical level and to allow for a greater knowledge expansion and transference in the future. This A.S. program requires a minimum of 15 semester hours of general education. At least two components of this core must be courses designed to develop skills in oral and written communication and in computational skills. For the A.A.S. degree 15 hours of general education are required. Students enrolling in this program must meet the minimum skills requirements in writing, reading, and mathematics as stipulated in State Board of Education Rule 6A-10.315.

This degree is a planned sequence of instruction consisting of eight tracts with one common core. It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of specialization. The

common core consists of 18 credit hours of technical core courses from the following areas: instrumentation and measurement, manufacturing processes and materials, quality, computer-aided drafting, electronics, and safety. The total Associate in Science /Associate in Applied Science degree program(s) consists of 60 credit hours.

The 18 credit hour technical core has been defined to align with the Manufacturing Skills Standards Council's (MSSC) skills standards. MSSC skill standards define the knowledge, skills, and performance needed by today's frontline manufacturing workers. After completing this core and the General Education requirements, it is anticipated that students will be prepared to pass the MSSC Production Technician Certification.

- 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 this program, the student will be able to perform the following:

- 01.0 Demonstrate an understanding of industrial processes and material properties.
- 02.0 Generate and interpret computer-aided drawings.
- 03.0 Demonstrate a fundamental understanding of electronics and electricity.
- 04.0 Demonstrate an understanding of industrial safety, health, and environmental requirements.
- 05.0 Demonstrate proficiency in the use of quality assurance methods and quality control concepts.
- 06.0 Demonstrate proficiency in using tools, instruments and testing devices.
- 07.0 Demonstrate basic troubleshooting skills.
- 08.0 Demonstrate appropriate communication skills.
- 09.0 Demonstrate appropriate math skills.
- 10.0 Demonstrate an understanding of modern business practices and strategies.
- 11.0 Demonstrate employability skills.

**Florida Department of Education  
Student Performance Standards**

**Program Title: Engineering Technology Support Specialist**

**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 GENERATE AND INTERPRET COMPUTER-AIDED DRAWINGS - The student will be able to:**

- 02.01 Apply current industrial computer aided-drawing practices.
- 02.02 Construct geometric figures.
- 02.03 Create and edit text formatted to industry standards.
- 02.04 Use and control accuracy-enhancement tools for entity-positioning methods.
- 02.05 Identify, create, store, and use standard part symbols and libraries.
- 02.06 Control entity properties by layer, color, and line type.
- 02.07 Use viewing commands to perform zooming and panning.
- 02.08 Use Query commands to interrogate database for entity characteristics.
- 02.09 Plot drawings on media using layout and scale.

- 02.10 Prepare drawings for flexibility of future editing and minimum file size.
- 02.11 Apply standard dimensioning rules.
- 02.12 Demonstrate proficiency importing and exporting various files types.
- 02.13 Operate related peripheral devices.
- 02.14 Read and interpret technical drawings to assure conformity of product.
- 02.15 Demonstrate skill in assessing and reading schematics and drawings.

03.0 DEMONSTRATE A FUNDAMENTAL UNDERSTANDING OF ELECTRONICS AND ELECTRICITY - The student will be able to:

- 03.01 Use appropriate grounding techniques.
- 03.02 Demonstrate knowledge of AC/DC theory.
- 03.03 Solve circuit problems using unit conversion and scientific notation.
- 03.04 Solve problems involving electric charge, electric current, potential difference, energy and Ohm's Law.
- 03.05 Solve problems in electric circuits involving work and power.
- 03.06 Solve problems involving series and parallel resistance circuits.
- 03.07 Solve problems involving capacitance in DC circuits.
- 03.08 Solve problems involving magnetic circuits.
- 03.09 Solve problems involving inductance in DC circuits.
- 03.10 Solve A.C. problems involving peak value, instantaneous, average value and RMS value of a sine wave.
- 03.11 Solve problems on factors governing reactance in A.C. circuits.
- 03.12 Solve impedance problems in A.C. circuits.
- 03.13 Prepare and complete concise, neat and accurate lab reports.

04.0 DEMONSTRATE AN UNDERSTANDING OF SAFETY, HEALTH, AND ENVIRONMENTAL REQUIREMENTS - The student will be able to:

- 04.01 Communicate any new or revised safety procedures.
- 04.02 Update personnel about current safety guidelines.
- 04.03 Wear appropriate Personal Protective Equipment (PPE).
- 04.04 Follow area-posted safety guidelines.
- 04.05 Demonstrate knowledge of, and follow applicable safety laws and regulations and the environment (e.g., Occupational Safety and Health Administration (OSHA)).
- 04.06 Maintain a clean and safe work environment.
- 04.07 Maintain personal protection equipment.
- 04.08 Report unsafe conditions/practices.
- 04.09 Locate emergency exits and alarms.
- 04.10 Comply with company-established safety practices.
- 04.11 Use appropriate fire fighting procedures.
- 04.12 Apply Occupational Safety Health Administration (OSHA) safety standards properly.
- 04.13 Demonstrate knowledge of when a machine or a process should be stopped to investigate or correct a hazard.

- 04.14 Demonstrate knowledge of regulatory agency fines and requirement for corrective actions.
- 04.15 Demonstrate knowledge of government and company procedures, rules and regulations concerning incident investigations.
- 04.17 Demonstrate knowledge of incident reporting procedures.
- 04.18 Use and evaluate information resources such as MSDS (Material Safety Data Sheets).
- 04.19 Demonstrate knowledge of National Institute of Occupational Safety and Health (NIOSH), Environmental Protection Agency (EPA) and other regulatory agencies recommendations, guidelines and best practices.
- 04.20 Demonstrate knowledge of how to safely identify, handle, monitor and measure hazardous materials.

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.
- 05.17 Demonstrate knowledge of standard industry practices regarding inventory control methods and procedures.
- 05.18 Demonstrate knowledge of production floor plan and safety requirements to place materials in most efficient and safe location and position.
- 05.19 Demonstrate knowledge of storage space available to establish lot sizes and reorder points.

- 05.20 Demonstrate knowledge of proper forecasts and methods for conducting inventory audits to recognize and report inventory discrepancies.
- 05.21 Identify significant inventory discrepancies.
- 05.22 Use cycle count process to ensure accurate counts are taken.
- 05.23 Demonstrate knowledge of trade-off techniques (e.g., balance lead time and cycle time issues with inventory)

06.0 DEMONSTRATE PROFICIENCY IN USING TOOLS, INSTRUMENTS AND TESTING DEVICES - The student will be able to:

- 06.01 Identify and use hand tools properly.
- 06.02 Identify and use power tools properly.
- 06.03 Use inspection equipment appropriately.
- 06.05 Implement appropriate testing regimes.
- 06.06 Use appropriate measurement tools (e.g., micrometers, tapes. etc).
- 06.07 Use appropriate safety monitoring and testing equipment.
- 06.08 Communicate issues with hand sketches.
- 06.09 Use electronic measuring equipment and instruments.
- 06.10 Use multi-gauging to inspect, verify, and document whether product dimensions meet customer requirements.

07.0 DEMONSTRATE BASIC TROUBLESHOOTING SKILLS - The student will be able to:

- 07.01 Apply troubleshooting and critical thinking skills to define the problem.
- 07.02 Identify symptoms and changes in a system.
- 07.03 Isolate potential sources/causes of problems.
- 07.04 Consult reference materials.
- 07.05 Evaluate repair options.
- 07.06 Document properly all repairs and adjustments made.
- 07.07 Monitor and correct parameters during tests.
- 07.08 Estimate and forecast time and resources needed to perform task.
- 07.09 Read blueprints, schematics and technical drawings.
- 07. 10 Modify or adjust equipment per engineering specifications.
- 07.11 Analyze process to identify and correct problems, such as bottlenecks.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS - The student will be able to:

- 08.01 Write logical and understandable statements, or phrases, to accurately complete forms commonly used in business and industry.
- 08.02 Read and understand graphs, charts, diagrams, and common table formats.
- 08.03 Read and follow written instructions.

- 08.04 Demonstrate an understanding of; and ability to follow oral instructions.
- 08.05 Answer and ask questions coherently and concisely.
- 08.06 Read critically to identify oversights and assumptions.
- 08.07 Interact with co-workers using appropriate communication tools correctly.
- 08.08 Demonstrate knowledge of technical language and technical acronyms.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS - The student will be able to:

- 09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 09.04 Use different unit systems appropriately.
- 09.05 Accurately convert between unit systems.
- 09.06 Read and interpret angle measurements.
- 09.07 Use scientific and engineering notation appropriately.
- 09.08 Apply the rules for significant digits properly.
- 09.09 Solve simple algebraic equations related to the workplace.

10.0 DEMONSTRATE AN UNDERSTANDING OF MODERN BUSINESS PRACTICES AND STRATEGIES - The student will be able to:

- 10.01 Demonstrate knowledge of modern business practices.
- 10.02 Demonstrate knowledge of production process to meet business requirements.
- 10.03 Describe the importance of entrepreneurship to the American economy.
- 10.04 List the advantages and disadvantages of business ownership.
- 10.05 Identify the business skills needed to operate a small business efficiently and effectively.
- 10.06 Demonstrate knowledge of the alignment of a company's business objectives with production goals.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS - The student will be able to:

- 11.01 Demonstrate competence in job search and interview techniques.
- 11.02 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 11.03 Identify and practice acceptable work habits.
- 11.04 Demonstrate acceptable employee health habits.
- 11.05 Demonstrate knowledge of the "Right-To-Know Law".

11.06 Work effectively in teams.