July 2010

Florida Department of Education
Curriculum Framework

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

CCC	
CIP Number	0615061304
Program Type	College Credit Certificate (CCC)
Program Length	18 Credit Hours
CTSO	SkillsUSA
SOC Codes (all applicable)	17-3029
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm

Purpose

This certificate program is part of the Engineering Technology AS/AAS degree program (0615000001). **This certificate program is the core of the Engineering Technology degree program.**

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.

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 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.

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.

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 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 proficiently 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.

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Florida Department of Education
Student Performance Standards

Program Title: **Engineering Technology Support Specialist**
CIP Number: **0615061304**
Program Length: **18 Credit Hours**
SOC Code(s): **17-3029**

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 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.
04.16 Demonstrate knowledge of incident reporting procedures.
04.17 Use and evaluate information resources such as MSDS (Material Safety Data Sheets).

04.18 Demonstrate knowledge of National Institute of Occupational Safety and Health (NIOSH), Environmental Protection Agency (EPA) and other regulatory agencies recommendations, guidelines and best practices.
04.19 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.
06.04 Implement appropriate testing regimes.
06.05 Use appropriate measurement tools (e.g., micrometers, tapes. etc).
06.06 Use appropriate safety monitoring and testing equipment.

06.07 Communicate issues with hand sketches.
06.08 Use electronic measuring equipment and instruments.
06.09 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.