

July 2008

Florida Department of Education
Curriculum Framework

Program Title: Electronics Aide
Specialization Tract: Electronics
Career Cluster: Manufacturing

CIP Number: PSV 0615.030313
Grade Level: College Credit Certificate
Length: 12 credit hours
SOC Code: 17-3023

- I. **MAJOR CONCEPTS AND CONTENT:** The purpose of this program is to prepare students for initial employment with an occupational title as Electronics or Electronics Test Aide 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 Electronics and Electronics Technology. It is part of the Electronics 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:

- 13.0 Demonstrate proficiency in basic D.C. circuits.
- 14.0 Demonstrate proficiency in A.C. circuits.
- 15.0 Demonstrate proficiency in solid state devices.
- 16.0 Demonstrate proficiency in digital circuits.

**Florida Department of Education
Student Performance Standards**

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Specialization Tract: Electronics

13.0 DEMONSTRATE PROFICIENCY IN BASIC DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

- 13.01 Define the characteristics of basic D.C. circuits.
- 13.02 Solve problems in electronic units utilizing metric prefixes.
- 13.03 Identify sources of electricity.
- 13.04 Define and describe voltage, current, resistance, power and energy.
- 13.05 Apply Ohm's law and power formulas.
- 13.06 Read and interpret color codes and symbols to identify electrical components and values.
- 13.07 Measure properties of circuits using a digital multimeter meter (DMM) and oscilloscopes.
- 13.08 Set up and operate power supplies for DC circuits.
- 13.09 Compute conductance and measure resistance of conductors and insulators.
- 13.10 Apply Ohm's law to series circuits.
- 13.11 Construct and verify the operation of series circuits.
- 13.12 Analyze and troubleshoot series circuits.
- 13.13 Apply Ohm's law to parallel circuits.
- 13.14 Construct and verify the operation of parallel circuits.
- 13.15 Analyze and troubleshoot parallel circuits.
- 13.16 Measure values of resistors, capacitors and inductors.
- 13.17 Construct and verify the operation of capacitors and inductors.
- 13.18 Analyze and troubleshoot circuits containing capacitors and inductors.
- 13.19 Apply various network theorems to D.C. circuits.

14.0 DEMONSTRATE PROFICIENCY IN A.C. CIRCUITS--The student will be able to:

- 14.01 Solve basic trigonometric problems as applicable to A.C. circuits.
- 14.02 Define the characteristics of AC capacitive circuits.
- 14.03 Construct and verify the operation of AC capacitive circuits.
- 14.04 Analyze and troubleshoot AC capacitive circuits.
- 14.05 Define the characteristics of AC inductive circuits.
- 14.06 Construct and verify the operation of AC inductive circuits.
- 14.07 Analyze and troubleshoot AC inductive circuits.
- 14.08 Define and apply the principles of transformers to AC circuits.
- 14.09 Construct and verify the operation of AC circuits utilizing transformers.
- 14.10 Analyze and troubleshoot AC circuits utilizing transformers.

- 14.11 Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
- 14.12 Analyze and troubleshoot differentiator and integrator circuits.
- 14.13 Define the characteristics of resistive, Inductive, and Capacitive (RLC) circuits (series, parallel and complex).
- 14.14 Construct and verify the operation of series and parallel resonant circuits.
- 14.15 Define the characteristics of series and parallel resonant circuits.
- 14.16 Construct and verify the operation of series and parallel resonant circuits.
- 14.17 Analyze and troubleshoot R-C, R-L, and RLC circuits.
- 14.18 Define the characteristics of frequency selective filter circuits.
- 14.19 Construct and verify the operation of frequency selective filter circuits.
- 14.20 Analyze and troubleshoot frequency selective filter circuits.
- 14.21 Define the characteristics of polyphase circuits.
- 14.22 Define basic motor theory and operation.
- 14.23 Define basic generator theory and operation.
- 14.24 Set up and operate power supplies for AC circuits.
- 14.25 Analyze and measure power in AC circuits.
- 14.26 Set up and operate capacitor and inductor analyzers for AC circuits.
- 14.27 Apply various network theorems to A.C. circuits.

15.0 DEMONSTRATE PROFICIENCY IN SOLID STATE DEVICES--The student will be able to:

- 15.01 Identify and define properties of semiconductor materials.
- 15.02 Identify and define operating characteristics and applications of junction diodes.
- 15.03 Identify and define operating characteristics and applications of special diodes.
- 15.04 Construct and verify the operation of diode circuits.
- 15.05 Analyze and troubleshoot diode circuits.
- 15.06 Identify and define operating characteristics and applications of bipolar transistors.
- 15.07 Identify and define operating characteristics and applications of field effect transistors.
- 15.08 Identify and define operating characteristics and applications of single-stage amplifiers.
- 15.09 Construct and verify the operation of single-stage amplifiers.
- 15.10 Analyze and troubleshoot single-stage amplifiers.
- 15.11 Construct and verify thyristor circuitry.
- 15.12 Analyze and troubleshoot thyristor circuitry.
- 15.14 Set up and operate DVM for solid-state devices.
- 15.15 Set up and operate power supplies for solid-state devices.
- 15.16 Set up and operate oscilloscopes for solid-state devices.
- 15.17 Set up and operate function generators for solid-state devices.
- 15.18 Set up and operate capacitor and inductor analyzers for solid-state devices.
- 15.19 Set up and operate curve tracers.
- 15.20 Set up and operate transistor testers.
- 15.21 Construct and analyze electronic circuits for all operating parameters.
- 15.22 Set up and operate measuring instruments for electronic circuit analysis.

15.23 Apply appropriate solid state circuitry for other systems such as electronic communications, telecommunications, wireless, and other electronic applications.

16.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

- 16.01 Define and apply numbering systems to codes and arithmetic operations.
- 16.02 Analyze and minimize logic circuits using Boolean operations.
- 16.03 Set up and operate logic probes for digital circuits.
- 16.04 Set up and operate power supplies for digital circuits.
- 16.05 Set up and operate pulsers for digital circuits.
- 16.06 Set up and operate oscilloscopes for digital circuits.
- 16.07 Set up and operate logic analyzers for digital circuits.
- 16.08 Set up and operate pulse generators for digital circuits.
- 16.09 Identify types of logic gates and their truth tables.
- 16.10 Construct combinational logic circuits using integrated circuits.
- 16.11 Troubleshoot logic circuits.
- 16.12 Analyze types of flip-flops and their truth tables.
- 16.13 Construct flip-flops using integrated circuits.
- 16.14 Troubleshoot flip-flops.
- 16.15 Identify, define and measure characteristics of integrated circuit (IC) logic families.
- 16.16 Identify types of registers and counters.
- 16.17 Construct registers and counters using flip-flops and logic gates.
- 16.18 Troubleshoot registers and counters.
- 16.19 Analyze clock and timing circuits.
- 16.20 Construct clock and timing circuits.
- 16.21 Troubleshoot clock and timing circuits.
- 16.22 Identify types of arithmetic-logic circuits.
- 16.23 Construct arithmetic-logic circuits.
- 16.24 Troubleshoot arithmetic-logic circuits.
- 16.25 Identify types of encoding and decoding devices.
- 16.26 Construct encoders and decoders.
- 16.27 Troubleshoot encoders and decoders.
- 16.28 Identify types of multiplexer and demultiplexer circuits.
- 16.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
- 16.30 Troubleshoot multiplexer and demultiplexer circuits.
- 16.31 Identify types of memory circuits.
- 16.32 Identify types of digital displays.
- 16.33 Set up and operate measuring instruments for digital circuit analysis.
- 16.34 Apply appropriate digital circuitry for other systems such as electronic communications, telecommunications, wireless, and other electronic applications.