Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Computer Electronics Technology
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8732100**	**I470104**
CIP Number	0647.010400	0647.010400
Grade Level	9-12 30, 31	30, 31
Length	11 Credits	1650 hours
Certification	COMP SVC @7 G ELECTRONIC @7 G BUS MACH @7 G	COMP SVC @7 G ELECTRONIC @7 G BUS MACH @7 G

I. **PURPOSE:** The purpose of this program is to prepare students for employment or advanced training in a variety of occupations in the computer electronics industry.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Computer Electronics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of five occupational completion points as follows: (1) End User Support Technician, Level I Support Technician, Help Desk Specialist; (2) PC Electronics Installer; (3) PC Technician, Field Technician, Level II Support Technician; (4) Computer Support Specialist, Level I LAN Technician, Field Service Technician; (5) Digital Electronics Repairer. When the recommended sequence is followed, the structure will allow students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training or become an occupational completer.

The courses content includes, but is not limited to, installation, programming, operation, maintenance and servicing of computer systems; and diagnosis and correction of operational problems in computers arising from mechanical, electrical or electronics, hardware and software malfunctions.

The course content includes, but is not limited to, communication, leadership skills, human relations and employability skills; and safe, efficient work practices.

III. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students will use various types of precision test equipment for analyzing, troubleshooting and repairing computer circuitry.

IV. **SPECIAL NOTE: SkillsUSA**-VICA, Inc. is the appropriate Career and Technical Student Organization (CTSO) for providing leadership training and for reinforcing specific career and technical skills. Career and Technical Student Organizations, when provided, shall be an integral

part of the career and technical instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC.

Cooperative training - OJT is appropriate for this program. Whenever cooperative training - OJT 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.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for adult vocational students to complete this program are: Mathematics 10.0, Language 9.0, Reading 9.0. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently through Vocational Preparatory Instruction (VPI). Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards, which the student must master to earn credit, must be specified on an individual basis. The job or jobs for which the student is being trained should be reflected in the student's desired postschool outcome statement on the Transition Individual Educational Plan (Transition IEP).

listed below are the courses that comprise this course when offered at the secondary level.

8732110 - Computer Electronics Technology 1 (150)
8732120 - Computer Electronics Technology 2 (150)
8732130 - Computer Electronics Technology 3 (150) [450] OCP A
8732140 - Computer Electronics Technology 4 (150) [150] OCP B
8732150 - Computer Electronics Technology 5 (150)
8732160 - Computer Electronics Technology 6 (150) [300] OCP C
8732170 - Computer Electronics Technology 7 (150)
8732180 - Computer Electronics Technology 8 (150) [300] OCP D
8732190 – Computer Electronics Technology 9 (150)
8732191 – Computer Electronics Technology 10 (150)
8732192 – Computer Electronics Technology 11 (150) [450] OCP E

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

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.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The standard length of this program is 1650 hours.

V. **INTENDED OUTCOMES:** After successfully completing this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE - A (450 Hours)
END USER SUPPORT TECHNICIAN - LEVEL I SUPPORT TECHNICIAN
HELP DESK SPECIALIST - INDUSTRY TITLE

COMPUTER ELECTRONICS TECHNOLOGY 1 - (01.01-01.09)

01.0 Demonstrate proficiency in software fundamentals.

COMPUTER ELECTRONICS TECHNOLOGY 2 - (01.10-01.12)

02.0 Demonstrate proficiency in customer relations.

COMPUTER ELECTRONICS TECHNOLOGY 3

03.0 Demonstrate appropriate communication skills.
04.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B (150 Hours)
PC ELECTRONICS INSTALLER - LEVEL II

COMPUTER ELECTRONICS TECHNOLOGY 4

05.0 Demonstrate proficiency in soldering and basic laboratory skills.
06.0 Demonstrate proficiency in basic D.C. circuits.
07.0 Demonstrate appropriate understanding of basic math.
08.0 Demonstrate appropriate understanding of basic science.
09.0 Demonstrate proficiency in basic A.C. circuits.

OCCUPATIONAL COMPLETION POINT - DATA CODE - C (300 Hours)
COMPUTER SUPPORT SPECIALIST - P.C. TECHNICIAN OES 25104

COMPUTER ELECTRONICS TECHNOLOGY 5

10.0 Demonstrate proficiency in computer systems architecture.

COMPUTER ELECTRONICS TECHNOLOGY 6

11.0 Demonstrate proficiency in peripheral equipment.

OCCUPATIONAL COMPLETION POINT - DATA CODE - D (300 Hours)
FIELD SERVICE TECHNICIAN/LEVEL I - LAN TECHNICIAN

COMPUTER ELECTRONICS TECHNOLOGY 7

12.0 Demonstrate proficiency in electronic information exchange.

COMPUTER ELECTRONICS TECHNOLOGY 8

13.0 Demonstrate proficiency in site requirements and considerations.

OCCUPATIONAL COMPLETION POINT - DATA CODE - E (450 Hours) (PSAV only)
DIGITAL ELECTRONICS TECHNICIAN OES 85799

COMPUTER ELECTRONICS TECHNOLOGY 9 - (14.01-14.18)

COMPUTER ELECTRONICS TECHNOLOGY 10 - (14.19-14.37)

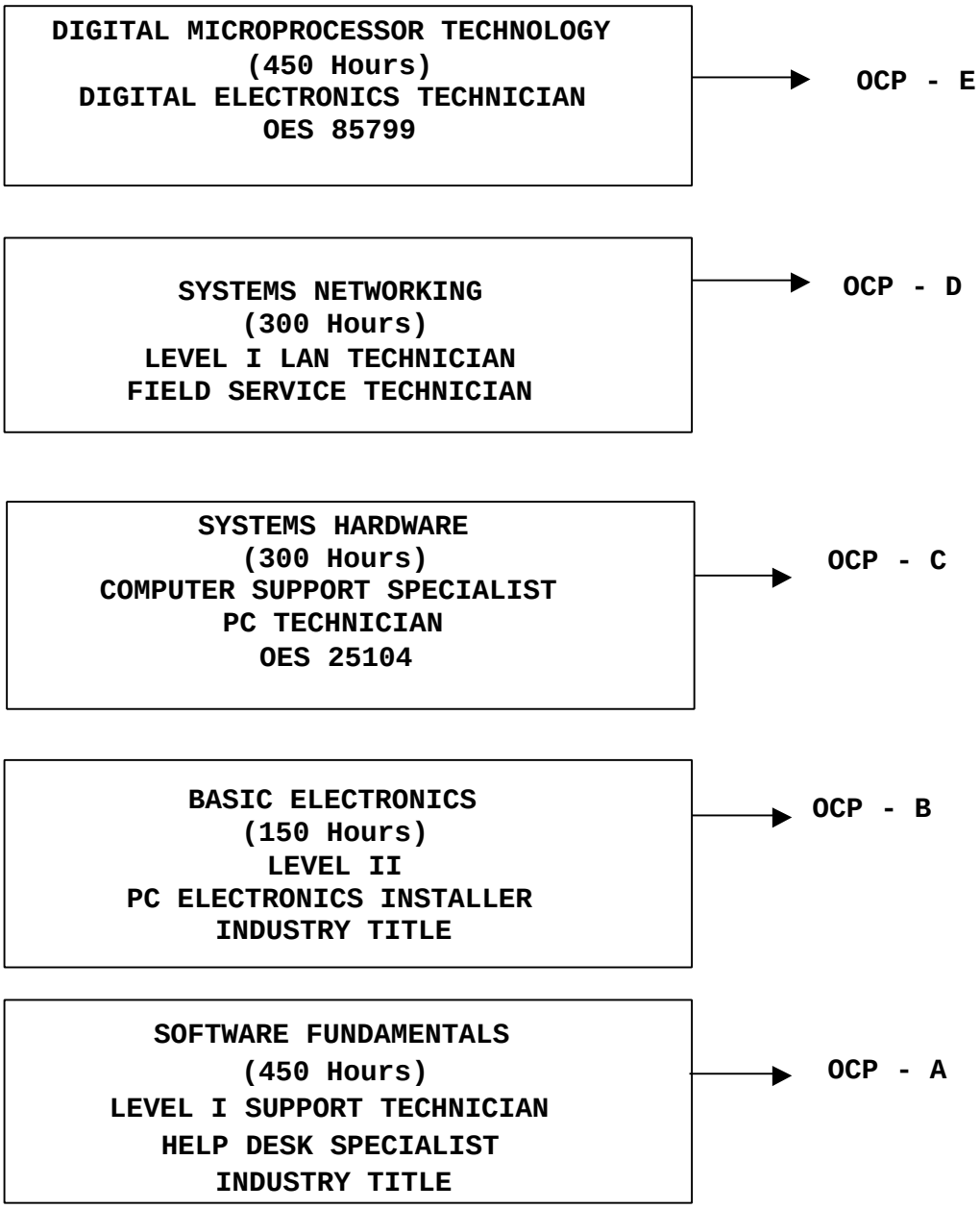
14.0 Demonstrate proficiency in digital circuits.

COMPUTER ELECTRONICS TECHNOLOGY 11

15.0 Demonstrate proficiency in fundamental microprocessors.
16.0 Demonstrate an understanding of entrepreneurship.

The following diagram illustrates the program structure:

COMPUTER ELECTRONICS TECHNOLOGY



Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Computer Electronics Technology
Secondary Number:
Postsecondary Number: I470104

OCCUPATIONAL COMPLETION POINT - DATA CODE - A (450 Hours)

01.0 DEMONSTRATE PROFICIENCY IN SOFTWARE FUNDAMENTALS--The student will be able to:

01.01 Apply OS commands, syntax usage and parameters.
01.02 Demonstrate knowledge of OS file storage, FAT tables, boot record and disk partition procedures.
01.03 Identify OS utilities for technical personnel.
01.04 Demonstrate proficiency in protecting stored data.
01.05 Demonstrate an understanding and implementation of virus protection.
01.06 Understand, control and customize OS drivers.
01.07 Understand compression technologies for the trouble shooting of related problems.
01.08 Understand and apply procedures for memory management and computer environment configuring.
01.09 Demonstrate proficiency in the boot up process.
01.10 Apply troubleshooting techniques for operating systems.
01.11 Describe the fundamentals of advanced graphical user interface (GUI) operating network systems.
01.12 Demonstrate usage of third party software diagnostic tools.

02.0 DEMONSTRATE PROFICIENCY IN CUSTOMER RELATIONS--The student will be able to:

02.01 Describe and demonstrate appropriate personal hygiene and professional attire.
02.02 Describe and demonstrate effective listening techniques.
02.03 Describe and apply techniques for instilling customer confidence and satisfaction.
02.04 Describe and apply techniques for keeping the customer informed.
02.05 Describe and apply effective follow-up techniques.
02.06 Demonstrate discretion in interacting with customers in field and retail environments.
02.07 Demonstrate an understanding of basic conflict resolution.

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

03.01 Write logical and understandable statements, or phrases, to accurately fill out forms and invoices commonly used in business and industry.
03.02 Read and use graphs, charts, diagrams, tables, parts manuals, and information sources commonly used in this industry/occupational area.
03.03 Read and follow written and oral instructions.
03.04 Answer and ask questions coherently and concisely.
03.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
03.06 Demonstrate appropriate telephone/communication skills.

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

04.01 Prepare a resume.
04.02 Conduct a job search.
04.03 Secure information about a job.
04.04 Identify and provide documents, which may be required when interviewing for a job.
04.05 Complete a job application form correctly and completely.
04.06 Demonstrate competence in job interview techniques.
04.07 Identify and demonstrate appropriate responses to criticism from employer, supervisor or other employees.
04.08 Identify and demonstrate acceptable work habits.
04.09 Demonstrate knowledge of how to make job changes appropriately.
04.10 Demonstrate knowledge of employee health issues.
04.11 Demonstrate efficient organizational skills.
04.12 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

OCCUPATIONAL COMPLETION POINT - DATA CODE - B (150 Hours)

05.0 DEMONSTRATE PROFICIENCY IN SOLDERING AND BASIC LABORATORY PRACTICES--The student will be able to:

05.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.
05.02 Make electrical connections.
05.03 Identify and use hand tools properly.
05.04 Identify and use power tools properly.
05.05 Demonstrate acceptable soldering techniques.
05.06 Demonstrate acceptable desoldering techniques.
05.07 Demonstrate electrostatic discharge (ESD) safety procedures.
05.08 Describe the construction of printed circuit boards (PCB's).
05.09 Explain the theoretical concepts of soldering.
05.10 Demonstrate rework and repair techniques.

06.0 DEMONSTRATE PROFICIENCY IN BASIC D.C. CIRCUITS--The student will be able to:

06.01 Solve problems in electronic units utilizing metric prefixes.
06.02 Identify sources of electricity.
06.03 Define voltage, current, resistance, power and energy.
06.04 Apply Ohm's law and power formulas.
06.05 Read and interpret color codes and symbols to identify electrical components and values.
06.06 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.
06.07 Compute conductance and compute and measure resistance of conductors and insulators.
06.08 Apply Ohm's law to series circuits.
06.09 Construct and verify operation of series circuits.
06.10 Analyze and troubleshoot series circuits.
06.11 Apply Ohm's law to parallel circuits.
06.12 Construct and verify the operation of parallel circuits.
06.13 Analyze and troubleshoot parallel circuits.

07.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC MATH--The student will be able to:

07.01 Solve problems for volume, weight, area and circumference and perimeter measurements for rectangles, square and cylinders.
07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, and feet and inches.
07.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

08.01 Demonstrate an understanding of the effects of temperature extremes and moisture content in regards to electronic equipment.
08.02 Demonstrate an understanding of the impact and effects of electrostatic discharge (ESD), power surges, grounding, and lighting strikes.
08.03 Apply the scientific method to draw conclusions or make interferences from data.
08.04 Demonstrate deductive reasoning techniques when troubleshooting.
08.05 Demonstrate an understanding of the effects of heat load and ventilation in regards to electronic equipment.
08.06 Identify safety and health related issues, including exposure to work related chemicals and hazardous materials, and demonstrate the appropriate precautionary measures.
08.07 Demonstrate an understanding of environmental impact and regulations in regards to the appropriate disposal of electronic equipment.

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

09.01 Identify properties of an AC signal.
09.02 Identify AC sources.
09.03 Analyze and measure AC signals utilizing VOM, DVM,

OCCUPATIONAL COMPLETION POINT - DATA CODE - C (300 Hours)

10.0 DEMONSTRATE PROFICIENCY IN COMPUTER SYSTEMS ARCHITECTURE--The student will be able to:

10.01 Draw and explain systems configuration in block detail.
10.02 Perform personal computer system tear-down, cleaning and inspection.
10.03 Upgrade and troubleshoot a variety of motherboards.
10.04 Demonstrate knowledge of bus systems and processor architecture.
10.05 Understand and troubleshoot memory and cache systems.
10.06 Understand, troubleshoot and replace power supply systems.
10.07 Troubleshoot a microcomputer system.
10.08 Demonstrate system upgrading techniques.

11.0 DEMONSTRATE PROFICIENCY IN PERIPHERAL EQUIPMENT--The student will be able to:

11.01 Demonstrate an understanding of input/output devices.
11.02 Identify and define serial and parallel interface standards.
11.03 Troubleshoot and replace video display hardware and monitors.

11.04 Troubleshoot, install and upgrade telecommunications devices and adapter cards.
11.05 Troubleshoot, install and upgrade multimedia hardware and software.
11.06 Troubleshoot, install and upgrade hard drives and CD-ROMS.
11.07 Troubleshoot and install tape and other mass data storage devices.
11.08 Troubleshoot, install and maintain printers.
11.09 Demonstrate professional connector assembly procedures.

OCCUPATIONAL COMPLETION POINT - D (300 HOURS)

12.0 DEMONSTRATE PROFICIENCY IN ELECTRONIC INFORMATION EXCHANGE--The student will be able to:

12.01 Install, connect and maintain network clients and peripherals to various network operating systems.
12.02 Demonstrate use of file systems commands and utilities on a network server.
12.03 Demonstrate setup configuring and sharing of user security, file, printer and network resources.
12.04 Demonstrate setup configuring and troubleshooting network applications on the server.
12.05 Demonstrate setup configuring and backup operation on the server or clients.
12.06 Demonstrate proficiency in performing help desk support for a network computer system.
12.07 Connect and configure computers for network connectivity.
12.08 Perform basic network system maintenance.
12.09 Describe use and system maintenance of a WAN and telecommunications system.
12.10 Perform procedures related to administration of a secure network.
12.11 Demonstrate knowledge of the Internet WAN system.
12.12 Demonstrate knowledge of network protocols.
12.13 Demonstrate knowledge of fundamentals of an Internet system.
12.14 Demonstrate knowledge of telecommunications services and standards.
12.15 Un-install, configure and troubleshoot Internet/Internet access by using browsers.

13.0 DEMONSTRATE PROFICIENCY IN SITE REQUIREMENTS AND CONSIDERATIONS--The student will be able to:

13.01 Demonstrate knowledge of data communication test equipment.
13.02 Demonstrate knowledge of telecommunication wiring systems.
13.03 Demonstrate knowledge of cable and LAN topology.
13.04 Demonstrate knowledge of hubs, switches and routers.
13.05 Calculate and determine power requirements.
13.06 Calculate and determine requirements of the working environment.
13.07 Install, configure and troubleshoot LAN cable systems (twisted pair, coax, or fiber).
13.08 Configure and troubleshoot patch bay, hubs and transceivers.

OCCUPATIONAL COMPLETION POINT - E (450 Hours)

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

14.01 Define and apply numbering systems to codes and arithmetic operations.

14.02 Analyze and minimize logic circuits using Boolean operations.
14.03 Set up and operate logic probes for digital circuits and solve power distribution and noise problems.
14.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
14.05 Set up and operate pulsars for digital circuits.
14.06 Set up and operate oscilloscopes for digital circuits.
14.07 Set up and operate logic analyzers for digital circuits.
14.08 Set up and operate pulse generators for digital circuits.
14.09 Identify types of logic gates and their truth tables.
14.10 Construct combinational logic circuits using integrated circuits.
14.11 Troubleshoot logic circuits.
14.12 Analyze types of flip-flops and their truth tables.
14.13 Construct flip-flops using integrated circuits.
14.14 Troubleshoot flip-flop.
14.15 Identify, define and measure characteristics of integrated circuits (IC) logic families.
14.16 Identify types of registers and counters.
14.17 Construct registers and counters using flip-flops and logic gates.
14.18 Troubleshoot registers and counters.
14.19 Analyze clock and timing circuits.
14.20 Construct clock and timing circuits.
14.21 Troubleshoot clock and timing circuits.
14.22 Identify types of arithmetic-logic circuits.
14.23 Construct arithmetic-logic circuits.
14.24 Troubleshoot arithmetic-logic circuits.
14.25 Identify types of encoding and decoding devices.
14.26 Construct encoders and decoders.
14.27 Troubleshoot encodes and decoders.
14.28 Identify types of multiplexer and demultiplexer circuits.
14.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
14.30 Troubleshoot multiplexer and demultiplexer circuits.
14.31 Identify types of memory circuits.
14.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
14.33 Construct digital-to-analog and analog-to-digital circuits.
14.34 Troubleshoot digits-to-analog and analog-to-digital circuits.
14.35 Identify types of digital displays.
14.36 Construct digital display circuits.
14.37 Troubleshoot digital display circuits.

15.0 DEMONSTRATE PROFICIENCY IN FUNDAMENTAL MICRO PROCESSORS--The student will be able to:

15.01 Identify central processing unit (CPU) building blocks and their uses (architecture).
15.02 Analyze bus concepts.
15.03 Analyze various memory schemes.
15.04 Use memory devices in circuits.
15.05 Troubleshoot memory device circuits.
15.06 Set up and operate oscilloscopes for microprocessor systems.
15.07 Set up and operate logic-data analyzers to troubleshoot microprocessor systems.
15.08 Identify types of input and output devices and peripherals.
15.09 Interface input and output ports to peripherals.
15.10 Analyze and troubleshoot input and output ports.
15.11 Write a microprocessor program in assembly languages.
15.12 Write a microprocessor program in machine language.
15.13 Execute a microprocessor program.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Identify characteristics of the American Enterprise System.
16.02 Define inflation and deflation.
16.03 Illustrate the basic economic questions facing any society.
16.04 Determine the results and change in demand or a change in supply.
16.05 List factors, which contribute to economic growth.
16.06 Identify characteristics of different types of business ownership.
16.07 Choose appropriate action in a situation requiring application of business ethics.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 1
Course Number: 8732110
Course Credit: 1

01.0 DEMONSTRATE PROFICIENCY IN SOFTWARE FUNDAMENTALS--The student will be able to:

01.01 Apply OS commands, syntax usage and parameters.
01.02 Demonstrate knowledge of OS file storage, FAT tables, boot record and disk partition procedures.
01.03 Identify OS utilities for technical personnel.
01.04 Demonstrate proficiency in protecting stored data.
01.05 Demonstrate an understanding and implementation of virus protection.
01.06 Understand, control and customize OS drivers.
01.07 Understand compression technologies for the trouble shooting of related problems.
01.08 Understand and apply procedures for memory management and computer environment configuring.
01.09 Demonstrate proficiency in the boot up process.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 2
Course Number: 8732120
Course Credit: 1

01.0 DEMONSTRATE PROFICIENCY IN SOFTWARE FUNDAMENTALS--The student will be able to:

01.10 Apply troubleshooting techniques for operating systems.
01.11 Describe the fundamentals of advanced graphical user interface (GUI) operating network systems.
01.12 Demonstrate usage of third party software diagnostic tools.

02.0 DEMONSTRATE PROFICIENCY IN CUSTOMER RELATIONS--The student will be able to:

02.01 Describe and demonstrate appropriate personal hygiene and professional attire.
02.02 Describe and demonstrate effective listening techniques.
02.03 Describe and apply techniques for instilling customer confidence and satisfaction.
02.04 Describe and apply techniques for keeping the customer informed.
02.05 Describe and apply effective follow-up techniques.
02.06 Demonstrate discretion in interacting with customers in field and retail environments.
02.07 Demonstrate an understanding of basic conflict resolution.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 3
Course Number: 8732130
Course Credit: 1

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

03.01 Write logical and understandable statements, or phrases, to accurately fill out forms and invoices commonly used in business and industry.
03.02 Read and use graphs, charts, diagrams, tables, parts manuals, and information sources commonly used in this industry/occupational area.
03.03 Read and follow written and oral instructions.
03.04 Answer and ask questions coherently and concisely.
03.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
03.06 Demonstrate appropriate telephone/communication skills.

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

04.01 Prepare a resume.
04.02 Conduct a job search.
04.03 Secure information about a job.
04.04 Identify and provide documents, which may be required when interviewing for a job.
04.05 Complete a job application form correctly and completely.
04.06 Demonstrate competence in job interview techniques.
04.07 Identify and demonstrate appropriate responses to criticism from employer, supervisor or other employees.
04.08 Identify and demonstrate acceptable work habits.
04.09 Demonstrate knowledge of how to make job changes appropriately.
04.10 Demonstrate knowledge of employee health issues.
04.11 Demonstrate efficient organizational skills.
04.12 Demonstrate knowledge of the “Florida Right-To-Know Law” as recorded in Florida Statutes Chapter 442.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 4
Course Number: 8732140
Course Credit: 1

05.0 DEMONSTRATE PROFICIENCY IN SOLDERING AND BASIC LABORATORY PRACTICES--The student will be able to:

05.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.
05.02 Make electrical connections.
05.03 Identify and use hand tools properly.
05.04 Identify and use power tools properly.
05.05 Demonstrate acceptable soldering techniques.
05.06 Demonstrate acceptable desoldering techniques.
05.07 Demonstrate electrostatic discharge (ESD) safety procedures.
05.08 Describe the construction of printed circuit boards (PCB's).
05.09 Explain the theoretical concepts of soldering.
05.10 Demonstrate rework and repairr techniques.

06.0 DEMONSTRATE PROFICIENCY IN BASIC D.C. CIRCUITS--The student will be able to:

06.01 Solve problems in electronic units utilizing metric prefixes.
06.02 Identify sources of electricity.
06.03 Define voltage, current, resistance, power and energy.
06.04 Apply Ohm's law and power formulas.
06.05 Read and interpret color codes and symbols to identify electrical components and values.
06.06 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.
06.07 Compute conductance and compute and measure resistance of conductors and insulators.
06.08 Apply Ohm's law to series circuits.
06.09 Construct and verify operation of series circuits.
06.10 Analyze and troubleshoot series circuits.
06.11 Apply Ohm's law to parallel circuits.
06.12 Construct and verify the operation of parallel circuits.
06.13 Analyze and troubleshoot parallel circuits.

07.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC MATH--The student will be able to:

07.01 Solve problems for volume, weight, area and circumference and perimeter measurements for rectangles, square and cylinders.
07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, and feet and inches.
07.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE --The student will be able to:

08.01 Demonstrate an understanding of the effects of temperature extremes and moisture content in regards to electronic equipment.
08.02 Demonstrate an understanding of the impact and effects of electrostatic discharge (ESD), power surges, grounding, and lighting strikes.
08.03 Apply the scientific method to draw conclusions or make interferences from data.
08.04 Demonstrate deductive reasoning techniques when troubleshooting.
08.05 Demonstrate an understanding of the effects of heat load and ventilation in regards to electronic equipment.
08.06 Identify safety and health related issues, including exposure to work related chemicals and hazardous materials, and demonstrate the appropriate precautionary measures.
08.07 Demonstrate an understanding of environmental impact and regulations in regards to the appropriate disposal of electronic equipment.

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

09.01 Identify properties of an AC signal.
09.02 Identify AC sources.
09.03 Analyze and measure AC signals utilizing VOM, DVM,

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 5
Course Number: 8732150
Course Credit: 1

10.0 DEMONSTRATE PROFICIENCY IN COMPUTER SYSTEMS ARCHITECTURE --The student will be able to:

10.01 Draw and explain systems configuration in block detail.
10.02 Perform personal computer system tear-down, cleaning and inspection.
10.03 Upgrade and troubleshoot a variety of motherboards.
10.04 Demonstrate knowledge of bus systems and processor architecture.
10.05 Understand and troubleshoot memory and cache systems.
10.06 Understand, troubleshoot and replace power supply systems.
10.07 Troubleshoot a microcomputer system.
10.08 Demonstrate system upgrading techniques.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 6
Course Number: 8732160
Course Credit: 1

11.0 DEMONSTRATE PROFICIENCY IN PERIPHERAL EQUIPMENT--The student will be able to:

11.01 Demonstrate an understanding of input/output devices.
11.02 Identify and define serial and parallel interface standards.
11.03 Troubleshoot and replace video display hardware and monitors.
11.04 Troubleshoot, install and upgrade telecommunications devices and adapter cards.
11.05 Troubleshoot, install and upgrade multimedia hardware and software.
11.06 Troubleshoot, install and upgrade hard drives and CD-ROMS.
11.07 Troubleshoot and install tape and other mass data storage devices.
11.08 Troubleshoot, install and maintain printers.
11.09 Demonstrate professional connector assembly procedures.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 7
Course Number: 8732170
Course Credit: 1

12.0 DEMONSTRATE PROFICIENCY IN ELECTRONIC INFORMATION EXCHANGE--The student will be able to:

12.01 Install, connect and maintain network clients and peripherals to various network operating systems.
12.02 Demonstrate use of file systems commands and utilities on a network server.
12.03 Demonstrate setup configuring and sharing of user security, file, printer and network resources.
12.04 Demonstrate setup configuring and troubleshooting network applications on the server.
12.05 Demonstrate setup configuring and backup operation on the server or clients.
12.06 Demonstrate proficiency in performing help desk support for a network computer system.
12.07 Connect and configure computers for network connectivity.
12.08 Perform basic network system maintenance.
12.09 Describe use and system maintenance of a WAN and telecommunications system.
12.10 Perform procedures related to administration of a secure network.
12.11 Demonstrate knowledge of the Internet WAN system.
12.12 Demonstrate knowledge of network protocols.
12.13 Demonstrate knowledge of fundamentals of an Internet system.
12.14 Demonstrate knowledge of telecommunications services and standards.
12.15 Un-install, configure and troubleshoot Internet/Internet access by using browsers.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 8
Course Number: 8732180
Course Credit: 1

13.0 DEMONSTRATE PROFICIENCY IN SITE REQUIREMENTS AND CONSIDERATIONS--The student will be able to:

13.01 Demonstrate knowledge of data communication test equipment.
13.02 Demonstrate knowledge of telecommunication wiring systems.
13.03 Demonstrate knowledge of cable and LAN topology.
13.04 Demonstrate knowledge of hubs, switches and routers.
13.05 Calculate and determine power requirements.
13.06 Calculate and determine requirements of the working environment.
13.07 Install, configure and troubleshoot LAN cable systems (twisted pair, coax, or fiber).
13.08 Configure and troubleshoot patch bay, hubs and transceivers.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 9
Course Number: 8732190
Course Credit: 1

OCCUPATIONAL COMPLETION POINT - E (450 Hours)

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

14.01 Define and apply numbering systems to codes and arithmetic operations.
14.02 Analyze and minimize logic circuits using Boolean operations.
14.03 Set up and operate logic probes for digital circuits and solve power distribution and noise problems.
14.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
14.05 Set up and operate pulsars for digital circuits.
14.06 Set up and operate oscilloscopes for digital circuits.
14.07 Set up and operate logic analyzers for digital circuits.
14.08 Set up and operate pulse generators for digital circuits.
14.09 Identify types of logic gates and their truth tables.
14.10 Construct combinational logic circuits using integrated circuits.
14.11 Troubleshoot logic circuits.
14.12 Analyze types of flip-flops and their truth tables.
14.13 Construct flip-flops using integrated circuits.
14.14 Troubleshoot flip-flop.
14.15 Identify, define and measure characteristics of integrated circuits (IC) logic families.
14.16 Identify types of registers and counters.
14.17 Construct registers and counters using flip-flops and logic gates.
14.18 Troubleshoot registers and counters.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 10
Course Number: 8732191
Course Credit: 1

14.19 Analyze clock and timing circuits.
14.20 Construct clock and timing circuits.
14.21 Troubleshoot clock and timing circuits.
14.22 Identify types of arithmetic-logic circuits.
14.23 Construct arithmetic-logic circuits.
14.24 Troubleshoot arithmetic-logic circuits.
14.25 Identify types of encoding and decoding devices.
14.26 Construct encoders and decoders.
14.27 Troubleshoot encodes and decoders.
14.28 Identify types of multiplexer and demultiplexer circuits.
14.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
14.30 Troubleshoot multiplexer and demultiplexer circuits.
14.31 Identify types of memory circuits.
14.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
14.33 Construct digital-to-analog and analog-to-digital circuits.
14.34 Troubleshoot digits-to-analog and analog-to-digital circuits.
14.35 Identify types of digital displays.
14.36 Construct digital display circuits.
14.37 Troubleshoot digital display circuits.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program number **8732100**
Course Title: Computer Electronics Technology 11
Course Number: 8732192
Course Credit: 1

15.0 DEMONSTRATE PROFICIENCY IN FUNDAMENTAL MICRO PROCESSORS--The student will be able to:

15.01 Identify central processing unit (CPU) building blocks and their uses (architecture).
15.02 Analyze bus concepts.
15.03 Analyze various memory schemes.
15.04 Use memory devices in circuits.
15.05 Troubleshoot memory device circuits.
15.06 Set up and operate oscilloscopes for microprocessor systems.
15.07 Set up and operate logic-data analyzers to troubleshoot microprocessor systems.
15.08 Identify types of input and output devices and peripherals.
15.09 Interface input and output ports to peripherals.
15.10 Analyze and troubleshoot input and output ports.
15.11 Write a microprocessor program in assembly languages.
15.12 Write a microprocessor program in machine language.
15.13 Execute a microprocessor program.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Identify characteristics of the American Enterprise System.
16.02 Define inflation and deflation.
16.03 Illustrate the basic economic questions facing any society.
16.04 Determine the results and change in demand or a change in supply.
16.05 List factors, which contribute to economic growth.
16.06 Identify characteristics of different types of business ownership.
16.07 Choose appropriate action in a situation requiring application of business ethics.