

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Electronics Technology
Occupational Area: Technology Education
Program Numbers: 8600900
CIP Number: 0821.010400
Grade Level: Secondary 9-12, & 30, 31
Standard Length: 3 Credits
Facility Design Code: 241, Related 808, 850, 852
CTSO: Florida Technology Student Association (FL-TSA)
Certification: INDUS ARTS @4 @6
 ELECTRONIC @7G
 TEC ELEC @7G
 GEN SHOP @4
 ELECTRICAL @4 @7G
 I ART-TEC 1 @2

- I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of electronics technology. This program focuses on transferable skills and stresses understanding and demonstration of the technological tools, machines, instruments, materials, processes and systems in business and industry.

The content includes, but is not limited to, the theory, use, and technical application of electronics technology. The content and activities will also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that make up this program. Design code 241 is the appropriate laboratory facility for this program.

8600910 - Electronics Technology I
 8600920 - Electronics Technology II
 8600930 - Electronics Technology III

- II. **LABORATORY ACTIVITIES:** Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.
- III. **SPECIAL NOTE:** The Florida Technology Student Association (FL-TSA) is the appropriate Career and Technical Student Organization for providing leadership training experiences and reinforcing specific vocational skills. Career and Technical Student Organizations, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, FAC. FL-TSA information can be obtained from the web site at <<http://www.florida-tsa.net>>.

Advanced Applications in Technology (AAiT) - course number 8601900 is appropriate to be used for content area continuation in this program after all three credits of this program have been completed. The purpose of this course is to provide students with the opportunity to develop a school based project from "vision" to "reality". Working in teams to design, engineer, manufacture, construct, test, redesign, test again; and then produce a finished "project". This would involve using ALL the knowledge previously learned, not only in Technology Education

but also across the curriculum. See the (AAiT) framework for more information.

Work-Based Experience (WBE) - course number 8601800 is the appropriate course to provide Technology Education students with the opportunity, as Student Learners, to gain real world practical, first-hand exposure in broad occupational clusters or industry sectors through a structured, compensated or uncompensated experience. Work-Based Experience is also designed to give the Student Learners an opportunity to apply and integrate the knowledge, skills, and abilities acquired during their School-Based Experience to actual work situations independent of school facilities. At least one credit of a Technology Education program consisting of three credits must be completed before enrolling in WBE. See the (WBE) framework for more information.

The Intermediate and Advance courses in this program may articulate into postsecondary Tech-Prep 2 + 2 programs when taken in sequence. Tech-Prep 2 + 2 programs require articulation agreements between secondary and postsecondary educational agencies.

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 post school outcome statement on the Transition Individual Educational Plan (Transition IEP).

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

- 01.0 Demonstrate the ability to work safely with a variety of technologies.
- 02.0 Demonstrate interpersonal skills as they relate to the workplace.
- 03.0 Identify and apply methods of information acquisition and utilization.
- 04.0 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.
- 05.0 Demonstrate and apply design/problem-solving processes.
- 06.0 Express an understanding of technological systems and their complex interrelationships.
- 07.0 Demonstrate the ability to properly identify, organize, plan, and allocate resources.
- 08.0 Discuss individual interests and aptitudes as they relate to a career.
- 09.0 Demonstrate employability skills.
- 10.0 Demonstrate an understanding of entrepreneurship.
- 11.0 Make an informed and meaningful career choice.
- 12.0 Describe the structure of matter related to electronics.
- 13.0 Describe, construct, conduct, and analyze experiments with basic DC and AC circuits and with circuits using magnetism.
- 14.0 Identify, measure, and describe the function of transformers and inductors in electronic circuits.
- 15.0 Use Ohm's law and Watt's law to analyze and experiment with resistive circuits.
- 16.0 Describe, construct, analyze, and experiment with capacitive circuits.
- 17.0 Demonstrate the use of electronic equipment.
- 18.0 Demonstrate proper electronic assembly methods.

- 19.0 Demonstrate an understanding of basic electrical circuits and electronic systems.
- 20.0 Describe the structure of matter related to electronics.
- 21.0 Describe, construct, conduct, and analyze experiments with basic DC and AC circuits and with circuits using magnetism.
- 22.0 Identify, measure, and describe the function of transformers and inductors in electronic circuits.
- 23.0 Use Ohm's law and Watt's law to analyze and experiment with resistive circuits.
- 24.0 Describe, construct, analyze, and experiment with capacitive circuits
- 25.0 Describe and experiment with integrated circuits.
- 26.0 Demonstrate the use of electronic equipment.
- 27.0 Demonstrate an understanding of basic electrical circuits and electronic systems.
- 28.0 Describe, conduct, and experiment with circuits using semiconductors.
- 29.0 Perform advanced study and skills related to electronics technology.
- 30.0 Demonstrate an understanding of the principles and applications of microcomputer systems.
- 31.0 Describe, identify, and correct problems in electronic circuits.
- 32.0 Demonstrate technical knowledge and skills about electronic networks and systems.
- 33.0 Conduct a research and experimentation project on an electronic system or process.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8600910
Course Title: Electronics Technology I
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technical skills of electronics technology.

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--
The student will be able to:

- 01.01 Select appropriate tools, procedures, and/or equipment needed to produce a product.
- 01.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
- 01.03 Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
- 01.04 Follow laboratory safety rules and procedures.
- 01.05 Demonstrate good housekeeping at work station within total laboratory.
- 01.06 Identify color-coding safety standards.
- 01.07 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 01.08 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.0 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- 02.02 Participate as a member of a team.
- 02.03 Teach others new skills.
- 02.04 Identify skills needed to serve clients/customers.
- 02.05 Demonstrate leadership skills.
- 02.06 Describe strategies necessary for negotiating agreements.
- 02.07 Demonstrate the application of skills necessary to work with people of diverse backgrounds.
- 02.08 Form an understanding and appreciation for work after listening to or observing technology workers.
- 02.09 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
- 02.10 Form an understanding and appreciation for the roles and work of co-workers.

03.0 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATIONS--
The student will be able to:

- 03.01 Define terms related to computers.
- 03.02 Identify and describe methods of information acquisition and evaluation.
- 03.03 Discuss advantages and disadvantages in the application of technologies.
- 03.04 Produce a plan to organize and maintain information relevant to emerging technologies.

- 03.05 Comprehend and communicate information relevant to emerging technologies.
- 03.06 Demonstrate the use of computers to process information.
- 04.0 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:
 - 04.01 Identify and explain the main and subordinate ideas in a written work.
 - 04.02 Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
 - 04.03 Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
 - 04.04 Distinguish fact from opinion.
 - 04.05 Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
 - 04.06 Select, relate, and organize, ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
 - 04.07 Improve one's own writing by restructuring, correcting errors, and rewriting.
 - 04.08 Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
 - 04.09 Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
 - 04.10 Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
 - 04.11 Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
 - 04.12 Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
 - 04.13 Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
 - 04.14 Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;
 - geometry.
 - 04.15 Make estimates and approximations, and judge the reasonableness of a result.
 - 04.16 Use elementary concepts of probability and statistics.
 - 04.17 Draw, read, and analyze graphs, charts, and tables.
 - 04.18 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
 - 04.19 Organize and communicate the results obtained by observation and experimentation.
 - 04.20 Apply the basic principles of biology, physics, and chemistry (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).
 - 04.21 Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety,

effects of drugs on health, trouble shooting problems on a machine).

05.0 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--The student will be able to:

- 05.01 Describe and explain steps in the design/problem-solving process.
- 05.02 Propose solutions to given problems.
- 05.03 Design and implement the optimal solution to a given problem.
- 05.04 Document each step of the design/problem-solving process.
- 05.05 Demonstrate "brainstorming" as a process to solve problems.
- 05.06 Define "critical thinking" and its value in the problem-solving process.

06.0 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--The student will be able to:

- 06.01 Demonstrate a knowledge of how social, organizational, and technological systems work.
- 06.02 Explore methods used to monitor and correct performance of technological systems.
- 06.03 Design and implement an optimal solution to a given problem.
- 06.04 Outline major historical technological developments or events.
- 06.05 Identify recent advances in technology.
- 06.06 Explain problem-solving roles of technology.
- 06.07 Forecast a technological development or event.
- 06.08 Define technology.

07.0 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--The student will be able to:

- 07.01 Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
- 07.02 Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
- 07.03 Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
- 07.04 Display a knowledge of the efficient use of human resources.

08.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--The student will be able to:

- 08.01 Describe individual strengths and weaknesses.
- 08.02 Discuss individual interests related to a career.
- 08.03 Identify careers within specific areas of technology.
- 08.04 Explore careers within specific areas of interest.

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

- 09.01 Conduct a job search.
- 09.02 Secure information about a career.
- 09.03 Identify documents which may be required when applying for a job interview.
- 09.04 Complete a job application form correctly.
- 09.05 Demonstrate competence in job interview techniques.
- 09.06 Prepare a resume for a job.

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

- 10.01 Define entrepreneurship.
 - 10.02 Describe the importance of entrepreneurship to the American economy.
 - 10.03 List the advantages and disadvantages of business ownership.
 - 10.04 Identify the risks involved in ownership of a business.
 - 10.05 Identify the necessary personal characteristics of a successful entrepreneur.
 - 10.06 Identify the business skills needed to operate a small business efficiently and effectively.
- 11.0 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--The student will be able to:
- 11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.
 - 11.02 Review tentative occupational choices based on the information learned and interest developed in this course.
- 12.0 DESCRIBE THE STRUCTURE OF MATTER RELATED TO ELECTRONICS--The student will be able to:
- 12.01 Describe the composition of elements, mixtures, and compounds according to the electron theory.
 - 12.02 List the atomic subparticles.
 - 12.03 Diagram and show the relationship between electrons, protons, and neutrons.
 - 12.04 State the law of electrical charges.
 - 12.05 Describe the classification and characteristics of materials as they apply to conductor, insulators, and semiconductors.
 - 12.06 Demonstrate proficiency in the identification of electronics symbols.
- 13.0 DESCRIBE, CONSTRUCT, CONDUCT, AND ANALYZE EXPERIMENTS WITH BASIC DC AND AC CIRCUITS AND WITH CIRCUITS USING MAGNETISM--The student will be able to:
- 13.01 Solve math problems related to DC and AC circuits.
 - 13.02 Define voltage, current, resistance, power, and energy.
 - 13.03 Set up and test basic circuits.
 - 13.04 Set up and operate multimeters in DC and AC circuits.
 - 13.05 Set up and operate power supplies in DC circuits.
 - 13.06 Describe magnetism, the law of magnetic poles, and the behavior of flux lines.
 - 13.07 Demonstrate electromagnetism.
 - 13.08 Construct simple circuits using a relay.
- 14.0 IDENTIFY, MEASURE, AND DESCRIBE THE FUNCTION OF TRANSFORMERS AND INDUCTORS IN ELECTRONIC CIRCUITS--The student will be able to:
- 14.01 Explain the theory of operation and application of inductance in inductors and transformers.
 - 14.02 Explain what an inductor is and what its purpose is.
 - 14.03 Construct circuits using transformers and inductors.
 - 14.04 Explain inductive reactance.
- 15.0 USE OHM'S LAW AND WATT'S LAW TO ANALYZE AND EXPERIMENT WITH RESISTIVE CIRCUITS--The student will be able to:
- 15.01 Identify resistors by color code.
 - 15.02 Identify and measure resistors.
 - 15.03 Apply Ohm's law to circuits.

- 15.04 Explain how resistors are constructed.
 - 15.05 Apply Watt's law to circuits.
 - 15.06 Use a VOM to verify values.
 - 15.07 Identify different types of resistors, and explain their use and ratings.
- 16.0 DESCRIBE, CONSTRUCT, ANALYZE AND EXPERIMENT WITH CAPACITIVE CIRCUITS--
The student will be able to:
- 16.01 Explain how a capacitor stores electrical energy.
 - 16.02 Explain how a capacitor is constructed.
 - 16.03 Explain capacitive reactance.
- 17.0 DEMONSTRATE THE USE OF ELECTRONIC EQUIPMENT--The student will be able to:
- 17.01 Use a VOM to obtain accurate measurements.
 - 17.02 Apply safety rules in the use of electronic instruments and demonstrate proper care and maintenance for the equipment during storage and use.
 - 17.03 Use voltmeters, ammeters, and ohmmeters to obtain accurate measurements.
 - 17.04 Set up and use an oscilloscope to observe waveforms and to determine the voltage of the signal presented.
 - 17.05 Use signal generators to produce waveforms of selected frequencies and shapes.
 - 17.06 Use testers to determine the condition of electronic components.
- 18.0 DEMONSTRATE PROPER ELECTRONIC ASSEMBLY METHODS--The student will be able to:
- 18.01 Exhibit safe soldering techniques.
 - 18.02 Identify proper soldering practices.
 - 18.03 Demonstrate proper soldering applications.
 - 18.04 Identify common electrical and electronics hand tools.
 - 18.05 Demonstrate electronic component assembly.
 - 18.06 Apply electrical tape to a spliced and soldered wire connection.
 - 18.07 Solder and desolder components and wires.
 - 18.08 Describe the two methods of making a printed circuit board.
- 19.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICAL CIRCUITS AND ELECTRONIC SYSTEMS--The student will be able to:
- 19.01 Identify problems and demonstrate appropriate solutions when dealing with series, series-parallel, parallel, voltage dividers, and network circuits.
 - 19.02 Define electronic systems.
 - 19.03 Describe the importance of electronic systems in today's technology world.
 - 19.04 Define electronics input, process and output of electronic systems.
 - 19.05 Conduct electronic experiments using input, process and output systems.
 - 19.06 Describe, design and conduct experiments with electronic systems.

July 2000

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8600920
Course Title: Electronics Technology II
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technical skills of electronics technology.

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--
The student will be able to:

- 01.01 Select appropriate tools, procedures, and/or equipment needed to produce a product.
- 01.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
- 01.03 Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
- 01.04 Follow laboratory safety rules and procedures.
- 01.05 Demonstrate good housekeeping at work station within total laboratory.
- 01.06 Identify color-coding safety standards.
- 01.07 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 01.08 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.0 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- 02.02 Participate as a member of a team.
- 02.03 Teach others new skills.
- 02.04 Identify skills needed to serve clients/customers.
- 02.05 Demonstrate leadership skills.
- 02.06 Describe strategies necessary for negotiating agreements.
- 02.07 Demonstrate the application of skills necessary to work with people of diverse backgrounds.
- 02.08 Form an understanding and appreciation for work after listening to or observing technology workers.
- 02.09 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
- 02.10 Form an understanding and appreciation for the roles and work of co-workers.

03.0 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATIONS--
The student will be able to:

- 03.01 Define terms related to computers.
- 03.02 Identify and describe methods of information acquisition and evaluation.
- 03.03 Discuss advantages and disadvantages in the application of technologies.

- 03.04 Produce a plan to organize and maintain information relevant to emerging technologies.
 - 03.05 Comprehend and communicate information relevant to emerging technologies.
 - 03.06 Demonstrate the use of computers to process information.
- 04.0 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:
- 04.01 Identify and explain the main and subordinate ideas in a written work.
 - 04.02 Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
 - 04.03 Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
 - 04.04 Distinguish fact from opinion.
 - 04.05 Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
 - 04.06 Select, relate, and organize ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
 - 04.07 Improve one's own writing by restructuring, correcting errors, and rewriting.
 - 04.08 Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
 - 04.09 Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
 - 04.10 Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
 - 04.11 Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
 - 04.12 Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
 - 04.13 Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
 - 04.14 Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;
 - geometry.
 - 04.15 Make estimates and approximations, and judge the reasonableness of a result.
 - 04.16 Use elementary concepts of probability and statistics.
 - 04.17 Draw, read, and analyze graphs, charts, and tables.
 - 04.18 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
 - 04.19 Organize and communicate the results obtained by observation and experimentation.
 - 04.20 Apply the basic principles of biology, physics, and chemistry (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).

- 04.21 Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).
- 05.0 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--The student will be able to:
 - 05.01 Describe and explain steps in the design/problem-solving process.
 - 05.02 Propose solutions to given problems.
 - 05.03 Design and implement the optimal solution to a given problem.
 - 05.04 Document each step of the design/problem-solving process.
 - 05.05 Demonstrate "brainstorming" as a process to solve problems.
 - 05.06 Define "critical thinking" and its value in the problem-solving process.
- 06.0 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--The student will be able to:
 - 06.01 Demonstrate a knowledge of how social, organizational, and technological systems work.
 - 06.02 Explore methods used to monitor and correct performance of technological systems.
 - 06.03 Design and implement an optimal solution to a given problem.
 - 06.04 Outline major historical technological developments or events.
 - 06.05 Identify recent advances in technology.
 - 06.06 Explain problem-solving roles of technology.
 - 06.07 Forecast a technological development or event.
 - 06.08 Define technology.
- 07.0 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--The student will be able to:
 - 07.01 Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
 - 07.02 Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
 - 07.03 Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
 - 07.04 Display a knowledge of the efficient use of human resources.
- 08.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--The student will be able to:
 - 08.01 Describe individual strengths and weaknesses.
 - 08.02 Discuss individual interests related to a career.
 - 08.03 Identify careers within specific areas of technology.
 - 08.04 Explore careers within specific areas of interest.
- 09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:
 - 09.01 Conduct a job search.
 - 09.02 Secure information about a career.
 - 09.03 Identify documents which may be required when applying for a job interview.
 - 09.04 Complete a job application form correctly.
 - 09.05 Demonstrate competence in job interview techniques.
 - 09.06 Prepare a resume for a job.

- 10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:
- 10.01 Define entrepreneurship.
 - 10.02 Describe the importance of entrepreneurship to the American economy.
 - 10.03 List the advantages and disadvantages of business ownership.
 - 10.04 Identify the risks involved in ownership of a business.
 - 10.05 Identify the necessary personal characteristics of a successful entrepreneur.
 - 10.06 Identify the business skills needed to operate a small business efficiently and effectively.
- 11.0 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--The student will be able to:
- 11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.
 - 11.02 Review tentative occupational choices based on the information learned and interest developed in this course.
- 20.0 DESCRIBE THE STRUCTURE OF MATTER RELATED TO ELECTRONICS--The student will be able to:
- 20.01 Describe the composition of element, mixtures, and compounds according to the electron theory.
 - 20.02 List the atomic subparticles.
 - 20.03 Diagram and show the relationship between electrons, protons, and neutrons.
 - 20.04 State the law of electrical charges.
 - 20.05 Describe the classification and characteristics of materials as they apply to conductors, insulators, and semiconductors.
 - 20.06 Demonstrate proficiency in the identification of electronics symbols.
- 21.0 DESCRIBE, CONSTRUCT, CONDUCT, AND ANALYZE EXPERIMENTS WITH BASIC DC AND AC CIRCUITS AND WITH CIRCUITS USING MAGNETISM--The student will be able to:
- 21.01 Solve electronic math problems related to DC and AC circuits.
 - 21.02 Define voltage, current, resistance, power, and energy.
 - 21.03 Set up and test basic circuits.
 - 21.04 Set up and operate multimeters in DC and AC circuits.
 - 21.05 Set up and operate power supplies in DC circuits.
 - 21.06 Describe magnetism, the law of magnetic poles, and the behavior of flux lines.
 - 21.07 Demonstrate electromagnetism.
 - 21.08 Construct simple circuits using a relay.
- 22.0 IDENTIFY, MEASURE, AND DESCRIBE THE FUNCTION OF TRANSFORMERS AND INDUCTORS IN ELECTRONIC CIRCUITS--The student will be able to:
- 22.01 Explain the theory of operation and application of inductance in inductors and transformers.
 - 22.02 Explain what an inductor is and what its purpose is.
 - 22.03 Construct circuits using transformers and inductors.
 - 22.04 Explain inductive reactance.
- 23.0 USE OHM'S LAW AND WATT'S LAW TO ANALYZE AND EXPERIMENT WITH RESISTIVE CIRCUITS--The student will be able to:

- 23.01 Identify resistors by color code.
 - 23.02 Identify and measure resistors.
 - 23.03 Apply Ohm's law to circuits.
 - 23.04 Explain how resistors are constructed.
 - 23.05 Apply Watt's law to circuits.
 - 23.06 Use a VOM to verify values.
 - 23.07 Identify different types of resistors, and explain their use ratings.
- 24.0 DESCRIBE, CONSTRUCT, ANALYZE AND EXPERIMENT WITH CAPACITIVE CIRCUITS--
The student will be able to:
- 24.01 Explain how a capacitor stores electrical energy.
 - 24.02 Explain how a capacitor is constructed.
 - 24.03 Explain capacitive reactance.
- 25.0 DESCRIBE AND EXPERIMENT WITH INTEGRATED CIRCUITS--The student will be able to:
- 25.01 Explain what integrated circuits (IC's) are and how they are manufactured.
 - 25.02 Explain the advantages of integrated circuits as compared to discrete component circuits.
 - 25.03 Construct electronic circuits which contain ICs.
 - 25.04 Describe the basic types of integrated circuit design, along with their pin numbering systems and dimensions.
- 26.0 DEMONSTRATE THE USE OF ELECTRONIC EQUIPMENT--The student will be able to:
- 26.01 Use a VOM to obtain accurate measurements.
 - 26.02 Apply safety rules in the use of electronic instruments and demonstrate proper care and maintenance for the equipment during storage and use.
 - 26.03 Use voltmeters, ammeters, and ohmmeters to obtain accurate measurements.
 - 26.04 Set up and use an oscilloscope to observe waveforms and to determine the voltage of the signal presented.
 - 26.05 Use signal generators to produce waveforms of selected frequencies and shapes.
 - 26.06 Use testers to determine the condition of electronic components.
- 27.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICAL CIRCUITS AND ELECTRONIC SYSTEMS--The student will be able to:
- 27.01 Identify problems and demonstrate appropriate solutions when dealing with series, series-parallel, parallel, voltage dividers, and network circuits.
 - 27.02 Define electronic systems.
 - 27.03 Describe the importance of electronic systems in today's technology world.
 - 27.04 Define electronic input, process and output of electronic systems.
 - 27.05 Conduct electronic experiments using input, process and output systems.
 - 27.06 Describe, design and conduct experiments with electronic systems.
 - 27.07 Define and give an example of a super conductor.

28.0 DESCRIBE, CONSTRUCT, AND EXPERIMENT WITH CIRCUITS USING SEMICONDUCTORS--
The student will be able to:

- 28.01 Describe the general theory and application of semiconductor devices.
- 28.02 Explain the difference between N-type and P-type material.
- 28.03 Explain the precautions necessary when working with solid state devices.
- 28.04 Demonstrate the proper procedures for the installation of solid state components using thermal release devices (heat sinks).
- 28.05 Construct and experiment with semiconductor devices.
- 28.06 Construct and test circuits which contain solid state components such as FET'S, SCR's, UJT's, tunnel diodes, zener diodes, light emitting diodes, etc.

July 2000

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8600930
Course Title: Electronics Technology III
Course Credit: 1

COURSE DESCRIPTION: This course provides students with an introduction to the knowledge, human relations, and technical skills of electronics technology.

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--
The student will be able to:

- 01.01 Select appropriate tools, procedures, and/or equipment needed to produce a product.
- 01.02 Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
- 01.03 Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
- 01.04 Follow laboratory safety rules and procedures.
- 01.05 Demonstrate good housekeeping at work station within total laboratory.
- 01.06 Identify color-coding safety standards.
- 01.07 Explain fire prevention and safety precautions and practices for extinguishing fires.
- 01.08 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

02.0 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida Technology Student Association (FL-TSA).
- 02.02 Participate as a member of a team.
- 02.03 Teach others new skills.
- 02.04 Identify skills needed to serve clients/customers.
- 02.05 Demonstrate leadership skills.
- 02.06 Describe strategies necessary for negotiating agreements.
- 02.07 Demonstrate the application of skills necessary to work with people of diverse backgrounds.
- 02.08 Form an understanding and appreciation for work after listening to or observing technology workers.
- 02.09 Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
- 02.10 Form an understanding and appreciation for the roles and work of co-workers.

03.0 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATIONS--
The student will be able to:

- 03.01 Define terms related to computers.
- 03.02 Identify and describe methods of information acquisition and evaluation.
- 03.03 Discuss advantages and disadvantages in the application of technologies.

- 03.04 Produce a plan to organize and maintain information relevant to emerging technologies.
 - 03.05 Comprehend and communicate information relevant to emerging technologies.
 - 03.06 Demonstrate the use of computers to process information.
- 04.0 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:
- 04.01 Identify and explain the main and subordinate ideas in a written work.
 - 04.02 Distinguish different purposes and methods of writing, identify a writer's point of view and tone, and interpret a writer's meaning.
 - 04.03 Define unfamiliar words by use of structural analysis, decoding, contextual clues, or by using a dictionary.
 - 04.04 Distinguish fact from opinion.
 - 04.05 Read critically by asking pertinent questions, by recognizing assumptions and implications, and by evaluating ideas.
 - 04.06 Select, relate, and organize ideas using outlining and/or graphic organizers and develop the ideas in coherent paragraphs.
 - 04.07 Improve one's own writing by restructuring, correcting errors, and rewriting.
 - 04.08 Gather and organize information from primary and secondary sources; write a report using this research; quote, paraphrase, and summarize accurately; and cite sources properly.
 - 04.09 Vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
 - 04.10 Write logical and understandable statements, or phrases, to accurately fill out commonly used forms.
 - 04.11 Compose unified and coherent correspondence, directions, descriptions, explanations and reports.
 - 04.12 Participate critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
 - 04.13 Conceive and develop ideas about a topic for the purpose of speaking to a group; choose and organize related ideas; present them clearly in Standard English; and evaluate similar presentations by others.
 - 04.14 Use the mathematics of:
 - integers, fractions, and decimals;
 - ratios, proportions, and percentages;
 - roots and powers;
 - algebra;
 - geometry.
 - 04.15 Make estimates and approximations, and judge the reasonableness of a result.
 - 04.16 Use elementary concepts of probability and statistics.
 - 04.17 Draw, read, and analyze graphs, charts, and tables.
 - 04.18 Ask appropriate scientific questions and recognize what is involved in experimental approaches to the solutions of such questions through familiarity with laboratory and field work.
 - 04.19 Organize and communicate the results obtained by observation and experimentation.
 - 04.20 Apply the basic principles of biology, physics, and chemistry (properties of matter; structure of compounds; concepts of motion; temperature, pressure and volume; work, power, force and energy; machines; human cell structure).

- 04.21 Identify problems rooted in basic biology, physics, or chemistry (effects of hazardous materials on health and safety, effects of drugs on health, trouble shooting problems on a machine).
- 05.0 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--The student will be able to:
 - 05.01 Describe and explain steps in the design/problem-solving process.
 - 05.02 Propose solutions to given problems.
 - 05.03 Design and implement the optimal solution to a given problem.
 - 05.04 Document each step of the design/problem-solving process.
 - 05.05 Demonstrate "brainstorming" as a process to solve problems.
 - 05.06 Define "critical thinking" and its value in the problem-solving process.
- 06.0 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--The student will be able to:
 - 06.01 Demonstrate a knowledge of how social, organizational, and technological systems work.
 - 06.02 Explore methods used to monitor and correct performance of technological systems.
 - 06.03 Design and implement an optimal solution to a given problem.
 - 06.04 Outline major historical technological developments or events.
 - 06.05 Identify recent advances in technology.
 - 06.06 Explain problem-solving roles of technology.
 - 06.07 Forecast a technological development or event.
 - 06.08 Define technology.
- 07.0 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--The student will be able to:
 - 07.01 Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
 - 07.02 Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
 - 07.03 Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
 - 07.04 Display a knowledge of the efficient use of human resources.
- 08.0 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER--The student will be able to:
 - 08.01 Describe individual strengths and weaknesses.
 - 08.02 Discuss individual interests related to a career.
 - 08.03 Identify careers within specific areas of technology.
 - 08.04 Explore careers within specific areas of interest.
- 09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:
 - 09.01 Conduct a job search.
 - 09.02 Secure information about a career.
 - 09.03 Identify documents which may be required when applying for a job interview.
 - 09.04 Complete a job application form correctly.
 - 09.05 Demonstrate competence in job interview techniques.
 - 09.06 Prepare a resume for a job.

- 10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:
 - 10.01 Define entrepreneurship.
 - 10.02 Describe the importance of entrepreneurship to the American economy.
 - 10.03 List the advantages and disadvantages of business ownership.
 - 10.04 Identify the risks involved in ownership of a business.
 - 10.05 Identify the necessary personal characteristics of a successful entrepreneur.
 - 10.06 Identify the business skills needed to operate a small business efficiently and effectively.
- 11.0 MAKE AN INFORMED AND MEANINGFUL CAREER CHOICE--The student will be able to:
 - 11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.
 - 11.02 Review tentative occupational choices based on the information learned and interest developed in this course.
- 29.0 PERFORM ADVANCED STUDY AND SKILLS RELATED TO ELECTRONICS--The student will be able to:
 - 29.01 Select an individual or group project in cooperation with the teacher.
 - 29.02 Develop a written plan of work to carry out the project.
 - 29.03 Show evidence of technical study in support of the project.
 - 29.04 Perform skills related to the project.
 - 29.05 Complete the project as planned.
- 30.0 DEMONSTRATE AN UNDERSTANDING OF THE PRINCIPLES AND APPLICATIONS OF MICROCOMPUTER SYSTEMS--The student will be able to:
 - 30.01 Define microcomputer systems.
 - 30.02 Describe the importance of microcomputer systems in today's technology world.
 - 30.03 Describe microcomputer applications in today's technology world.
 - 30.04 Define microcomputer interfacing.
 - 30.05 Conduct microcomputer systems experiments.
 - 30.06 Conduct microcomputer systems interfacing, sensing and control applications.
- 31.0 DESCRIBE, IDENTIFY, AND CORRECT PROBLEMS IN ELECTRONIC CIRCUITS--The student will be able to:
 - 31.01 Identify problems and demonstrate solutions when dealing with power supplies, oscillators, and amplifiers.
- 32.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRONIC NETWORKS AND SYSTEMS--The student will be able to:
 - 32.01 Define and describe telecommunications.
 - 32.02 Conduct telecommunications experiments including receivers, transmitters, wirelines and antennas, telephones and fiber optics.
 - 32.03 Describe the technology and organization of electronic guidance systems.
 - 32.04 Perform technical skills in building, assembling, servicing, or operating one of the above systems.

- 32.05 Define and describe logic control.
- 32.06 Conduct a logic control experiment.
- 32.07 Define and describe digital communications.
- 32.08 Conduct a digital communications experiment.
- 32.09 Define and describe industrial controls.
- 32.10 Conduct an industrial controls experiment.

33.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN ELECTRONIC SYSTEM OR PROCESS--The student will be able to:

- 33.01 Identify a problem.
- 33.02 State a need to research the problem.
- 33.03 Form a hypothesis about the problem.
- 33.04 Plan the procedures for researching the problem.
- 33.05 Conduct the research following the planned procedures.
- 33.06 Present the research findings in a seminar.
- 33.07 State conclusions based on the research findings.