Florida Department of Education
Curriculum Framework

Program Title: **Electricity**
Program Type: **Career Preparatory**
Career Cluster: **Architecture and Construction**

Career Certificate Program		
Program Number	I460312	
CIP Number	0646030202	
Grade Level	30,31	
Program Length	1200 Hours	
Teacher Certification	Refer to the **Program Structure** section.	
CTSO	SkillsUSA	
SOC Codes (all applicable)	Please see the CIP to SOC Crosswalk located at the link below.	
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml	
Basic Skills Level	Computations (Mathematics): 9	Communications (Reading and Language Arts): 9

Purpose

The purpose of this program is to prepare students for employment or advanced training in a variety of electrical construction industries.

This program focuses on broad, transferable skills, stresses the understanding of all aspects of the electricity industry, and demonstrates such elements of the industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Architecture and Construction career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Architecture and Construction career cluster.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of three occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

To teach the courses listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the postsecondary program structure:

OCP	Course Number	Course Title	Teacher Certification	Length
A	BCV0603	Electrician Helper	ELECTRICAL @7 7G IND ENGR 7G TEC ED 1@2 ENG&TEC ED 1@2	300 Hours
B	BCV0640	Residential Electrician	ELECTRICAL @7 7G	450 Hours
C	BCV0652	Commercial Electrician		450 Hours

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.

2. Apply appropriate academic and technical skills.

3. Attend to personal health and financial well-being.

4. Communicate clearly, effectively and with reason.

5. Consider the environmental, social and economic impacts of decisions.

6. Demonstrate creativity and innovation.

7. Employ valid and reliable research strategies.

8. Utilize critical thinking to make sense of problems and persevere in solving them.

9. Model integrity, ethical leadership and effective management.

10. Plan education and career path aligned to personal goals.

11. Use technology to enhance productivity.

12. Work productively in teams while using cultural/global competence.

Standards

After successfully completing this program, the student will be able to perform the following:

01.0 Explain the importance of health, safety, environmental stewardship and related regulatory compliance.
02.0 Identify, use and maintain the tools and accessories used in the electrical industry.
03.0 Demonstrate an understanding of basic Direct-Current (DC) electrical-circuit skills.
04.0 Apply mathematics knowledge and skills to electricity.
05.0 Demonstrate an understanding of basic electricity.
06.0 Read and interpret basic electric codes.
07.0 Apply further mathematics knowledge and skills to electricity.
08.0 Demonstrate further understanding of electricity.
09.0 Demonstrate analytical and trouble shooting skills related to electrical principles.
10.0 Demonstrate proficiency in electrical math problems and skills.
11.0 Demonstrate an understanding of Alternating Current (AC) circuit skills.
12.0 Explain the importance of employability and entrepreneurship skills.
13.0 Install residential wiring.
14.0 Install residential wiring systems.
15.0 Demonstrate proficiency in commercial wiring.
16.0 Demonstrate specialized electrical skills.

Florida Department of Education
Student Performance Standards

Program Title: Electricity
Career Certificate Program Number: I460312

Course Number: BCV0603 **Occupational Completion Point: A** **Electrician Helper – 300 Hours**	
01.0	Explain the importance of health, safety, environmental stewardship and related regulatory compliance. The student will be able to:
01.01	Understand the role and purpose of the Occupational Safety and Health Administration (OSHA) rules and regulations.
01.02	Clean the work area and maintain it in a safe condition.
01.03	Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments.
01.04	Identify and operate workplace safety electrical devices.
01.05	Identify health related problems that may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
01.06	Explain emergency procedures to follow in response to workplace accidents.
01.07	Create a disaster and/or emergency response plan for specific incidences.
01.08	Explain the importance of CPR (CardioPulmonary Resuscitation) and first aid.
01.09	Describe "Right-to-Understand" Law as recorded in (29 CFR.1910.1200).
02.0	Identify, use and maintain the tools and accessories used in the electrical industry. The student will be able to:
02.01	Identify and select tools, equipment and materials to complete a job.
02.02	Drill holes in metal, wood and concrete for electrical installations.
02.03	Determine the layout of electrical devices, complying with local, state and national electric code regulations.
02.04	Install the following, complying with the appropriate local, state or national electric codes: • Conductors and cable. • Standard outlets and switch boxes. • Cord connections on equipment. • Cords, switches, receptacles and dimmers, including a single-pole switched lighting circuit, a three-way switched lighting circuit and a four-way combination circuit.

03.0	Demonstrate an understanding of basic Direct Current (DC) electrical circuit skills. The student will be able to:
	03.01 Define the following terms: voltage, current, resistance and power.
	03.02 Measure voltage, current and resistance using industry standard electrical measuring devices.
	03.03 Analyze and explain series, parallel, and series parallel (combination) circuits.
	03.04 Draw each type of circuit and calculate the circuit values.
	03.05 Explain and apply Ohm's Law.
	03.06 Compute conductance and resistance of conductors.
04.0	Apply mathematics knowledge and skills to electricity. The student will be able to:
	04.01 Demonstrate knowledge of arithmetic operations.
	04.02 Analyze and apply data and measurements to solve problems and interpret documents.
	04.03 Construct charts, tables and graphs using functions and data.
05.0	Demonstrate an understanding of basic electricity. The student will be able to:
	05.01 Relate electricity to the nature of matter.
	05.02 Describe various ways that electricity is produced.
	05.03 Explain the magnetic properties of circuits and devices.
	05.04 Explain the principles of electromagnetism.
06.0	Read and interpret basic electric codes. The student will be able to:
	06.01 Describe the importance of following the local, state and national electric codes.
	06.02 Read and interpret basic electric codes, wiring plans and specifications.
	06.03 Identify licensure requirements for electrical occupations.
	06.04 Demonstrate knowledge of National Fire Protection Association (NFPA) 70E and how it relates to job safety.
07.0	Apply further mathematics knowledge and skills to electricity. The student will be able to:
	07.01 Demonstrate and solve basic algebraic formulas related to electricity.

	07.02 Solve basic trigonometric functions related to electrical theory.
	07.03 Explain basic Alternating Current (AC) theory and solve related mathematical problems using appropriate test equipment.
	07.04 Solve math related problems from measurements on training aids.
08.0	Demonstrate further understanding of electricity. The student will be able to:
	08.01 Explain how voltage is produced by chemical, mechanical, thermal, photoelectric and piezo electric means.
09.0	Demonstrate analytical and trouble shooting skills related to electrical principles. The student will be able to:
	09.01 Identify conditions and resolutions to overcurrent and ground fault conditions in electrical circuits.
	09.02 Discuss the dangers, conditions and resolutions to short circuit and arc fault conditions in electrical circuits.

Course Number: BCV0640 Occupational Completion Point: B Residential Electrician – 450 Hours	
10.0	Demonstrate proficiency in electrical math problems and skills. The student will be able to:
	10.01 Calculate wiring costs.
	10.02 Calculate voltage drop.
	10.03 Determine ampacity correction factors.
	10.04 Calculate conduit fill.
	10.05 Calculate box fill.
	10.06 Calculate range loads.
11.0	Demonstrate an understanding of Alternating Current (AC) circuit skills. The student will be able to:
	11.01 Identify the physical and electrical characteristics of capacitors and inductors.
	11.02 Demonstrate proficiency in measuring, testing and connecting a transformer.
	11.03 Analyze and apply the principles of transformers to AC circuits.
	11.04 Identify the properties of an AC signal. (optional)
	11.05 Identify AC sources.

12.0	Explain the importance of employability and entrepreneurship skills. The student will be able to:
12.01	Identify and demonstrate positive work behaviors needed to be employable.
12.02	Develop personal career plan that includes goals, objectives and strategies.
12.03	Examine licensing, certification and industry credentialing requirements.
12.04	Maintain a career portfolio to document knowledge, skills and experience.
12.05	Evaluate and compare employment opportunities that match career goals.
12.06	Identify and exhibit traits for retaining employment.
12.07	Identify opportunities and describe requirements for career advancement.
12.08	Describe the benefits of ongoing professional development.
12.09	Examine and describe entrepreneurship opportunities as a career planning option.
13.0	Install residential wiring. The student will be able to:
13.01	Identify residential wiring requirements and specifications in accordance with a wiring plan.
13.02	Identify electrical symbols in construction documents.
13.03	Draw a residential wiring plan, using electrical wiring symbols.
13.04	Identify and install a recessed lighting fixture, a fluorescent lighting fixture and a surface lighting fixture according to the specifications, complying with the appropriate local, state and national electric codes.
13.05	Identify, install and wire a duplex receptacle outlet circuit, a split wired duplex receptacle outlet circuit, and a special purpose receptacle outlet circuit, a Ground Fault Circuit Interrupter (GFCI) receptacle or circuit breaker, and an Arc Fault Circuit Interrupter (AFCI) receptacle or circuit breaker, according to the specifications, complying with the appropriate local, state and national electric codes.
14.0	Install residential wiring systems. The student will be able to:
14.01	Install and wire a low voltage signal system.
14.02	Install conduit systems.
14.03	Provide power for Heating, Ventilation and Air Conditioning (HVAC) equipment.
14.04	Install the following, complying with the appropriate local, state and national electric codes: • Service entrance main panel. • Service entrance meter base.

	• Alarm systems and smoke detectors.
14.05	Demonstrate knowledge of the requirements for the installation of a swimming pool electrical system.
14.06	Connect single-phase and three-phase transformers.
14.07	Troubleshoot residential electric circuits.

Course Number: BCV0652 Occupational Completion Point: C Commercial Electrician – 450 Hours	
15.0	Demonstrate proficiency in commercial wiring. The student will be able to:
15.01	Read and interpret a commercial wiring plan and specifications.
15.02	Draw a commercial electrical wiring plan.
15.03	Select tools, equipment and materials to complete a job.
15.04	Install or identify the following according to the plan and specifications, complying with appropriate electric codes: • Wire mold. • Conduit, duct and raceway systems. • Conductors in a conduit.
15.05	Describe the difference between a residential and a commercial lighting circuit.
15.06	Describe poly-(three)-phase circuits.
15.07	Install a simple poly-(three)-phase circuit.
15.08	Construct control circuits from schematics.
15.09	Describe high voltage (over 1000 volts) wiring requirements.
15.10	Demonstrate a general knowledge of hazardous locations and wiring methods.
15.11	Explain a commercial three-phase receptacle circuit and an emergency lighting system.
15.12	Explain commercial service entrance requirements.
16.0	Demonstrate specialized electrical skills. The student will be able to:
16.01	Demonstrate an understanding of solid state control devices such as Variable Frequency Drives (VFD's), electronic ballast, electronic motor starters, motion sensors, etc.
16.02	Demonstrate an understanding of data cable installation according to the plans and specifications.

16.03 Demonstrate an understanding of the basic concepts of grounding and bonding.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Career and Technical Student Organization (CTSO)

SkillsUSA is the co-curricular career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Basic Skills

In Career Certificate Programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Computation (Mathematics) and Communications (Reading and Language Arts). These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02, Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01, F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College System Institution must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91, F.S.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.