2012 – 2013

Florida Department of Education
Curriculum Framework

Program Title: **Electrical Distribution Technology Advanced**
Career Cluster: **Energy**

CCC	
CIP Number	0646030102
Program Type	College Credit Certificate (CCC)
Program Length	50 Credit Hours
CTSO	SkillsUSA
SOC Codes (all applicable)	49-9051
Targeted Occupation List	http://www.labormarketinfo.com/wec/TargetOccupationList.htm
Perkins Technical Skill Attainment Inventory	http://www.fldoe.org/workforce/perkins/perkins_resources.asp
Statewide Articulation	http://www.fldoe.org/workforce/dwdframe/artic_frame.asp

Purpose

The purpose of this program is to prepare students for advanced entry-level employment as utility electrical line workers, or in related work on private industry owned and operated electrical distribution systems.

This certificate program is part of the Electrical Distribution Technology AS/AAS degree program (1646030101/0646030101).

A College Credit Certificate consists of a program of instruction of less than sixty (60) credits of college-level courses, which is part of an AS or AAS degree program and prepares students for entry into employment (Rule 6A-14.030, F.A.C.).

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Energy 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 Energy career cluster.

The content includes but is not limited to safety and safe work practices; fundamentals of electricity and electrical formulae; electrical transmission/distribution substation operation; installation, maintenance and operation of overhead and underground electrical distribution systems and internship employment.

Laboratory Activities

Laboratory activities are an integral part of this program. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes related to these occupations. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

Career and Technical Student Organization (CTSO)

SkillsUSA, Inc. is the appropriate career and technical student organization for providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered. The activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.065, F.A.C.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities as identified on the secondary student's IEP or 504 plan or postsecondary student's accommodations' plan to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their postsecondary service provider. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Articulation

For details on articulation agreements which correlate to programs and industry certifications refer to http://www.fldoe.org/workforce/dwdframe/artic_frame.asp.

Standards

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

01.0 Demonstrate general safe work practices promulgated under Federal, State and industry regulation.
02.0 Demonstrates rescue, CPR and lifesaving strategies particularly related to the industry.
03.0 Demonstrates proficiencies in rigging pole climbing and basic pole framing.
05.0 Demonstrates proficiencies in setting distribution poles.
06.0 Demonstrates proficiencies installing overhead line equipment.
07.0 Demonstrates proficiencies in applying electrical formulae and electric test equipment.
08.0 Demonstrates proficiencies in constructing new underground electrical distribution systems.
10.0 Demonstrates techniques for maintenance of overhead facilities.

11.0 Demonstrates techniques for maintenance of underground facilities.
16.0 Demonstrates proficiencies in applied electrical theory.
17.0 Demonstrate proficiency in utility construction equipment operation and maintenance.

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Florida Department of Education
Student Performance Standards

Program Title: **Electrical Distribution Technology Advanced**
CIP Number: **0646030102**
Program Length: **50 Credit Hours**
SOC Code(s): **49-9051**

This certificate program is part of the Electrical Distribution Technology AS/AAS degree program (1646030101/0615.030201). At the completion of this program, the student will be able to:

01.0 Demonstrates general safe work practices promulgated under Federal, State and industry regulation--The student will be able to:

- 01.01 Discuss and describe the function and mission of OSHA and an employer's Safety Organization.
- 01.02 Be able to research, generally interpret and apply sections of a Safe Work practice manual.
- 01.03 Be able to research, generally interpret and apply OSHA safe work practices
- 01.04 Discuss safe trenching, excavation and shoring practices.
- 01.05 When given a scenario the student will be able to discuss the applied safe work practices.
- 01.06 Discuss safe truck driving and pole and equipment trailer practices.
- 01.07 Understand the process of obtaining the State of Florida CDL-A Permit License.

02.0 Demonstrates rescue, CPR and lifesaving strategies particularly related to the industry--The student will be able to:

- 02.01 Describe the rescue and life saving requirement training for line workers under OSHA.
- 02.02 Correctly evaluate potential hazards for rescue planning in tailboard sessions.
- 02.03 Correctly identify the standby equipment for job site safety/rescue preparedness.
- 02.04 Evaluate safety/rescue equipment for worthiness.
- 02.05 Evaluate a first aid kit for completeness.
- 02.06 Correctly evaluate and administer first aid.
- 02.07 Effectively initiate professional lifesaving 911 response in an emergency situation.
- 02.08 Describe the processes for organizing a rescue response team.
- 02.09 Perform as the incident commander in a rescue response.
- 02.10 Perform CPR alone and as a team on adults, children and infants.
- 02.11 Describe the process and perform a rescue of an injured person from an aerial platform.
- 02.12 Describe the process and perform a rescue of an injured person from a pole top or structure.
- 02.13 Describe the process and perform a rescue of an injured person from a manhole.

03.0 Demonstrates proficiencies in rigging, pole climbing and basic pole framing--The student will be able to:

03.01 Discuss and explain how ropes are manufactured.
03.02 Discuss the construction of and application of rope.
03.03 Distinguish between rope types and applications.
03.04 Demonstrate proper care and maintenance of ropes.
03.05 Correctly apply and tie knots for a variety of rigging requirement.
03.06 Discuss and demonstrate the effect of rigging multiple sheave blocks.
03.07 Properly rig a variety of sheaved blocks.
03.08 Demonstrate proper rope splicing techniques.
03.09 Properly apply hoist to a variety of lifting situations.
03.10 Demonstrate care, maintenance and operation of cable, chain and strap hoist.
03.11 Demonstrate rigging for pulling/tensioning down guys.
03.12 Demonstrate rigging for lifting equipment and poles.
03.13 Demonstrate inspection, care, maintenance and application of a variety of slings.
03.14 Demonstrate the application and rigging of gins and saddles.
03.15 Discuss and demonstrate the dynamics of compound rigging.
03.16 Discuss the care and maintenance of pole climbing equipment.

05.0 Demonstrate proficiencies in setting distribution poles--The student will be able to:

05.01 Discuss and identify different types of and applications of line support structures.
05.02 Identify ratings and manufacturer of structures by reading the pole “brand.”
05.03 Correctly stake and layout for pole setting by reading a construction blueprint.
05.04 Install a variety of pole guy anchor types.
05.05 Discuss wind loading and pole stresses.
05.06 Discuss and identify pole failure modes.
05.07 Discuss and properly install and test pole/structure grounding installations.
05.08 Properly layout the tools and equipment to set a wood or concrete pole.
05.09 Properly excavate for and install a wood or concrete pole using a pole truck and capstan.
05.10 Properly excavate for and set a 30/5 wood pole by hand.
05.11 Properly execute a dead-man and push brace installation.
05.12 Demonstrate canting, tamping and raking of distribution structures.
05.13 Demonstrate proficiencies in setting a variety of pole anchor systems.
05.14 Identify transmission structure types.
05.15 Correctly identify dead end, close, vertical, cross-arm, alley arm and pole top pin construction.
05.16 Intelligently discuss joint-use utility provisions and clearances.

06.0 Demonstrates proficiencies installing overhead line equipment--The student will be able to:

06.01 Using a blueprint and standards manual properly apply distribution construction standards for Pole Line Equipment installations.
06.02 Correctly determine the application and voltage of a distribution class insulator by observation of a pole line.
06.03 Properly apply the correct insulators for a distribution line installation.
06.04 Properly apply the correct surge arrestors for a distribution line installation
06.05 Properly install and wire surge arrestors in a variety of applications and configurations.
06.06 Discuss stress cone and insulator technology.
06.07 Discuss lightning arrestor technologies.

06.08 Classify distribution class switches and disconnects by current, voltage and style.
06.09 Properly classify a variety of load break rated disconnect switches.
06.10 Install a variety of distribution class cross arms.
06.11 Discuss the safety considerations regarding operating and switching OCB's and reclosers.
06.12 Demonstrate the operating technology for single and three phase reclosers and regulators.
06.13 Correctly install three phase transformer banks and distribution class line boost transformers.
06.14 Install and safely operate single and three phase distribution class capacitor banks.
06.15 Properly remove single and three phase capacitor banks from service.
06.16 Install and operate secondary capacitor installations.
06.17 Correctly install a variety of three phase banked transformers.

07.0 Demonstrates proficiencies in applying electrical formulae and electric test equipment--The student will be able to:

07.01 Demonstrates understanding of Alternating Current mathematical models.
07.02 Demonstrates understanding of Direct Current mathematical models.
07.03 Demonstrates understanding of measurement of electromotive force.
07.04 Demonstrates understanding of measurement of electrical current.
07.05 Demonstrate measuring Volt Amps and Watts.
07.06 Explain the fundamentals of operation and demonstrate electrical measuring equipment.
07.07 Correctly apply electrical formulae to solve electrical computations.
07.08 Demonstrates a variety of cable location equipment.
07.09 Demonstrates proficiency in cable testing of primary and secondary UG cables.
07.10 Demonstrate understanding of high potential testing procedures.
07.11 Demonstrates proficiency in ground testing.
07.12 Demonstrates proficiency in "ringing" cable connections.
07.13 Demonstrates understanding of testing of rubber goods.
07.14 Demonstrates testing of streetlight ballast and components.
07.15 Demonstrates testing of controllers and controller components.

08.0 Demonstrates proficiencies in constructing new underground electrical distribution system--The student will be able to:

08.01 Demonstrates safety considerations regarding trenching and underground installations.
08.02 Correctly identify soil conditions for trenching planning according to OSHA regulations.
08.03 Correctly assemble material and equipment to construct a URD single phase redial installation.
08.04 Demonstrate knowledge of blueprint reading for an underground loop system.
08.05 Demonstrate direct burial and conduit installation of URD primary and secondary cable.
08.06 Correctly differentiate between classes and sizes of primary and secondary cables.
08.07 Demonstrate proper storage and handling of primary and secondary cable.
08.08 Demonstrate excavation, punching and cutting of buried primary cable.

08.09 Correctly splice/terminate a variety of types of XLPE and rubber insulated primary labels.
08.10 Install and ground a single phase URD transformer.
08.11 Install, ground and tie two single phase pad mount transformers into an open-delta bank.
08.12 Demonstrate understanding of the process of cast in place concrete transformer/switch pad foundations.
08.13 Correctly install a pole mounted 3 phase pot head termination with grounding and dropouts.
08.14 Correctly install a single phase residential service pole and meter riser.
08.15 Demonstrate “thumping” fault location on primary cable.

10.0 Demonstrate techniques for maintenance of overhead facilities--The student will be able to:

10.01 Demonstrates change out of a variety of distribution class cross arms.
10.02 Demonstrates maintenance of distribution class disconnects in pole, arm and inline installations.
10.03 Demonstrates maintenance of single and three phase reclosers and regulators
10.04 Demonstrates maintenance of single and three phase distribution class capacitor banks.
10.05 Demonstrates maintenance of secondary capacitor installations.
10.06 Demonstrates re-lamping and maintenance of lighting systems.
10.07 Demonstrates proficiency of a variety of insulator change-outs.
10.08 Demonstrates proficiency of pole change-outs.
10.09 Demonstrates proficiency in switch and arrestor maintenance and change-outs.
10.10 Demonstrates proficiency in pole and pole line inspection.
10.11 Demonstrates proficiency in transformer inspection, maintenance and change-outs.

11.0 Demonstrates techniques for maintenance of underground facilities--The student will be able to:

11.01 Demonstrates replacement of a single phase pad mounted transformer.
11.02 Demonstrates a secondary triplex and primary splice for direct burial.
11.03 Perform a tape splice of primary URD cable.
11.04 Demonstrate a conversion splice of lead to XLPE primary cable.
11.05 Refuse a three phase bayonet fusing system.
11.06 Demonstrate leakage gradient fault finding equipment on secondary faulted cable.
11.07 Demonstrate inspection and maintenance on a pad mounted transformer.
11.08 Demonstrate inspection and maintenance on UG sectionalizer switches.
11.09 Demonstrate refusing of live front UG transformers.

16.0 Demonstrates proficiencies in applied electrical theory--The student will be able to:

16.1 Demonstrates an understanding of the history of electricity.
16.2 Demonstrates an understanding of static electricity and lightning.
16.3 Demonstrates an understanding of parallel and series circuits.
16.4 Demonstrates knowledge of the theory of electrical induction.
16.5 Demonstrates knowledge of AC and DC electric theory.

16.6 Demonstrates an understanding of the properties of an electrical arc.
16.7 Demonstrates understanding of the component parts of a transformer.
16.8 Demonstrates understanding of the process of electricity generation.
16.9 Demonstrate an understanding of properties of transmitting electrical current.
16.10 Demonstrates understanding of the principal of operation of an electric motor.
16.11 Demonstrate the theory of capacitance.
16.12 Demonstrate the theory of electrical reactance and resistance.
16.13 Demonstrate understanding of KW, KVA and the principals of electric power.
16.14 Identify classes of insulators and conductors.
16.15 Demonstrate basic low voltage control wiring safety and installation.

17.0 Demonstrate proficiency in utility construction equipment operation and maintenance--
The student will be able to:

17.1 Demonstrate safe work practice for operating machinery.
17.2 Demonstrate routine daily inspection to trucks and mobile equipment.
17.3 Inspect hydraulic systems for operational integrity.
17.4 Properly “fly” a boom for safety inspection.
17.5 Demonstrate understanding of dielectric testing of an insulated boom section.
17.6 Clean and maintain dielectric bucket liners and boom insulators.
17.7 Maintain and install vehicle grounds.
17.8 Safely jump start a vehicle.
17.9 Inspect equipment for safe operational conditions.
17.10 Safely load, secure and unload a variety of equipment from a drive-on trailer.
17.11 Read a load lifting chart.
17.12 Plan a lift.
17.13 Accurately give hand signals to a boom truck operator.
17.14 Set up an aerial truck for operation.
17.15 Safely operate an aerial lift truck
17.16 Safely operate a boom truck.
17.17 Safely operate a pole-hole digger truck.
17.18 Safely operate an operator seated trenching machine.
17.19 Safely operate a walk behind trencher.
17.20 Safely operate a backhoe.