ELECTRICAL LINE WORKER 3
COURSE CODE: 6307

COURSE DESCRIPTION: The Electrical Line Worker 3 course continues to prepare the student to enter the electric utility industry and the skills, knowledge, safe work practices and physical ability required to perform line work. Students receive classroom and field training in math, electrical circuit analysis, power systems including Ohm's Law, AC and DC theory and analysis, generation, transmission and distribution of electrical energy and transformer theory. Climbing techniques are strongly emphasized. Safety and teamwork are demonstrated and emphasized in all phases of training.

OBJECTIVE: Given the necessary equipment, supplies, and facilities, the student will complete all of the following core standards successfully.

CREDITS:	1 (120 hours), 2 (240 hours) units per course code
PREREQUISITE(S):	Electrical Line Worker 2 with passing grade "C"
RECOMMENDED GRADE LEVEL:	10 - 12
COMPUTER ACCESS REQUIRED:	1 Computer per student with Internet access
RECOMMENDED ENROLLMENT:	12
RECOMMENDED CURRICULUM:	T&D Lineman Training

A. STUDENT ORGANIZATIONS

Proficient professionals know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

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B. TECHNOLOGY KNOWLEDGE

Effective professionals know the academic subject matter, including the ethical use of technology as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation.
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., piracy; cyberbullying, illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, documents, video, sounds, music, trademarks, Creative Commons, and other elements for personal use.
6. Describe ethical and legal practices of safeguarding the confidentiality of business-related information.
7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.

C. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate punctuality.
2. Demonstrate self-representation.
3. Demonstrate work ethic.
4. Demonstrate respect.
5. Demonstrate time management.
6. Demonstrate integrity.
7. Demonstrate leadership.
8. Demonstrate teamwork and collaboration.
9. Demonstrate conflict resolution.
10. Demonstrate perseverance.
11. Demonstrate commitment.
12. Demonstrate a healthy view of competition.
13. Demonstrate a global perspective.
14. Demonstrate health and fitness.
15. Demonstrate self-direction.
16. Demonstrate lifelong learning.

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D. PROFESSIONAL KNOWLEDGE

Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate effective speaking and listening skills.
2. Demonstrate effective reading and writing skills.
3. Demonstrate mathematical reasoning.
4. Demonstrate job-specific mathematics skills.
5. Demonstrate critical-thinking and problem-solving skills.
6. Demonstrate creativity and resourcefulness.
7. Demonstrate an understanding of business ethics.
8. Demonstrate confidentiality.
9. Demonstrate an understanding of workplace structures, organizations, systems, and climates.
10. Demonstrate diversity awareness.
11. Demonstrate job acquisition and advancement skills.
12. Demonstrate task management skills.
13. Demonstrate customer-service skills.

E. LOAD CALCULATIONS – BRANCH AND FEEDER CIRCUITS

Proficient electrical line workers demonstrate appropriate knowledge and skills for calculating branch circuit and feeder loads for residential and commercial applications as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Calculate branch circuit ratings.
2. Apply de-rating factors.
3. Calculate branch circuit ampacity.
4. Calculate motor loads.

F. CONDUCTOR SELECTION AND CALCULATIONS

Proficient electrical line workers demonstrate appropriate knowledge and skills for sizing and installing conductors for different applications as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Identify overcurrent protection for branch circuits and feeders.
2. Identify the properties of conductors.
3. Calculate wire sizes based on resistance.
4. Calculate conductor resistances.
5. Calculate voltage drops for various applications.

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G. ADVANCED PERSONAL PROTECTIVE EQUIPMENT

Proficient electrical line workers use personal protective equipment in special situations as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Identify and use personal protective equipment for high-voltage cables.
2. Identify and use personal protective equipment when using excavation equipment.
3. Identify and use personal protective equipment when entering confined enclosures.

H. HAZARDOUS LOCATIONS

Proficient electrical line workers demonstrate appropriate NESC® classifications and requirements for hazardous locations as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Identify Class I locations.
2. Identify Class II locations.
3. Identify Class III locations.
4. Locate NESC® requirements for hazardous locations.
5. Identify sources of ignitions.
6. Select and install explosion-proof equipment and seals.

I. OVERCURRENT PROTECTION

Proficient electrical line workers demonstrate appropriate knowledge and skills for selecting circuit breakers and fuses for various applications as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Identify overload conditions.
2. Identify short circuit conditions.
3. Identify ground faults.
4. Identify arc faults.
5. Identify fuse ratings.
6. Identify types of fuses and their operating characteristics.
7. Identify fuse classes and applications.
8. Identify circuit breaker classifications.
9. Identify circuit breaker interrupting capacity ratings.
10. Select overcurrent devices for various applications.
11. Apply short circuit calculations.
12. Test and troubleshoot circuit breakers.
13. Test and troubleshoot fuses.

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J. DISTRIBUTION EQUIPMENT

Proficient electrical line workers demonstrate appropriate NESC® knowledge and skills for installing, grounding, and maintenance of switchboards and switchgear, as well ground fault relay testing, as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Describe switchboards and switchgear, including NEC requirements for installation, grounding, and maintenance.
2. Describe the proper installation of distribution equipment.
3. Test and maintain distribution equipment.

K. TRANSFORMERS

Proficient electrical line workers demonstrate appropriate knowledge and skills for installing various transformers, connections, and grounding requirements, as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Describe construction, operations, and applications of various transformers.
2. Describe the NESC® requirements for the installation of connections, and grounding requirements of transformers.
3. Calculate transformers and transformer banking.

L. COMMERCIAL ELECTRICAL SERVICES

Proficient electrical line workers demonstrate appropriate knowledge and skills for the components, installation, and NESC® requirements for commercial electrical services, as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Describe the components, installation considerations, and NESC® requirements for commercial electrical services.

N. AC ELECTRICAL CIRCUITS (SINGLE AND 3-PHASE)

Proficient electrical line workers demonstrate appropriate knowledge and skills for calculating the size of conductors and overcurrent protection as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Calculate conductor capacities for AC circuits.
2. Use a dynamometer to calculate conductor loads.

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M. UTILITY POLE USAGE

Proficient electrical line workers demonstrate appropriate knowledge and skills for pole usage as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Demonstrate appropriate pole setting.
2. Determine construction measurements.
3. Determine single-phase or three-phase construction.
4. Identify guy load values.
5. Demonstrate proper guying techniques.
6. Identify framing materials.
7. Demonstrate appropriate framing techniques.

N. PROFESSIONAL DEVELOPMENT

Proficient electrical line workers demonstrate appropriate knowledge and skills for working in the line worker industry as needed in their role. The following accountability criteria are considered essential for students in the Electrical Line Worker program of study.

1. Research certifications appropriate to the Electrical Line Worker industry.
2. Research appropriate interviewing skills and participate in mock interviews.

Additional Course Materials and Resources

Academic Standards and Indicators

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