ELECTRICAL DISTRIBUTION IN CONSTRUCTION
Course Syllabus

Course Number: CNST-0206
OCAS Code: None
Course Length: 60 Hours
Career Cluster: Architecture and Construction
Career Pathway: Construction
Career Major(s): Commercial Electrician’s Assistant

Pre-requisite(s): This course covers the common practices of electrical distribution and the repair and maintenance of distribution systems.

Instructor-created materials

Course Objectives:

A. Demonstrate Knowledge of Transformer Fundamentals.
   1. Define the purpose of transformers.
   2. Demonstrate basic knowledge of transformers.
   3. List and describe NEC requirements for transformer installations.
   4. Perform calculations to size transformers.
   5. Connect transformers in a delta and wye configuration.
   6. List and describe various uses for transformers.

B. Understand Transformer Theory.
   1. Calculate primary and secondary currents and voltages and turn ratios of transformers.
   2. Calculate the total load primary and secondary of transformers.
   3. Describe the function of a control transformer.
   4. Test transformer windings with a DMM.
   5. Design a control transformer.

C. Describe Distribution Equipment.
   1. Describe the purpose of switchgear.
   2. Describe the four general classifications of circuit breakers and list the major circuit breaker ratings.
   3. Describe switchgear construction, metering layouts, wiring requirements, and maintenance.
   4. List NEC® requirements pertaining to switchgear.
   5. Describe the visual and mechanical inspections and electrical tests associated with low-voltage and medium-voltage cables, metal-enclosed busways, and metering and instrumentation.
   6. Describe a ground fault relay system and explain how to test it.
D. Demonstrate Knowledge of Distribution System Transformers.
   1. Describe transformer operation.
   2. Explain the principle of mutual induction.
   3. Describe the operating characteristics of various types of transformers.
   4. Connect a multi-tap transformer for the required secondary voltage.
   5. Explain NEC® requirements governing the installation of transformers.
   6. Compute transformer sizes for various applications.
   7. Explain types and purposes of grounding transformers.
   8. Connect a control transformer for a given application.
   9. Size the maximum load allowed on open delta systems.
  10. Describe how current transformers are used in conjunction with watt-hour meters.
  11. Apply capacitors and rectifiers to practical applications.
  12. Calculate the power factor of any given electrical circuit.

E. Install a 480-Volt Distribution Center.
   1. Install a 480-volt three phase main distribution panel.
   2. Identify a switchgear used for electrical service.
   3. Identify and install three phase disconnects.
   4. Identify importance of color codes for wiring identification.
   5. Use NEC to determine correct wire size.
   6. Identify and Install breakers and fuses.

F. Connect a 480-Volt to 208-Volt Distribution.
   1. Identify and connect a 480 to 208-volt transformer.
   2. Identify and install a 480 volt 3 phase bus duct system.
   3. Install conduit and wire per NEC requirements to operate a 480-volt service.
   4. Troubleshoot and test a 480 volt 3 phase service.

1 NCCER objective
All unmarked objectives are TTC instructor developed.

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures:
1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment:
Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.
### ELECTRICAL DISTRIBUTION IN CONSTRUCTION

<table>
<thead>
<tr>
<th>Available Certifications/College Credit</th>
<th>The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.</th>
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<tr>
<td>College Credit Eligibility:</td>
<td>The student must maintain a grade point average of 2.0 or better.</td>
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Tulsa Tech
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