ALTERNATING CURRENT CIRCUITS IN CONSTRUCTION
Course Syllabus

Course Number: CNST-0168
OHLAP Credit: No
OCAS Code: None
Course Length: 90 Hours
Career Cluster: Architecture and Construction
Career Pathway: Construction
Career Major(s): Commercial Electrician’s Assistant

Pre-requisite(s): This course covers electrical theory in AC circuits and develops understanding of generation, amplitude, phase, phase shift, power factor, measurement methods, and troubleshooting skills.

Course Description:
This course covers electrical theory in AC circuits and develops understanding of generation, amplitude, phase, phase shift, power factor, measurement methods, and troubleshooting skills.

Textbooks:
Amatrol Electrical Training Systems


Course Objectives:

A. Understand Alternating Current.
   1. Calculate the peak and effective voltage or current values for an AC waveform.
   2. Calculate the phase relationship between two AC waveforms.
   3. Describe the voltage and current phase relationship in a resistive AC circuit.
   4. Describe the voltage and current transients that occur in an inductive circuit.
   5. Define inductive reactance and state how it is affected by frequency.
   6. Describe the voltage and current transients that occur in a capacitive circuit.
   7. Define capacitive reactance and state how it is affected by frequency.
   8. Explain the relationship between voltage and current in the following types of AC circuits:
      a. RL circuit
      b. RC circuit
      c. LC circuit
      d. RLC circuit
   9. Describe the effect that resonant frequency has on impedance and current flow in a series or parallel resonant circuit.
   10. Define bandwidth and describe how it is affected by resistance in a series or parallel resonant circuit.
   11. Explain the following terms as they relate to AC circuits:
      a. True power
      b. Apparent power
      c. Reactive power
      d. Power factor
   12. Explain basic transformer action.

B. Install, Test, and Measure Inductors and Capacitors (Amatrol)
   1. Connect and operate a relay in a circuit.
   2. Calculate the total load on an AC circuit with inductors.
3. Discharge a capacitor.²
4. Test a capacitor with a DMM.²
5. Measure the voltage across a charge capacitor.²
6. Calculate the total load on an AC circuit with capacitor.²
7. Calculate the time to charge and discharge a capacitor.²

¹ NCCER objective
² Amatrol objective

**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.

**Available Certifications/College Credit:**
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.

**College Credit Eligibility:**
The student must maintain a grade point average of 2.0 or better.