DIRECT CURRENT CIRCUITS IN CONSTRUCTION
Course Syllabus

Course Number: CNST-0774
OHLAP Credit: No
OCAS Code: None
Course Length: 60 Hours
Career Cluster: Architecture and Construction
Career Pathway: Construction
Career Major(s): Commercial Electricians Assistant, Electrical Assistant-Entry Level

Pre-requisite(s): Electrical Safety

Course Description: This course covers electrical theory in DC circuits and develops a student's understanding of the electrical units of volts, ohms, amps, and watts, measurement equipment and methods, interrelationships, and troubleshooting skills.

Textbooks:
Amatrol Electrical Training Systems


Course Objectives: A. Operate, Test, and Measure Circuits.
1. Define voltage.¹
2. Identify what units voltage is measured in and give the abbreviation symbol.¹
3. Define a ground and list the two types.¹
4. Explain voltage with reference to ground.¹
5. Describe how to use an analog voltmeter and give the schematic symbol.¹
6. Measure the output voltage of a power supply using an analog voltmeter.¹
7. Describe the function of a volt-ohm meter.¹
8. Describe what a digital multimeter is.¹
9. List and explain the function and operation of the eight parts of a digital multimeter.¹
10. Explain how to measure voltage with a DMM.¹
11. Measure the output voltage of a power supply using a DMM.¹
12. Identify what units current is measured in and give the abbreviation symbol.¹
13. Explain how to measure current with a DMM and give the schematic symbol for an ammeter.¹
14. Measure the current in a circuit with a DMM.¹
15. Identify what unit resistance is measured in and give the abbreviation symbol.¹
16. Explain how to measure the resistance with a DMM and give the schematic symbol of an ohmmeter.¹
17. Measure the resistance of different loads with a DMM.¹
18. Describe how to measure continuity in a circuit.¹
19. Test the continuity of wires using a DMM.¹
20. Describe the function and operation of a fuse and give its schematic symbol.¹
21. Operate a circuit using a fuse.¹
22. Test and replace a fuse.¹
23. Describe the function and operation of a circuit breaker and give its schematic symbol.¹
24. Operate a circuit using a circuit breaker.\(^1\)
25. Test and reset a circuit breaker.\(^1\)

**B. Understand Electrical Theory.**
1. Explain the basic characteristics of a series circuit.\(^2\)
2. Explain the basic characteristics of a parallel circuit.\(^2\)
3. Explain the basic characteristics of a series-parallel circuit.\(^2\)
4. Calculate, using Kirchoff’s Voltage Law, the voltage drop in series, parallel, and series-parallel circuits.\(^2\)
5. Calculate, using Kirchoff’s Current Law, the total current in parallel and series-parallel circuits.\(^2\)
6. Find the total amount of resistance in a series circuit.\(^2\)
7. Find the total amount of resistance in a parallel circuit.\(^2\)
8. Find the total amount of resistance in a series-parallel circuit.\(^2\)

**C. Become Familiar with Electrical Test Equipment.**
1. Explain the operation of and describe the following pieces of test equipment:\(^2\)
   a. Ammeter\(^2\)
   b. Voltmeter\(^2\)
   c. Ohmmeter\(^2\)
   d. Volt-ohm-milliammeter (VOM)\(^2\)
   e. Wattmeter\(^2\)
   f. Megohmmeter\(^2\)
   g. Frequency meter\(^2\)
   h. Power factor meter\(^2\)
   i. Continuity tester\(^2\)
   j. Voltage tester\(^2\)
   k. Recording instruments\(^2\)
   l. Cable-length meters\(^2\)
2. Explain how to read and convert from one scale to another using the above test equipment.\(^2\)
3. Explain the importance of proper meter polarity.\(^2\)
4. Define frequency and explain the use of a frequency meter.\(^2\)
5. Explain the difference between digital and analog meters.\(^2\)

\(^1\) Amatrol objective
\(^2\) NCCER 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.