South Central College

MECA 1222  Electricity - Devices and Circuits II

Course Outcome Summary

Course Information

Description
This course provides an exploration of the basics in electricity and electronics. Topics include an overview of alternating current, circuit laws, components, and use of test equipment. Students learn the basic technique of troubleshooting electric circuits, including measurement techniques, analysis of faults, and repair procedures. Teamwork, critical thinking, and problem solving are emphasized. Hands-on experience and practical applications are included. Prerequisites: MECA 1122: Electricity - Devices and Circuits I.

Total Credits 3
Total Hours 64

Types of Instruction

Instruction Type Credits/Hours
Classroom Presentation
On-Campus Lab

Pre/Corequisites

MECA 1122: Electricity - Devices and Circuits I

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Learn Alternating Current and Voltage

   Learning Objectives
   - Review AC Terminology
   - Understand Types of AC Waveforms
   - Analyze the Sine Wave
   - Review AC Generator
2. **Explain Power in AC Circuits**
   Learning Objectives
   Measure Power in Resistive AC Circuits
   Analyze Power in Out-of-Phase Circuits
   Explain True Power and Apparent Power
   Review Power Factor

3. **Understand Electrical Quantities and Units**
   Learning Objectives
   Comprehend Charge, Current and Current Carriers in AC Circuits
   Explain the Unit of Current, Unit of Voltage and the Unit of Resistance
   Explain Conductors, Insulators and Semiconductors
   Review Power and Energy

4. **Summarize Capacitance and Inductance in AC Circuits**
   Learning Objectives
   Describe Basic Capacitor Action
   Example Voltage Rating and Specifications
   Describe Factors Determining Inductance and The Henry
   Explain Types of Capacitors and Symbols
   Analyze Capacitors in Series and Parallel Circuits

5. **Learn Transformers**
   Learning Objectives
   Describe Transformer Fundamentals
   Explain Efficiency of Transformers
   Demonstrate How to Wire a Transformer
   Know the Different Types of Transformers
   Calculate Transformer Ratings
   Explain Three-Phase Transformers

6. **Evaluate R, C, and L Circuits**
   Learning Objectives
   Explain Impedance
   Demonstrate Adding Phasors
   Use RC Circuits
   Use RL Circuits
   Use RCL Circuits
   Explain Resonance
   Create Filters

7. **Review Power in AC Circuits**
   Learning Objectives
   Understand Resistive AC Circuits
   Explain Power Factor
   Develop Three-Phase Circuits
   Use AC Power Terminology

8. **Learn Instruments and Measurements**
   Learning Objectives
   Use Digital Multimeter
   Describe Meter Movements
   Demonstrate Analog Ammeter and Voltmeter Use
   Explain Wheatstone Bridge, Wattmeter and Frequency Meters
   Measure Inductance and Capacitance

9. **Use Electric Motors**
Learning Objectives
Study Motor Classifications
Integrate Motors in Circuits
Analyze Motor Ratings

10. **Explore Residential and Industrial Wiring Concepts**

   Learning Objectives
   Study Electrical Codes
   Construct AC Circuits
   Define Power Distribution

**SCC Accessibility Statement**

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: [www.southcentral.edu/disability](http://www.southcentral.edu/disability)

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.