



South Central College

## MECA 1222 Electricity - Devices and Circuits II

### Course Outcome Summary

#### Course Information

<b>Description</b>	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.
<b>Total Credits</b>	3
<b>Total Hours</b>	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

Demonstrate Three-Phase Alternating Current

## **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.