



South Central College

MECA 1122 Electricity - Devices and Circuits I

Course Outcome Summary

Course Information

Description	This course provides an exploration of the basics in electricity and electronics. Topics include an overview of direct 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.
Total Credits	3
Total Hours	64

Types of Instruction

Instruction Type	Credits/Hours
Classroom Presentation	
On-Campus Lab	

Pre/Corequisites

None

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 Basic Concepts

Learning Objectives

Review Work, Energy and Energy Conversion

Apply Energy Conversion, Efficiency

Identify Structure of Matter, Electric Charge and Valence Electrons

Describe Ions, Static Charge and Static Discharge

2. Understand Electrical Quantities and Units

Learning Objectives

Comprehend Charge, Current and Current Carriers
Explain the Unit of Current, Unit of Voltage and the Unit of Resistance
Explain Conductors, Insulators and Semiconductors
Review Power and Energy

3. Interpret Basic Circuits, Laws and Measurements

Learning Objectives

Describe Circuit Essentials
Explain Circuit Symbols and Diagrams
Demonstrate how to Calculate Electrical Quantities
Demonstrate how to Measure Electrical Quantities

4. Apply Ohm's Law while conducting circuit analysis

Learning Objectives

State Ohm's Law with reference to current, voltage, and resistance
Use Ohm's Law in various circuit configurations
Explain Special Units and Conversion

5. Define Multiple-Load Circuits

Learning Objectives

Identify Series Circuits
Identify Parallel Circuits
Describe Power in Multiple-Load Circuits
Explain Conductance
Explain Series - Parallel Circuits
Understand Voltage Dividers and Regulators

6. Explain Complex-Circuit Analysis

Learning Objectives

Explain Simultaneous Equations
Know Loop-Equations Technique
Know Node Voltage Technique
Identify Superposition Theorem
Identify Thevenin's and Norton's Theorem

7. Discuss Magnetism and Electromagnetism

Learning Objectives

Explain Magnetism, Magnets, Magnetic Fields, Flux and Poles
Identify Electromagnetism, Magnetic Materials, and Magnetomotive Force
Identify Reluctance
Describe DC Motor Operation, Solenoids and Relays

8. Summarize Capacitance and Inductance in DC Circuits

Learning Objectives

Describe Basic Capacitor Action
Example Voltage Rating and Specifications
Explain Types of Capacitors and Symbols
Demonstrate Capacitors in Series and Parallel Circuits

9. Lean Basic Soldering Skills

Learning Objectives

Identify soldering equipment and components
Describe how to solder components on a PCB and how to remove components on a PCB
Demonstrate properly soldered connections

10. Operate Electrical Measurement Meters to Determine Voltage, Current, and Resistance in a

circuit

Learning Objectives

Operate a voltmeter
Use an ammeter
Operate an ohmmeter
Describe the advantages/disadvantages of DMMs and VOMs
List the safety precautions for using electrical meters

11. Troubleshoot to Find Common Printed Circuit Board Defects and Problems

Learning Objectives

List common technician tools used for troubleshooting electrical circuits
Explain the safety procedures to protect the technician and circuits
Discuss the importance of electrostatic discharge (ESD)
Develop common troubleshooting techniques
Identify open and short circuits
Know the importance of documentation as part of the troubleshooting process

12. Contribute to a Team Capstone Course Project

Learning Objectives

As a teammember, select an appropriate capstone project
Communicate with teammembers
Create a report

13. Communicate Information with and Receive Knowledge from Local Industry Representatives

Learning Objectives

Take detailed notes from presentations provided by industry representatives
Ask questions to industry representatives during presentations and tours
Prepare a cover letter a resume

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

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