

SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION
Electrical/Electromechanical Technology Program
Revision Date: August 22, 2022

I. CATALOG DESCRIPTION

Course Number: ELEC1131
Course Title: DC Principles
Co-requisite(s): MATH0900
Catalog Description: An in depth study of electrical concepts, using Ohm's Law, Kirchhoff's Voltage and Current Laws to understand series, parallel, and combination circuitry. Magnetism is studied to gain knowledge of DC motors, generators and relays. Inductors and capacitors and their operation in DC circuits are also covered. Analyzation, diagnostic and trouble resolution skills are enhanced using the VOM, DMM, oscilloscope, power supplies and other lab test equipment.
Credit Hours: 5
Class Hours: 45
Lab Hours: 90
Total Contact Hours: 135

II. COURSE OBJECTIVES: *Course will:*

- A. Explain how to use test equipment.
- B. Explain basic electronic component identification.
- C. Explain basic electrical concepts.
- D. Analyze DC resistive circuits, series, parallel and combination.
- E. Demonstrate basic measurement equipment (VOM, DMM, and Oscilloscope)
- F. Demonstrate how to make direct and indirect electrical measurements (Volts, Amps, Ohms, and Watts).

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

- A. Student Learning Outcomes: *Student will be able to:*
 - 1. Relate operations of the basic DC circuit components to application in electronic circuits.
 - 2. Demonstrate problem-solving techniques in troubleshooting DC circuits.
 - 3. Recognize the atomic structure of elements and the nature of atomic charges.
 - 4. Explain numeric systems and metric notations used in electronics calculations.
 - 5. Examine the meaning and relationship of electrical quantities such as voltage, current, resistance, conductance, and power using Ohm's Law.
 - 6. Demonstrate an understanding of electronic component recognition, schematic drawing and reading.
 - 7. Develop the ability to measure electrical quantities with analog and digital multimeters.
 - 8. Demonstrate an understanding of circuit flow diagram interpretation, design curves, tables, graphs, and recording of data.
 - 9. Understand the basis of magnetism and the principle of electromagnetism.
 - 10. Understand the operation and application of capacitors and inductors in DC circuits.
 - 11. Troubleshoot DC circuits.
- B. General Education Learning Outcomes (GELOs)

1. GELO #3: Critical Thinking & Problem Solving
Outcome 2: Synthesize information to arrive at reasoned solutions to problems.

IV. CONTENT/TOPICAL OUTLINE

- A. Basic Electrical Concepts
 1. Introduction, components, quantities, and units
 2. Basic electricity, voltage, current, resistance
 3. Ohm's Law, energy and power
 4. Soldering
- B. Series DC circuits
 1. Series circuit configuration
 2. Ohm's Law in series circuit
 3. Calculating resistance, current and power
 4. Voltage divider and Kirchhoff's Voltage Law
- C. Parallel DC circuits
 1. Parallel circuit configuration
 2. Ohm's Law in parallel circuit
 3. Calculating resistance, current and power
 4. Current divider and Kirchhoff's Current Law
- D. Series Parallel Circuits
 1. Series-parallel circuit configuration
 2. Ohm's Law in series/parallel circuits
 3. Calculating resistance, current and power
 4. Current divider and voltage divider
 5. Kirchhoff's Current Law and Kirchhoff's Voltage Law
 6. Loaded voltage and current divider circuits
 7. Bridge circuits
- E. Magnetism and Electromagnetism
 1. Principles of magnetic materials
 2. Permanent and electromagnets
 3. Application of magnetism in industry and electronics
 4. Magnetic properties, induction, hysteresis
 5. Motors and generators
- F. Capacitors and Inductors in DC circuits
 1. Principles and applications of capacitors in DC circuits
 2. Principles and applications of inductors in DC circuits
- G. Final Comprehensive Exam

V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): Floyd, Thomas L., *Electronic Fundamentals' Circuits, Devices and Applications*, (Refer to CID and/or instructor for current edition)
- B. Other Resources: Outside reading as required
- C. Supplies: Scientific Calculator and hand tools

VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
 1. Lecture
 2. Lab

VII. METHODS OF EVALUATION

- A. Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
 - 1. Homework
 - 2. Quizzes
 - 3. Exams
 - 4. Lab Projects
 - 5. Lab Tests

VIII. SPECIFIC COURSE REQUIREMENTS

- A. A minimum grade of D is required.
- B. **Cheating within the Manufacturing Division:** Any violation of academic integrity on assignments, quizzes, or tests will result in a grade of 0 on that assignment, quiz, or test. A second violation in any course after the initial infraction will result in a grade of F for that course. Any additional violations while in the program will result in a suspension from the program.
- C. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.