



Concepts of Electricity and Electronics

Course: ELE100	Lec + Lab 3 Credit(s) 4 Period(s) 3.7 Load
First Term: 2004 Fall	Course Type: Occupational
Final Term: Current	Load Formula: S

Description: Principles of electric circuits, magnetism and electromagnetism including basic motors and generators. Use of basic measuring instruments. Includes an overview of electronics in the modern world

Requisites: Prerequisites: None

MCCCD Official Course Competencies

1. Define the electrical quantities of charge, potential difference, current, and resistance, giving the standard unit in which each is measured. (I)
 2. Identify common electrical and electronic components and their corresponding schematic symbols. (II)
 3. Construct simple series DC networks and simple parallel DC networks; measure voltages, currents, and resistances using the appropriate test equipment. (III)
 4. Derive and apply the various forms of Ohm's law and the power formulas in solving simple DC circuits. (IV)
 5. Calculate equivalent resistance and voltage distribution in simple series DC circuits, using Kirchhoff's current law. (V)
 6. Calculate equivalent resistance and current distribution in a simple parallel DC circuit, using Kirchhoff's current law. (VI)
 7. Compute voltages, currents, and power values in simple series and simple parallel DC circuits. (V, VI)
 8. Define the principles of magnetic fields, electromagnetic induction, self and mutual inductance, and transformer action. (VI, VII, VIII)
 9. Describe motor and generator action in terms of fundamental magnetic principles. (IX)
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MCCCD Official Course Outline

- I. Introduction to Electronics Theory
 - A. Structure of Matter
 - B. Conductors, Insulators, and Semiconductors
 - C. Charged Bodies & Coulomb's law
 - D. Electron Current
 - E. Electromotive Force (voltage)

- II. Electronic Devices & Symbols
 - A. Schematic Symbols
 - B. Cells & Batteries
- III. Multimeters
 - A. Ohmmeters
 - B. Voltmeters
 - C. Ammeters
- IV. Ohm`s & Kirchhoff`s Laws
 - A. The practical circuit
 - B. Ohm`s Law
 - C. Total resistance in a series circuit
 - D. Kirchhoff`s Current Law
 - E. Kirchhoff`s Voltage Law
- V. Series Resistive Circuits
 - A. DC & AC comparisons
 - B. Electrical Power & Energy
 - C. Troubleshooting Series Resistive Circuits
- VI. Parallel Resistive Circuits
 - A. Simple Parallel Resistive Circuits
 - B. Total Resistance in a Parallel Resistive Circuit
 - C. Current Distribution in Parallel Circuits
 - D. Voltage Distribution in Parallel Circuits
 - E. Power Distribution in Parallel Circuits
 - F. Troubleshooting Parallel-Resistance Circuits
- VII. Magnetism and Relays
 - A. Magnetism
 - B. Magnetic Poles
 - C. Theories of Magnetism
 - D. Law of Magnetic Force
 - E. Magnetic Fields
 - F. Magnetizing of Magnetic Materials
 - G. Magnetic Shielding
 - H. International Standard of Units
 - I. Electromagnetism
 - J. The Electromagnetic Effect
 - K. Electromagnetic relays
- VIII. Transformers
 - A. Theory of Operation
 - B. Lenz`s Law
 - C. Coefficient of Coupling
 - D. Impedance in Transformers
 - E. Current in Transformers
 - F. Electrical power in transformers
 - G. Reflected Impedance
 - H. Types of Transformers

- I. Multiple Secondary Transformers
 - J. Troubleshooting Transformers
 - K. Determining Set-up or Step-down
 - IX. Generators & Motors
 - A. Requirements for Induction
 - B. Generating an Induced Voltage
 - C. Alternating Current Generators
 - D. Direct Current Generators
 - E. Electric Motors
 - F. Direct-Current Motors
 - G. Alternating-Current Motors
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Last MCCCCD Governing Board Approval Date: **4/27/2004**

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