



Circuit Analysis I

Course: ELE111	Lecture 4 Credit(s) 3 Period(s) 3 Load
First Term: 2004 Fall	Laboratory 0 Credit(s) 3 Period(s) 2 Load
Final Term: Current	Course Type: Occupational
	Load Formula: C

Description: Direct current (DC) and Alternating current (AC) electric circuits. Ohm`s law, Kirchoff`s laws, series, parallel and series-parallel circuits, fundamentals of inductance and capacitance, and the transient behavior of circuits containing resistance and capacitance or resistance and inductance

Requisites: Prerequisites: None. Corequisites: ELE105 or MAT120 or MAT121 or MAT122 or equivalent

MCCCD Official Course Competencies

1. Define basic electricity terms. (I, II)
 2. Use the standard color code to determine resistance. (II)
 3. Make circuit measurements using the ammeter, voltmeter, ohmmeter, and oscilloscope. (II)
 4. Apply the scientific method of inquiry and deduction to the laws, theories and axioms of AC (alternating current)/DC (direct current) circuits to specific laboratory experiments. (I-XII)
 5. Use Ohm`s law and Kirchoff`s laws to solve series, parallel and series-parallel circuit problems. (III, IV, V, VI, VII)
 6. Calculate voltages and currents of simple Resistor, Inductor, and Capacitor (RLC) circuits using phasors. (VII, XII)
 7. Describe the properties of magnetic fields and magnetic materials, and relate to the operation of magnetic devices. (VIII)
 8. Calculate equivalent capacitance of capacitors connected in series and parallel. (IX)
 9. Determine the frequency and calculate the peak, peak-to-peak, and Root-mean-square (RMS) values of a sine wave. (XI)
 10. Analyze the transient behavior of simple RC and RL circuits. (VII, XII)
 11. Calculate inductive and capacitive reactance. (IX)
 12. Calculate equivalent inductance of inductors connected in series and parallel. (IX)
 13. Analyze the basic transformer. (X)
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MCCCD Official Course Outline

- I. Introduction to Electricity
 - A. Circuit Components and Measuring Devices
 - B. Electrical and Magnetic Units
 - C. Scientific Notation
 - D. Metric Prefixes
- II. Voltage, Current, and Resistance
 - A. Atomic Structure
 - B. Electrical Charge
 - C. Voltage
 - D. Current
 - E. Resistance
 - F. Electrical Circuits
 - G. Basic Circuit Measurements
- III. Ohm`s Law
 - A. Ohm`s Law
 - B. Current Calculations
 - C. Voltage Calculations
 - D. Resistance Calculations
 - E. The Current, Voltage, Resistance Relationship
- IV. Power and Energy
 - A. Power and Energy
 - B. Power in Electric Circuits
 - C. Resistor Power Ratings
 - D. Energy Loss and Voltage Drop in Resistance
 - E. Power Supplies
- V. AC/DC Series Resistive Circuits
 - A. Resistors in Series
 - B. Rules and Laws for Series Circuits
 - C. Voltage Dividers
 - D. Ground
 - E. Troubleshooting Series Circuit
- VI. AC/DC Parallel Resistive Circuit
 - A. Resistors in Parallel
 - B. Rules and Laws for Parallel Circuits
 - C. Current Sources
 - D. Current Dividers and Applications
 - E. Troubleshooting Parallel Circuits
- VII. AC/DC Series Parallel Circuits
 - A. Series Parallel Relationships
 - B. Analysis of Series Parallel Circuits
 - C. Loaded Voltage Dividers
 - D. Ladder Networks and the Wheatstone Bridge
 - E. Troubleshooting
- VIII. Magnetism and Electromagnetism
 - A. Magnetic Fields

- B. Electromagnetism
 - C. Hysteresis
 - D. Induction
 - E. Applications of Electromagnetism Induction
 - IX. Capacitance and Inductance
 - A. Definition and physical properties
 - B. Circuit configurations and total capacitance and total inductance
 - X. Transformers
 - A. Basic transformers
 - B. Step-up/step-down
 - XI. Alternating Current and Voltage: The sine wave
 - XII. Phasors and Complex Numbers
 - A. Rectangular and polar forms
 - B. Phasor arithmetic
 - A. Electromagnetism
 - B. Solenoids
 - C. Magnetic circuits
 - D. Magnetic units
 - XIV. Inductance
 - A. Electromagnetic induction
 - B. Flux linkage
 - C. Faraday`s & Lenz`s laws
 - D. Self-induction
 - E. Inductors in series & parallel
 - XV. RL Transient Circuits
 - A. Charge & discharge of Inductors
 - B. L/R time constant
 - C. Applications
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Last MCCCCD Governing Board Approval Date: **4/27/2004**

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