

Introduction to Electric Circuit Analysis

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Prerequisite by topic:

1. Introductory physics
2. Differential equations
3. Introductory complex algebra.

Course Overview:

- 1- Basic electrical concepts: current, voltage, power, electric field, energy, power
- 2- Circuit elements: resistance, capacitance, inductance, voltage source, current source
- 3- Direct current (DC) circuits
 - Basic laws: Ohm's law, Kirchhoff's laws
 - Nodal analysis and mesh analysis
 - Superposition theorem
 - Thevenin's and Norton's theorems
 - Source transformation
 - Maximum power transfer
 - Applications of laws and theorems to circuits.
- 4- Transient analysis of circuits: first order and second order circuits.
- 5- Sinusoidal steady-state (AC) analysis:
 - Phasors
 - Impedance and admittance
 - Solving AC circuits
 - Power calculations.
- 6- The ideal operational amplifier as an active circuit element.
- 7- Introduction to Pspice.

Textbook: Allan R. Hambley, "Electrical Engineering Principles and Applications," 3th edition, Pearson/Prentice-Hall, 2005, ISBN 0-13-147046-9.