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 filed, 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.