



## EE221 - Fundamentals of Electric Circuits (Required Course)

**Code and Name:** EE 221 Fundamental of Electric Circuit

**Credit Hours:** 3 (Lecture: 3, Tutorial: 1)

### Textbook:

- Fundamental of Electric Circuit, C. K. Alexander and M.O. Sadiku, Fifth Edition, McGraw-Hill, 2006.

### Other References:

- W. H. Hayt, Jr., J. E. Kemmerly, and S.M. Durbin, Engineering Circuit Analysis, Eighth Edition
- Robert L. Boylestad, Introductory Circuit Analysis, Eleventh Edition.
- John O'Malley, Schaum's Outline of Basic Circuit Analysis, Second edition.

### Course Description:

Basic laws: Ohm's, KVL, KCL. Resistive networks. Circuit analysis techniques: nodal and mesh analysis. Network theorems: Thevenin's, Norton's, source transformations, superposition, maximum power transfer. Energy storage elements. phasor technique for steady-state sinusoidal response. Transient analysis of first-order circuits

**Pre-requisites:** MATH 102, PHYS 118, PHYS 120, and GE 101

**Co-requisites:** None

### Course Learning Outcomes:

With relation to ABET Student Outcomes (SOs: 1-7)

1. Identify the electrical circuit elements and the way to calculate them. (1)
2. Identify the electrical circuit elements laws. (1)
3. Solve the electrical circuit using nodal and mesh analysis. (1)
4. Formulate the electrical circuits using Superposition, Source transformation. (1)
5. Solve different types of operational amplifier problems. (1)
6. Identify the capacitors and inductors storage and release phases. (1)
7. Solve the AC electrical circuits using RL and RC circuits. (1)
8. Formulate the sinusoidal steady state analysis circuits. (1)

### Topics to be covered:

- Introduction to Circuit Analysis and Design: Overview, SI Units, Voltage, Current, Power and Energy
- Basic Components and Electric Circuits Sources, Resistance Ohm's Law
- Voltage and Current Laws
- Basic Nodal and Mesh Analysis
- Circuit Analysis Techniques: Linearity, Superposition, Source Transformations, Thevenin and Norton
- Equivalent Maximum Power Transfer, Delta-to-Wye Equivalent Circuits
- Capacitors and Inductors: Inductors, Capacitors, Series and Parallel Combinations
- Basic RL and RC Circuits: RL circuits RC circuits
- Basic RL and RC Circuits: (cont.) Unit-step, pulse functions. Natural and force response Driven circuits
- Sinusoidal Steady State Analysis
- AC Circuit Power Analysis

### Grading Policy:

The grading for the course are 60% coursework and 40% Final Exam. The coursework consist of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.

