Faculty of Engineering and Technology

Department of Electrical and Computer Engineering

ENEE 2304 – Circuit Analysis

First semester 2024/2025

Course Outline

Instructors

Dr. Hakam Shehadeh
Office: Masri119

Dr. M. Abu-Khaizaran

Teaching Assistant
• N/A

Contact Hours
• 3 credit hours

Prerequisites:
• Math 331
Ordinary Differential Equations
• Math 234
Introduction to Linear Algebra

Course Objectives

• Analysis of DC circuits with different techniques.
• Analysis of transient circuits using differential equations technique.
• Analysis of single and three-phase AC circuits using phasor transforms
• Calculations of sinusoidal steady-state power in single and three-phase AC circuits
• Analysis of AC circuits using Laplace transforms
• Analysis and design of passive filter circuits
• Analysis of two-port circuits
• Use software tools (Matlab/ Simulink or PSPICE) to analyze various types of circuits.

Course Content

The following topics will be covered:
• Circuit elements and variables.
• Simple resistive circuits.
• Techniques of circuit analysis.
• Natural and step responses of RL, RC, and RLC circuits.
• AC steady state analysis using phasor and Laplace transforms.
• AC steady state power calculations
• Balanced three-phase circuit analysis.
• Passive filter circuits.
• Tow port circuits

Textbook

J.W. Nilsson and S.A. Riedel, “Electric Circuits”, Prentice Hall, 9th edition, 2011.

Learning Outcomes

1. To be able to apply different circuit analysis techniques to solve DC circuits.
2. To be able to determine the natural and the step response of the first and second order circuits

3. To be able to transform a circuit with a sinusoidal source into the frequency domain using phasor concepts.
4. To be able to apply different circuit analysis techniques to solve AC circuits.
5. To be able to calculate all forms of AC power in AC circuits.
6. To be able to analyze a balanced three phase circuits.
7. To be able to analyze the circuit in the s-domain and be able to transform the s-domain solution back to the time domain.
8. To understand the definition and significance of the transfer function and be able to calculate the transfer function for the circuit using s-domain techniques.
9. To be able to calculate any set of two-port parameters.
10. To be able to analyze a terminated two-port circuit and a cascaded interconnection of two-port circuits.
11. To be able to use software tools to analyze various types of circuits.

Evaluation

Participation	5%
Short Exams	20%
PSpice Project	10%
Midterm exam **on Wednesday 4/12/2024**	25%
Final Exam	40%