EEE203 - Electric Circuits I

Fall 2021

Course Description:

This course provides the fundamentals of electrical engineering. It deals with the behaviour of circuits built from basic linear circuit elements that are resistor, capacitor, inductor, independent and dependent voltage and current sources. Students completing this course will be able to analyze electric circuits. Topics include: DC circuit analysis; energy storage and time domain behavior; sinusoidal steady state circuit analysis; ac power; three-phase systems; magnetic laws and circuits; and, ideal transformers.

Instructor:

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Schedule:

Monday	Lecture 0900-0950
Tuesday	Lecture 1100-1150
Thursday	Lecture 0800-0850
	Lab 0900-1050

Textbook: Electric Circuits, Eleventh Edition (James W. Nilsson, Susan A. Riedel)

Grading:

Quizzes	20%
Assignments	10%
Labs	10%
Final Exam	60%
Total	**100%**

Academic Integrity. Plagiarism, cheating, and other violations of academic integrity represent serious infractions for which penalties range from a recorded caution to expulsion from RMC. It is your responsibility to understand and comply with the College's regulations on academic integrity.

Assignments. Assignments are to be completed **individually** and you must **do the work yourself**. For assignments:

- **You may** collaborate with other students to identify appropriate reference sources and problem-solving approaches **as long as** your submitted assignment clearly identifies anyone you collaborated with what form that collaboration took.
- Where your answers rely on information obtained from a source outside the course material, **you must** clearly identify that source by providing an appropriate citation.
- **You may not** copy answers from any source including another student's work.
- **You may not** provide another student with your preliminary or completed answers, by any means.

Laboratories. Laboratories are to be completed **in your assigned laboratory group** and you must **do the work yourselves**. For laboratories:

- **You are required** to collaborate with the other members of your laboratory group and are each expected to contribute materially to the intellectual work of completing the laboratory. If a member of a laboratory group does not contribute materially to the intellectual work, that group member’s name must not appear on the laboratory report and the member will not be awarded marks for the laboratory.
- Where your laboratory solutions or answers to questions rely on information obtained from a source outside the course material, **you must** clearly identify that source by providing an appropriate citation.
- **You may** collaborate with students outside your laboratory group to identify appropriate reference sources and problem-solving approaches **as long as** your submitted laboratory report clearly identifies anyone you collaborated with and what form that collaboration took.
- **You may not** copy designs, models, source code, or other answers from any source including the work of a student outside your laboratory group.
- **You may not** provide a student outside your laboratory group with your preliminary or completed designs, models, source code or other answers, by any means.

Chapter 1 - Circuit Variables

1.1 Electrical Engineering: An Overview
1.2 The International System of Units
1.3 Circuit Analysis: An Overview
1.4 Voltage and Current
1.5 The Ideal Basic Circuit Element
1.6 Power and Energy

Chapter 2 - Circuit Elements

2.1 Voltage and Current Sources
2.2 Electrical Resistance (Ohm's Law)
2.3 Constructing a Circuit Model
2.4 Kirchhoff's Laws
2.5 Analyzing a Circuit Containing Dependent Sources

Chapter 3 - Simple Resistive Circuits

3.1 Resistors in Series
3.2 Resistors in Parallel
3.3 The Voltage-Divider and Current-Divider Circuits
3.5 Measuring Voltage and Current
3.6 Measuring Resistance—The Wheatstone Bridge

Chapter 4 - Techniques of Circuit Analysis

4.2 Introduction to the Node-Voltage Method
4.3 The Node-Voltage Method and Dependent Sources
4.4 The Node-Voltage Method: Some Special Cases
4.5 Introduction to the Mesh-Current Method
4.6 The Mesh-Current Method and Dependent Sources
4.7 The Mesh-Current Method: Some Special Cases
4.8 The Node-Voltage Method Versus the Mesh-Current Method
4.9 Source Transformations
4.10 Thévenin and Norton Equivalents
4.12 Maximum Power Transfer
4.13 Superposition

Chapter 6 - Inductance, Capacitance, and Mutual Inductance

6.1 The Inductor
6.2 The Capacitor
6.3 Series-Parallel Combinations of Inductance and Capacitance
6.4 Mutual Inductance

Chapter 7 - Response of First-Order RL and RC Circuits

7.1 The Natural Response of an RL Circuit
7.2 The Natural Response of an RC Circuit
7.3 The Step Response of RL and RC Circuits

Chapter 9 - Sinusoidal Steady-State Analysis

9.1 The Sinusoidal Source
9.2 The Sinusoidal Response
9.3 The Phasor
9.4 The Passive Circuit Elements in the Frequency Domain
9.5 Kirchhoff's Laws in the Frequency Domain
9.6 Series, Parallel, and Delta-to-Wye Simplifications
9.7 Source Transformations and Thévenin–Norton Equivalent Circuits
9.8 The Node-Voltage Method
9.9 The Mesh-Current Method
9.10 The Transformer
9.11 The Ideal Transformer

Chapter 10 - Sinusoidal Steady-State Power Calculations

10.1 Instantaneous Power
10.2 Average and Reactive Power
10.3 The rms Value and Power Calculations
10.4 Complex Power
10.6 Maximum Power Transfer