



蘇州大學  
Soochow University

# ENR 220 Electric Circuit Analysis

Fall 2023

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

## **COURSE OBJECTIVES**

This course is intended to provide insights into fundamental electric circuit analysis theory, problems and their applications in electrical engineering. Covered topics include electric circuit elements, techniques of circuit analysis, inductance, capacitance and mutual inductance, solution of first and second-order networks, steady-state analysis, sinusoidal steady-state analysis, electrical circuit analysis using Laplace transforms, frequency selective circuits, two-port networks and network functions.

Upon completion of this course, students will be able to:

1. Develop a deep understanding of basic electrical circuit elements and their functions.
2. Apply various circuit analysis techniques, including nodal analysis, mesh analysis, Thevenin and Norton equivalent circuits, and Laplace transform methods.
3. Understand the appropriate use of specific circuit configurations and compare the applications of different types of electric circuits.
4. Compare and contrast the operation of various types of electrical elements.
5. Acquire practical problem-solving skills and the ability to real-world circuit design and analysis tasks.

## **PREREQUISITES**

MAT 337 Differential Equations for Engineers

PHY 118 Physics for Engineers



## GRADING

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Grades will be determined by accumulating points, with 100 points being the maximum, as follows:

ITEM	POINTS
Assignments	20 Points
Midterm 1	15 Points
Midterm 2	15 Points
Project	20 Points
Final Exam	30 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F.$$

We reserve the right to make adjustments to the overall grading policy.

## COURSE MATERIALS

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### Required Texts:

James W. Nilsson, Susan A. Riedel, *Electric Circuits*, 11th Edition, Pearson Education, 2018.

### Recommended (Optional) Texts or Other Materials:

None

## COURSE TOPICS

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MODULE	TASKS
Module 1	<b>Topics:</b> Topic 1: Introduction and Course Overview Topic 2: Electric Circuit Variables Topic 3: Electric Circuit Elements Topic 4: Simple Resistive Circuits <b>Assessments:</b> Assignment#1



Module 2	<b>Topics:</b> Topic 5: Techniques of Circuit Analysis: Node-Voltage Method Topic 6: Techniques of Circuit Analysis: Mesh-Current Method Topic 7: Thevenin and Norton Equivalents; Maximum Power Transfer Topic 8: Inductance, Capacitance, and Mutual Inductance <b>Assessments:</b> Assignment#2 Project
Module 3	<b>Topics:</b> Topic 9: Response of First-Order RL and RC Circuit Topic 10: Natural and Step Responses of RLC Circuits Topic 11: Sinusoidal Steady-State Analysis Topic 12: Sinusoidal Steady-State Power Calculations <b>Assessments:</b> Midterm#1 Project
Module 4	<b>Topics:</b> Topic 13: The Operational Amplifier Topic 14: Balanced Three-Phase Circuits Topic 15: Introduction to the Laplace Transform Topic 16: The Laplace Transform in Circuit Analysis <b>Assessments:</b> Midterm#2 Project due
Module 5	<b>Topics:</b> Topic 17: Introduction to Frequency Selective Circuits Topic 18: Two-Port Networks and Network Functions Topic 19: Two-Port Circuits Topic 20: Final Exam Review <b>Assessments:</b> Final Exam

## ATTENDANCE

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1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning



and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

### **LEARNING REQUIREMENTS**

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- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

### **TECHNOLOGY POLICY**

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The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

### **ACADEMIC INTEGRITY POLICY**

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Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.



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## **DISABILITY ACCOMMODATION**

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.