



蘇州大學
Soochow University

ENR 323 Engineering Electromagnetics

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

This course provides students with a solid grasp of electromagnetic fundamentals and electromagnetic waves by emphasizing physical understanding and practical applications. Students will explore fundamental principles of electromagnetism, including Maxwell's equations, electromagnetic waves, transmission lines, and antenna theory. The course emphasizes theoretical concepts and practical applications in various engineering disciplines.

Upon Completion of this Course, students will be able to:

1. Understand fundamental concepts of electromagnetic theory, including Maxwell's equations and their applications.
2. Analyze electromagnetic fields and waves in different media and boundary conditions.
3. Gain insight into the behavior of transmission lines, and their impact on signal integrity and system performance.
4. Apply electromagnetic theory to the design and analysis of transmission lines and antennas.
5. Gain practical skills in using electromagnetic simulation software for engineering applications.

PREREQUISITES

MAT 260 Calculus III; PHY 222 General Electricity and Magnetism



GRADING

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

ITEM	POINTS
4 Labs	20 Points
2 Lab Reports	20 Points
Midterm	20 Points
Final Project	10 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

Required Texts:

Engineering Electromagnetics and Waves, Second Edition, Umran S. Inan, Aziz Inan, Ryan Said, Wesley, Pearson.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Introduction: Electromagnetic Components Topic 2: Maxwell's Equations and Electromagnetic Waves Topic 3: Transient Response of Transmission Lines Topic 4: Transmission Line Parameters Assessments: Lab#1



Module 2	Topics: Topic 5: Steady-State Waves on Transmission Lines Topic 6: Impedance Matching Topic 7: The Smith Chart Topic 8: Lines Terminated in an Arbitrary Impedance Assessments: Lab#2 Lab Report#1
Module 3	Topics: Topic 9: The Static Electric Field Topic 10: Microelectromechanical Systems (MEMS) Topic 11: Steady Electric Currents Topic 12: Current Flow, Ohm's Law, and Resistance Assessments: Lab#3 Midterm
Module 4	Topics: Topic 13: The Static Magnetic Field Topic 14: Time-Varying Fields and Maxwell's Equations Topic 15: Waves in an Unbounded Medium Topic 16: Polarization of Electromagnetic Waves Assessments: Lab#4 Lab Report#2
Module 5	Topics: Topic 17: Reflection, Transmission, and Refraction of Waves at Planar Interfaces Topic 18: Parallel-Plate and Dielectric Slab Waveguides Topic 19: Waves between Parallel Metal Plates Topic 20: Field-Matter Interactions and Metamaterials Assessments: Final Project Final Exam

ATTENDANCE

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

- 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

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

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.



蘇州大學
Soochow University

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.