

Foundations of Engineering Electromagnetics

ECE 555 – 001 and – 002

Fall 2026

Course Outline and Syllabus

- Lectures:** I will lecture Tu Th 9:30-10:45 AM MITCH-118 and the lectures will be recorded. The recordings will be posted under **Media Gallery** at the side of the <http://canvas.unm.edu> website for this course and available to all students.
- Instructor:** Professor Edl Schamiloglu
Office: 323C ECE Building; Phone: 505-277-4423
e-mail: edls@unm.edu (preferred method of communication)
- Office Hours:** MW 10-11 AM, ECE 323C or by phone/Zoom
- Prerequisites:** ECE 360 or equivalent (undergraduate electromagnetics)
- Textbook:** **Required:** D.G. Dudley, *Mathematical Foundations for Electromagnetic Theory* (IEEE Press, New York, NY, 1994) (ISBN-13: 978-0780310223). We will cover Chapters 1-4. Supplemental material will also be provided.

Recommended: L. Sevgi, *Electromagnetic Modeling and Simulation (IEEE Press Series on Electromagnetic Wave Theory)* (IEEE Press/John Wiley and Sons, New York, NY, 2014) (ISBN-13: 978-1118716182). This reference will be useful for the final project.
- Course Website:** <http://canvas.unm.edu>. You will need your UNM NET ID to access this page if you are registered for the course.
- Catalog Description:** Mathematical foundations for engineering electromagnetics: linear analysis and method of moments, complex analysis and Kramers-Kronig relations, method of steepest descent, Green's functions, spectral representation method and electromagnetic sources.
- Course Objectives:** This course is a prerequisite to ECE 561, although students admitted in the Spring semester can take this after completing ECE 561. Topics covered: Mathematical foundations for engineering electromagnetics: linear analysis and method of moments, complex analysis (including the method of steepest descent), Kramers-Kronig relations, Green's functions, spectral representation method, and electromagnetic sources.
- Grading:** 7 problem sets [every two weeks, to be scanned and uploaded to Canvas's assignment tool] (30%), midterm exam (30%), and a final project (40%). Final grades will be assigned as follows:

| 100 A+ | 90-99 A | 80-89 B | 70-79 C | <70 F |

(Note: These are not raw scores, they are based on the curved scores for the Exams)

Lecture Schedule*

<u>Week#</u>	<u>Day</u>	<u>Date</u>	<u>Topic 1</u>	<u>Text Chapter/Ref.</u>
1	Tu	18 Aug	Preamble – Applied EM@UNM	Sit back, relax, and listen
	Th	20 Aug	EM Spectrum/Intro to Linear Analysis	Chapter 1
2	Tu	25 Aug	Inner Product Space	Chapter 1
	Th	27 Aug	Hilbert Space/Operators	Chapter 1
3	Tu	01 Sep	CSB Inequality	Chapter 1
	Th	03 Sep	Random Coupling Model	Lecture Notes
4	Tu	08 Sep	Topic 2 - Complex Analysis I	Lecture Notes
	Th	10 Sep	Topic 2 - Complex Analysis II	Lecture Notes
<u>Topic 2</u>				
5	Tu	15 Sep	Topic 1 - No Class – Read Method of Moments Papers	
	Th	17 Sep	Topic 2 - No Class – Review of Linear Space	
6	Tu	22 Sep	<i>Connections to Quantum Mechanics</i>	Lecture Notes
	Th	24 Sep	No Class – Read Papers	Lecture Notes
7	Tu	29 Sep	Complex Analysis III	Lecture Notes
	Th	01 Oct	Complex Analysis IV	Lecture Notes
8	Tu	06 Oct	No Class – Read Method of Steepest Descent	
	Th	08-09 Oct	Fall Break	
<u>Topic 3</u>				
9	Tu	13 Oct	Sturm-Liouville – First kind	Chapter 2
	Th	15 Oct	Sturm-Liouville – Second kind	Chapter 2
10	Tu	20 Oct	Sturm-Liouville – Third kind	Chapter 2
	Th	22 Oct	Sturm-Liouville – Wrap-up	Chapter 2
11	Tu	27 Oct	Midterm Exam	
	Th	29 Oct	Go over Midterm Exam Solutions – Discuss Final Project	
<u>Topic 4</u>				
12	Tu	03 Nov	Spectral Rep. Meth. SLP1/SLP2	Chapter 3
	Th	05 Nov	Spectral Rep. Meth. SLP1/SLP2	Chapter 3
13	Tu	10 Nov	Spectral Rep. Meth. SLP3	Chapter 3
	Th	12 Nov	Spectral Rep. Meth. SLP3	Chapter 3
14	Tu	17 Nov	Spectral Rep. Meth. and GF's	Chapter 3
<u>Topic 5</u>				
	Th	19 Nov	EM Sources – Sheet Source	Chapter 4
15	Tu	24 Nov	EM Sources – Line Source	Chapter 4
	Th	26 Nov	Thanksgiving Holiday – No Class	
16	Tu	01 Dec	No Class – work on Final Project	
	Th	03 Dec	No Class – work on Final Project	

*I will miss several lectures due to travel. I will post my lecture slides and provide instructions for guided study for these missed classes or Dr. Ahmed Elfrgani will lecture on my behalf. The final project will be due at noon on Friday, December 11, 2026.



FALL 2026 ADDITIONAL SYLLABUS INFORMATION

Accommodations: UNM is committed to providing equitable access to learning opportunities for students with documented disabilities. As your instructor, it is my objective to facilitate an inclusive classroom setting, in which students have full access and opportunity to participate. To engage in a confidential conversation about the process for requesting reasonable accommodations for this class and/or program, please contact [Accessibility Resource Center](#) at arcsrvs@unm.edu or 505-277-3506.

UAP 2720 and 2740. Our classroom and university should foster mutual respect, kindness, and support. If you have concerns about discrimination, harassment, or violence, please seek [support](#) and [report](#) incidents. Find confidential services at [LoboRESPECT Advocacy Center](#), [the Women's Resource Center](#), and the [Arcoiris Center](#). UNM prohibits discrimination on the basis of sex (including gender, sex stereotyping, gender expression, and gender identity). All instructors are "responsible employees" who must [communicate reports](#) of sexual harassment, sexual misconduct and sexual violence to [Compliance, Ethics and Equal Opportunity](#). For more information, please see [UAP 2720](#) and [UAP 2740](#).

Credit-hour statement: This is a three-credit-hour course. Class meets for two 75-minute sessions of direct instruction for 15 weeks during the Fall 2026 semester. Please plan for a minimum of six hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

No Generative AI Use

This course is meant to help you develop and demonstrate key knowledge and skills without the support of generative artificial intelligence (AI) tools for submitted work. Using generative AI to complete submitted coursework in this course will interfere with the advantages in learning and understanding that this course offers you. You are expected to complete submitted work without any generative AI assistance. Prohibited generative AI use includes tools such as ChatGPT, Claude, Gemini, Copilot, Grammarly's generative AI features, AI image generators, AI video or audio generators, AI code generators, AI paraphrasing tools, AI presentation generators, AI design tools, and similar technologies. The purpose of this course policy is educational, not punitive. The assignments in this course are aligned with specific learning processes and outcomes that support your future learning and expertise. Submitting AI-generated or AI-assisted in this course is inconsistent with course expectations and may violate UNM's academic integrity standards and Student Code of Conduct. If AI use is suspected, I will use submitted coursework, assignment directions, conversations with you about your work and process, and this syllabus to determine whether academic misconduct occurred. If you are unsure if a tool or use is allowed, please ask before submitting the assignment.