ENGINEERING

Foundations of Engineering Electromagnetics
ECE 555 – in-class and on-line sections
Fall 2017
Course Outline and Syllabus

Lectures: Tu Th 9:30-10:45 AM
Room DSH-132 – Sec 002 students are welcome to attend the lectures if they wish; otherwise, the recordings will be posted under Mediasite Recordings at the bottom of the Learn.unm.edu website for this course and available to all students.

Instructor: Professor Edl Schamiloglu
Office: 323C ECE Building; Phone: 505-277-4423
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Office Hours: M W 9:00-10:00 AM and by appointment [since I assumed the position of Associate Dean for Research for the School of Engineering I will likely not be able to reliably be in my office for office hours. If you would like to speak with me regarding the course I recommend emailing me so that we can arrange for a time to meet.]

Prerequisites: ECE 360 or equivalent (undergraduate electromagnetics)

Textbook: 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.

Course Website: http://learn.unm.edu. You will need your UNM NET ID to access this page if you are registered for the course.

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 learn.unm.edu 's assignment tool] (30%), two exams (30%) and a comprehensive final exam (40%).

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Lecture Schedule*

Week#	*Day*	*Date*	*Topic*	*Text Chapter/Ref.*
1	Tu	22 Aug	Preamble – Applied EM@UNM	
	Th	24 Aug	Intro to Linear Analysis	Chapter 1
2	Tu	29 Aug	Inner Product Space	Chapter 1
	Th	31 Aug	Hilbert Space	Chapter 1
3	Tu	05 Sep	Operators in Hilbert Space	Chapter 1
	Th	07 Sep	Method of Moments	Chapter 1
4	Tu	12 Sep	Complex Analysis I	Lecture Notes
	Th	14 Sep	Complex Analysis II	Lecture Notes
5	Tu	19 Sep	*Connections to Quantum Mechanics*	Lecture Notes
	Th	21 Sep	Complex Analysis III	Lecture Notes
6	Tu	26 Sep	Complex Analysis IV	Lecture Notes
	Th	28 Sep	Method of Steepest Descent	Lecture Notes
7	Tu	03 Oct	**Exam #1**	
	Th	05 Oct	Introduction to Green's Functions	Chapter 2
8	Tu	10 Oct	Sturm-Liouville Theory	Chapter 2
	Th	12 Oct	*Fall Break*	
9	Tu	17 Oct	Sturm-Liouville – First kind	Chapter 2
	Th	19 Oct	Sturm-Liouville – Second kind	Chapter 2
10	Tu	24 Oct	Sturm-Liouville – Third kind	Chapter 2
	Th	26 Oct	Sturm-Liouville – Third kind	Chapter 2
11	Tu	31 Oct	*Review of Chapter 2 Material*	
	Th	02 Nov	**Exam #2**	
12	Tu	07 Nov	Spectral Representation Method	Chapter 3
	Th	09 Nov	Spectral Rep. Meth. SLP1/SLP2	Chapter 3
13	Tu	14 Nov	Spectral Rep. Meth. SLP3	Chapter 3
	Th	16 Nov	Spectral Rep. Meth. SLP3	Chapter 3
14	Tu	21 Nov	Spectral Rep. Meth. and GF's	Chapter 3
	Th	23 Nov	*Thanksgiving Break*	
15	Tu	28 Nov	EM Sources – Sheet Current	Chapter 4
	Th	30 Nov	EM Sources – Line Source	
16	Tu	05 Dec	EM Sources – Point Source	Chapter 4
	Th	07 Dec	*Review for Final Exam***	

** Time and location of Final Exam will be discussed in December.

NOTE: I will miss a few lectures due to program reviews, travel, etc. I will provide an updated list of those dates as they become available. There will either be a guest lecturer or I will provide material for students to work on *in lieu* of class.

* subject to change