EE 4301.001.23S Course Syllabus

Course Information

Course Number/Section	EE 4301.001.23S
Course Title	Electromagnetic Engineering I
Term	Spring 2023
Days & Times	Monday and Wednesday: 11:30 am - 12:45 pm
Meeting Place	ECSN 2.126

Professor Contact Information

Professor	Ifana Mahbub, Ph.D.
Office Phone	972-883-6463
Email Address	Ifana.Mahbub@utdallas.edu
Office Location	ECSN 3.215
Office Hours	Tuesday and Thursday 2:00 pm to 3:00 pm
	Or by appointment

Course Pre-requisites, Co-requisites, and/or Other Restrictions:

Prerequisites: PHYS 2326 and ENGR 3300 and (CE 3301 or EE 3301 or TE 3301).

Course Description:

Introduction to static electric and magnetic fields. Introduction to the general characteristics of wave propagation. Physical interpretation of Maxwell's equations. Propagation of plane electromagnetic waves and energy.

Required Textbooks and Materials:

Required Texts
Fundamentals of Applied Electromagnetics by Fawwaz T. Ulaby and Umberto Ravaioli, Eighth Edition, (Pearson 2020) IBSN: 978-0-13-668158-8

Recommended Material
div grad curl and all that, by H. M. Schey, Third Edition (Norton, 1997) IBSN: 0-393-96997-5

A Student's Guide to Maxwell's Equations, by Daniel Fleisch, (Cambridge University Press, 2008) IBSN: 978-0-521-70147-1

William H. Hayt Jr. and John, A. Buck, 2012. **Engineering Electromagnetics**, Eighth Edition, Mcgraw- Hill. ISBN: 978-0-07-338066-7

Course Learning Objectives:

1. Ability to explain and analyze electro-static and magneto-static fields.
2. Ability to determine electric and magnetic fields in the presence of simple dielectric, magnetic and conducting materials.
3. Ability to explain the physical significance of Maxwell's equations and the coupling of electric and magnetic fields.
4. Ability to explain electromagnetic wave equations and the propagation of electromagnetic fields and energy.

Detailed Course Content:

Date	Topics	Text Sec(s)
Topic Schedule for EE4301.501 Spring 2023		
Date	Topics	Text Sec(s)
Wednesday, January 18, 2023	Intro and Review	Chapter 3
Monday, January 23, 2023	Electric Charge and Coulomb's Law	4-1, 4-2, 4-3
Wednesday, January 25, 2023	Electric Field Calculations	4-3
Monday, January 30, 2023	Gauss's Law and Electric Potential	4-4
Wednesday, February 1, 2023	Electric Potential Calculations (**Class will be taught by the TA)**	4-5
Monday, February 6, 2023	Conductors and Dielectrics	4-6, 4-7
Wednesday, February 8, 2023	Displacement Vector, Boundary Cdns, Capacitance	4-8, 4-9
Monday, February 13, 2023	Electric Forces and Electric Energy	4-10
Wednesday, February 15, 2023	Laplace and Poisson Equations	
Monday, February 20, 2023	Method of Images	4-11
Wednesday, February 22, 2023	Review for Exam #1	
Monday, February 27, 2023	Exam #1	
Wednesday, March 1, 2023	Magnetic Fields	5-1, 5-2
Monday, March 6, 2023	Magnetic Field Calculations	5-2
Wednesday, March 8, 2023	Magnetic Dipoles, Torque	5-3, 5-4
Monday, March 13, 2023	Spring Break - No Class	
Wednesday, March 15, 2023	Spring Break - No Class	
Monday, March 20, 2023	Magnetic Materials	5-5
Wednesday, March 22, 2023	Boundary Conditions, Inductance	5-6, 5-7
Monday, March 27, 2023	Magnetic Energy and Forces	5-8
Wednesday, March 29, 2023	Time Varying Fields, Faraday's Law	6-1
Monday, April 3, 2023	Maxwell's Equations	
Wednesday, April 5, 2023	Review for Exam #2	
Monday, April 10, 2023	Exam #2	
Wednesday, April 12, 2023	Plane Waves in Lossless Media	7-1, 7-2
Monday, April 17, 2023	Polarization	7-3
Wednesday, April 19, 2023	Plane Waves in Lossy Media (**Class will be recorded and uploaded, I will be out of town)**	7-4
Monday, April 24, 2023	Power Flow	7-6
Wednesday, April 26, 2023	Plane Wave Reflection and Transmission	8-1, 8-2
Monday, May 1, 2023	Plane Wave Reflection - Oblique Incidence, TIR, Brewster Angle, Standing Waves	8-4, 8-5
Wednesday, May 3, 2023	Review for Final Exam	

Important Dates:

No Physical Classes: Monday, Mar 13th through Saturday, Mar 18th – Spring Break
                                  Wednesday, Apr 19th – Lecture will be recorded and uploaded

Classes Begin: Wednesday, Jan 18th
Classes End: Wednesday, May 3rd

Exam Dates:	Exam #1	Monday, February 27th
	Exam #2	Monday, April 10th
	Final Exam	TBD

Homework and Exams

Homework will be assigned regularly and due dates will be specified. Assignments will be posted on eLearning and all submissions will be through eLearning. Homework submissions MUST be in pdf file format – no other file format will be accepted. Homework due dates will be clearly specified – late submissions will be penalized: a 10-point penalty for 1 day late; 20 point penalty for 2 days late; after 2 days homework will not be accepted. No exceptions unless you receive prior permission from Dr. Mahbub

Exams will be in-person on the dates specified above. Exams will be closed books; one sheet of notes will be allowed for each regular exam; two sheets of notes will be allowed for the final exam. The final exam will be comprehensive.

Weights for Final Course Average:

Homework:	10%
Quiz (3):	30%
Exams (2):	30%
Final Exam:	30%

Tutoring: There will be tutoring available for this course through the IEEE – check with the IEEE for dates and times of those tutoring sessions.

UT Dallas Syllabus Policies and Procedure:

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.