



TED UNIVERSITY

Syllabus for EE 341-01 Electromagnetic Fields and Waves Fall 2016-2017

Instructor:	Prof. Dr. Erdem YAZGAN
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Time Schedule:	Monday (09.00 – 11.50), Tuesday (11.00 – 11.50)
Office Hours:	Monday (15.00 - 16.00), Tuesday (14.00 - 15.00) (or by appointment)
Classroom:	A331, K085

Course Code & Number	EE 341	Course Title	Electromagnetic Fields and Waves
Type of Course	☒ Compulsory ☐ Elective	Semester	☒ Fall ☐ Spring ☐ Summer
Level of Course	BSc	Year of Study	Junior
Course Credit Hours / ECTS	(3+0+0) 3 / 5 ECTS	Pre-requisite / Co-requisite	Pre-requisite: MATH 204 Co-requisite: None
Mode of Delivery	☒ Face-to-face ☐ Distance learning	Language of Instruction	☒ English ☐ Turkish
Course Coordinator	Prof. Dr. Erdem Yazgan Phone: 0312-5850027 E-mail: erdem.yazgan@tedu.edu.tr		
Computer Usage Textbook	D.K.Cheng, "Field and Wave Electromagnetics" Addison Wesley Pub. Comp., W.H. Hayt, and J.A. Buck, "Engineering Electromagnetics", McGraw-Hill, 2007.		
Supplementary Reading	1) David K. Cheng, "Fundamentals of Engineering Electromagnetics", Prentice Hall, 1993. 2) Matthew N.O. Sadiku, "Elements of Electromagnetics", 4th ed. Oxford, 2006.		
Module and Instructor Evaluation Date	Evaluation will be held on the last day of the class		

Course Catalog Description	Electrostatic fields: Coulomb's law, Gauss' law, electric potential, boundary conditions, capacitance, electrostatic force and energy, Poisson's and Laplace's equation, image method. Steady electric currents. Static magnetic fields: Biot-Savart law, Ampere's law, vector magnetic potential, inductance, magnetostatic force and energy. Faraday's law of induction. Wave concept. Maxwell's equations. Plane waves. Polarization. Poynting's vector.
Course Objectives	The goal of this course is to provide the basic principles of electromagnetics emphasizing on the characterization and the solution of static and dynamic electric and magnetic field problems
Course Learning Outcomes (LO)	Having successfully completed this course, students will be able to: LO-1: Determine (B3) static electric fields created by charge distributions. LO-2: Calculate (B3) electrostatic potential. LO-3: Calculate (B3) capacitance and electrostatic energy. LO-4: Formulate (B2) and apply (B3) boundary conditions. LO-5: Solve (B3) electrostatic boundary value problems. LO-6: Determine (B3) steady electric currents and resistance. LO-7: Determine (B3) static magnetic fields. LO-8: Calculate (B3) inductance and magnetostatic energy. LO-9: Formulate (B2) and analyze (B3) Faraday's law of induction. LO-10: Identify (B2) Maxwell's equations. LO-11: Formulate (B3) uniform plane waves in lossless or lossy medium. LO-12: Identify (B2) the concept of polarization. LO-13: Formulate (B2) electromagnetic power and Poynting's theorem. LO-14: Demonstrate (B3) written/oral communication skills by preparing reports and by giving an oral presentation to the class. LO-15: Display a professional commitment to group

Week		Topics	Learning Outcome (LO)	Assignments / Exams
1		Brief overview of vector calculus. Static electric fields, Fundamental postulates of electrostatics, Coulomb's law	1	
2		Electric field due to continuous distribution of charges, Electric flux density, Gauss' law	1	Assignment #1
3		Electrostatic potential	2	
4		Behavior of material media (conductors and dielectrics) in static electric field, Boundary conditions	3	Assignment #2
5		Capacitance and electrostatic energy	3	
6		Poisson's and Laplace equations, Method of images	5	Quiz #1
7		Steady electric currents, Continuity of current, Resistance	6	Assignment #3
8		Static magnetic fields, Fundamental postulates of magnetostatics, Biot-Savart law, Ampere's law	7	Midterm # 1
9		Magnetization, Magnetic flux density, Boundary conditions	7,4	Assignment #4
10		Self and mutual inductance, Magnetic energy and forces	8	Quiz #2
11		Electromagnetic induction, Faraday's law	9	Assignment #5
12		Time-varying fields and Maxwell's equations	10	Midterm # 2
13		Uniform plane waves, Flow of electromagnetic power and Poynting's theorem; Polarization of plane waves	11,12,13	Assignment #6
14		Student project presentations	14	
15		FINAL EXAMS WEEK, (date and time to be announced later).		

COURSE ASSIGNMENTS	
A. Midterm Exams [40%]	
There will be 2 closed-book midterm exams, 25% for each exam. Exam 1 will be on the 8 th week and cover the linear algebra part. Exam 2 will be on the 12 th week and cover the differential equations part. Date and time of the exams will be announced later.	
B. Final [30%]	
There will be a cumulative closed-book final exam covering all topics. Date and time of the final will be announced at the end of the semester.	
C. Quizzes [10 %]	
There will be 2 quizzes Each quiz will be divided into two sections. Students will work collaboratively during the first half of the quiz (cooperative quiz), whereas must complete the second half of the quiz on their own (individual quiz).	
D. Written assignments [10%]	
There will be 6 homework/Matlab assignments with equal weight, which will be distributed on the 2 nd , 5 th , 7 th , 9 th , 11 th and 13 th weeks.	
E. Written/Oral project [10%]	
A group of two students will be given a topic that covers the real-life applications of linear algebra and differential equations. Each topic will be investigated, presented and reported in an academic format. Oral presentations will be held on the last week of the semester. Topics and details will be announced later.	
F. Extra bonus credit [3%]	
If your attendance rate is at least 90% at the end of the semester, you will be given 3% extra credits as bonus.	

COURSE ASSESSMENTS & LEARNING OUTCOMES MATRIX	
Assessment Methods	Course Learning Outcomes
Written homeworks / Matlab assignments	LO # 1...13
Quizzes	LO # 1...13 and 15
Written/Oral project	LO # 1...13, 14
1 st Midterm Exam	LO # 1...4
2 nd Midterm Exam	LO # 5...8
Final Exam	LO # 1...13

CONTRIBUTION OF THE MODULE TO PROGRAM OUTCOMES			
Program Outcomes	EE		
1	√		
2	√		
3	√		
4	√		
5	√		

Teaching Methods & Learning Activities	☒ Telling/Explaining ☒ Questioning ☒ Reading ☒ Demonstrating ☒ Problem Solving	☒ Collaborating ☒ Oral Presentations/Reports ☒ Web Searching ☒ Other(s): Homework and MATLAB assignments
Assessment Methods (Formal & Informal)	☒ Test/Exam ☒ Quiz ☒ Performance Project ☒ Written ☒ Oral	☒ Presentation (Oral) ☒ Other(s): Homework and LAB. assignments
Student Workload (Total 140 Hrs)	☒ Lectures 42 hrs ☒ Course Readings 50 hrs ☒ Exams/Quizzes 20 hrs	☒ Report on a Topic 10 hrs ☒ Oral Presentation 3 hrs ☒ Other: Homework 20 hrs

COURSE POLICIES	
I. Attendance	
- Regular class attendance is expected for all students at the University. You are not required but advised to attend all classes. - You will be rewarded with 3% extra <i>bonus</i> credits, if your attendance rate is at least 90% at the end of the semester. This means that you may miss only 4 single-hours to get this bonus. - Please sign the attendance sheet when you come to the class. Any false signatures will result in zero participation grades for all parties involved. - Please send your professor a brief e-mail to explain your absence in advance. - Your absence will not reduce your attendance rate <i>if and only if</i> you have a legitimate reason for missing a class (such as illness, death in family, a traffic accident, etc.). In case of an illness or emergency, you must supply a formal documentation that supports your claim. - Classes start on the hour. Please be respectful of your classmates by being on time. - All electronic equipment should be turned off and kept out of sight before lecture starts.	
II. Make-up Exams	
Make-ups for Midterm Exams 1 and 2 will be available <i>if and only if</i> you have a legitimate reason for missing the exam (such as illness, death in family, a traffic accident, etc.). In case of an illness or emergency, you must supply a formal documentation that supports your claim.	
III. Late Submission Policy	
Late submissions will not be graded. There will be <i>no</i> make-up for quizzes and homework/Matlab assignments. Missed assignments and quizzes will result in a grade of zero (0).	
IV. Participation	
In their book, <i>The Adult Student's Guide to Survival & Success</i>, Al Siebert and Mary Karr suggest that the most effective learning technique of all is to study by <i>asking and answering questions</i>. Develop the habit of reading textbooks, taking lecture notes, and studying by asking and answering questions. When you do this, you save many hours of studying and have time to spend with your family or friends. There are several ways to go about asking and answering questions. - When studying on your own, write questions that occur to you while you're reading and then go back and find the answers. - If you're part of a study group, make a list of questions to ask the group.	

- In the classroom, participate fully by asking questions and answering the ones posed by your instructor.

Curiosity is one of the cornerstones of learning. Be curious. Ask questions. Learn faster.

V. Cheating & Plagiarism

Collaboration is strongly encouraged; however, the work you hand in must be solely your own. Cheating and plagiarism are very serious offenses and will be penalized accordingly by the university disciplinary committee.

Cheating has a very broad description which can be summarized as "acting dishonestly". Some of the things that can be considered as cheating are the following:

- Copying answers on exams, homeworks and lab works,
- Using prohibited material on exams,
- Lying to gain any type of advantage in class,
- Providing false, modified or forged data in a report,
- Plagiarising (see below),
- Modifying graded material to be re-graded,
- Causing harm to colleagues by distributing false information about an exam, homework or lab.

All of the following are considered plagiarism:

- Turning in someone else's work as your own,
 - Copying words or ideas from someone else without giving credit,
 - Failing to put a quotation in quotation marks,
 - Giving incorrect information about the source of a quotation,
 - Changing words but copying the sentence structure of a source without giving credit,
 - Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.
- (www.plagiarism.org)

VI. Disability Support

If you have a disabling condition which may interfere with your ability to successfully complete this course, please contact Dr. Aslı Bugay (email: asli.bugay@tedu.edu.tr) or Dr. Tolga İnan (email: tolga.inan@tedu.edu.tr). For more information please see Handbook for Registered Students.

*** GOOD LUCK ***