The University of Texas at Tyler
Department of Electrical Engineering

EENG 3303 – Electromagnetic Fields (Required)

Syllabus

Catalog Description:

Vector analysis; static electric field; steady electric currents; static magnetic fields; time varying fields and Maxwell's equations; plane electromagnetic waves; transmission lines; introduction to waveguides; introduction to antennas.

Prerequisites:	MATH 3404, MATH 3305, PHYS 2326, and PHYS 2126
Credits:	3 (3 hours lecture, 0 hours laboratory per week)
Text(s): (Required)	1. Elements of Electromagnetics by Matthew N. O. Sadiku, Sixth Edition, Oxford University Press
Additional Material: (Recommended)	Reference(s): 1. MATLAB® 2. Instructor's lecture notes
Course Coordinator:	Hassan El-Kishky, Ph.D., P.E.

Topics Covered:

1. Vector Analysis
2. Static Electric Fields
3. Steady Electric Currents (Circuit Theory)
4. Static Magnetic Fields
5. Time Varying Fields
6. Maxwell Equations
7. Electromagnetic Waves
8. Introduction to Transmission Lines, Antennas, and Waveguides

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes (formerly Objectives)[1]: By the end of this course students will be able to:

1. Formulate the electric field and potential expressions due to various charge distributions [1]
2. Calculate electrostatic energy and capacitance due to various charge distributions [1]
3. Solve static electric field problems using analytical techniques [1]
4. Solve static magnetic field problems using analytical techniques [1]
5. Formulate a boundary value problem in electromagnetic fields [1,4,5]
6. Solve a boundary value problem in electromagnetic fields [1,4,5]
7. Solve a 2-D electrostatic problem using a numerical technique
8. Write and present a report on the solution of a 2-D electrostatic problem using experimental, analytical, and numerical techniques [3]

9. Use modern engineering tools including modeling and simulation software [3,4,5]
10. Develop the principles of time-varying fields and Maxwell's equations [1]
11. Solve Maxwell for uniform plane waves [1]
12. Write a paper on the impact of electromagnetics on society [3]
13. Develop transmission lines distributed model [1]

[1]*Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Student Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; [1, 5, 6, 10, 11,13]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors; [2, 3, 4, 8]
3. an ability to communicate effectively with a range of audiences;
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts; [12]
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; [7, 9, 10]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

[2]*Numbers in brackets refer to course learning outcomes/objective(s) that address the Program Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	hours
Engineering Sciences and Design:	3.0	hours
General Education Component:	0	hours

Prepared By:	Hassan El-Kishky	Date:	07/15/2011
Modified:	Seyed Ghorshi	Date:	08/22/2018
			08/24/2019
			05/28/2020
	Hassan El-Kishky		08/23/2021

Important-please read

Students are expected to wear face masks covering their nose and mouth in public settings (including classrooms and laboratories). The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code (Links to an external site.) and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, digestive issues (e.g. nausea, diarrhea), or a higher than normal temperature should stay at home and are encouraged to use the UT Tyler COVID-19 Information and Procedures (Links to an external site.)website to review protocols, check symptoms, and report possible exposure. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

EENG 3303 ELECTROMAGNETIC FIELDS

Fall'21

Class Time: TBA
Location: TBA

Coordinator: Hassan El-Kishky
Tel: (903) 565-5580 Fax: : (903) 565-5877
Email: helkishky@uttyler.edu

Office Hours: 9:30-11:00 TTh

Contents: The goal of this course is to provide the student with the fundamentals of the classical theory of electromagnetics.

Vector Analysis	1 ½ Week
Static Electric Fields	2 ½ Week
Steady Electric Currents (Circuit Theory)	½ Week
Static Magnetic Fields	2 Week
Time Varying Fields	3 Week
Maxwell Equations	1 ½ Week
Electromagnetic Waves	2 ½ Week
Transmission Lines	1 Week
Introduction to Antennas and Wave Guides	1 Week
	(15 ½ Week)

Grading:

Exam 1	25%
Exam 2	25%
Exam 3	25%
Final Exam	25%

**Students are required to combine both mathematical analysis and numerical computation using a computer technical calculation package such as MATLAB or any high-level computer programming language that applies to the case-study. An oral presentation is required.

Academic Integrity:
Students should be aware that absolute academic integrity is expected of every student in all undertakings at The University of Texas at Tyler. Failure to comply can result in strong university-imposed penalties.

Note:
If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability support services/accommodation(s) must provide appropriate documentation of his/her disability to the Disability Support Services counselor. In order to assure approved services the first week of class, diagnostic, prognostic, and prescriptive information should be received 30 days prior to the beginning of the semester services are requested. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579)." Additional information may also be obtained at the following UT Tyler Web address: http://www.uttyler.edu/disabilityservices.

Grade Replacement Policy:

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grade point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2006-08 Catalog, p. 35)