The University of Texas at Tyler
Department of Electrical Engineering

Course: 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 3304, MATH 3305, and PHYS 2326/2126

Credits: 3 ( 3 hours lecture, 0 hours laboratory per week )


Additional Material: Instructor’s Lecture Notes

Course Coordinator: Hassan El-Kishky, Assoc. Professor of Electrical Engineering

Topics Covered: Vector Analysis
Static Electric Fields
Steady Electric Currents (Circuit Theory)
Static Magnetic Fields
Time Varying Fields
Maxwell Equations
Electromagnetic Waves
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 Objectives: By the end of this course students will be able to:
1. Solve electromagnetic field problems using vector analysis [1,4,5].
2. Solve static electric field problems using analytical techniques [1,4,5].
3. Solve static magnetic field problems using analytical techniques [1].
4. Solve simple electromagnetic fields based circuit theory problems [1]
5. Develop and solve simple boundary value problems in electromagnetics [1,4,5]
6. Numerically simulate, model, and solve a 2-D electrostatic problem [4,5,6]
7. Develop and apply the principles of time-varying fields and Maxwell’s equations [1].
8. Solve Maxwell equations and predict the propagation of electromagnetic waves [1].
9. Solve simple uniform plane waves problems [1]
10. Develop the principles of transmission lines and wave-guides [1]

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

**Relationship to Program Outcomes (only items in dark print apply)**

This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering [1-10].
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering [1-9].
3. have the ability to analyze electrical circuits, devices, and systems [1-10].
4. have the ability to design electrical circuits, devices, and systems to meet application requirements [1-9].
5. have the ability to design and conduct experiments, and analyze and interpret experimental results.
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods [1-10].
7. have effective written, visual, and oral communication skills [6].
8. possess an educational background to understand the global context in which engineering is practiced, including [2]:
   a. knowledge of contemporary issues related to science and engineering.
   b. the impact of engineering on society.
   c. the role of ethics in the practice of engineering.
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams.
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers.

*Numbers in brackets refer to course objective(s) that address the Program Outcome.*

**Contribution to Meeting Professional Component: (in semester hours)**

| Mathematics and Basic Sciences: | 0.25 hours |
| Engineering Sciences and Design: | 2.75 hours |
| General Education Component: | 0 hours |

**Disability Support Services**

“If you have a disability, including a learning disability, for which you request an accommodation, please contact Ida MacDonald in the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Support Services counselor. 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).”

**Prepared By:** Hassan El-Kishky  
**Date:** 08/15/2011