EE3601 Lines, Fields, and Waves

Updated: Feb. 2 2013

This course outline is to serve as a reference for instructors and students. It gives a general overview of course content and ABET Outcomes. Please consult the semester specific syllabus produced by the course instructor for more detailed information.

Course Prerequisites, Basic Content, and Outcomes

Catalog Description:
(3.0 cr; Prereq-[2011, [Math 2243 or Math 2373 or Math 2573], [Phys 1302 or Phys 1402], CSE] or %; fall, spring, summer, every year) Properties of transmission lines, electrostatics, magnetostatics, and electromagnetic waves in unbounded space. Guides, cavities, radiation theory, antennas.

Contact Hours:
3 hours of lecture and 1 hour of discussion per week

Text:
Fundamentals Of Applied Electromagnetics W/cd 6th Edition, Ulaby, Prentice Hall.

Prerequisites by Topic:
Calculus, including differential equations and multi-variable calculus. Introductory fields and waves (physics). Basic circuit analysis through phasors and the Laplace transform.

Course Outcomes:
1) Comprehensive understanding of ideal transmission line behavior in transient and steady state conditions.
2) A basic understanding of loss in transmission lines.
3) A basic understanding of electro- and magneto-statics sufficient to enable further study of advanced fields and waves topics.

Relationship to Student Outcomes:
In accordance with ABET accreditation criteria, all engineering programs must demonstrate that their students achieve certain outcomes. This list of outcomes may be found on the ABET.org website. Of the outcomes listed in the ABET criteria (enumerated as (a) through (k)), this course teaches skills which help the student achieve the following outcomes:

(a) an ability to apply knowledge of mathematics, science, and engineering
(i) a recognition of the need for, and an ability to engage in life-long learning

Course Outline

Week	Lecture Topics
1	Intro to Waves and Phasors
2	Transmission Lines
3	Transmission Lines
4	Vector Calculus
5	Electrostatics
6	Electrostatics
7	Magnetostatics
8	Maxwell's Equations for Time Varying Fields
9	Maxwell's Equations for Time Varying Fields
10	Plane Wave Propagation
11	Plane Wave Propagation
12	Reflections and Transmission of Plane Waves
13	Reflections and Transmission of Plane Waves
14	Radiation and Antennas
15	Radiation and Antennas

Departmental and University Policies

Student Academic Integrity and Scholastic Dishonesty: Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else's work as your own, can result in disciplinary action. The University Student Conduct Code defines scholastic dishonesty as follows:

*Scholastic Dishonesty***:** Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering forging , or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Within this course, a student responsible for scholastic dishonesty can be assigned a penalty up to and including an "F" or "N" for the course. If you have any questions regarding the expectations for a specific assignment or exam, ask.

Incompletes: A grade of I for Incomplete is given at the discretion of the course instructor when, due to extraordinary circumstances, the student who has successfully completed a substantial portion of the course's work with a passing grade was prevented from completing the work of the course on time. Students must fill out an Incomplete Grade Agreement form found in Keller 3-166. The maximum time to remove and replace an incomplete grade is one year.

Makeup Work for Legimate Absensces: Consult university policy here:
http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html

Personal Electronic Devices: Consult university policy here:
http://policy.umn.edu/Policies/Education/Education/CLASSROOMPED.html

Mental Health: As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website at http://www.mentalhealth.umn.edu