ELECTRICAL ENGINEERING DEPARTMENT
California Polytechnic State University

EE 335 Electromagnetic Fields and Transmission (4 units) Spring 2006
Instructor: James G. Harris
Prerequisite: MATH 241, EE 212/242
Objective: The overall educational objectives are to give the junior EE students a basic understanding of Maxwell’s equations and apply them to plane waves; a basic understanding of radio frequency, pulse, and power transmission lines; and the ability to use Smith charts for transmission line analysis, design and matching, and to relate the subject matter with the material presented in electric circuit theory.
Textbooks: Iskander, Magdy F., Electromagnetic Fields and Waves; Waveland Press; 2000; texts for PHYS 133, MATH 241, and EE 212
Recommended: Kraus, J. D.; Electromagnetism, 4th ed; McGraw-Hill; 1992
Inan, S. U., Inan, S. I.; Engineering Electromagnetics; Addison-Wesley; 1998
Cheng, D. K.; Field and Wave Electromagnetics, 3rd ed; Addison-Wesley; 1998
Ramo, Simon; Whinnery, John R.; Van Duzer, Theodore; Fields and Waves in Communication Electronics, 3rd ed; Wiley; 1993
Ulaby, F. T.; Fundamentals of Applied Electromagnetics; Pearson Prentice Hall; 2004
Course Website Reference: http://www.ee.calpoly.edu/~jharris, and/or Blackboard(tbd)
Course Homework: Weekly homework assignments will be collected, corrected, graded, and returned. Students are encouraged to work in study groups; however, each student must turn in their own work. Late homework will not be accepted. There are planned projects using PSpice for homework assignments covering transmission line material; students can get a student version of PSpice on a CD from the senior project window (20-111).
Tests: All midterms and the final examination will be closed book and notes with no calculator. There will be an honor system imposed with a signed statement required by the student: “I have neither given nor received unpermitted aid during this examination”.
Grades: The grade will be based upon the following proportion:
  Homework 15%
  Two Midterms (@25%) 50%
  Final Exam 35%
Improvement or degradation in student performance over the quarter will be used to resolve borderline cases.
Office Hours: MWF 11:10-12:00; M 2:10-3:00; T 1:10-2:00; 20-305 x65708; jharris@calpoly.edu
Other times will be available by arrangement.
Notes to the student: There may be times when the instructor must be absent from the class in order to participate in national engineering education activities; other assistance will be provided during these periods. Your understanding and patience are appreciated.

EE 335 COURSE SCHEDULE – tentative Spring 2005

Date Reading Comments
M 3/27 7.2-3 introduction; distributed circuit transmission line model
W 3/29 7.4-6 lossless TL solution, boundary conditions
F 3/31 Holiday
M 4/3 7.8-9 time domain analysis; step and pulse response; HW 1 due
W 4/5 7.10 sinusoidal steady-state TL solution
F 4/7 7.11 boundary conditions, reflection coefficient; impedance
M 4/10 7.13 VSWR, power flow, analytical solution; HW 2 due
W 4/12 5.6;7.12,15 smith chart TL solutions
F 4/14 7.14 impedance matching – single and double stub
M 4/17 7.2,10 lossy TL, power flow; HW 3 due
W 4/19 1.1-2 review of vector algebra
F 4/21 1.3-5 vector coordinate systems
M 4/24 1.6 electric and magnetic fields; HW 4 due
How to be a successful student in EE 335:

1. plan on spending a minimum of 8 hours per week outside of lecture
2. do the reading assignment before lecture – come to class prepared with questions
3. form a study group (three people are best) – meet before homework is due and exams
4. reference your texts for calculus, physics and circuits to review prerequisite material in:
   a. vector calculus (MATH 241) - vector algebra, integration (line, surface, volume),
      differentiation (derivative, gradient, divergence, curl)
   b. physics (PHYS 133) – wave equation and motion, charges and electric fields (q, E, D),
      currents and magnetic fields (I, H, B), properties of materials (\(\sigma, \varepsilon, \mu\))
   c. circuits (EE 112/211/212) – solution of linear differential equations; linear analysis in
      time (transient and steady-state) and frequency (phasor and impedance) domains;
      sinusoidal steady-state analysis (complex power)
5. review all text examples and do all the homework – ask questions in lecture on examples, and
   understand solutions to all homework problems; attempt your homework solution without making
   reference to any solutions in the public domain
6. take advantage of the office hours to answer individual questions
7. consult the recommended texts listed in the syllabus for additional reading on subjects
8. use Google (or your favorite search engine) to search the web for resource materials on concepts
   that you wish to gain greater understanding; it is recommended that only resources with
   authoritative qualifications such as university sites be consulted
9. review previous exam reviews and midterms on the website in EE 335, EE 334, and EE 313 – use
   these resources to assist you in memorizing the definitions and laws/principles of electromagnetic
   theory; use dimensional analysis to assist in memorizing formulas; be able to derive results from
   definitions and laws/principles
10. strategy for taking exams: initially, read all problems; then, answer questions that yield 70% of the
    total, checking all results; finally, complete other problems as time permits