EEL 3472 ─ Electromagnetic Fields I   **Spring 2009**

Instructor: Dr. Jim P. Zheng   Room 346   Lecture Hours: MWF 12:55-1:45pm
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Prerequisites: EEL-3112 and MAP-3306 (grading C or better for both courses)

Required Textbooks:
1. J.A. Edminister, Theory and Problems of Electromagnetics, 2nd Ed., McGraw-Hill, Inc., New York, 1995, ISBN: 0-07-021234-1.
2. Daniel Fleisch, A Student's Guide to Maxwell's Equations, Cambridge University Press,2008, ISBN: 978-0-521-70147-1.

Recommended Reference Book:
Fawwaz T. Ulaby, Fundamentals of Applied Electromagnetics, Pearson Prentice Hall, 1994, ISBN: 0-13-577388-1.

Course Description: The electrostatic field; Gauss' law; boundary conditions; capacitance; Laplace's and Poisson's equations; energy, forces, and torques. The steady electric current. The magnetostatic field; vector potential; Ampere's and Biot-Stavart laws; inductance; energy, forces, and torques. Quasistatic fields; electromagnetic induction.

Course Objectives: This course is designed to provide the students with the basic knowledge and a firm grasp of the fundamental principles so that they can understand, formulate, and interpret the results of engineering problems involving electromagnettic fields. Specifically, after completing the course the student will be able to:
1. Evaluate static electric fields and capacitance.
2. Solve simple boundary value problems in electrostatics.
3. Analyze steady electric currents.
4. Evaluate static magnetic fields and inductance.
5. Calculate forces and torques in static magnetic fields.
6. Analyze and calculate the electromotive force resulted from changing magnetic fields due to transformer and motional induction.

Relationship to ABET Program Outcomes: A, C, E, M, and N

Course Topics:
1. Orthogonal coordinate systems
2. Vector analysis
3. Static electric fields (electrostatics)
4. Electrostatic boundary–value problems
5. Static magnetic fields (magnetostatics)
6. Time-varying fields and Maxwell's equations
7. Electromagnetic waves

Grading: Two Examinations: 40%   (20% from each exam)
Homework: 15%
Field Trip to NHMFL and Report: 5%
Final Examination: 40%   (a comprehensive exam)
Attendance and Quizzes: 5%   (bonus points, no credit will be
                                                  awarded if one missed more than 3 lectures)

Grading scale: **A: >90%, B: 80-89.9%, C: 65-79.9%, D: 45-64.9%, F: <44.9%**

These breakpoints may be lowered slightly depending on overall class performance.

Policy Statements:
- Attendance is mandatory. The grade will be lower at least by one level, if one absents from class more than 3 times.
- Coming late (5 minutes) or leaving early (5 minutes) will be considered as the absence from class.
- Homework is due at the beginning of class. No exception!
- The general policy is no makeup exams and quizzes. In the event of an excused absence, you must notify the instructor prior to the exam to discuss proper procedure.
- Cellular phones and beepers must be turned off in the classroom.
- There is renewed emphasis on the Honor Code. Violation of this code can result in course failure and/or dismissal from the College of Engineering.