

Electromagnetics - Course Syllabus

Course Number: EE122

Course Title: Electromagnetics

Academic Semester: Spring

Academic Year: 2015/ 2016

Semester Start Date: Jan, 24, 2016

Semester End Date: May, 19, 2016

Class Schedule: Mon & Th 14:30-16:00

Classroom Number: 3225 Bldg. 9 Level 3

Instructor(s) Name(s): Talal Al-Attar

Email: Talal.Attar@Kaust.edu.sa

Teaching Assistant name:

Email:

Office Location: Bldg:1 Level:3 Office: 3134

Office Hours:

COURSE DESCRIPTION FROM PROGRAM GUIDE

Prerequisites: familiarity with Resistance, Capacitance, Electric current and basic vector calculus. The course covers quasistatic and dynamic solutions to Maxwell's equations; waves, radiation, and diffraction.

The main contents are: vector analysis and vector calculus. The laws of Coulomb, Lorentz, Faraday, Gauss, Ampere, Biot-Savart and Lenz. Dielectric and magnetic materials. Poisson equation solutions. Forces, Power and Energy in electric and magnetic fields. Capacitance and Inductance. Maxwell's equations. Boundary conditions. Introduction to Wave equation, Poynting vector, Wave propagation and reflection. Includes weekly Simulations.

COMPREHENSIVE COURSE DESCRIPTION

This course covers the following topics:

Vector analysis and vector calculus. The laws of Coulomb, Lorentz, Faraday, and Gauss. Dielectric and magnetic materials. Energy in electric and magnetic fields. Capacitance and Inductance. Maxwell's equations. Wave equation. Poynting vector. Wave propagation and reflection.

GOALS AND OBJECTIVES

After completing this course, the student should have a firm grasp on:

- The concepts of the vector calculus (Scalars, vectors, gradient, divergence and curl).
- The application of different laws (Coulomb, Gauss, Poisson, Ampere, Biot-Savart, Lorentz, Maxwell, and Faraday)
- The difference between dielectrics and conductors.
- The nature of the magnetic materials and circuits.

REQUIRED KNOWLEDGE

Familiarity with Resistance, Capacitance, Electric current, and basic vector calculus.

REFERENCE TEXTS

- Required Textbook:

Elements of Electromagnetics

Matthew N.O. Sadiku

- Reference Books:

Engineering Electromagnetics

Hayt & Buck

Fundamentals of Electromagnetics (with Matlab)

Lonngren, Savov & Jost

METHOD OF EVALUATION

Percentages %	Graded content (Assignments, Oral quizzes, Projects, Midterm exam, Final Exam, Attendance and participation, etc)
Homeworks	15%
Quizzes	15%
Midterms	40% (20% Two Exams)
Final	30%

COURSE REQUIREMENTS

Assignments

Nature of the assignments (assigned reading, case study, paper presentation, group project, written assignment, etc)

Homework:

Homework assignments are due on Thursday in the class.

The Solutions will be provided by the end of the day homeworks are due.

If you need more time for your homework, you have to inform the Instructor or the TA in advance.

Quizzes:

There will be at least one Quiz every week starting the 2nd week and will be based on a 0-10 point scale.

The worst few quizzes will be dropped (If any). If you are keeping up with the problem sets, they should be relatively easy.

Exams:

There will be two midterm exams and one final exam

You are free to use your text book, course notes and any provided figures and handouts.

Course Policies

Absences, Assignments, late work policy, etc.

All homework assignments, quizzes, and exams are required. Students who do not show up for a Quiz or an exam should expect a grade of zero on that exam.

If you dispute your grade on any homework, quiz, or exam, you may request a re-grade (from the TA for the homeworks and quizzes or from the instructor for the exams) only within 48 hours of receiving the graded exam.

Incomplete (I) grade for the course will only be given under extraordinary circumstances such as sickness, and these extraordinary circumstances must be verifiable. The assignment of an (I) requires first an approval of the dean and then a written agreement between the instructor and student specifying the time and manner in which the student will complete the course requirements.

Additional Information

Engineers are required to practice “continuous” or “life-long” learning. This course will cover a lot of material which will require the students to do a lot of self-study, reading of the textbooks and handouts, learning how to use equipment and software, etc...Although the instructor and the TAs are committed to help the students in this course, the students are also expected to take initiatives and to get used to this notion of self-study that will be anyway (i) expected from them in their future careers and (ii) imperative to their success and survival in the real engineering and academic worlds.

Please don't hesitate to ask if you have any question or concern about the course.

NOTE

The instructor reserves the right to make changes to this syllabus as necessary.