

University of Puerto Rico
 Mayagüez Campus
 College of Engineering
 Department of Electrical and Computer Engineering
 Bachelor of Science in Electrical Engineering

Course Syllabus

1. General Information:	
Alpha-numeric codification: INEL 4151 Course Title: Electromagnetics I Number of credits: 3 Contact Period: 3 hours of lecture per week Required in INEL	
2. Course Description:	
English: Static and time varying electric and magnetic fields; dielectric, magnetic and conducting materials; capacitance, inductance and conductivity; magnetic circuits; dielectric and magnetic hysteresis; Maxwell's equations. Spanish: <i>Campos eléctricos y magnéticos estáticos y variables con el tiempo; materiales dieléctricos, magnéticos y conductores; capacitancia, inductancia y conductividad; circuitos magnéticos, histéresis dieléctrica y magnética; ecuaciones de Maxwell.</i>	
3. Pre/Co-requisites and other requirements:	
Requisites: (FISI3172 O FISI3162) Y (MATE3063 O MATE3185) Co-requisite: MATE4009	
4. Course Objectives:	
Describe the fundamental concepts of the interaction of electric and magnetic fields with matter. Introduce Maxwell's equations and their physical significance.	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input type="checkbox"/> discussion <input type="checkbox"/> computation <input type="checkbox"/> laboratory <input type="checkbox"/> seminar with formal presentation <input type="checkbox"/> seminar without formal presentation <input type="checkbox"/> workshop <input type="checkbox"/> art workshop <input type="checkbox"/> practice <input type="checkbox"/> trip <input type="checkbox"/> thesis <input type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify: oral presentation of a design project.	
6. Minimum or Required Resources Available:	
N/A	
7. Course time frame and thematic outline	
Outline	Contact Hours
Review of vector calculus concepts	2
Coulomb's law and electric field intensity	3
Electric flux density, Gauss' law and divergence	5
Conductors, divergence and capacitance	9
Laplace's and Poisson's equations	5
Magnetostatic fields	6
Magnetic forces, materials and inductance	7
Maxwell's equations	3
Applications of Maxwell's equations	2
Exams	3
Total hours: (equivalent to contact period)	45
8. Grading System	
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable	
9. Evaluation Strategies (Suggested): The faculty member teaching the course will provide the student with the evaluation strategy he/she will be using throughout the semester. This will be done within the first week of classes.	

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	3	0-100%
<input checked="" type="checkbox"/> Final Exam	1	
<input checked="" type="checkbox"/> Short Quizzes		0-100%
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input type="checkbox"/> Projects		
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: dependent on instructor		0-100% Error! Not a valid bookmark

10. Bibliography:

Textbook: Elements of Electromagnetics, 4th edition, M.N.O. Sadiku, Oxford University Press, NY, 2007

11. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

12. Contribution of Course to meeting the requirements of Criterion 5:

Math	Basic Science	General	Engineering Topic
			√

13. Course Outcomes

Solve electrostatic problems using Coulomb's law, and Gauss's law.	a
Describe the differences between dielectric and conducting materials.	a
Analyze capacitors and resistors using Gauss's law, and the Laplace's and Poisson's equations.	a
Solve magnetostatic problems using Biot-Savart's law and Ampere's law.	a
Describe the differences between diamagnetic, paramagnetic and ferromagnetic materials.	a
Find the inductance and magnetic force on different structures	a
Design simple capacitors, resistors and inductors	c
Determine the energy density in the electric and magnetic fields for different configurations.	a

Person who prepared this description and date of preparation: Electromagnetic Committee, March, 12, 2008. Submitted by: Dr. Rafael Rodríguez, Committee Coordinator, March, 12, 2008