

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

Course Syllabus

<b>1. General Information:</b>	
Alpha-numeric codification: INEL 4152 Course Title: Electromagnetics II Number of credits: 3 Contact Period: 3 hours of lecture per week Required in INEL	
<b>2. Course Description:</b>	
English: Maxwell's equations and wave-equations. Plane waves in dielectric and conducting media. Power flow and Poynting vector. Polarization, reflection y diffraction of waves. Waveguides, transmission lines. Smith Chart, impedance matching. Antennas..	
Spanish: Ecuaciones de Maxwell y la ecuación de onda; ondas planas en medios dieléctricos y conductores; Fuljo de potencia y el vector de Poynting; polarización, reflexión y difracción de ondas; guías de onda, líneas de transmisión, carta de Smith, pareo de impedancias; antenas .	
<b>3. Pre/Co-requisites and other requirements:</b>	
Requisites: MATE4009, INEL4151	
<b>4. Course Objectives:</b>	
Introduce and describe wave propagation mechanisms in unbounded and bounded media and waveguides. Introduce radiation mechanisms and antenna parameters.	
<b>5. Instructional Strategies:</b>	
<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.	
<b>6. Minimum or Required Resources Available:</b>	
N/A	
<b>7. Course time frame and thematic outline</b>	
<b>Outline</b>	<b>Contact Hours</b>
Maxwell's equations	3
Plane wave propagation	12
Transmission lines	12
Waveguides	9
Antennas	6
Exams	3
<b>Total hours: (equivalent to contact period)</b>	<b>45</b>
<b>8. Grading System</b>	
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable	
<b>9. Evaluation Strategies</b> (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%
<b>TOTAL:</b>		<b>100%</b>

**10. Bibliography:**

Textbook: Elements of Electromagnetics, 4<sup>th</sup> 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
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**13. Course Outcomes**

**Map to Program Outcomes**

Formulate the equation for a plane wave traveling in a unbounded general medium	a
Calculate the reflection and transmission coefficients for normal and oblique incidence for a dielectric-dielectric interface and a dielectric-perfect electric conductor interface.	a,e
Calculate the reflection and transmission coefficients for normal incidence for a dielectric-conductor interface.	a,e
Describe the electromagnetic fields inside a transmission line	a
Calculate the reflection coefficient for a terminated transmission line	a,e
Design matching networks using quarter wave transformers and single stubs.	c,e
Use the Smith Chart to find reflection coefficients and impedances, and to design single stub matching networks.	k,e
Describe the electromagnetic fields inside a waveguide.	a
Determine the number of modes propagating in a waveguide	a,e
Design a waveguide given the desired operating frequency range	c,e
Describe the fundamental antenna parameters	a
Analyze and interpret data from laboratory demonstrations	b

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