

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 4103 Course Title: Electrical Systems Analysis III Number of credits: 3 Contact Period: 45 Required in INEL	
<b>2. Course Description:</b>	
English: Analysis of magnetic circuits and polyphase balanced power systems. Topics include transformers and power transmission lines. Computer-aided analysis of these systems is introduced.	
Spanish: Análisis de circuitos magnéticos y sistemas de potencia monofásicos y trifásicos balanceados. Los temas incluyen transformadores, líneas de transmisión e introducción al análisis, por computadora, de dichos sistemas.	
<b>3. Pre/Co-requisites and other requirements:</b>	
INEL 4102, INEL 4151, MATE 4009	
<b>4. Course Objectives:</b>	
The course presents fundamental concepts of power transformers and transmission lines. This is a three credit-hours course, open to Junior Electrical Engineering students. After completing the course, students will have a sound background on the analysis of electric power systems. They will define and describe the basic components of a power system (source, feeders, transformers and loads). Students must identify three phase circuit configurations including transformer connections. They will apply three phase concepts to every day life situations and equipment. Students will be able to solve problems involving power transformers and transmission lines.	
<b>5. Instructional Strategies:</b>	
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input checked="" 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 checked="" type="checkbox"/> special problems <input type="checkbox"/> tutoring  <input type="checkbox"/> research <input checked="" type="checkbox"/> other, please specify: There will be laboratory demonstrations throughout the semester. Students must attend these demonstrations during the regular class period. Material from these demonstrations will be part of the class, and thus will be evaluated. Students may be asked to collect data from these demonstrations, analyze it and submit a report with the results of the analysis.	
<b>6. Minimum or Required Resources Available:</b>	
All students are expected to bring a solid background in circuit analysis and calculus. Students should also have basic knowledge of electromagnetic theory. Students must always bring to class the textbook and a scientific calculator (preferably one that handles complex numbers).	
<b>7. Course time frame and thematic outline</b>	
<b>Outline</b>	<b>Contact Hours</b>
Introduction	1
Student learning profile	
Review of power and electromagnetics fundamentals	4
Single-phase systems	16
Three-phase systems	12
Transmission lines	6
Contemporary Issues	3
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	70
<input checked="" type="checkbox"/> Final Exam	1	20
<input checked="" type="checkbox"/> Short Quizzes	_____	5
<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: Homework	_____	5
<b>TOTAL:</b>		<b>100%</b>

**10. Bibliography:**

Textbook:

J. Glover and M. Sarma, Overbye, T, Power System Analysis and Design, 4<sup>th</sup> Edition, International Thomson Pub., 2007.

References:

D. Fink (Ed.), Standard Handbook for Electrical Engineers, 14th Ed., McGraw Hill, 1999.

R. Shults, R. Smith, Introduction to Electric Power Engineering, Harper & Row, 1985.

**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**

1. Possess sufficient knowledge of circuit analysis and electromagnetic principles to enable understanding of the physical operation of electric power devices and systems.
2. Be able to apply linear algebra and phasor analysis concepts to descriptions and solutions of steady state electric power engineering problems.
3. Be capable of extracting specifications and physical constraints from power engineering verbal problems.
4. Be capable of physical thinking, approximation and simplification within the context of fundamental frequency steady state, power system and device analysis.
5. Be capable of effectively describing single-phase and three-phase power systems in a way that can lead to the construction of a solution.
6. Be capable of defining single-line, transformer, transmission line models as possible power engineering problem solutions.
7. Be able to validate a solution (applying models above) within the physical context of a power system.

**Map to Program Outcomes**

- (a)
- (a)
- (a)
- (e)
- (e)
- (e)
- (e)
- (e)

Person(s) who prepared this description and date of preparation: \_\_\_\_\_

Submitted by: Efrain O’Neill nov 2006

