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

Course Syllabus

1. General Information:

Alpha-numeric codification: INEL 4103
Course Title: Electrical Systems Analysis III
Number of credits: 3
Contact Period: 45

2. Course Description:

English: Analysis of magnetic circuits and polyphase balanced power systems. Topics includes transformers and power transmission lines. Computer-aided analysis of these systems is also introduced.

Spanish: Análisis de circuitos magnéticos y sistemas de potencia monofásicos y trifásicos balanceados. Los temas incluyen transformadores, líneas de transmisión e introducción al análysis, por computadora, de dichos sistemas.

3. Pre/Co-requisites and other requirements:

INEL 4102, INEL 4151, MATE 4009

4. Course Objectives:

This 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 everyday life situations and equipment. Students wll be able to solve problems involving power transformers and transmission lines.

5. Instructional Strategies:

☒conference ☒discussion ☒computation ☐laboratory

☐seminar with formal presentation ☐seminar without formal presentation ☐workshop

☐art workshop ☐practice ☐trip ☐thesis ☒special problems ☐tutoring

☐research ☒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.

6. Minimum or Required Resources Available:

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).

7. Course time frame and thematic outline

Outline	Contact Hours
Introduction Student learning profile	1
Review of power and electromagnetics fundamentas	4
Single phase systems	16
Three phase systems	12
Transmission lines	6
Contemporary issues	3
Exams	3
Total hours: (equivalent to contact period)	45

8. Grading System

☒Quantifiable (letters) ☐ Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
☐ **Exams**		
☐ **Final Exam**		
☒ **Short Quizzes**	**__7__**	**80%**
☐ **Oral Reports**		
☐ **Monographies**		
☐ **Portfolio**		
☒ **Projects**	**1**	**20%**
☐ **Journals**		
☐ **Other, specify: Homework**	**_____**	
TOTAL:		**100%**

10. Bibliography:

Textbook:
G.D. Glover and M. Sarma, Power System Analysis and Design. 4th Edition, International Thomson Pub., 2008.
Grove, California: Brooks/Cole.
References:
D. Fink (Ed.), Standard Handbook for Electrical Engineers, 14th Edition, McGraw Hill, 1999
R. Shults, R. Smith, Introduction to Electric Power Engineering, 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. Course Outcomes	**Map to Program Outcomes**
1. Possess sufficient knowledge circuit analysis and electromagnetic principles to enable understanding of the physical operation of electric power devices and systems.	(a)
2. Be able to apply linear algebra and phasor analysis concepts to descriptions and solutions of steady state electric power engineering problems.	(a)
3. Be able to extract specifications and physical constraints from power engineering verbal problems.	(a)
4. Be capable of physical thinking, approximation and specificationwithin the context of fundamental frequency steady state, power system and device analysis.	(e)
5. Be capable of effectivly describing single phase and three phase power systems in a way that can lead to the construccttion of a solution.	(e)
6. Be capable of defining single-line, transformers, transmission line models as possible power engineering problem solution.	(e)
7. Be able to validate a solution (applying models above) within the physical context of a power system.	(e)
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