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 4102
Course Title: ELECTRICAL SYSTEMS ANALYSIS II
Number of credits: 3
Contact Period: 3 hours of lecture per week
Required in INEL & ICOM

2. Course Description:

English: Network functions; circuit analysis by Laplace transforms and Fourier series; two-port networks; Butterworth and Chebyshev filters; computer-aided analysis of these systems.

Spanish: Funciones de Redes; Analisis de Circuitos Por Medio de la Transformadade Laplace y Series de Fourier; Redes de Dos Puertas; Filtros Butterworth y Chebyshev; Analisis de Estos Sistemas Mediante el Uso Decomputadoras.

3. Pre/Co-requisites and other requirements:

Prerequisites: INEL 3105, (FISI 3172 or FISI 3162) and INGE 3016. Co-requisite: MATE 4009.

4. Course Objectives:

One objective of the course is to develop in the student the ability to characterize and analyze linear systems using circuit parameters, impulse response, and transfer functions, as well as the characterization of signals. A second objective is to develop in the student the skill to use the Laplace transform and the Fourier series in the characterization and analysis processes. A third objective is to introduce the concept of the linear filter, its specification, and design.

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:

6. Minimum or Required Resources Available:

7. Course time frame and thematic outline

Outline	Contact Hours
Phasors and power calculations review	4
Coupled coils	4
Introduction to Laplace transform: Signal representation using Laplace transform Analysis of the time domain response using Laplace	5
Laplace transform in circuit analysis Circuit representation using the transfer function, Impulse response, Convolution	6
Two-port networks:	4
Bode diagrams: The transfer function and the steady state sinusoidal response Bode plots and simulations	4
Fourier Series: Ch. 16 Series Spectra plots and simulations Average power, RMS value Steady state non sinusoidal circuit analysis	8
Filters: Passive filters Active filters	7

Exams	3
Total hours: (equivalent to contact period)	45

8. Grading System

☒Quantifiable (letters) ☐ Not Quantifiable

9. Evaluation Strategies

	Quantity	Percent
☒ **Exams**	**3**	**65**
☒ **Final Exam**	**1**	**30**
☒ **Short Quizzes**	**4**	**3**
☐ **Oral Reports**		
☐ **Monographies**		
☐ **Portfolio**		
☐ **Projects**		
☐ **Journals**		
☒ **Other, specify: Homework**	**6**	**2**
TOTAL:		**100%**

10. Bibliography:

J. David Irwin, John Wiley, BASIC ENGINEERING-CIRCUITS ANALISIS, 8th edition (2004). .

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.

Contribution of course to meeting the requirements of Criterion 5

Engineering Science: 2.5 credits

Engineering Design: 0.5 credits

12. Course Outcomes All outcomes should be sampled every semester. Passing students should be separated from non-passing students in the tabulation.	**Map to Program Outcomes**	**Maximum Level To Achieve**
1. Apply Laplace Transform to solve or analyze electrical circuit system.	(a)	3
2. Apply Fourier Series to solve or analyze electrical circuit system.	(a)	3
3. Apply Bode diagram to analyze the transfer function and the steady state sinusoidal responses.	(a)	3
4. Use commercially available software for circuit analysis using Fourier Series, and Bode plots.	(k)	3

Person(s) who prepared this description and date of preparation: Comité de Asuntos Académicos Oct 2009, Submitted by: Raúl E. Torres, Committee Coordinator