

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 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; Análisis de Circuitos por medio de la Transformada de Laplace y Series de Fourier; Redes de dos puertas; filtros Butterworth y Chebyshev; análisis de estos sistemas mediante el uso de computadoras.	
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:	
<input checked="" type="checkbox"/> conference <input checked="" 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:	
6. Minimum or Required Resources Available:	
7. Course time frame and thematic outline	
Outline	Contact Hours
Phases 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 (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	65
<input checked="" type="checkbox"/> Final Exam	1	30
<input checked="" type="checkbox"/> Short Quizzes	4	3
<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	6	2
TOTAL:		100%

10. Bibliography:

J. David Irwin, John Wiley, BASIC ENGINEERING-CIRCUITS ANALISIS, 9th edition (2008).

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

Engineering Science: 2.5 credits

Engineering Design: 0.5 credits

13. Course Outcomes

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|---|-----|
| 1. Apply Laplace Transform to solve or analyze electrical circuit system. | (a) |
| 2. Apply Fourier Series to solve or analyze electrical circuit system. | (a) |
| 3. Apply Bode diagram to analyze the transfer function and the steady state sinusoidal responses. | (a) |
| 4. Be able to interpret and draw electrical circuits diagrams. | (g) |
| 5. Use commercially available software for circuit analysis using Fourier Series, and Bode plots. | (k) |

Map to Program Outcomes

Person(s) who prepared this description and date of preparation: Academic Affairs Committee, Feb 2007, Submitted by: Raúl E. Torres, Committee Coordinator

