School of Management, Engineering and Technology
Department of Electrical Engineering and Renewable Energy

EE 225: Circuits III – Laplace Transforms & Applications

Catalogue Description (2009/2010):	Introduction to the Laplace Transform. Circuit Analysis using the Laplace Transform. Passive Filters. Active Filters. Frequency Response and Bode Plots. Introduction to Fourier Analysis		
Hours/Credits: (Lecture-Lab-Total)	(4-3-4)		
Class Schedule:	Once or twice weekly lecture class (3 hours total)		
Lab Schedule:	Once weekly three hour labs, one term		
Prerequisites:	EE 223 with grade "C" or better, MATH 321		
Required Text:	Nilsson, J.W., Riedel, S.A., "Electric Circuits," 8th Ed., Prentice Hall, ISBN: 0-13-198925-1		
Reference Text:	Laplace Transforms & Applications Workbook		
Course Coordinator:	Mateo Aboy, Ph.D.		
Regular Instructors:	Mateo Aboy, Cristina Crespo, Bruce Barnes		
Course Objectives - Lecture:	Upon completion of the lecture, a student should be able to: • Calculate the Laplace transform of a function using the definition and/or Laplace transform table. • Calculate the inverse Laplace transform using partial fraction expansion and the Laplace table. • Understand and know how to use the initial and final value theorems. • Perform circuit analysis in the s-domain. • Understand the concept of transfer function. • Use a circuit's transfer function to calculate the impulse, unit, and step response. • Know the RC, RL, and RLC configurations as passive filters. • Design active filters. • Create Bode diagrams. • Have a basic understanding of Fourier Analysis.		
Course Objectives - Lab:	Upon completion of the lab, students should be able to: • Be fluent using MATLAB to perform analysis in the s-domain • Be able to perform circuit analysis in the s-domain using MATLAB and Spice. • Be able to design and analyze analog filters. • Be able to apply the concept of transfer function in practical settings. • Use circuit's transfer function and MATLAB to calculate the circuit's impulse response, step response, ramp response, and frequency response.		
Topics Covered:	• Introduction to the Laplace Transform. Circuit Analysis using the Laplace Transform. Passive Filters. Active Filters. Frequency Response and Bode Plots. Introduction to Fourier Analysis		
Relevant Program Outcomes:	(a) an ability to apply knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (d) an ability to function on multi-disciplinary teams (e) an ability to identify, formulate, and solve engineering problems (g) an ability to communicate effectively (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		
Required or Elective:	Required		
Criterion 5:	Engineering Topics		
Prepared By:	Dr. Mateo Aboy	Updated:	2010-05-04