The University of Texas at Tyler
Department of Electrical Engineering
Houston Engineering Campus

Course: EENG 3305 – Linear Circuit Analysis II (Required)

Syllabus

Catalog Description:

Laplace transform; Transient Circuit Analysis; circuit analysis and design using the Laplace transform; convolution in time domain and frequency domain; transfer functions; frequency response and Bode plots; passive and active filter design (frequency selective circuits); Fourier series; Fourier Transform; two-port circuits; balanced three-phase AC circuits. Three hours of lecture per week.

Prerequisites: EENG 3304, MATH 3305, MATH 3404, COSC 1336, COSC 1136

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): Alexander, Charles K. and Matthew N. O. Sadiku, Fundamentals of Electric Circuits, Fifth Edition, McGraw-Hill, 2013, ISBN 978-0-07-338057-5

Additional Material: Handouts

Course Coordinator: Seyed Ghorshi, PhD

Topics Covered: (paragraph of topics separated by semicolons)

Laplace Transform; Circuit Analysis and Design using the Laplace Transform; Convolution in Time Domain; Transfer Functions; Frequency Response and Bode Plots; Passive and Active Filter Design (frequency selective circuits); Fourier Series; Fourier Transform; Balanced Three-phase AC Circuits

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes[1]: By the end of this course students will be able to:

1. Understand how the Laplace transform is used to solve differential equations for circuit design (1)
2. Design a passive RLC filter (1)
3. Solve a frequency scaling problem in active filter design. (1)
4. Design high-order filters using op-amps. (1)
5. Describe how the Fourier Series can be used to represent periodic signals (2)
6. Demonstrate the use of convolution in time to describe an LTI system. (1)
7. Determine the impulse response and step response in linear circuit. (1)
8. Compute the Fourier Transform for aperiodic signals. (1)

9. Sketch Bode plots for single pole systems by hand. (1)
10. Use modern engineering tools including modeling and simulation software and virtual instruments. (2, 4)
11. Analyze balanced three-phase circuits. (2)
12. Analyze two-port networks. (1)

[1] *Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Program Outcomes (only items in dark print apply)[2]: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering; [1,5,6,8]
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering; [10]
3. have the ability to analyze electrical circuits, devices, and systems; [3,9,11]
4. have the ability to design electrical circuits, devices, and systems to meet application requirements; [4]
5. have the ability to design and conduct experiments, and analyze and interpret experimental results;
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods; [2,7,12]
7. have effective written, visual, and oral communication skills;
8. possess an educational background to understand the global context in which engineering is practiced, including:
   a. knowledge of contemporary issues related to science and engineering;
   b. the impact of engineering on society;
   c. the role of ethics in the practice of engineering;
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams;
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers.

[2] *Numbers in brackets refer to course objective(s) that address the Program Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0.25	hours
Engineering Sciences and Design:	2.75	hours
General Education Component:		hours

Prepared By: Hassan El-Kishky Date: August 23, 2007

Updated By: Seyed Ghorshi Date: August 22, 2018

EENG 3305: Linear Circuits Analysis –II

Fall 2018 Syllabus

Instructor Information:

Seyed Ghorshi, PhD
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The University of Texas at Tyler
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Course Description:
The objective of this course is to study the application of Laplace transform for the analysis and design of linear circuits. The course will focus on time domain as well as frequency domain analysis; convolution; transfer functions; passive and active filter design; Fourier series and Fourier Transform; two-port circuits; balanced three-phase circuits.

Course Content:
The primary student learning objectives are:

Use the Laplace transform to solve differential equations for circuit design
Determine the impulse response and step response in linear circuit.
Demonstrate the use of convolution in time to describe an LTI system.
Describe how the Fourier Series can be used to represent periodic signals
Compute the Fourier Transform for aperiodic signals
Sketch Bode plots
Design a passive RLC filter
Solve a frequency scaling problem in active filter design
Design high-order filters using op-amps
Analyze balanced three-phase circuits
Analyze two-port networks

Recommended Textbook:
Alexander, Charles K. and Matthew N. O. Sadiku, Fundamentals of Electric Circuits, Fifth Edition, McGraw-Hill, 2013, ISBN 978-0-07-338057-5

Evaluation and Grading:
Homework Assignments (10%)
MATLAB Assignment (10%)
Midterm Exam (40%)
Final Exam (40%)