

**The University of Texas at Tyler**  
**Department of Electrical Engineering**

**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

**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:** Premananda Indic, 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<sup>1</sup>:** 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)

<sup>1</sup>Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Student Outcomes (only items in dark print apply)<sup>2</sup>: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics; [1, 3, 5, 6, 8, 9, 11]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors; [2, 4, 7, 12]
3. an ability to communicate effectively with a range of audiences;
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions; [10]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

<sup>2</sup>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	hours
Engineering Sciences and Design:	3.0	hours
General Education Component:	0	hours

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

Updated By: Seyed Ghorshi Date: August 22, 2018  
August 24, 2019  
May 28, 2020