The University of Texas at Tyler
Department of Electrical Engineering

EENG 4109.031 – Electronic Circuit Analysis II Laboratory (Required)

Syllabus

Catalog Description:

Structure of a simple operational amplifier; active filters; feedback concepts and oscillators; small-signal analysis; introduction to nonlinear electronic circuits; transfer characteristics of CMOS digital circuits; introductory LabVIEW programming.

Prerequisites: EENG 4309 (co-requisite)

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

Text(s): None

Additional Material: None

Course Coordinator: Kazi Rashed

Topics Covered: (paragraph of topics separated by semicolons)

Measurement of amplifier gain and input and output resistances; pole-zero locations and frequency response; construction and test of a simple operational amplifier; active filter design and test; transfer characteristics of a CMOS inverter;

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

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

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

1. Measure the mid-band characteristics (input resistance, output resistance, and voltage gain) of a single-stage amplifier and compare them to expected values [3].
2. Compute the frequency response of a linear network from its pole/zero locations and compare those to empirical measurement [3].
3. Simulate the effects of negative feedback (extended bandwidth, effects on input and output impedances, stabilization of closed-loop gain, improved disturbance rejection) [3].
4. Measure the electrical characteristics (input-bias current, input-offset voltage, slew rate, output voltage range, and gain-bandwidth product) of a simple operational amplifier [3].
5. Design simple active filters [3].
6. Validate the performance of simple active filters [3]
7. Analyze feedback circuits and determine when a feedback circuit will oscillate [3].

8. Measure the transfer characteristics of an MOS inverter [3].
9. Use modern engineering tools including modeling and simulation software and virtual instruments [4]
10. Perform experiments as members of a team [3,4]
11. Utilize engineering literature such as technical manuals and product datasheets to select components to meet experimental or prototype requirements [3]
12. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner [3]

[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. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics [2,7]
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 [3,5]
3. an ability to communicate effectively with a range of audiences [12]
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 [10]
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions [1,4,6,8,9]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [11]

[2]*Numbers in brackets refer to Course Learning Objective(s) that address the Program Outcome.*

Prepared By: Revised by Kazi Rashed Date: 08 January 2020