The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 4109 – 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: Shawana Tabassum

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; conditions of oscillation; LabVIEW programming of a simple 4-bit ADC; 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 midband 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. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering [9]
3. have the ability to analyze electrical circuits, devices, and systems [2,7]
4. have the ability to design electrical circuits, devices, and systems to meet application requirements [5]
5. have the ability to design and conduct experiments, and analyze and interpret experimental results [1,4,6,8]
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods [3]
7. have effective written, visual, and oral communication skills [12]
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]
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers [11].

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

Prepared By:	Yasser Mahgoub	Date:	15 January 2020
Revised By:	Shawana Tabassum	Date:	06 January 2022

The University of Texas at Tyler
Department of Electrical Engineering

EENG 4109: Electronic Circuit Analysis II Laboratory

Class Information

Time**:** 2:00 – 4:45 PM on Wednesday

Place: RBN 02046

Course-Instructor

Shawana Tabassum, PhD

Office: RBN 2009A

Email: stabassum@uttyler.edu (preferred way of communication)

Response time: I try to respond to all emails within one business day. So, please be patient.

Student Hours: Tue, Wed, and Thu 1-2 PM (For additional hours ***feel free to email me if the above times do not work for you***)

Course Description

The purpose of this laboratory is to cover 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.

Laboratory Outline

The numbers in the two right-hand columns refer to the chapter numbers of the 6th and 7th Editions of the Sedra and Smith text.

Week	Laboratory Procedure
Week 1	Introduction
Week 2	CC and CB amplifiers
Week 3	CC and CB amplifiers
Week 4	Frequency Response
Week 5	Frequency Response

Week 6	Negative Feedback
Week 7	Negative Feedback
Week 8	**Midterm Exam**
Week 9	Spring Break
Week 10	The Differential Amplifier
Week 11	The Differential Amplifier
Week 12	Active Filters
Week 13	Active Filters
Week 14	Oscillators
Week 15	Oscillators
Week 16	**Final exam**

Grading Scale

Letter Grades	Range (in %)
A	89-100
B	77-88
C	65-76
D	53-64
F	52 and below

Any deviation from the above policy such as scaling or curving to calculate the individual item or final scores will be at the sole discretion of the instructor and performed by the instructor uniformly for all students in the class.

Course Policies

Attendance Policy:

The progressive nature of the class means that perfect attendance is recommended if a good grade is desired. Makeup labs will only be provided for valid absences and at the sole discretion of the instructor.

Course communication:

Course communication will take place by e-mail and by announcements on UT-Tyler's Learning Management System (LMS). University policy requires that official e-mail communication be sent only to Patriot e-mail accounts.

Laboratory Policy:

- Late reports will NOT be graded. Make-up or late submission will be allowed only with a prior arrangement with the instructor, or for emergency (e.g., medical); adequate documentation should be provided for the same. (See the late assignments and make-up policy below)
- You will have to submit the reports through Canvas using pdf or word format. But, please remember if you take picture and upload, your writing has to be LEGIBLE. Otherwise, we might ask you to resubmit.

You are always welcome to discuss with your peers regarding any assignments, as cooperative learning can result in higher achievement than individual learning. However, do NOT copy, paste and use materials from your peers. That will be counted as PLAGIARISM.

All resources, including materials obtained from internet, should be properly acknowledged.

Campus resources:

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu , https://www.uttyler.edu/writingcenter/onlinetutoringinfo.php
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Academic Advising, https://www.uttyler.edu/advising/
- UT Tyler Counseling Center (903.566.7254), https://www.uttyler.edu/counseling/
- UT Tyler Canvas support, https://www.uttyler.edu/canvas/. See below for more information
- UT Tyler Technology support, https://www.uttyler.edu/ccs/
- UT Tyler Student Accessibility and Resources, https://www.uttyler.edu/disabilityservices/
- UT Tyler Library support, https://www.uttyler.edu/library/
- UT Tyler PASS Tutoring Center, https://www.uttyler.edu/tutoring/
- UT Tyler Veterans Resources, https://www.uttyler.edu/military-and-veterans-success-center/?r=/veteransaffairs/
- UT Tyler Student Health and Wellness, https://www.uttyler.edu/wellness/onlineresources.php

Academic Misconduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

i. "Cheating" includes, but is not limited to:

- copying from another student's test paper;
- using, during a test, materials not authorized by the person giving the test;
- failure to comply with instructions given by the person administering the test;
- possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
- using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
- collaborating with or seeking aid from another student during a test or other assignment without authority;
- discussing the contents of an examination with another student who will take the examination;
- divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
- substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
- paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
- falsifying research data, laboratory reports, and/or other academic work offered for credit;
- taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
- misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

University Policies

People learn differently, and our goal is to ensure everyone is learning, regardless of their needs. We will make every effort to accommodate the needs of students with different learning abilities.

UT Tyler Honor Code:

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities:

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/rightsresponsibilities.php

Campus Carry:

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php

UT Tyler a Tobacco-Free University:

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Grade Replacement/Forgiveness and Census Date Policies:

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy:

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability/Accessibility Services:

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Social Security and FERPA Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation:

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Canvas for Students at UT Tyler

Getting Started:

1. Be sure to have a UT Tyler username. If you do not, please visit Passwords and Accounts (https://www.it.iastate.edu/services/accounts)
2. Login to Canvas with your UT Tyler username and password and look for your course for this semester.

General Help with Canvas:

In your Canvas course page, on the global navigation on the left panel, you will see a Help Tab. Clicking on that will take to various available options. Generally, you have:

- Canvas Live Chat – 24*7 live chat with Canvas specialists
- Canvas Guides-a repository of how-tos
- Ask the Canvas Community-Online support forum for canvas users.

Visit UT Tyler Canvas support if your questions are not answered