

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

**EENG 3106.001: Electronic Circuit Analysis I Lab (required)**

**Syllabus**

**Catalog Description:**

Circuit applications of operational amplifiers; circuit effects of non-ideal characteristics of operational amplifiers; diode characteristics; diode circuits and applications; transistor biasing (bipolar junction transistors and field effect transistors); low frequency transistor amplifier design.

**Prerequisites:** EENG 3306 (Co-requisite)

**Credits:** ( 0 hours lecture, 1 hours laboratory per week )

**Text(s):** None

**Additional Material:** Laboratory Procedures (provided online)

**Course Coordinator:** Prabha Sundaravadivel, Assistant Professor

**Topics Covered:** (paragraph of topics separated by semicolons)

Generalized amplifier models and two-port networks; operational amplifier circuits (including non-ideal characteristics); semiconductor diode characteristics; diode rectifier and waveshaping circuits; MOSFET device characteristics; bipolar junction transistor characteristics; the common-emitter amplifier.

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

1. Examinations / Quizzes
2. Homework
3. Report/paper
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. Calculate and measure the effects on circuit performance of non-ideal electrical characteristics of operational amplifiers.
2. Measure and analyze semiconductor diode V-I characteristics.
3. Design simple rectifier and waveshaping circuits.
4. Measure and analyze the V-I characteristics of enhancement-mode MOS devices.
5. Measure and analyze the V-I characteristics of bipolar junction transistors.
6. Measure the voltage gain, input impedance, and output impedance of a single-stage common-emitter amplifier and compare these to theoretical values.
7. Use modern engineering tools including modeling and simulation software and virtual instruments.
8. Utilize engineering literature such as technical manuals and product datasheets to select components to meet experimental or prototype requirements
9. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.

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

**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 [1,6].
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].
3. An ability to communicate effectively with a range of audiences. [9]
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 [2,4,5,7].
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [8].

<sup>2</sup>Numbers in brackets refer to course learning outcome(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:		hours
Engineering Sciences and Design:	1	hours
General Education Component:		hours

Grade Replacement:

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grade point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2006-08 Catalog, p. 35)

Prepared By:

David M. Beams

Date:

8 August 2016

Edited By:

R. J. Pieper

20 August 2018

Prabha Sundaravadivel

10 August 2019

**Department of Electrical Engineering**

**Course: EENG 3106. 001 – Electronic Circuit Analysis I Laboratory**

**COURSE OUTLINE**

Course Coordinator:

**Dr. Prabha Sundaravadivel**  
 Assistant Professor, Department of Electrical Engineering  
**Office:** RBN 2015  
**Email:** [PSundaravadivel@uttyler.edu](mailto:PSundaravadivel@uttyler.edu)  
**Office Hours:** Wednesday 1 - 4 PM (RBN 2015)  
 Email, Canvas Discussion Boards

Prerequisite or co-requisite:

EENG 3306  
 (Electronic Circuit Analysis I)

Meeting time:

Mondays - 2:00–4:45 PM

Place:

Section 001 - RBN 2046

Teaching Assistant:

Prosenjit Ghosh  
 Email: [PGhosh2@patriots.uttyler.edu](mailto:PGhosh2@patriots.uttyler.edu)  
 Office Hours: Wednesdays 2 -4 PM

Grading Policy:

Lab Assignments	70 %	No. of Labs – 7
Final Exam	25%	Nov 28, 2022
Participation	5%	
<b>Total</b>	<b>100%</b>	

Semester Schedule:

Date	Laboratory activities	Assignment Due
August 22	<i>Introduction to Electronics, MultiSim and SPEA testing</i>	
August 29	<i>Operational amplifier designs</i>	<i>Quiz - 1</i>
Sept. 12	<i>Operational amplifier designs</i>	Lab-1: <i>Operational amplifier designs</i>
Sept. 19	<i>Diode IV characteristics</i>	
Sept. 26	<i>Diode IV characteristics</i>	Lab-2: <i>Diode IV characteristics</i>
Oct. 3	<i>Diode rectifier and wave shaping circuits</i>	
Oct. 10	<i>Diode rectifier and wave shaping circuits</i>	Lab-3: <i>Diode rectifier and wave shaping circuits</i>
Oct. 17	<i>MOSFET IV characteristics</i>	
Oct. 24	<i>BJT IV characteristics</i>	Lab-4: <i>MOSFET IV characteristics</i>
Oct 31	<i>SPEA Testing day</i>	Lab-5: <i>BJT IV characteristics</i>
Nov. 7	<i>Common-emitter amplifier</i>	Lab-6: <i>SPEA testing report</i>
Nov. 14	<i>Common-emitter amplifier</i>	Lab-7: <i>Simulation for Common-emitter amplifier</i>
Nov 21		<i>Thanksgiving Break</i>
Nov 28		<i>Final Exam</i>

**Important course management information:**

1. All assignments are to be submitted through Canvas. No hard copies will be accepted.
2. Students can form group of 2-3. The roster will be posted by the Instructor.
3. Components for all laboratories (except for *Operational amplifier designs* and *Common-emitter amplifier*) are available in the parts kit and there should ordinarily be no need to obtain additional components from the cabinets. However, values of  $\pm 5\%$  resistances between 1 $\Omega$  and 1Meg, and resistors not available in the kit will be supplied on request for these two experiments.
4. Credit for the laboratory will be withheld until components are returned and will be reduced if the components are returned late.
5. Circuits are to be disconnected and parts returned to the parts kits at the conclusion of each experiment. Tools and hand-held digital multimeters are to be returned to the laboratory cabinets *at the end of each laboratory session*.
6. Simulation results for a given experiment are due by 11:59 PM on the submission day.

**Grading:** Each assignment carries 50 points credit. 0 points if submitted after the due date.

**Grading scale:** 90-100– A; 80-89–B; 70-79–C; 60-69 – D; <60 – F. Final scores will be rounded to the nearest integer.

**In-Person Lab Policy:** If you are planning to attend the classes in-person, FACE MASKS are MANDATORY during the entire lab hours. Please be responsible in terms of social distancing. For detailed instructions on the University’s policies, visit: <https://www.uttyler.edu/coronavirus/>

**Patriot e-mail:** All students at UT-Tyler have been given Patriot e-mail accounts with addresses of the form:  
<user name>@patriots.uttyler.edu

Any e-mail messages sent either individually or to the class as a whole will be sent to Patriot e-mail accounts.

**Course and instructor evaluations:** Student evaluations of both the course and the instructor at the end of the course are a valuable means of assessment; filling them out is strongly encouraged. Departmental evaluation forms will be presented at the last regularly-scheduled class meeting.

**Academic misconduct:** Academic misconduct will not be tolerated. Examples of academic misconduct include (but are not limited to) submitting the work of others as one’s own (plagiarism) and doing work intended to be submitted by another person. *Copying materials from on-line sources for your laboratory reports without attribution is plagiarism!*

### 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>

#### 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 that students need to be aware of. 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 Services

In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Services counselor. If you have a disability, including a learning disability, for which you request an accommodation, please contact the Disability Services office in UC 3150, or call (903) 566-7079.

#### Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

#### Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

#### 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.

Happy Learning!