ELEE 3101 Electronics Lab
Fall 2018
W 4:30pm-7:10pm
Brownsville: BSETB 1.232

PREREQUISITES: Credit for ELEE 2105 with a C or better and concurrent enrollment of ELEE 3301.

TEXTBOOK AND/OR RESOURCE MATERIAL
Laboratory manuals for each lab will be provided.
Read Electrical Safety and Lab Notebook guidelines.

COURSE OBJECTIVES
Instill an insightful understanding of op-amps and basic semiconductor devices (transistors and diodes) and their applications by characterizing various devices and building/experimenting with various circuit configurations.

INTRODUCTION
This laboratory will seek to illustrate and provide insight into the concepts covered in ELEE 3301. In this course, we will analyze, build and experiment on various circuits which implement semiconductor devices to obtain a desired outcome. The course starts with a review of op-amps and explores the non-idealities of the operational amplifiers. This will be followed by the characterization of various types of diodes and various passive and active diode circuits. The diode experiments will be followed by the characterization of MOS and BJT transistors and the design of the basic amplifier cells. To conclude the course, design and implementation of active loads (current sources) and a differential amplifier (time permitting) will be analyzed and implemented.

PREPARATION
Preparation for the lab involves printing the laboratory assignment and reading it before class. It is essential that you read and understand the lab before class in order to have enough time to complete it in the time allotted. The laboratory assignments will be available on the blackboard website.

LAB STRUCTURE
Lab assignments will be performed in groups of two students. A lab report is due the class after a lab is completed and must be done individually. In order to receive credit for a lab report, you must be present in the lab and participate in the experiment. Attendance will be taken at the beginning of every class. If you are not present when attendance is taken you will be considered absent. A record will also be kept of all lab reports that are submitted at the beginning of class. It is your responsibility to ensure you have marked as present and that your report was submitted.

LAB EQUIPMENT
One member of each group will check out a breadboard from the electrical engineering supply room. You will be responsible for returning the breadboard at the end of the semester. Parts/components will be provided at the beginning of class and should be returned upon completing of the assignment or at the end of class.

GRADING POLICIES
1. Midterm Examination 20%
2. Final Examination 20%
3. Lab Report 40%
4. Lab Quizzes and Attendance 20%
The grades for this course will be assigned according to the following scale:

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<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
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<tbody>
<tr>
<td>&gt;=</td>
<td>90</td>
<td>80 - 89</td>
<td>70 - 79</td>
<td>60 - 69</td>
<td>&lt; 60</td>
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The possible grades are A, B, C and F.
ANY AMOUNT of plagiarism will be given a grade of ZERO for all parties involved.

**ABSENCES**
Due to the difficulty in preparing the lab for an individual student, no make-up labs are allowed. Do not turn in a lab report for a lab you were not present for, it will not be graded.

**LATE REPORTS**
Lab reports are due one week from the assigned date. Lab reports must be submitted by the end of the lab session. Late reports will lose 25% of the credit, and will not be accepted after one week from the day of the Lab. If you know you will not attend class, it is your responsibility to submit your report before the scheduled class date. If an emergency prevents you from submitting your report on time, it will be accepted if documentation of the emergency is provided (e.g. police report indicating the date and time of a car accident in which you were involved).

**LAB REPORT FORMAT**

- **Objective** (10%)
  Purpose of activity and expected outcomes. (No credit for copying the lab manual objectives).

- **Presentation of Experiments** (20%)
  Materials and a short summary of the topic under investigation.

- **Procedure** (30%)
  The steps taken to investigate the topic. (No credit for copying the lab manual procedure).

- **Data** (30%)
  Collected data, graphs, schematics and calculations.

- **Conclusions** (10%)
  Analysis of the data/calculations.

**SCHEDULE (Subject to change as the semester progresses.)**

<table>
<thead>
<tr>
<th></th>
<th>Lab 0: PSpice Tutorial</th>
<th>08/29/18</th>
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<tbody>
<tr>
<td>1</td>
<td>Lab 1: Intro to PSpice Student Version</td>
<td>09/05/18</td>
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<tr>
<td>2</td>
<td>Lab 2: Op Amps1</td>
<td>09/12/18</td>
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<tr>
<td>3</td>
<td>Lab 3: Op Amps 2</td>
<td>09/19/18</td>
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<td>4</td>
<td>Lab 4: Diodes</td>
<td>09/26/18</td>
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<tr>
<td>5</td>
<td>Lab 5: MOSFETS</td>
<td>10/03/18</td>
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<td>6</td>
<td>Lab 6: BJTs</td>
<td>10/10/18 &amp; 10/17/18</td>
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<td></td>
<td><strong>Midterm (Experimental Exam)</strong></td>
<td>10/24/18</td>
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<td>Lab notebook is due on next meeting.</td>
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<td>7</td>
<td>Project 1: Cascade Op-Amp Gain Design</td>
<td>10/31/18 -11/21/18 (4 Weeks)</td>
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<tr>
<td>8</td>
<td>Project 2: Regulated Power Supply</td>
<td>11/28/18</td>
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<tr>
<td>9</td>
<td>Project 3: Transistor Amplifier</td>
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Learning Objectives for Core Curriculum Requirements
This course satisfies a core curriculum requirement and matches the following outcomes set by the Texas Higher Education Coordinating Board (THECB) outcomes: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, Social Responsibility, and Personal Responsibility.

Calendar of Activities
Include in this section a table or list that provides information for students regarding important dates, assignments or activities. The UTRGV academic calendar can be found at https://my.utrgv.edu/home at the bottom of the screen, prior to login. Some important dates for fall 2018 include:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>August 27</td>
<td>First day of classes</td>
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<td>August 30</td>
<td>Last day to add a course or register for fall 2018</td>
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<td>September 3</td>
<td>Labor Day – NO classes</td>
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<td>November 14</td>
<td>Last day to drop a course; will count toward the 6-drop rule</td>
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<td>November 22 - 24</td>
<td>Thanksgiving Holiday – NO classes</td>
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<td>December 6</td>
<td>Study Day – NO classes</td>
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<td>December 7 - 13</td>
<td>Final Exams</td>
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<td>December 14 – 15</td>
<td>Commencement Exercises</td>
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UTRGV Policy Statements

The UTRGV disability accommodation, mandatory course evaluation statement and sexual harassment statement are required on all syllabi. Additional policy statements are optional, such as those covering attendance, academic integrity, and course drop policies.

**STUDENTS WITH DISABILITIES: Required on all syllabi. Do not modify.**

Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive academic accommodations should contact Student Accessibility Services (SAS) as soon as possible to schedule an appointment to initiate services. Accommodations can be arranged through SAS at any time, but are not retroactive. Students who suffer a broken bone, severe injury or undergo surgery during the semester are eligible for temporary services.

**Pregnancy, Pregnancy-related, and Parenting Accommodations**

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Accessibility Services for additional information and to request accommodations.

**Student Accessibility Services:**

**Brownsville Campus:** Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at ability@utrgv.edu. **Edinburg Campus:** Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at ability@utrgv.edu.

**MANDATORY COURSE EVALUATION PERIOD: Required on all syllabi. Do not modify.**

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available on or about:

- **Module 1**: October 4 – 10
- **Module 2**: November 29 – December 5
- **Full Fall Semester**: November 15 – December 5

**ATTENDANCE:** Recommended on all syllabi; may be modified by the instructor as long as it is not inconsistent with UTRGV policy.

Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

**SCHOLASTIC INTEGRITY:** Recommended on all syllabi.

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism (including self-plagiarism), and collusion; 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. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

**SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE:** Required on all syllabi. Do not modify.

In accordance with UT System regulations, your instructor is a “Responsible Employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this
course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect that is free from sexual misconduct and discrimination.

**COURSE DROPS:** Recommended on all syllabi; may be modified by the instructor as long as it is not inconsistent with UTRGV policy.

According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

**STUDENT SERVICES:** Recommended on all syllabi.

Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Students Services Center (UCentral) for additional information. UCentral is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email (ucentral@utrgv.edu) or telephone: (888) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor’s office hours. University Resources include the Learning Center, Writing Center, Advising Center and Career Center. The centers provide services such as tutoring, writing help, critical thinking, study skills, degree planning, and student employment. Locations are:

- **Learning center:** BSTUN 2.10 (Brownsville) or ELCTR 100 (Edinburg)
- **Writing center:** BLIBR 3.206 (Brownsville) or ESTAC 3.119 (Edinburg)
- **Advising center:** BMAIN 1.400 (Brownsville) or ESWKH 101 (Edinburg)
- **Career center:** BCRTZ 129 (Brownsville) or ESSBL 2.101 (Edinburg)

who take the same class for the third time.