
ECE 3110 Section 04

Electrical Engineering Laboratory 3

Class Location: 200C Riggs Hall

Class Meeting Time: Monday 09:00 am – 11:00 am

Lab Teaching Assistant: Ali Arzani

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Office and Office Hours (or meeting location): 308 Riggs Hall (by appointment)

Instructor of Record: Dr. Apoorva Kapadia

Email: akapadi@clemson.edu

Office: 307 Fluor Daniel EIB

Office Hours: By Appointment Only

Course Description

Measurements and characteristics of electronic devices and circuits; use of manual and automated instruments to acquire data; oral and written engineering reports.

Pre-Requisite or concurrent enrollment: ECE 3200

Pre-Requisite: ECE 2120, ECE 2620, MATH 2080, and PHYS 2210 all with a C or better

Course Objectives

The goal of this laboratory is to study electronics through experimentation. Upon completion of this course, students should be able to use standard laboratory equipment to analyze the behavior of basic electronic devices and to design, simulate, and construct simple circuits containing these devices.

Required Materials

Text: Lab Manual – Download from: http://www.clemson.edu/ces/ece/resources/lab_manuals.html

Circuit Simulator: LTSpice – <http://www.linear.com/designtools/software/>

Topical Outline

| <u>Laboratory #</u> | <u>Full Week of Classes #</u> | <u>Laboratory Description</u> |
|---------------------|-------------------------------|---|
| 1 | 2 (starting September 4) | Introduction |
| 2 | 3 | Semiconductor Diode Characteristics |
| 3 | 4 | Power Supply Operation |
| 4 | 5 | Diode Clippers & Clampers |
| 5 | 6 | Power Supply Design |
| 6 | 7 | Bipolar Junction Transistor (BJT) Characteristics |
| | | No Lab during the week of Fall Break |
| 7 | 9 | BJT Common Emitter Bias Circuit |
| 8 | 10 | BJT Common Emitter Voltage Gain Circuit |
| 9 | 11 | BJT Common Emitter Amplifier Design 1 |
| 10 | 12 | BJT Common Emitter Amplifier Design 2 |
| | | No Lab during the week of Thanksgiving |
| 11 | 14 | Field Effect Transistors (FETs) |
| 12 | 15 | Basic Logic Gates |

Grading

A – 90% - 100%
 B – 80 to < 90%
 C – 70 to < 80%
 D – 60 to < 70%
 F – < 60%

Distribution

Prelab 25%
 Post-Lab Reports 30%
 Full Lab Reports (3) 45%

 Course Grade 100%

Additional Policies

Attendance is mandatory. If you must miss a lab due to special circumstances, please contact the TA who will attempt to find another section of the lab to for you to attend in order to make up for the missed lab. If you cannot do so due to course conflicts then let the TA know, and another course of action will be decided upon. You will receive a score of 0 for any missed labs that are not completed before the final lab exam.

Lab Teams

Most of the labs will consume the full two-hour lab period and will be performed by two-person lab teams. Some labs will require only one hour and will be performed by each team member sequentially and independently during half of the corresponding lab period.

Homework Policy

Every lab requires preparation prior to performing the experiments. Most of the labs require SPICE simulations, and some of the labs require calculations of design parameters before beginning the experiments. Students are required to perform this preparatory work prior to coming to the lab. At or before the beginning of lab, students are required to turn in both a pre-lab report for the current week and a post-lab report from the previous week.

Pre-Lab Reports

Each pre-lab report is due at the **beginning** of the lab period. No exceptions of any kind will be permitted for this. If the pre-lab is not submitted before the start of lab, the student shall receive a zero for the pre-lab report. The required report format is found in the lab manual. Each student is required to keep a copy of all pre-labs submitted. The pre-lab report should be used as the basis for the post-lab report and the two full lab reports, which will be written sometime after completion of the lab.

In certain cases, an instructor may require the student to make corrections to simulations in the pre-lab reports, which will be due the following lab meeting. A 10-point deduction will be taken on every resubmission. Resubmissions must be turned in no later than a week from the due date.

If you have not completed your pre-lab when due, a grade of 50% will be assigned for the post lab grade as well.

Post-Lab Reports

Each post-lab report is due at the **beginning** of the **following** lab period. So then at the beginning of each lab period, the student will turn in a pre-lab report for the current experiment, and a post-lab report for the previous experiment. The post-lab report will include the pre-lab report, the experimental results obtained in lab, and the 'Discussion of Experimental Results' section (see page XXVI of the lab Manual). The student will be required to follow the lab report guidelines, which are found in the lab manual at the end of each lab section, when writing the discussion for the post lab report

Full Lab Reports

Students are required to turn in two full lab reports for the semester. An opportunity to turn in a rough draft will be given with no grade assignment. An electronic copy is required for final submissions of all lab reports. Lab reports will be assigned randomly to each student. The first report will be assigned upon completion of Lab 3, and the second report will be assigned upon completion of Lab 7. The lab reports are due at the beginning of the lab period on a date determined by the instructor. The required report format will be posted on Canvas.