CMPE 314

Principles of Electronic Circuits
Laboratory Manual

LABORATORY PROCEDURES

The following guidelines are established to assure that experiments will be run smoothly.

You are expected to read the relevant experiment prior to coming to the laboratory. You should also prepare yourself by reviewing the material covered in class and by thinking about the objectives of each part of the experiment. You need to get familiar with operations of the lab equipment by reading the appropriate sections of the equipment manuals.

Some experiments will require you to do some lab preparation assignment before coming to the laboratory. Such assignment is essential for the experiments to be executed. Other than this preparation, the work required for each experiment is limited to the duration of the laboratory hours. Students are expected to perform experiments in the scheduled period.

Each part of an experiment should be completed with satisfactory results recorded in your report before proceeding to the next part, showing good understanding of what has been learned. Recording some data is of little use if a student does not understand what he is doing. For this reason students are encouraged to dig more into the background knowledge and present that in their reports. It is much better to complete part of the experiment and understand that material than to complete the entire experiment with little or no understanding. By saying so, a well prepared student shall be able to complete all parts of each experiment.

The students are suggested to bring the following items to each laboratory:

1. Textbook or reference book
2. A notebook containing all of the notes taken in the laboratory and all of the previous experiment instructions and reports
3. Standard Electrical Engineering laboratory folder
4. Standard green or gold engineering paper
5. Mechanical pencil or several sharpened pencils
6. Straight edge and curve drawing equipment
7. Calculator
8. Any special graph paper or other equipment designated in the instruction sheets or by the instructor

PERFORMING THE EXPERIMENT

Each experiment will be performed with the students working in groups, with each member of the group participating in all parts of the experiment. Each laboratory group consists of two (3 maximum) students. Three groups perform different experiments at the same time. Each group will work alone, take separate data, independent of other groups.

1. Do not move equipment from one bench to another. If you have an instrument that is or seems to be defective, notify your instructor/TA at once.
2. Do not write on, mark on or deface any piece of equipment or furniture in this laboratory.
3. Do not place textbooks or other article on electronic equipment.
4. Do not remove any equipment or software from the laboratory without a prior approval of professor in charge of that lab.
5. Never leave the lab unattended with the door open.
6. Do not eat or drink in the laboratory.
7. The lab personnel will attempt to help you in any way they can. Please help them by keeping the labs neat and in order.
8. Never loan a laboratory key (student ID) to anyone.
9. Use the lab telephone for emergency calls only.

At the end of each lab session:

1. Return component, connectors, cables, and software with manuals to their proper location.
2. Turn off all equipment and bench power.
3. Arrange the equipment at your position in a neat order.
4. Turn off all battery-operated equipment.
5. Pick up all papers and wipe off table.
6. Leave lab with a clean and well-arranged appearance.

LAB ASSIGNMENT

It is assumed that the student will review all materials necessary for the experiment to be performed. When new material or ideas are introduced, the necessary information will be given in the introduction section, which must be studied carefully. Lab preparation assignments are designed to prepare the student to study and understand for the experiment to be performed that week. These problems must be completed before the period begins and are to be turned in as instructed by the instructor. Do not work on Lab preparation assignments after the laboratory period begins. Each student should always attempt to work the assignment problems without help. If help is needed then the student can use any form of help necessary to understand the working of the problems. He/She can even study the problems worked out by another student, but after understanding the problems, the student must stop all help and work the problems by him or herself to hand in. Copying of other students' work, in any form, is not permitted.

PRELAB

Each lab will have a pre-lab part unless otherwise notified. The students are required to read the experiment before coming into the lab and submit pre-labs (copies) at the beginning of each lab. The pre-lab should typically contain the following things.

Purpose: What is the aim of the experiment? What information do I need to perform this experiment? What knowledge can I get from this lab? The objective part of the lab material will have some pointers for this portion.

Formulas/Design: Write down the formulas you think are useful for this lab. If the lab asks you to design a particular circuit, it should be properly designed. Show all the steps in the pre-lab report.

Procedure: What is the procedure for the experiment? Write the procedure point wise and draw sketches/diagrams wherever necessary. You don't have to write all the procedure that is given in the lab material. Write what you feel, are important steps.

Expected Results: You are not expected to get the results before performing the lab but you can write about the results based on the theoretical knowledge. Again sketches/diagrams are always useful.

Questions: Note down the questions/queries you have before the experiment. Please make sure you clear them with the TA before proceeding.

LABORATORY REPORT

Each student in a laboratory group will write a separate report. The laboratory report, turned in by each student at the beginning of the next laboratory session, is his or her own work and is the results of the experiment performed by his/her group.

Lab reports are due at the next lab meeting following that of the realization of the experiment. No late reports are accepted without prior approval.

A laboratory report is to be prepared for each experiment, and should be of the following format unless directed otherwise by the laboratory instructor. The laboratory instructor may alter the report format when it is desirable or necessary. Standard symbols and notations are to be used throughout the report. The report, in general, will consist of three parts:

1. Cover Page
2. Report
3. Conclusions

1. Cover:
MEMORANDUM
TO: Instructor.s Name
FROM: Student.s Name
DATE: Date of Performance
SUBJECT: Descriptive Title of Experiment

2. Report Body
I. Objective:
II. Equipment and Materials Used:
III. Procedures and Results:

3. Discussions and Conclusions

(Student.s Signature)

In the report, you should write about everything that you think is relevant to the experiment.
The following are some guidelines for the preparation of laboratory reports:

- Show the derivation of all expressions used in the experiment (but not given in the book). These derivations should be done before coming to the laboratory.
- For each part, clearly indicate what you have done. The sections of the report should have a one-to-one correspondence with the sections of the experiment procedure. Each section, or part, in the report should be complete, since the experiment is performed one part at a time with satisfactory results recorded before proceeding to the next part.
- Give a sketch of the experimental setup. Explain the measurements taken. Tabulate all raw and processed data clearly.
- Where data is to be plotted graphically, it may be done directly using a plotting program such as MATLAB with the associate data table. All data points on graphs must be clearly marked. If more than one curve is plotted on one set of axes, use either different identifying schemes (dots, squares, triangles, etc.), to label each point.
- If data is not plotted, arrange it in tabular form.
- Data, as well as graphs or diagrams should be plainly labeled with an identifying number and a descriptive title. A straight edge must be used to draw all straight lines.
- Write down all your observations, results, and conclusions. Answer all the questions that are posed in this manual. Remember each question carries points!
- May contain information about equipment problems or anything else that should be considered in grading. Comments about how to improve the laboratory are welcomed and can be a part of this memorandum.

The student is responsible for presenting the results in a clear, precise, organized and understandable form. Results that cannot be easily followed are of very little use to anyone. A student will be graded on how he presents the results of each part of the experiment.

The student's signature on the report attests that to the best of his/her ability the report meets all requirements and that the work embodied in the report was performed by the student and his/her partners during and for this laboratory experiment.

The nature of the experiment is such that a conclusion will not always be meaningful. The instructor will indicate which experiment should have a conclusion. In general any comments a student may wish to express are welcomed.

LAB ATTENDANCE POLICY

Any missed lab should be made up within 1 week.
Missing a lab is only acceptable when emergency occurs (e.g.medical emergency); otherwise students can only ask for a new schedule of lab 1 week in advance. Make-up labs have the same report due time with the regular labs.

GRADING:

The Labs will contain 100 points each. 20 points for prelabs and 80 points for the lab report. Following is the detailed allocation of points:

Prelabs……20 pts
Lab Reports:
- Objective……10 pts
- Equipment and Materials Used……. 10 pts
- Procedures and Results……..60 pts

Total…….. 100 pts.