

General Rules and Responsibilities of Student, Lab Attendant, Laboratory Teaching Assistant, Faculty in the Laboratory

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Introduction

Laboratories are intended to enhance the learning experience of the student in topics encountered in Electrical Engineering. In labs, students are expected to gain experience in using the basic measuring devices used in electrical engineering and in interpreting the results of measurement operations in terms of the concepts introduced electrical engineering course. How the student performs in the lab depends on his/her preparation, participation, and teamwork. Each team member must participate in all aspects of the lab to insure a thorough understanding of the equipment and concepts. The student, lab teaching assistant, and faculty members all have certain responsibilities toward successful completion of the lab's goals and objectives.

Lab Attendant Responsibilities

The lab attendant is expected to keep neat and clean their respective lab & instruments.

Student Responsibilities

The student is expected to be prepared for each lab. Lab preparation includes reading the lab experiment and related textbook material. In addition to this, the lab pre-laboratory preparation may consist of performing calculations that you will need during the lab experiment. If you have questions or problems with the preparation, contact your Laboratory Teaching Assistant (LTA), but in a timely manner. Don't wait until an hour or two before and then expect to find the LTA immediately available. Active participation by each student in lab activities is expected. The student is expected to ask the teaching assistant any questions he/she may have. **DO NOT MAKE COSTLY MISTAKES BECAUSE YOU DID NOT ASK A SIMPLE QUESTION.** A large portion of the student's grade is determined in the comprehensive final exam, so understanding the concepts and procedure of each lab is necessary for successful completion of the lab. The student should remain alert and use common sense while performing a lab experiment. He/she is also responsible for keeping a professional and accurate record of the lab experiments in a laboratory notebook. Students should report any errors in the lab manual to the teaching assistant.

Laboratory Teaching Assistant Responsibilities

The Laboratory Teaching Assistant (LTA) shall be completely familiar with each lab prior to class. The LTA shall provide the students with a syllabus and safety review during the first class. This syllabus shall include the LTA's office hours, telephone number, and the name of the faculty. The LTA is responsible for insuring that all of the necessary equipment and/or preparations for the lab are available and in working condition. **LAB EXPERIMENTS SHOULD BE CHECKED IN ADVANCE TO MAKE SURE EVERYTHING IS IN ORDER.** The LTA should fully answer any questions posed by the students and supervise the students performing the lab experiments. The LTA is expected to grade the pre-labs, lab notebooks, and reports in a fair and timely manner. The reports should be returned to the students in the next lab period following submission. The LTA should report any errors in the lab manual to the faculty.

Faculty Responsibilities

The faculty should insure that the laboratory is properly equipped, i.e., that the teaching assistants receive any equipment necessary to perform the experiments. The Faculty is responsible for supervising the teaching assistants and resolving any questions or problems that are identified by the teaching assistants or the students. The coordinator may supervise the format of the final exam for the lab. He/she is also responsible for making any necessary corrections to this manual. The faculty coordinator is responsible for insuring that the software version of the manual is continually updated and available.

Lab Policy and Grading

The student should understand the following policy.

ATTENDANCE: Attendance is mandatory and any absence must be for a valid excuse and must be documented. If the instructor is more than 30 minutes late, students may leave the lab.

LAB RECORDS: The student must:

1. Perform the Pre-Lab assignment by the beginning of each lab.
2. Keep all work in preparation of and obtained during the lab in an approved NOTEBOOK.
3. Prepare a lab report on selected experiments.

GRADING POLICY: The final grade of the course is based on the following:

Laboratory notebook and in class work Lab, Pre-lab
Lab reports and Final exam of lab.

In-class work will be determined by the teaching assistant, who, at his/her discretion may use team evaluations to aid in this decision. The final exam should contain a written part and a practical (physical operations) part.

Course Goals and Objectives

The Electrical Engineering labs are designed to provide the student with the knowledge to use basic measuring instruments and techniques with proficiency. These techniques are designed to complement the concepts introduced in Electrical Engineering. In addition, the student should learn how to effectively record experimental results and present these results in a written report. More explicitly, the class objectives are:

1. To gain proficiency in the use of common measuring instruments;
2. To enhance understanding of advanced electric circuit analysis concepts.
3. To develop communication skills through
 - (a) Maintenance of succinct but complete laboratory notebooks as permanent, written descriptions of procedures, results, and analyses,
 - (b) Verbal interchanges with the Laboratory Instructor and other students, and
 - (c) Preparation of succinct but complete laboratory reports;
4. To compare theoretical predictions with experimental results and to resolve any apparent differences.

Use of Laboratory Instruments

One of the major goals of Electrical Engineering lab is to familiarize the student with the proper equipment and techniques for making electrical measurements. Some understanding of the lab instruments is necessary to avoid personal or equipment damage. By understanding the device's purpose and following a few simple rules, costly mistakes can be avoided.

In general, all devices have physical limits. These limits are specified by the device manufacturer and are referred to as the device RATING. The ratings are usually expressed in terms of voltage limits, current limits, or power limits. It is up to the engineer to make sure that these ratings (limit values) are not exceeded in device operation. The following rules provide a guideline for instrument protection.

Instrument Protection Rules

1. Set instrument scales to the highest range before applying power.
2. When using an oscilloscope, especially one with a cathode ray tube, do not leave a bright dot or trace on the screen for long periods of time. To avoid burning the image into the screen, reduce the intensity until the dot or trace is barely visible.
3. Be sure instrument grounds are connected properly. Avoid accidental grounding of "hot" leads, i.e., those that are above ground potential
4. Check polarity markings and connections of instruments and components carefully before connecting or turning on power.

5. Never connect an ammeter across a voltage source. Only connect ammeters in series with loads. An ammeter is a low-resistance device that, if connected in parallel, will short out most components and usually destroy the ammeter or its protecting fuse.
6. Do not exceed the voltage and current ratings of instruments or other circuit elements. This particularly applies to wattmeters since the current or voltage rating may be exceeded with the needle still on the scale.
7. Be sure any fuse or circuit breaker is of suitable value. When connecting electrical elements to make up a circuit, it is easy to lose track of various points in the network and accidentally connect a wire to the wrong place. A procedure to follow that helps to avoid this is to connect the main series portion of the network first, then go back and add the elements in parallel. As an element is added, place a small check (✓) by it on your circuit diagram. This will help you keep track of your progress in assembling the whole circuit. Then go back and verify all connections before turning on the power. [One day someone's life may depend upon your making sure that all has been done correctly.]

Laboratory Notebooks and Reports

The Laboratory Notebook

The student records and interprets his/her experiments via the laboratory notebook and the laboratory report. The laboratory notebook is essential in recording the methodology and results of an experiment. In engineering practice, the laboratory notebook serves as an invaluable reference to the technique used in the lab and is essential when trying to duplicate a result or write a report. Therefore, it is important to learn to keep an accurate notebook. The laboratory notebook should:

Be kept in a sewn and bound or spiral bound notebook.

Contain the experiment's title, the date, the equipment and instruments used, any pertinent circuit diagrams, the procedure used, the data (often in tables when several measurements have been made), and the analysis of the results.

Contain plots of data and sketches when these are appropriate in the recording and analysis of observations.

Be an accurate and permanent record of the data obtained during the experiment and the analysis of the results. You will need this record when you are ready to prepare a lab report.

The Laboratory Report

The laboratory report is the primary means of communicating your experience and conclusions to other professionals. In this course you will use the lab report to inform your LTA what you did and what you have learned from the experience. Engineering results are meaningless unless they can be communicated to others.

Your laboratory report should be clear and concise. The lab report shall be typed on a word processor. As a guide, use the format on the next page. Use tables, diagrams, sketches, and plots, as necessary to show what you did, what was observed, and what conclusions you draw from this. Even though you will work with one or more lab partners, your report must (shall)

be the result of your individual effort in order to provide you with practice in technical communication.

You will be directed by your LTA to prepare a lab report on a few selected lab experiments during the semester. Your assignment might be different from your lab partner's assignment.

Format of Lab Report

LABORATORY XXXXXXXX

TITLE

- Indicate the lab title and number.

NAME – Give your name.

LAB PARTNER(S) - Specify your lab partner's name.

DATE - Indicate the date the lab was performed.

OBJECTIVE - Clearly state the objective of performing the lab.

EQUIPMENT USED - Indicate which equipment was used in performing the experiment. The manufacturer and model number should be specified.

PROCEDURE - Provide a concise summary of the procedure used in the lab. Include any modifications to the experiment.

DATA - Provide a record of the data obtained during the experiment. Data should be retrieved from the lab notebook and presented in a clear manner using tables.

OBSERVATIONS AND DISCUSSIONS - The student should state what conclusions can be drawn from the experiment. Plots, charts, other graphical medium, and equations should be employed to illustrate the student's viewpoint. Sources of error and percent error should be noted here.

QUESTIONS - Questions pertaining to the lab may be answered here. These questions may be answered after the lab is over.

CONCLUSIONS - The student should present conclusions, which may be logically deduced, from his/her data and observations.

SIGNATURE - Include the statement "This report is accurate to the best of my knowledge and is a true representation of my laboratory results."

SIGNED _____