Electrical and Electronics Engineering

EEE-281 Electric Circuits Laboratory

Fall 2023-2024

LABORATORY INSTRUCTIONS

Laboratory Description:

Voltage, current and resistance measuring instruments; signal generators; oscilloscopes. Experiments on linear and nonlinear resistive circuits, operational amplifier circuits, first and second order circuits. Experiments will be carried out by groups of **two** students.

Laboratory Grading:

Quizzes	: 15 %
Laboratory performance	: 10 %
Reports and preliminary works	: 50 %
Final lab exam	:25 %

For each lab:

- Report 25%
- Prework 25%
- Quiz 10%
- Lab Performance 20%
- Viva 20%

Preliminary Work:

A complementary preliminary work should be completed before coming to the laboratory for those experiments that a preliminary work is assigned on the experiment sheet. ***Only those students who have submitted the preliminary work at the beginning of the laboratory will be allowed to conduct the experiment!***

Quizzes:

A quiz will be given at the start of each experiment (except the introductory experiments at the beginning of the semester). The quiz questions will cover the subjects included in the preliminary works (including the reading assignments).

Report:

A report about the experiment should be prepared during the experiment and submitted to the assistant before leaving the laboratory. Each team of two students will submit one report including:

- Name of the students
- Name of the assistant
- Date
- Name of the experiment
- The objective of the experiment
- Graphical results and measurements
- Comparison of the results with the expected ones
- Conclusions

The reports should be written on A4 white paper in a neat and tidy manner. The graphs should be plotted on commercial A4 graph paper. The reports should be submitted immediately after the laboratory session. Please see the following parts of this document to learn how to prepare a reasonable report.

Equipment:

Each team has to bring A4 white papers and commercial graph papers and a ruler. Calculator may be used during the quiz and the experiment. The students are responsible from the equipment on their experiment bench. The equipment's should be checked at the beginning of each laboratory session and in case of any missing equipment, the students should inform their assistants. Exchanging of equipment is not allowed among the benches without the permission of the assistant.

Attendance:

The students should attend all the experiments. Those who miss **two** experiments without any allowable excuse (medical report or coinciding exams) will fail the laboratory. Make-ups may only be given to those who have valid excuses.

If you have a medical report or a conflicting exam, you should consult your assistant with a written formal request and your request will be assessed whether you will be given a make-up.

HOW TO PREPARE A LABORATORY REPORT?

Engineers, scientists, and managers write reports to communicate the results of research, field work, and other activities. Often, a report is the only concrete evidence of your research, and the quality of the research may be judged directly by the quality of the writing and how well you convey the importance of your findings. Content, organization and clarity are the keywords to remember when preparing a report.

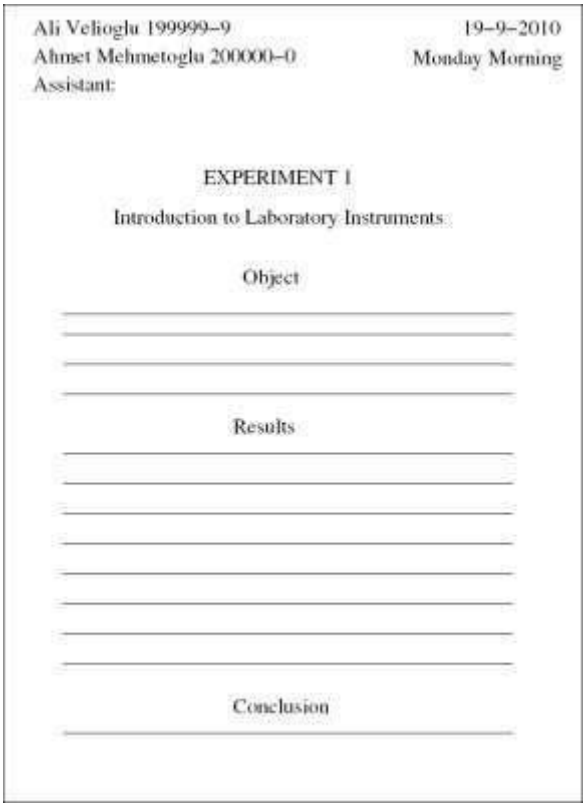
Reporting the results obtained from an experiment is as important as conducting the experiment. A sloppy report significantly deducts from the value of the results. Therefore, a properly prepared report is very important.

Fortunately, a lab report has a fairly consistent format that will help you to organize your information clearly. This document covers some important points on how to prepare a proper report for an EE201 experiment.

Format

The lab report must include:

- The title of the experiment
- The names and the ID-numbers of the students (Upper left corner)
- The name of your teaching assistant (Upper left corner)
- The date that the lab was performed (Upper right corner)
- The lab section (Upper right corner)


Ali Velioglu 199999–9 19–9–2010
Ahmet Mehmetoglu 200000–0 Monday Morning
Assistant:

EXPERIMENT 1

Introduction to Laboratory Instruments

Object

Results

Conclusion

Figure 1: Lab report format.

Sections of the Report

There are three main sections of the laboratory report.

- Objective
- Results
- Conclusion

Objective:

In this section objectives of the report should be summarized. Laboratory manual also contains a section which explains the objectives of the experiment. The objective section in the report should not be copied directly from this section. It should represent your understanding of the experiment with your own words.

Results:

This section contains the results obtained in the experiment. The results consist of data tables and graphs plotted on separate graphical papers. You should compare your results against expectations from theory and quantify the differences. If the errors are significant, then you should state the possible reasons. It is strongly recommended that you enrich your results with your comments.

Conclusion:

The conclusion section is a verbal summary of the experiment. It is important that you do not repeat the results section here; this should be a simple summary of what was done, observed, and learned in the experiment.

Data Tables

Tables are effective and concise tools to summarize results and point to differences across parameters. It is a good habit to think of plan out the data you would like to get from an experiment by preparing tables before starting any measurement. The units should always be included along with the data.

Plotting the Graphs

Some of the results are presented by graphs more efficiently. Therefore, graphs are frequently used in reports. A proper plot should obey the following rules:

- All of the graphs should be plotted on a graphical paper.
- Title of the plot should be written.
- The vertical and horizontal axes should be drawn and clearly named.
- The units of the axis should be written.
- Origin of the plot should be clearly indicated.
- The indicators corresponding to each unit on the axes should be depicted clearly.
- Units of the values should always be mentioned.
- Critical or important values should always be mentioned.

Example:

A proper graph:

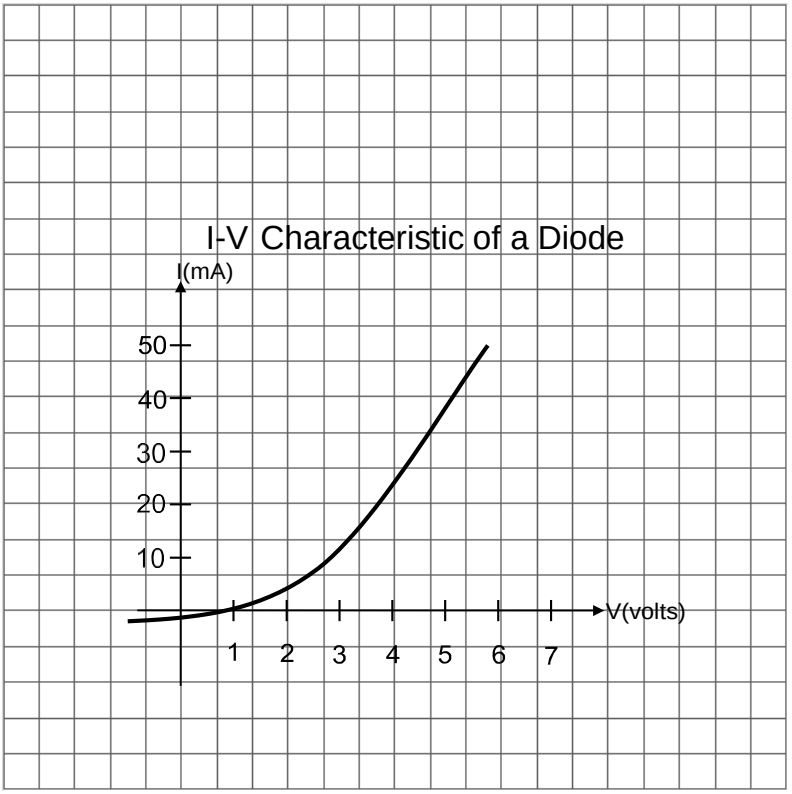


Figure 2

An unacceptable graph:

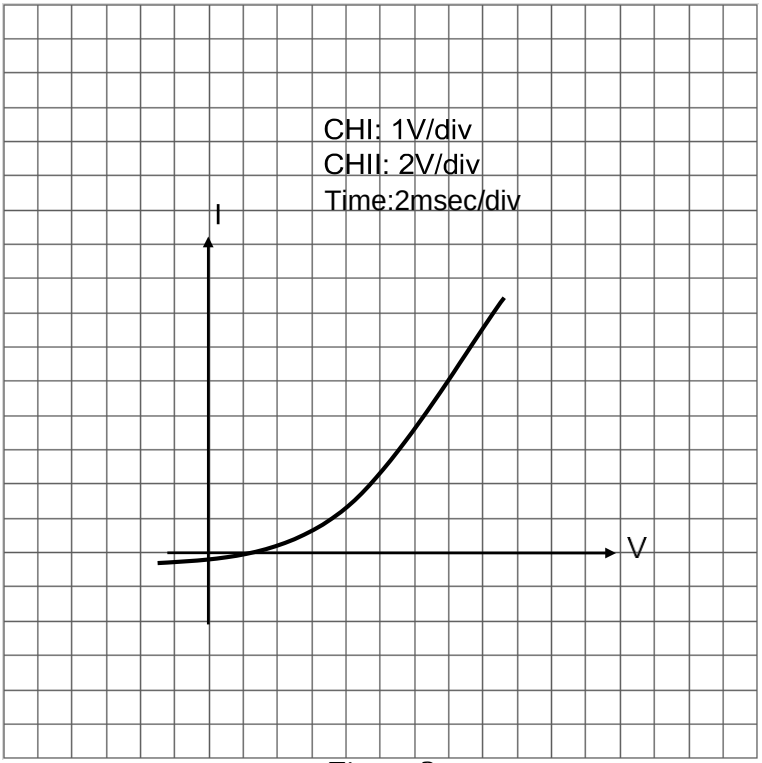


Figure 3

The graph shown in figure 3 is completely unacceptable because,

- The title of the graph is not written
- Units of the axes are not given
- Axes are not ‘ticked’. Corresponding values are not shown.

A few important points about the reports

- You should write in complete, grammatically correct sentences.
- If most of your sentences are long (4 or more 'clauses' or parts) you will confuse the reader. Consider making two sentences (with 3 or less parts in each).
- Be concise. If you can use one word instead of a phrase with two or more words, then choose the one-word alternative.
- **Be objective. Limit your use of personal pronouns (I, you, we), emotionally loaded words (wonderful, useless, lovely), and casual or ambiguous expressions.**
- Use technical terms correctly. Learn what they mean, how to use them, and how to spell them.
- Do not use contractions (isn't, doesn't, it's), While these are common in speech, in formal writing the full form (is not, does not, it is) is expected.
- Do not forget to indicate **units** of the values.
- N.B: Always submit a PDF file

A good lab report does more than presenting the data; it demonstrates the writer's comprehension of the concepts behind the data. Merely recording the expected and observed results is not sufficient. You should also identify how and why differences occurred, explain how they affected your experiment, and show your understanding of the principles the experiment was designed to examine. Bear in mind that a format, however helpful, cannot replace clear thinking and organized writing. You still need to organize your ideas carefully and express them coherently.