

Lab Report Preparation Guide

Each group is required to prepare a report following the completion of the experiment. The report should clearly present the purpose of the experiment, the procedure followed, the obtained results, the necessary calculations and plots, and the group's interpretation of the findings.

The following requirements should be considered when preparing the report:

- The report must not exceed 10 pages.
- The report must be prepared by the group members themselves and should reflect their own results, observations, interpretations, and conclusions.
- The cover page must include the names and relevant information of all group members. If any member of the group did not participate in the preparation of the report, this must be explicitly stated on the cover page.
- Plagiarism is strictly prohibited. Information obtained from textbooks, journal articles, websites, or other sources must be properly cited.
- The report should be written in clear, concise, and understandable English.

1. Objective & Theory

Clearly state the objective of the experiment and explain the fundamental theory related to the investigated problem.

The theoretical background should be sufficient to help the reader understand the physical principles, equations, and concepts used in the experiment and subsequent calculations.

Students may use textbooks, research articles, lecture materials, and other reliable academic or technical resources to strengthen their understanding of the subject. Any external information used in the report must be properly cited. Avoid copying lengthy theoretical explanations directly from references. The theory should instead be explained in your own words, focusing on the concepts that are directly relevant to the experiment.

2. Procedure

Describe the procedure followed during the experiment in a clear and logical manner. The explanation should allow the reader to understand:

- How the experimental setup was prepared?
- How the measurements were taken?
- Which variables or parameters were controlled or changed?
- The main steps followed during the experiment.

When appropriate, students may also include their observations or comments regarding the experimental procedure, such as difficulties encountered, important precautions, or factors that could influence the measurements. The procedure should describe what was actually performed during the experiment, rather than simply reproducing the laboratory instructions.

3. Results

Present the measured experimental data under this section. The collected data should be organized using clearly formatted tables. Each table should contain appropriate headings, symbols, and units. Measured quantities should be distinguished from values obtained later through calculations. Students should make sure that the reported data are consistent with their original experimental measurements. The data sheet filled during the experiment must also be shared.

4. Sample Calculations

Most experiments require repetitive calculations to obtain the desired quantities at different measurement points. It is not necessary to show every repetitive calculation in detail. However, students must provide at least one complete sample calculation for each required calculated variable.

The sample calculation should clearly show:

- The equation used
- The numerical values substituted into the equation
- The appropriate units
- The final calculated result

After demonstrating the calculation method once, the remaining calculated values may be summarized in a table. Also, this section only can be written by hand.

5. Necessary Plots

All plots required for the experiment should be presented under this section. Students are strongly encouraged to use appropriate computational or graphical tools such as MATLAB, Microsoft Excel, Python, or similar software to prepare the figures.

Plots should be prepared carefully and must include, where applicable:

- Clearly labeled horizontal and vertical axes
- Appropriate physical units
- A suitable legend when multiple data sets are shown
- Meaningful figure captions
- Appropriate scales and data ranges

Plots should be sufficiently clear to allow the reader to observe important trends and compare experimental and/or theoretical results. The plots should not simply be included without explanation. Important features of the results should be discussed in the **Discussion & Conclusion** section.

6. Discussion & Conclusion

This section is one of the most important parts of the report. Students are expected to provide their **own interpretation of the experimental results** rather than merely repeating the numerical values presented in previous sections. You can discuss your findings with other groups, but the final conclusions must be yours only.

The discussion may include:

- Interpretation of the observed trends
- Comparison of experimental results with theoretical expectations
- Discussion of agreements or discrepancies between different results
- Observations made during the experiment
- Possible sources of experimental error or uncertainty
- Limitations of the experimental procedure
- Explanations for unexpected results
- Recommendations for improving the experiment or measurement procedure

Identify the specific physical, measurement-related, or procedural factors that may have contributed to the difference, whenever possible. The section should end with a concise conclusion summarizing the main findings of the experiment and explaining whether the objectives of the experiment were achieved.

7. References

All external sources used in the preparation of the report must be properly cited and listed under this section. Every source cited in the text must appear in the reference list, and every source included in the reference list must be cited somewhere in the report.

Students should use reliable and traceable sources such as textbooks, journal articles, conference papers, technical standards, or other academic and technical resources. Every reference included in the report must correspond to a real, existing source. Fabricated, incomplete, or non-existent references are not acceptable.

About AI Usage:

AI-based tools may be used for visualization purposes, although their use is not recommended when conventional tools such as MATLAB, Excel, or similar software can be used. The use of generative AI models to produce the entire report, generate interpretations or discussions, or perform the required calculations on behalf of the students is strictly prohibited. The calculations, interpretation of the experimental results, discussion, and conclusions must reflect the students' own work and understanding.

The purpose of the report is not only to present numerical results, but also to demonstrate that the group members understand the experiment, can process and interpret the obtained data, and can communicate the findings clearly in a technical report.

Good luck and kind regards,
Burak.