

A GUIDE TO LABORATORY REPORT WRITING

AT THE

ILLINOIS INSTITUTE OF TECHNOLOGY

THE COLLEGE WRITING PROGRAM

**www.iit.edu/~writer
writer@charlie.cns.iit.edu**

FALL 1999

Table of Contents

Table of Contents 2

Introduction 3

Need for Report Writing 3

Advantages of a Standardized Format..... 3

Use of Computer-based Word Processors..... 3

Time Required for Report Writing..... 4

Intended Readership 4

Structure of Physics Reports 5

Professionalism: Formatting and Language 8

Checklist..... 10

Getting Help at The ARC (Academic Resource Center)..... 10

Introduction

A GUIDE TO LABORATORY REPORT WRITING

independent access to a computer, PC's and Macs, with word-processing software and printers, are available for use throughout the campus. Most word processing software incorporates useful features that significantly enhance the capability to produce a professional-quality report. These features include formatting, graphing, drawing, and spell-check.

Time Required for Report Writing

The most frequent complaint from students about laboratory courses is based on the perception that an excessive amount of time is needed for the preparation of laboratory reports, and that the return on this investment of time (in terms of the GPA) is not proportional. In fact, however, students who are able to report on their laboratory work in clear, organized reports receive higher grades than those who cannot. While report writing can indeed be time-intensive, the time is well spent because it provides students with the opportunity to develop or improve a skill that will be extremely valuable in their future careers.

A number of strategies can be deployed to lessen the time spent writing reports. Many

A GUIDE TO LABORATORY REPORT WRITING

recommendations. Professional laboratory reports are written to meet the needs of all these individuals.

Because they are an important part of your pre-professional training, laboratory reports written at IIT should also be written to satisfy the needs of this varied readership. Thus, some repetition of information in different sections of the report, perhaps with a difference in emphasis or detail, is often necessary. As in all professional writing, clarity and precision in both language and calculations are essential in a laboratory report. Figures, charts, tables, and graphs should be used whenever they would be helpful. This guide describes a report structure that satisfies these varied requirements.

Structure of Physics Reports

Laboratory reports may be classified according to whether they are complete reports on a project, short reports on one or more tests, or short reports on one or more techniques. The structure of laboratory reports has evolved to serve the needs of the varied readership described in the previous section.

The laboratory report should always be written for the convenience of the reader. Thus, for example, each section of the report should be headlined and the sections should be arranged in an appropriate, easily-understood sequence. In the context of the course for which it is written, the laboratory report serves to describe what you did during the laboratory session, how you manipulated the raw data, and what you conclude as a result. While it may seem logical to you to write a report in a chronological or historical sequence, such an approach is not the most useful for your readers, who would find such a report difficult to scan for the items of interest. Think of the document as a performance document, i.e., *proof* that you understand what you did and that you can apply it in practical situations.

By the time you graduate from IIT, you are expected to understand the format for a full report as well as some of the variations that are appropriate in different contexts. The reports described above typically contain many different sections. The sections required to complete your Physics lab reports should be written *in the order* listed below:

A GUIDE TO LABORATORY REPORT WRITING

The content of each of the sections in a laboratory report is described in the following pages. Most of the descriptions are general enough to be valid for all reports. A few are related to the fact that these reports are being prepared for a laboratory course at IIT.

1. Title page

The following information should appear on the title page:

- A brief but informative title that describes the report
- Your name
- Date(s) the experiment was performed
- Date the report was due
- Names of other group members *who were present for the experiments*
- Laboratory section number
- Name of the Teaching Assistant

2. Statement of Objective

State the objective(s) of the experiment concisely, in paragraph form. The laboratory manual or instruction sheet will help here. The fact that experiments in laboratory courses are being used to educate students is a secondary objective, and should not be stated in the report. In other words, the objective written in your report should never be to “familiarize students with the use of equipment.” Rather, the objective should state the problem that your procedure and data attempts to answer. Some key verbs that you will use in the objective might include “to investigate,” “to plot,” “to measure,” or “to compare.” The section should inform the reader precisely why the project was undertaken.

3. Theory

A concise description of the relevant theory should be provided when the theory is needed to understand other parts of the report, such as the data analysis or discussion sections. This section is sometimes combined with the introduction and background section, if this results in a more readable report. The relevant equations should be introduced and all the terms to be used in the report should be defined.

A GUIDE TO LABORATORY REPORT WRITING

faulty equipment at a later date, if necessary. The reader must be able to connect each item in this section to the item in the Description of Experimental Setup section.

5. Procedure

Detail the procedure used to carry out the experiment step-by-step. Sufficient information should be provided to allow the reader to repeat the experiment in an identical manner. Special procedures used to ensure specific experimental conditions, or to maintain a desired accuracy in the information obtained should be described. As with all sections of the report, the procedure describes what *was* done in the lab and should, therefore, be written in the *past tense*. Copying the procedure from a lab manual would be an inaccurate reflection of the work completed in the lab and is not acceptable.

6. Data

All the pertinent raw data obtained during the experiment are presented in this section. This section should contain only raw information, not results from manipulation of data. If the latter need to be included in the same table as the raw data in the interests of space or presentation style, the raw data should be identified clearly as such.

The type of data will vary according to the individual experiment and can include numbers, sketches, images, photographs, etc. All numerical data should be tabulated carefully. Each table, figure and graph in the report must have a caption or label and a number that is referenced in the written text. Variables tabulated or plotted should be clearly identified by a symbol or name. Units, if any, should always be clearly noted.

7. Analysis of Data

This section describes in textual form how the formulaic manipulation of the data was carried out and gives the equations and procedures used. If more than one equation is used, all equations must carry sequential identifying numbers that can be referenced elsewhere in the text. The final results of the data analysis are reported in this section, using figures, graphs, tables or other convenient forms. The end result of the data analysis should be information, usually in the form of tables, e0.000h8of the8data a8nveniea-una5ig aor Vateua7 shoulion, ne end result of th3hould 5 a pd s the6(a)t aprm nnd pYougnyThis ,l conditis

This name. U06 lo9.4(u)is in t etc0oj000(usedon, ne ent5up ,l condit)-1.4 -1.14 TD-0.0002w[is 4 a2 th

9. Conclusions

Base all conclusions on your actual results. Explain the meaning of the experiment and the implications of your results. Examine the outcome in the light of the stated objectives. This section should answer the question “So what?” Seek to make conclusions in a broader context in the light of the results.

10. References

Using standard bibliographic format, cite all the published sources you consulted during the conduct of the experiment and the preparation of your laboratory report. List the author(s), title of paper or book, name of journal, or publisher as appropriate, page number(s) if appropriate and the date. If a source is included in the list of references, it must also be referred to at the appropriate place(s) in the report.

11. Appendix

Details of analysis, computations, etc. that were referenced in the main body of the report should be included in the appendix. If the appendix contains more than one item, each one is designated by a specific letter (Appendix A, Appendix B, etc.) and listed in the table of contents.

Professionalism: Formatting and Language

As with all other modes of communication, laboratory reports are most effective if the language and style are selected to suit the background of the principal readers. Reports are judged not only on technical content, but on clarity, ease of understanding, word usage, and grammatical correctness. Following are several trouble spots for report writers.

1. Tables, Graphs and Equations

All tables, graphs and equations should be introduced by a sentence of explanation. They should also have an explanatory label. The labels should be executed using the same formatting and numbered sequentially throughout the report. Units and variables must always be identified (see sample lab report).

Don't expect figures or equations to serve where sentences and paragraphs are needed. Visual and verbal descriptions must always go together. There are two reasons for this coupling: first, it assures that the information contained in the report is clear; second, it allows the author of the report to take credit for interpreting the significance of the data. **Good reports will demonstrate to readers that the author is more than just a technician plugging numbers.**

2. Verb Tense

Reports should be written in the past tense in an impersonal style.

NO: The TA set up the equipment before we began the experiment.

A GUIDE TO LABORATORY REPORT WRITING

A GUIDE TO LABORATORY REPORT WRITING

with College Writing Program tutors, students can improve their grades in lab courses. You can also get writing help online by sending email to writer@charlie.cns.iit.edu.

Checklists, a guide to Equation Editor, grammar references, and other help for writing lab reports can be found on the Writing Program's web page: www.iit.edu/~writer.

A sample laboratory report for each course will be available with the TA or at The ARC.