

**INSTRUCTIONS FOR
PHYSICS WORK TERM REPORTS**

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revised January 2006

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1. Introduction

Co-operative education provides an opportunity for the student to alternate between academic study at the university and practical experience with employers. During an academic semester, various university courses may require the student to write lab reports. During a work term, the employer may require the student to write technical reports. The physics work term report is something different: for a selected topic, it should present *both* the academic foundation *and* the practical implementation. The student will submit one work term report to the physics co-op coordinator at the end of each work term.

The writing of a work term report allows the student to demonstrate the ability to select a topic, and to present the relevant quantitative information in an appropriately professional manner. The target audience for the report should be the writer's peers, i.e. undergraduate physics students. The report will be graded by a physics faculty member, who will often not be an expert in the specific topic and may be unfamiliar with acronyms and jargon used in the work place, but who is keenly interested in reading a well-written carefully-researched scientific report on this topic.

2. Topic

The topic for a physics work term report should be related to the student's work place during the work term. It should provide (i) an overview of the phenomenon that is to be studied, (ii) the scientific method used and the data obtained, or a discussion of technical data that are generally available, (iii) a sufficiently detailed analysis of these data, and (iv) conclusions.

Physics is a broad subject, and most physics students will see many possible topics for the work term report. The topic could be one that the student worked on directly, either as the leader or as an assistant. It could be a phenomenon that fellow employees were investigating and that the student found interesting. It could be an issue that is not under study by the employer but is relevant to that employer in at least a general way, and that the student wishes to explore through use of the existing scientific literature.

The student will benefit from articulating the topic clearly. If it is merely an imprecise idea in the student's mind, then the report could easily degenerate into a minimally-connected collection of information. If the topic is a precise theme, then it becomes a clear goal toward which each section of the report should lead.

3. First and last impressions

Brilliant scientific work can be submerged in poor English or a confused presentation. Conversely, ordinary scientific work can be enhanced by good language and thoughtful presentation. The conscientious physics student should strive to be a clear communicator as well as a good practitioner. Without effective communication, scientific progress goes unnoticed and society does not benefit.

In industry and business, a late report, beyond the time it was required to help make a decision, is a useless document! No marks are given for effort. Scorn, resentment and the impression of unreliability are the real consequences. Planning and organization are required to ensure that reports are completed on time.

The best time for a student to prepare a physics work term report is during the work term. This permits ready access to people and surroundings as sources of guidance and information. The work term report must be submitted to the physics co-op coordinator on or before the Friday of the first full week of classes in the semester following the work term.

4. Format

A typical physics work term report is approximately twenty double-spaced pages, including the cover page, letter of transmittal, and all other items detailed below. As an exercise in formal communication, the report must be well-written in correct English. Writing style, spelling and punctuation are important. The report should include the following items in the listed order:

- Cover

The report will usually be contained in a duotang, binder or plastic cover. A cover which allows the pages of the report to lie flat is desirable. The cover should indicate the title of the report, the student's name, the student's university ID number and the class number (PHYS 051, 052, 053 or 054).

- Letter of Transmittal

The letter of transmittal not only introduces the report, but also explains its purpose and scope and outlines the major conclusions or recommendations. The letter of transmittal precedes the title page. It is a letter included with the report and, as such, has no page number. A standard business letter format should be used, with the letter addressed to the Physics Co-op Coordinator, and the student's signature at the end. The letter of transmittal should be a single page containing the following information:

- The title of the report

- The class number (PHYS 051, 052, 053 or 054)
- The employer's name and location
- The main activity of the employer
- The student's project or area of work
- The scope of the report, i.e. what facets of the problem are discussed
- Any disclaimers, special problems or extenuating circumstances
- Acknowledgements of helpful people, groups or organizations
- Any other features of interest to the reader.

- Title Page

The title page announces the report to the reader. It is not numbered. It should be descriptive of the report's content and understandable to the target audience (i.e. the student's peers). Terminology specific to the employer, and uncommon acronyms, should not appear in the title. Information required on the title page is,

- The report title
- The employer's name and location
- The student's name, ID number and course number
- The date of submission of the report

- Table of Contents

The Table of Contents allows the reader to find the location of a specific section. It is constructed from the major headings used in the report. Note that the appendices are listed at the bottom of the Table of Contents.

- List of Tables and Figures

The page numbers for each table and figure are collected here for easy reference.

- Summary

The summary is written for a general reader who wishes to be familiar with the content of the report while avoiding technical details. The summary is a separate report, stating the physics phenomenon, the approach to understanding it, the main results and any recommendations. Items in the main report such as tables, figures or sections are *not* referred to in the summary. The summary is normally prepared after the report is completed, and is presented centered on its own (single) page.

- Introduction

This section should introduce the subject and why it is important. It should contain sufficient background information for the reader to understand the rest of the report, and it should briefly outline the content of the rest of the report. The Introduction section should not be longer than the

combination of Method and Analysis sections. If a significant amount of background information is required, some of that material may be included as appendices.

- Method

This section, together with the Analysis section, forms the core of the report. The specific scientific steps upon which conclusions will be based must be presented in a logical and thorough manner. Diagrams of an apparatus can be valuable. If the student was not directly involved in the study or experiment, then this section might rely on information from others. Appropriate credit must be clearly stated. The Method section may be subdivided into subsections if this seems helpful for the reader.

- Analysis

This section should contain a qualitative discussion and interpretation of various issues and outcomes from steps taken in the previous section, but it should also contain a quantitative statistical analysis of the scientific data. The estimation of systematic uncertainties, where possible, should be discussed. The Analysis section may be subdivided into subsections if this seems helpful for the reader.

- Conclusions

Conclusions are results derived from the evidence provided in the Method and Analysis sections. No new material is presented in the Conclusions. When presenting more than one conclusion, state the main conclusion first, followed by the others in order of decreasing importance, to ensure maximal impact on the reader.

- Recommendations (if applicable)

If the report seeks to influence specific future decisions, then this section should state the recommendations succinctly, along with a brief summary of why each recommendation represents the superior course of action within the available options.

- References

Any information quoted, paraphrased or summarized is cited as a reference. Citing references assists the reader by indicating where further information can be found, and lends credibility to the analysis within the report. Any material that is not original should be followed by a number in square brackets that corresponds to an entry in the References. The material may be tables, figures, equations, technical specifications, or text.

- Glossary (if applicable)

This section contains the definitions for words, phrases, acronyms and symbols that may be unfamiliar to the target audience. These are listed in alphabetical order, with symbols collected at the beginning or end of the list. A glossary avoids the need for repetitive and/or lengthy definitions within other sections of the report, thereby assisting the reader without hampering the readability of the report.

- Appendices (if applicable)

Data that are supplementary to the main ideas of the report may be placed in an appendix. Multiple appendices should be used if required.

5. Typesetting

Pages should be single-sided in a font that is easy to read (type and size). Double spacing, or at least something more than single spacing, is recommended. Except for the title page and letter of transmittal, all pages are numbered. Sections preceding the Introduction are numbered with lower case Roman numerals (i, ii, iii, ...) Tables and figures should be numbered separately, Table 1, Table 2, ... Figure 1, Figure 2, ... and there must be at least one reference to each in the text. Any table or figure that is disconnected from the text would be in danger of being missed by the reader.

6. Co-operative education resources

- Issues about the physics work term report should primarily be directed to the physics coordinator, Dr. Randy Lewis in LAB 221, and students are welcome to contact him at any time. (Examples of past reports are available for viewing.)
- The physics co-operative education website is
<http://www.phys.uregina.ca/ugrad/coop>
- The University of Regina Co-operative Education Office is located in RC 163, and its website is
<http://www.uregina.ca/coop>