PHYS 1626 Modern Physics Lab: Writing option supplement, Spring 2025

Instructor: Dr. Joyce Jiang

Overview (Writing Option)

This course follows the same syllabus as for Modern Physics Lab but has a few additional requirements. Students taking the writing option must submit two additional Formal Lab reports based on two of the experiments performed (usually the first two experiments).

Formal lab reports should be prepared in the style of a scientific paper. The text should be clear and concise, often this requires multiple editing passes and or previews by colleagues. These reports will be graded on style and format as well as content and correctness. Writing in a polished style with an emphasis on clarity will take a lot more work than a normal lab write up.

Course Structure and Requirement

The first formal lab report will be submitted as a draft after finishing the experiment. It should be marked "Draft: title of the Paper" in the title. It will be marked up and returned to you for revisions. We will arrange a one-on-one session to go over the draft and comments approximately after the draft due date. The report will then be resubmitted as a formal lab report. If you do not submit a draft report, only the final version of the report will be graded. Also, if you submit the draft late, there may not be time for substantial feedback.

Submission of a draft version for the second formal lab report is not required, but it is an option; the report can be directly submitted in its completed form. The expectation is that students will have learned the appropriate style and format from the feedback provided in the first lab report. However, if you wish to receive feedback on a draft of the second experiment, please ensure that it is submitted by the deadline indicated in the timetable below.

The table below summarize the important timeline for PHYS 1426 and 1626. Please pay attention to the **bolded** timeline in order to fulfill the requirement of PHYS 1626.

Experiment	Start Lab	Finish Lab	Report Due	Draft Due at 11:59 pm	Paper Due at 11:59 pm
Experiment 1	Jan 23	Feb 13	Feb 19	**Mar 8**	**Mar 29**
Experiment 2	Feb 20	Mar 20	Mar 26	Apr 12 (not mandatory)	**Apr 26**
Experiment 3	Mar 27	Apr 17	Apr 23		

Formal Lab Report Format (Labs 1 & 2)

The Lab Reports are required to have the following elements.

1. **Introduction**

   An introduction provides background information and an overview of how the measurements to be performed are related to a physical parameter that is sought. It often also addresses why the measurement is important, in other words, the overarching motivation for measuring this quantity.

   The introduction should briefly present the basic theory of the experiment. Important formulas should also be outlined along with a sketch of how you arrive at them from the essential physics (without deriving every step). Formulas should be presented in a formal style (using numbered equations) which are referenced by the physics discussion text. The introduction should also outline the organization of the paper and provide details on the scope of the measurement (what physical measurable will be presented in the conclusion).

2. **Experimental Technique**
   Describe the experimental apparatus and measurement procedure. This should include explaining the purpose and essential properties of all components of the apparatus used. Include figures with sketches of the apparatus (annotated as needed). All Figures must be labeled and have captions for explanation. All should also be referenced from the text in the course of the description. (Figures are referred to in the text as Fig. N where N is the figure number at the start of the caption). Any necessary calibration steps and or data should also be presented and discussed. Some calibration data may need to be presented in tabular form. All tables should have captions and be references from the text. (Tables are referred to in the text as Tab. N where N is the table number at the start of the caption). Figures and Tables are numbered in sequence (Fig. 1, 2, ...) and (Tab. 1, 2, ...).

3. **Analysis and Results**
   The main data should be presented in this section. Details of how the data were analyzed and any necessary calculations should also be presented in the text. Intermediate quantities needed to obtain the final result should be presented and discussed.

   Data is usually best presented in graphical form. In some cases tabular form is more appropriate but there is no need to include long tables of numbers if the same information is present in a graph. As above, each plot should have a Figure number and be referenced from the text. Label the axes in all graphs and include units. For data points use circles, squares or other symbols to distinguish different sets of points. Error bars on data points are usually required.

4. **Discussion and Conclusions**
   The conclusion should always start with a presentation of the main result(s) obtained. An important part of the result is an estimation (and justification) of uncertainty in the measured quantity. The discussion should center around the agreement or disagreement with the prediction. If disagreement is found the probably cause(s) should be further discussed. Sometimes, a disagreement with theory points to physics which is missing from the analysis and or a disagreement can point to completely new physics. (although this will likely not be the case in our lab).

5. **Appendix**
   An appendix is often used to include auxiliary material that supports the conclusions but is not necessarily crucial to the measurement. It is not always present in a real paper. In our case, the appendix will be used to append the discussion questions embedded in the lab write up.

6. **References**
   All reference material used (textbooks, journal articles) in the text of your report should be listed in numbered format in this section. They should be numbered in the order that they appear in the text and referred to as Ref. [N]. There is a prescribed format for references, please see a standard APS journal article bibliography.

The papers must be submitted in PDF format. I will provide templates in latex for you to get started. (Word Document may also be used if necessary).