Physics 202 Laboratory  
Fall 2009

Meeting: Trexler 273  
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Required Materials: To be distributed by Instructor.

Motivation
Laboratory classes are often dreaded by all students because they demand that we become adept at putting our thoughts on paper. This is scary for most of us because our thoughts are often a mess. The fact is that most of us will be paid a salary based on our ability to write what we are thinking in a coherent and concise manner. Whether it is our boss or our colleagues, people want to know what we have completed and how did we go about accomplishing our tasks. The laboratory work (and report writing) in this class are practice in this art of “mind-writing”.

For aspiring scientists, the concepts and practice of writing are uncharted waters, particularly where numeric values are incorporated. Scientific writing has its own guidelines and structure; in my experience, one only gets better at writing by writing.

The opportunity to reinforce and apply what is learned in the 202 course should be welcomed by each of you. Learning physics is an iterative process, and the laboratory serves this end as it provides a varied context.

Intended Learning Outcomes
The following five learning activities will serve as the foundation for the lab exercises: the Art of Experimentation, Experimental & Analytical Skills, Conceptual Learning, Communication, and Collaborative Learning Skills. While the content of the labs will attempt to follow the 202 course outline, every lab session will focus on these foundational activities (though probably not equally).

The successful student will—
1. explore open-ended questions that highlight course-related phenomena.
2. challenge (and be challenged by) colleagues regarding their current understanding of physical concepts as they are implemented within the lab.
3. write paragraphs that pertain to physical phenomena, graphical results, and error uncertainties in a meaningful way.
4. design experimental testing of hypotheses in part and/or in full to meet the laboratory purpose(s).
5. deepen understanding and application of errors, both systematic and random, as they apply to physical results.

Attendance Policy
Since a portion of your grade in 202 (15%) depends on the laboratory, you must enroll in both the “lecture” and laboratory sections of 202. The lab starting and ending times are firm, although it may be possible to complete the lab before the published ending time. You will be allowed one late entrance to
the lab up to 15 minutes after the set starting time, i.e., <3:05. After the first 15 minutes, no one will be admitted without prerequisite authorization. Alternative arrangements (e.g., make-ups) will only be entertained as a result of a discussion with me beforehand or an emergency note (death, hospitalization, misdemeanor, etc.) signed by a governing official (medical doctor, parent, law enforcer, etc.).

**Academic Integrity**

I want to foster a mutual respect for the classroom hours that we have together. In light of this, please remember to turn off cell phones, PDAs, etc. during the class (including laptops) and come prepared (e.g., book, paper, and pencil). Since you will construct both group and individual laboratory reports, we will spend some time discussing the difference between “collaboration” and “plagiarism.” In short, collaboration relies on the individual strengths and contributions of each group member to produce a deeper level of understanding. Plagiarism exists when someone takes personal credit for another’s creative (usually written) work. Please be advised that the RC AI policy will be upheld within this course.

**Grading**

Unless otherwise specified, written lab reports for each exercise are due one week from data completion. Neatly printed or typed reports are acceptable that follow in the order presented below. In the name of conserving paper, the course will (attempt to) conduct all-electronic submission and grading via the Bb site. **Please note that a deduction of 10 points will occur for every day a lab is late past the specified due date, and no credit is awarded for labs > 5 days late.** A percentage breakdown of how the total grade is determined is as follows: Cover “page” (aka. Heading) 5%, Abstract 20%, Introduction 15%, Data and Results 40%, and Discussion 20%. Each required section of the lab is briefly described below. Although we will discuss lab writing at our initial meeting (and then throughout the semester at various times), please have a look at the sample lab posted on the Bb pages as a guide as well as the lab writing rubric.

**Contents** The following items must be included on every Cover Page: title of the experiment, date, your name, and collaborators’ names. Though trivial to complete, this information accurately identifies your work so that you can receive a grade.

The Abstract provides a brief summary of the entire report. This summary includes the purpose of the lab (i.e., the hypothesis), a short statement of the physical phenomena investigated, the principal numerical and/or qualitative result(s), and a concluding sentence of quantitative agreement/disagreement with the intended purpose.

A neat and organized presentation of the Data and Results is important, which includes any graphs and calculations. Graphs must contain appropriate titles and labels, and equations need to be stated formally (i.e., in general form) before any values are inserted. All values need units. Any questions provided under this section in the lab handout do NOT need answering explicitly. Rather, they are meant to guide you as the lab is completed and the Discussion is written.

Lastly, a concise Discussion (~2 paragraphs) should conclude each lab. Here again, the results should be stated and commented on as compared with the established values (if available). Also, an attempt to summarize the possible sources of error in your measurements and/or results should be included. In this section, you could discuss any questions from the handout asked within the (Discussion and/or the Results) section.