

Syllabus for PHY251

Fall 2009

LABORATORY REQUIREMENTS

- Text: The laboratory course pack is **PHYSICS 251 (Fall 2009)**. It is the only acceptable version. By Sept. 7, it can be purchased at any local student bookstore.
- Calculator: Trigonometric and logarithmic functions are required. Statistics functions will be very useful, but are not required.
- PHY 251 on the Web: <http://www.pa.msu.edu/courses/PHY251>
- *No food or drinks of any kind are allowed in the laboratory, NO exceptions*

SCHEDULE

Laboratories begin on September 14 and run through December 11, 2009. As shown in the Table below, 10 experiments are scheduled with a (50 minute) Practical Laboratory, the week of October 26, and the week of December 7, 2009.

Week	Begins	Laboratory
1	31-Aug	No Labs
2	7-Sep	No Labs
3	14-Sep	(1) Intro. to Computers & Uncertainties
4	21-Sep	(2) Reaction Time
5	28-Sep	(3) Free Fall 1 (measuring g)
6	5-Oct	(5) Newton's 2nd Law
7	12-Oct	(6a) Inelastic Collisions
8	19-Oct	(6b) Elastic Collisions
9	26-Oct	<i>Practical Lab (TBD)</i>
10	2-Nov	(8) Moment of Inertia
11	9-Nov	(9) The Pendulum
12	16-Nov	(10) The Spring
13	17-Nov	No Labs (Thanksgiving week)
14	30-Nov	(11) Waves
15	7-Dec	<i>Practical Lab (TBD)</i>

OBJECT

The object of this course is to teach you how to make measurements of physical parameters and how to analyze and interpret them. Working in groups of two, you will make measurements, tabulate and graph your data, evaluate uncertainties in your measurements, analyze the results of your experiments, and answer the questions for each experiment given in the laboratory manual.

PREPARATION FOR THE LAB SESSIONS

You will find it very helpful to prepare well, *i.e.* read and study the materials for the laboratories before you come to class. Being prepared before you come to your lab session will enable you to finish on time, enjoy the lab more and help you get a higher grade. During the first 10 minutes of every lab period a closed book quiz will be given aimed at testing your readiness to perform that day's experiment and your understanding of the previous experiment. There WILL be a quiz on the first day of lab so please make sure you have read the syllabus and the first experiment "Introduction to Computers and Uncertainties" before arriving to class the week of September 14. Arrive on time or you will miss the quiz and the credit. All the materials to be graded (including data sheets, graphs, answers to questions, etc.) must be completed during your lab period and handed in to the instructor before leaving the lab, with ABSOLUTELY NO EXCEPTIONS.

The lab report consists of the WORKSHEET pages from the course pack and, using the computer and lab printer, any plots required and any fit parameters (e.g., slope and uncertainty) that you are asked to obtain. Included on the worksheets are spaces or tables for your measurements, calculations, and questions to be answered.

GRADES

Laboratory reports will be graded by your instructor on a 20-point scale and will be handed back at the beginning of the next lab. The points will be distributed **roughly** as follows: quiz (4 pts), acquisition of data (including accuracy) (5 pts), graphs and calculations (6 pts), answers to questions (5 pts). Explain how you identified and tried to solve problems in the experiment, if there were any. If you see that your data does not agree with your predictions explain, as well as you can, what is wrong. Please write clearly and neatly in full sentences. Avoid wordiness and excessive detail.

Your grade will be based on the total number of points for the labs and quizzes, *dropping the lowest lab score of the semester before computing your grade* (see below for policy regarding excused absences). Since the instructors for the various sections do not necessarily grade identically, the scores for a given instructor's sections will be considered as a group for grading purposes. Each of the groups will receive approximately the same average grade in the course, so that there is no advantage to having one instructor rather than another. Within the group, the grades will be assigned strictly in order of points achieved. The grade will be assigned by a curve, not a "straight scale" (for which there is no uniform definition in any case). In the past, the average for the course was about 2.6. Please obtain from your instructor and save your graded lab reports and quizzes. You may think a score wasn't correctly calculated either during or at the end of the semester. If you (FIRST) cannot resolve the issue with your instructor, you must (SECOND) submit all of your graded lab reports and quizzes for review by the course Administrator. After this review, the score for any laboratory may go up *or down*.

Plagiarism or copying will not be tolerated. Only the data you take during the lab will be common with your lab partner. Lab partners are expected to turn in printed versions of the same Excel data sheets and Graphs. Identical or slightly modified copies of the hand-

written answers to the Questions or on a Graph, will result in both students receiving a zero lab score. Please review MSU's policy on Academic Integrity included below:

Academic Integrity:

The principles of truth and honesty are recognized as fundamental to a community of teachers and scholars. The University expects that both faculty and students will honor these principles and in so doing protect the validity of University grades. This means that all academic work will be done by the student to whom it is assigned, without unauthorized aid of any kind. (See General Student Regulation 1.00, Scholarship and Grades, for specific regulations.) Instructors, for their part, will exercise care in the planning and supervision of academic work, so that honest effort will be positively encouraged. If any instance of academic dishonesty is discovered by an instructor, it is his or her responsibility to take appropriate action. Depending on his or her judgment of the particular case, he or she may give a failing grade to the student on the assignment or for the course. In instances where a failing grade in a course is given only for academic dishonesty, the instructor will notify the student's academic dean in writing of the circumstances. The student who receives a failing grade based on a charge of academic dishonesty may appeal a judgment made by a department, school, or a college to the University Academic Integrity Review Board. Refer to Academic Freedom for Students at Michigan State University. When, in the judgment of the academic dean, action other than, or in addition to, a failing grade is warranted, the dean will refer the case to the college-level hearing board which shall have original jurisdiction. In cases of ambiguous jurisdiction the appropriate judiciary will be randomly selected by the Assistant Provost from one of the three core colleges. Appeals from the judgment may be made to the University Academic Integrity Review Board. Refer to Academic Freedom for Students at Michigan State University. In instances of academic dishonesty where the instructor feels that action other than, or in addition to, a failing grade in the course is warranted, the instructor will report the case to his or her departmental or school chairperson and to the students academic dean. The dean will then refer the case to the College- level hearing board which shall have original jurisdiction. Refer to Academic Freedom for Students at Michigan State University.

MISSING LABS/MAKE-UP LABS

Laboratory attendance is mandatory. Make-up labs for an excused absence will be limited to attending during the same week another lab section with less than 20 students enrolled. It may not be possible to find room in another section for a make-up, as most sections are currently full. If you miss a lab for any legitimate reason, such as illness, **you must provide your instructor with the reason no later than 24 hours after the missed lab**, and provide a list of sections that have less than 20 students enrolled in which you can do the make-up. Your TA will choose (and notify the TA of) the section you must attend. Work done while attending a make-up section without first clearing it with your instructor will not be accepted. The instructor of make-up section must be informed at the start of the lab that you are there to do the make-up approved by your TA. Also, you may be asked to provide suitable documentation (i.e. a note from your doctor). If you miss a lab due to a legitimate reason, and obtain an excused absence from your instructor that grade can be considered as your lowest score. You will be allowed only **ONE** excused lab. *A zero score for an unexcused absence will not be considered as a laboratory with the lowest score, i.e., the zero will NOT be dropped from the total score.*

Know the NAME, PHONE, and EMAIL of your lab instructor as the instructor is in charge of all aspects of laboratory procedures. Confer with the instructor if you have a problem, since they can ordinarily solve most problems. Communications regarding the day-to-day operations of your section should be directed to your instructor **NOT** the lab coordinator, e.g., a missed lab, etc.

The laboratory coordinator for this course is Professor Carl Bromberg, with office hours are on Monday (by appointment only) in room 3225 of BPS. To make an appointment, send e-mail to Professor Bromberg at bromberg@pa.msu.edu. Please include a phone number and your Monday academic schedule to find a mutually convenient time.

COMPUTERS IN PHYSICS 251

Computers controlled by a central server will be used in all the physics undergraduate labs. It is your responsibility to close all applications and log-out of your computer account when you leave the laboratory.

I. Microsoft Excel

Excel is a spreadsheet program which you can use to record/store your data.

II. Kaleidagraph

Kaleidagraph is a general plotting program. It takes its input from columns of data and allows you to either plot a histogram of the contents of one column or “scatterplot” any column versus any other column, and obtain the best fit for the parameters for an expected functional dependence, e.g., a straight line’s slope, intercept and uncertainties. Although some of these things are possible in Excel, Kaleidagraph has a very user-friendly interface for adjusting axes/labels/text/bins etc. in any of the graphs.

The input for the plots can be copied from an Excel spreadsheet and pasted, or typed directly into a Kaleidagraph data table. Once you are satisfied with your plot (binning is correct, labels are clear, axes are labeled and have units!), you can make a best fit for the parameters of an expected functional dependence and include the results on the plot. The plot can then be saved, printed and attached to your worksheets.

Last update: August 3, 2009