Syllabus for PHY252
Spring 2009

LABORATORY REQUIREMENTS

- Course Pack: **PHYSICS 252 Introductory Physics Laboratory II, Spring 2009**, can be purchased at any local student bookstore. Make sure you have purchased the **Spring 2009 edition** of the course pack since it is not the same as previous semesters.
- Calculator: Trigonometric and logarithmic functions are required. Statistics functions will be very useful, but are not required.
- PHY 252 on the Web : http//www.pa.msu.edu/courses/PHY252
- *No food or drinks of any kind are allowed in the laboratory, NO exceptions*

SCHEDULE
Laboratories will begin on January 26 and run through May 1, 2009. As shown in the Table below, you will perform 11 physics experiments with a (50 minute) Practical during the 8th and 16th week of classes.

Week	Begins	Laboratory
1	12-Jan	*No Labs*
2	19-Jan	*No Labs (MLK-day Monday)*
3	26-Jan	**1.** Ohm's Law
4	2-Feb	**2.** Kirchoff's Laws
5	9-Feb	**3.** Electrical Energy
6	16-Feb	**4.** The Oscilloscope
7	23-Feb	**5B.** RC Circuits (w/scope)
8	2-Mar	***Lab Practical I***
9	9-Mar	*No Labs (Spring Break)*
10	16-Mar	**6.** The Amplifier
11	23-Mar	**7.** Bio-electric Measurements
12	30-Mar	**8.** Thin Lenses
13	6-Apr	**9.** Diffraction and Interference
14	13-Apr	**11.** The Prism Spectrometer
15	20-Apr	**12.** Color
16	27-Apr	***Lab Practical II***

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 given in the laboratory manual for each experiment.

PREPARATION FOR THE LAB SESSIONS
You will find it very helpful to prepare well, *i.e.* read and study the materials for the laboratories <u>before</u> 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 "Ohm's Law" before arriving to class the week of January 26. Please arrive on time or you will miss the quiz <u>and the credit</u>. All the materials to be graded (your lab report including data sheets, graphs, answers to questions, etc.) must be completed during your lab period and handed in to the instructor <u>before</u> you leave the lab; there will be ABSOLUTELY NO EXCEPTIONS.

The lab report consists of any WORKSHEET pages from the lab manual and, using the computer and lab printer, any plots required, and any fit parameters (e.g., slope and its 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. If you think a score wasn't correctly calculated either during or at the end of the semester, *and* you cannot resolve the issue with your instructor, you must submit <u>**_all_**</u> of your graded lab reports for review by the course Administrator. After this review, the score of any laboratory could go up or down.

Plagiarism or copying will not be tolerated. Lab partners are expected to turn in copies of the same Excel data sheets and graphs. Answers to the questions, however, are not to be copied, word for word, from the course pack material. Also, lab partners turning in

identical or slightly modified versions for the answers to questions, will BOTH receive a zero for that lab. 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

Because personally participating in each laboratory is an essential part of this course, you must be present for each session. Make-up labs 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 many sections are currently full. If you miss a lab for any reason, such as illness, you must notify your instructor *no later than 24 hours after the missed lab* and provide suitable documentation (i.e. a note from your doctor). To make-up the lab, a section must be selected (less than 20 students enrolled) and your instructor must obtain permission from the instructor of that section. If you miss a lab due to a legitimate reason and do not perform a make-up lab, you will be excused from that lab and it will be considered as your lowest score. *An unexcused absence will be given a zero score for that lab and it will not be considered as the lowest score of the semester.*

Your lab instructor is in charge of all aspects of laboratory procedures. Please 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. (ie: a missed lab, etc.)

The laboratory coordinator for this course is Professor Bromberg. His office hours are 3:30-5:00 PM Mondays in room 3225 of BPS. To make an appointment at a different time, send e-mail to Professor Bromberg at bromberg@pa.msu.edu. Please include a phone number and a copy of your academic schedule to set up a mutually convenient time.

COMPUTERS IN PHYSICS 252

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. Only two of the available tools are relevant to PHY252

I. <u>Microsoft Excel</u>

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

II. <u>Kaleidagraph</u>

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.

<p align="center">Last update: January 9, 2009</p>