Physics 174: Physics Lab Introduction
Spring 2010, Prof. Ki-Yong Kim

What the course is about

Physics 174 is an introductory physics lab course that meets for 1 hour and 50 minutes each week in Room 3115 of the Physics Building. In this course you will be expected to master a few basic ideas and tools which you will need for later labs, including: understanding experimental errors, using computer spreadsheets for analyzing, plotting and fitting data, and working with simple electrical circuits and electrical measuring equipment. This course is intended for, but not limited to, students who are majoring in Physics or are considering doing so.

Corequisite: Math 140 (Calculus I). You will have to know how to take derivatives of functions starting about one month into the course. It will also be helpful to have taken a high school (or college) physics course.

Books: The required texts are:

- *Physics 174 Laboratory Manual*, **Eleventh Edition (June 2009)**, ISBN-13: 978-0-470-56673-2 ***(it is important to get the Eleventh Edition)***
- "A Practical Guide to Data Analysis for Physical Science Students" by Louis Lyons, Cambridge University Press, ISBN: 0-521-42463-1, ISBN-13: 978-0-521-42463-9

Be sure to bring your Lab Manual with you to every class, including the first class.

How the course works

This course is intended to give you hands-on experience with measurement techniques and basic data analysis. You'll spend time in the lab (room 3115) each week doing an exercise that focuses on a particular concept, following pretty specific instructions in the Lab Manual. You'll answer a series of questions as you work through each exercise. Your professor and TA will be available to help when you need it and to check your work; you'll have a "checksheet" that we will initial as we check each task that you've completed. At the end of the lab period, you will turn in your work, normally in the form of an Excel spreadsheet that you will submit electronically using ELMS (we'll tell you how to do that during the first meeting).

Reading assignments are designed to help prepare you for the lab exercises, so that you can make the best use of your time in the lab. An hour and 50 minutes may seem like a lot of time, but it isn't. Preparing in advance by doing the reading assignment will help you finish on time.

Homework is assigned at the end of most of the labs. Depending on how quickly you've completed the in-class exercise, you may have some time left to do the homework before you leave. You must turn in your homework (usually using ELMS) by 10:00 pm on the second day after your lab session. That is, if you have lab on Wednesday, then the homework is due by 10:00 pm Friday; if you have lab on Thursday, the deadline is 10:00 pm Saturday. We will grade your spreadsheets and homework before your next lab period.
The course includes two in-class **practical exams** which will involve making measurements and analyzing the data you collect, much like the regular exercises. (In fact, the Lab Manual lists them with exercise numbers.) The instructions and questions for these exams will be handed out at the beginning of the lab period on the scheduled exam dates.

Course web site: Course information, the week-by-week schedule of lab exercises, and other documents are posted in the ELMS (Blackboard) system. **You will use the course web site to turn in your Excel spreadsheets from the in-class exercises and homework,** and will also be able to use it to view your grade on each assignment. You should be able to log in at http://elms.umd.edu, and the course should appear in the "My Courses" panel.

Course sections

Section	Day	Time	Instructor	Teaching Assistant
0101	Wednesday	9:00am–10:50pm	Prof. Kim	
0201	Wednesday	3:00pm–4:50pm	Prof. Kim	
0301	Wednesday	1:00pm–2:50pm	Prof. Kim	
0401	Thursday	11:00am–12:50pm	Prof. Goodman	
0501	Thursday	2:00pm–3:50pm	Prof. Goodman	

Week-by-week schedule

We will skip Exercise 3 in the lab manual, but do both exercises 5 and 5* (five-star).
Note the two exams on March 10 and May 5

Thursdays	Topic
Jan 27	Exercise 1: Introduction to Excel
Feb 3	Exercise 2: Measurement Error and Uncertainty
Feb 10	Exercise 4: Straight Line Fits Using χ^2 and Excel
Feb 17	Exercise 5: Propagation of Errors
Feb 24	Exercise 5*: Using χ^2 to Test a Theory
Mar 3	Exercise 6: Review of Spreadsheets and Errors
Mar 10	**Exam on Spreadsheets and Errors**
Mar 17	**Spring Break**
Mar 24	Exercise 8: Resistors and Multimeters
Mar 31	Exercise 9: Current and Voltage
Apr 7	Exercise 10: The Digital Oscilloscope and the Function Generator
Apr 14	Exercise 11: The Oscilloscope and AC Signals
Apr 21	Exercise 12: Reflection of Voltage Pulses
Apr 28	Exercise 13: Review of Circuits
May 5	**Exam on Circuits and Error analysis**

Contact information

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Course policies

Arriving late to class:
Classes at Maryland begin right on the hour. It is important that you arrive at the lab on time so that you can get instructions for the lab work and have time to finish. If you arrive more than 10 minutes late, you will probably not be allowed to do the lab at that time and will have to make it up during another section.

Making up missed labs:
If you must miss your regular lab section (due to illness, a religious observance, or some other compelling reason), then you should make that lab up by going to another section that same week, if possible. Contact your instructor and the instructor of the other section (if different) to let them know that you need to do this and to check whether there is space available. If you cannot attend another section, contact your instructor ASAP and a time for a make-up lab will be arranged. In general, this should be done during the same calendar week as the lab is scheduled (so that the equipment for that lab is still set up), and **definitely no later than the following Tuesday**. The homework for the lab will be due by 10:00 pm on the second day after you make up the lab.

Grading:

50%	Lab Spreadsheets
20%	Homework
15%	Test on spreadsheet, errors and measurements
15%	Test on the oscilloscope and electrical circuits

General comments on assignments:
Finishing all the labs *and* homework sets is very important. Missing a lab will generally cost you

one letter grade in your final grade, so be sure to come every week. Missing even one homework set will hurt your grade too, so do the best you can. Do the homework early, so that you have time to ask questions if something gives you trouble! Also, if you can't completely finish a homework set, turn in what you do have *before* the deadline. **No credit will be given for late homework** unless you have a valid excuse (illness, a religious observance, or some other compelling reason.) When you are working on the homework sets, feel free to discuss among yourselves to try to figure out what is going on. However, do not use these discussions as an excuse to copy someone else's solution to the homework, or let someone else copy your solution. That is cheating and is strictly forbidden. It is also self-defeating since another part of your grade will come from tests. The right way to discuss the homework is to first work through a problem on your own and try to arrive at a definite answer, even if you aren't sure it is correct. With this preparation you can then discuss intelligently with your colleagues and see if you have missed something essential. Of course, you can always ask one of your instructors - that's what we get paid for!

Honor Code:
The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html .

Students with disabilities:
Accommodations will be provided to enable students with disabilities to participate fully in the course. Please discuss any needs with your instructor at the beginning of the semester so that appropriate arrangements can be made.

Weather and emergency closures:
If the University is closed due to weather or some emergency situation on a day when homework is due, then that homework will be due by noon on the next day when the University is open. If the University is closed on the *scheduled date of an exam*, then the exam will be given during your next regularly scheduled class period when the University is open. If the University is closed on your regular class day in any other (non-exam) week, *including the "review" exercise week before each exam,* then the exam will still be given according to the original schedule. In these or other exceptional circumstances, we will attempt to communicate with students by email.