Physics 174: Physics Lab Introduction

Fall 2012, Prof. Arpita Upadhyaya

What the course is about:

Physics 174 is an introductory Physics Lab that meets for one 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 interested in majoring in Physics

Prerequisites: The only prerequisite or co-requisite for the course is Math 140. You will need to know how to take derivatives of functions starting about one month into the course.

Texts: ***Physics 174 Lab Manual*** – June 2010 (12th edition). Also recommended is a book on data analysis: "A Practical Guide to Data Analysis for Physical Science Students" by Louis Lyons or Introduction to Error Analysis by Taylor.

Web Site: To get the latest information on Physics 174, check the web site at:

http://www.physics.umd.edu/courses/Phys174/index.html

Or, you can get there by logging onto the elms course page: **www.elms.umd.edu**. You will need to use your U Maryland Directory ID and password to reach the class pages.

Lab sections: I teach three lab sections on the following days:

Section	Day	Time	Teaching Assistant
0103	Thursday	2:00 pm – 3:50 pm	Qin Liu
0106	Thursday	12:00 pm - 1:50 pm	Qin Liu
0109	Wednesday	4:00 pm – 5:50 pm	Qin Liu

Contact Information:

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Office Hours: You can try stopping by my office at any time but the best way to reach me is to make an appointment by e-mail.

Teaching Assistants for the course:

Qin Liu
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Zhenghan Gao
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How the course works:

Classwork: 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).

You are required to submit on ELMS the Excel workbook with your class exercise at the end of each class. There will be a **second** submission site on ELMS where you can submit your work after completing it at home, **including** the HW assignment. This will be due within two days after your lab class, as described below.

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 on 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 11:00 pm Friday; if you have lab on Tuesday, the deadline is 10:00 pm Thursday. We will grade your spreadsheets and homework before the next lab period.

Exams: The course includes two in-class **practical exams** which involve making measurements and analyzing the data you collect, much like a regular exercise. 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.

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.

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 Policies:

Arriving late to class:

Classes at Maryland begin right on the hour. It is important that you arrive on time to Physics 174 so that you can get instructions for the lab and have time to finish. If you arrive more than 10 minutes late, you may not be allowed into the lab and may have to make it up during another section. This is **hard**, because the sections are full, so, **don't be late**!

Lab Makeup Time: 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. The homework for the lab will be due by 10:00 pm on the second day after you make up the lab. Because the other sections are full, it is also very hard to do a make-up, so **do not miss your lab section**.

Grading:

50% Lab Spreadsheets
20% Homework: **do the homework!!!**
15% Test on spreadsheet, errors and measurements
15% Test on the oscilloscope and electrical circuits

Missing one Lab (and not making it up before the next lab) will cost one letter grade in your final grade. Missing one homework set will cost one-half of a letter grade in your

final grade. No credit will be given for late homework unless you are seriously ill and provide a written note from your physician.

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 the problem on your own. 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.

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.shc.umd.edu.

To further exhibit your commitment to academic integrity, remember to sign the Honor Pledge on all examinations and assignments: "I pledge on my honor that I have not given or received any unauthorized assistance on this examination (assignment)."

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.

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 the week of Oct 15 and Dec 3!

P 174 - Schedule of Labs - Fall 2012

Week of	Topic
9/3	Exercise 1: Introduction to Excel
9/10	Exercise 2: Measurement Error and Uncertainty
9/17	Exercise 4: Straight Line Fits Using χ^2 and Excel
9/24	Exercise 5: Propagation of Errors
10/1	Exercise 5*: Using χ^2 to Test a Theory
10/8	Exercise 6: Review of Spreadsheets and Errors
10/15	Exercise 7 : Exam on Spreadsheets and Errors
10/22	Exercise 8: Resistors and Multimeters
10/29	Exercise 9: Current and Voltage
11/5	Exercise 10 and 11 : The Digital Oscilloscope, Function Generator and AC signals
11/12	Exercise 12: Reflection of Voltage Pulses
11/19	No PHYS174 labs, Thanksgiving Break
11/26	Exercise 13: Review of Circuits
12/3	Exercise 14 : Exam on Circuits and Error analysis
12/10	No labs