

Physics 174: Physics Lab Introduction
Fall 2014, Sections 0102, 0103 & 0106
Dr. Wendell T. Hill, III

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 master a few basic ideas and tools that you will need for later labs. These include: 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.

Co-requisite: Math 140 (Calculus I). You will need to know how to take derivatives of functions starting about one month into the course.

Required Textbook

- *Physics 174 Laboratory Manual*, Twelfth Edition (June 2010), it is important to get the Twelfth Edition. Be sure to bring the manual to every class

Recommended Textbook

- *A Practical Guide to Data Analysis for Physical Science Students* by Louis Lyons
or *An Introduction to Error Analysis* by J.R. Taylor

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 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. There is a checksheet in the manual for each lab. Their use will be discussed during the first lab meeting. 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. (You will be instructed on how to do this during the first lab meeting. Note, with the current version of ELMS you can upload and submit your assignment multiple times.) You have an opportunity to complete any part of the calculations for a lab at home and submit a revised version to be graded. **If you do not turn in a revised version, the version submitted at the end of class will be graded; be sure to turn in a version at end of class and save it somewhere for yourself.**

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 and Final Spreadsheet 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) and your final spreadsheet by 11:59 pm on the Monday after your lab session.**

The course includes two in-class practical exams that 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 (Canvas) 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	Teaching Assistant	Email/Location/Phone
0102	Wed	2:00 - 3:50 pm	Jasper Drisko	jasperdrisko@gmail.com Rm 1136 Chem & Nucl Eng x53731
0103	Thurs	2:00 - 3:50 pm	Jasper Drisko	jasperdrisko@gmail.com Rm 1136 Chem & Nucl Eng x53731
0106	Thurs	12:00 - 1:50 pm	Afif Bandak	abandak@terpmail.umd.edu Phys Undergrad Lounge Rm 1302

Contact Information:

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Week-by-week schedule

We will skip Exercises 5 and 12 in the lab manual, but do exercises 5* (five-star). Note the dates of our two exams below in bold type.

P 174 - Schedule of Labs - Fall 2014 All Sections R. Greene and W. Hill

Week of	Topic
9/1	Exercise 1: Introduction to Excel
9/8	Exercise 2: Measurement Error and Uncertainty
9/15	Exercise 3: Measurements, Averages, and Standard Deviations
9/22	Exercise 4: Straight Line Fits Using χ^2 and Excel
9/29	Exercise 5*: Using χ^2 and Propagation of Errors to Test a Theory
10/6	Exercise 6: Review of Spreadsheets and Errors
10/13	Exercise 7: Exam on Spreadsheets and Errors
10/20	Exercise 8: Resistors and Multimeters
10/27	Exercise 9: Current and Voltage
11/3	Exercise 10: The Digital Oscilloscope and the Function Generator
11/10	Exercise 11: The Digital Oscilloscope and AC Signals
11/17	Exercise 13: Review of Circuits
12/1	Exercise 14: Exam on Circuits and Error Analysis
	No labs Thanksgiving Week

Course Policies:

Arriving late to class: Classes at Maryland begin right on the hour. It is important that you arrive on time to the lab 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 to do the lab and may have to make it up during another section. This is difficult because the sections are typically full, so please 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 the 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 him/her know that you need to do this and to check to see if 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. If you miss an exam due to an allowed reason, contact your instructor ASAP to make arrangements for a suitable makeup. In general, these should be done during the same calendar week as the scheduled event (so that the equipment is still set up). Again, because the other sections are usually full, it is not easy to arrange a make-up time so please do not miss your lab section. You should also understand that the technical staff uses Fridays to set up and prepare for the following week's lab so **Fridays will typically not be available for makeups.**

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 to complete all assignments. 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 because 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. Then 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 your instructor or TA for help.

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: <http://shc.umd.edu/SHC/Default.aspx>.

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 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, emails will be sent and/or announcements will be posted with further information.