Physics 174: Physics Lab Introduction, Spring 2018

 Dr. 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.

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 Texts: Only the electronic manual is required for this course. Students are required to purchase the electronic lab manual from Expert TA: https://www.theexpertta.com. See below for instructions on registration for Expert TA.

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.

Lab Report: Each week, before you leave the lab, you must submit to ELMS an Excel spreadsheet lab report of all the work you completed so far. If you need to make revisions to this report, or finish some parts, you will have until 11:59 PM on the day before your next week's lab session to submit a revised version. Graded lab report should be available the following week.

Homework: Homework is typically assigned in the **Expert TA** course website. You will finish and submit your homework through **Expert TA**. *No credit will be given for late homework unless you are seriously ill and provide a written note from your physician*.

Exams: 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 (Canvas) system. **You will use the course web site to turn in your Excel spreadsheets from the in-class exercises,** 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. You can also obtain the syllabus of Physics 174, at the web site:

http://www.physics.umd.edu/academics/courses/970-physics-174-physics-laboratory-introduction.html

Course sections:

Lab sections:

Lab section	Day	Time	Instructors	Teaching Assistant	Lab Room	**Registration Code for Expert TA**
0201	Tuesday	2-3:50 PM	A. Upadhyaya	Josue Cifuentes	3115 Phys	USH22MD-1335D8-1MR
0301	Wednesday	1-2:50 PM	A. Upadhyaya	Shuyao (Cathy) Gu	3115 Phys	USH22MD-80380C-1MQ
0401	Thursday	11-12:50 PM	A. Upadhyaya	Shuyao (Cathy) Gu	3115 Phys	USH22MD-8BE0A4-1MP

Expert TA Registration Information

1. Enter the following links, based on your section number:

Section	*Class Registration Code Link
0201	http://goeta.link/USH22MD-1335D8-1MR
0301	http://goeta.link/USH22MD-80380C-1MQ
0401	http://goeta.link/USH22MD-8BE0A4-1MP

2. Complete registration and payment.

Contact Information:

    Instructor

    Dr. Arpita Upadhyaya
    Office: 1151 PSC Building
    Phone: 301-405-9939
    Email: arpitau@umd.edu

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: Josue Morales Cifuentes
    Office: 3309 Toll Physics Building, Phone: 5-0409
    Email: jmorale4@umd.edu

    Shuyao (Cathy) Gu
    Office: 3103B Toll Physics Building, Phone: 5-6189
    Email: sgu12@terpmail.umd.edu

Office Hours:

Josue Morales Cifuentes (Section 0201): Wednesday, 3 – 4 pm
Shuyao (Cathy) Gu (Section 0301, 0401): Tuesday, 3:30 – 5:30 pm

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 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 the lab is still set up).   Because the other sections are typically full, it is also very hard to do a make-up, so please do not miss your lab section.

Grading:

- 45%   Lab Spreadsheets
- 15%   Homework
- 20%   Test on spreadsheet, errors and measurements
- 20%   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 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 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: www.studenthonorcouncil.umd.edu/whatis.html

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. If a religious holiday falls on your lab session or exam day let me know as soon as possible and we will make suitable arrangements.

Week-by-week schedule:

We will skip Exercise 3 and 12. Note the dates of our two exams below in bold type.

Phys 174 - Schedule of Labs - Spring 2018

Week of:	Topic
1/22	No Labs
1/29	Exercise 1: Introduction to Excel
2/5	Exercise 2: Measurement Error and Uncertainty
2/12	Exercise 4: Straight Line Fits Using χ^2 and Excel
2/19	Exercise 5: Propagation of Errors
2/26	Exercise 6: Using χ^2 to Test a Theory
3/5	Exercise 7: Review of Spreadsheets and Errors
3/12	**Exercise 8: Exam on Spreadsheets and Errors**
3/19	Spring Break – NO LAB
3/26	Exercise 9: Resistors and Multimeters
4/2	Exercise 10: Current and Voltage
4/9	Exercise 11: The Digital Oscilloscope
4/16	Exercise 12: AC signals
4/23	Exercise 14: Review of Circuits
4/30	**Exercise 15: Exam on Circuits and Error analysis**