

Physics 276 - Experimental Physics II: Electricity and Magnetism

Prof. Eno – Spring 2015

Course information:

Experimental methods and tools related to circuits. Topics include inductance, capacitance, AC circuits, diodes, transistors, and amplifiers.

Prerequisites:

- PHYS272 (Introductory Physics: Fields)
- PHYS275 (Experimental Physics I: Mechanics and Heat)
 - ... and associated math courses

Instructor:

Prof. Sarah Eno, PSC 3109, Phone: 5-7179, e-mail: eno@umd.edu.

Office Hours:

By appointment; feel free to contact me to schedule a meeting. You are also welcome to come to my office without an appointment, however I may not be available.

Schedule:

- Section 0101: Monday 1:00pm-4:50 (PHYS 3120)
- Section 0201: Tuesday 1:00pm-4:50 (PHYS 3120)

Prof. Anlage and I will occasionally substitute for one another. You must be on time for class. If you are late, you will not be allowed to start the lab, but instead must do the lab during the make up week. Please note that you cannot pass the class unless you complete all labs.

Optional Texts:

- A Practical Guide to Data Analysis for Physical Science Students; Louis Lyons, Cambridge Press
- An Introduction to Error Analysis; J. R. Taylor, University Science Books

In addition, you should have purchased a general introductory physics textbook for your PHYS272 class. For example:

- Physics for Scientists and Engineers, by D. Giancoli, 4th Edition, Vol. 2, Pearson.

You will need to refer to this or a similar textbook occasionally.

Other material:

You will be provided with a radio on the first day of the semester. We do not have extras of most of the components, so please be careful not to break or lose them. You will be provided with a yellow storage bin for your components and works in progress. Later in the semester we will have versions of the radio that will work with your low impedance iPod earbuds. You may elect to bring earbuds to class.

Website:

The materials for this course will be on ELMS.

Course policies:

Students are required to do all of the assigned experiments. If you are not able to attend a scheduled lab section, make an arrangement in advance by writing to the instructor to see if there is a possibility to get permission to attend another lab session in the same week. Only those with a valid written excuse for missing a lab will be considered. Students are responsible for notifying the instructor within the first two weeks of the semester about projected absences due to religious observances during the semester. If a missed lab cannot be made up in the same week, it must be made up during the make-up week at the end of the semester. Late arrival or the making of phone calls during the lab is not allowed.

Course requirements:

Experiments: You will work with a partner. Your partner will be assigned, and will change each week. Students are required to submit a spreadsheet record of all that was done in the lab. The spreadsheet must be uploaded before leaving class. The spreadsheet should be used to record, plot, and analyze your data as you collect it. Keep a complete record in the spreadsheet including diagrams of measurement configurations that were used to obtain the data, the results, and the analysis used to obtain the results. For each measured number, you need to include an estimate of the uncertainty, both statistical and systematic. You should seek as much advice as you need during the lab. To get a good grade, you should ask many questions of your instructor, TA, and other class mates. (Of course, direct copying of another student's spreadsheet will result in failure of the lab and possible disciplinary action in accordance with the University's academic integrity policy).

The in-class spreadsheets will be graded out of 40 points as follows:

- +5: turn in spreadsheet
- +10: all data taken
- +5: errors assigned to all measured numbers (no partial credit)
- +10: all fits, calculations based on measured numbers, etc. done (partial credit possible)
- +5 :all errors on results of fits, calculations, etc. done (partial credit possible)
- +5: spreadsheet is neat and well labeled

Laboratory Report: You and your partner are required to submit a written report of your results for three of the experiments. The class schedule will indicate for which labs this is required. Lab reports should be submitted as a PDF file. The reports should be submitted electronically using the ELMS system (<http://elms.umd.edu/>), and will be due at the start of lab the following week. The lab report will automatically lose 5% of its maximum points per day for each day it is late. A missing lab report will cost one letter grade for the course. Missing a lab entirely and not making it up will result in failure of the course. A detailed rubric, describing the lab report requirements and how they will be graded will be linked to elms and provided in the first class.

Pre-lab Homework: Each week, you will be given a homework assignment designed to prepare you for the next lab. The homework will consist of questions or problems related to the upcoming lab and/or a short writing assignment regarding the lab. This is to be submitted online via elms and is due at least 1/2 hour prior to class

Final exam: The final exam will be based on material covered during the semester. Students are expected to take data following appropriate experimental procedures and explain the underlying physics. Knowledge of the workings of the instruments used in the lab can also be tested. Please note that the use of google or any other external resource during the exam is expressly forbidden. If you have any questions either before or during the exam as to what resources can be used, please raise your hand and ask.

Discussion: Part of a class meeting will be devoted to discussions of the physics and data analysis for the experiments. Participation in these sessions is just as important as the experiments themselves. Attendance is mandatory. However, this is not a lecture course, and the main way that you will learn experimental physics is to by doing and discussing, rather than just listening.

Presentations: Each student will give a 15 minute oral presentation relevant to AM radio and telecommunications. A list of suggested topics will be linked to the class web site. Other topics may also be chosen with permission of the instructor. The date for the presentations is given in the schedule on the class website.

The presentation should be accompanied by electronic slides in pdf format. Your slides should be uploaded on elms no later than 24 hours in advance. Topics are chosen first come, first serve, so pick a topic early for the best selection. Please email Professor Eno with your top 3 in order of preference. A detailed grading rubric will be linked to the class web site and provided the first day of class.

Grade:

- 40%: In-class Spreadsheet
- 10%: Pre-lab Homework
- 20%: Lab reports
- 15%: Presentation
- 15%: Final Exam

Laboratory Managers:

- Mr. Allen Monroe, rm 3311, John S. Toll building, 5-6002, amonroe [at] umd.edu
- Mr. Thomas Baldwin, rm 3202, John S. Toll building, 5-6004, tbald [at] umd.edu

T.A.:

TBA

Bad weather:

Winter in the Washington Metro area can bring large snowstorms that make travel dangerous. Should this happen and the University is closed as a result during a scheduled lab, class will be cancelled, and we will most likely reschedule the lab for the following week. Closing is announced over local radio/TV and the University's homepage: <http://www.umd.edu/>.

Academic Integrity:

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>.

Disabilities:

Students with documented disability should contact the instructor at the beginning of the semester to discuss accommodations.

Disclaimer:

The instructor reserves the right to make minor changes to this syllabus to meet the specific needs of the class during the semester.