

PHYSICS 276 EXPERIMENTAL PHYSICS II: ELECTRICITY AND MAGNETISM

1. INSTRUCTORS

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Graduate teaching assistants:

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2. MEETING TIME AND PLACE

Laboratory Location - Room 3120 Physics Building

Lab meeting times:

Section 0401 - Wednesday 2:00 pm - 5:50 pm

Section 0301 - Friday 12:00 pm - 3:50 pm

Other sections of this course is taught by Professor Goldenbaum:

Section 0101 - Monday 2:00 pm 5:50 pm

Section 0201 - Tuesday 2:00 pm 5:50 pm

Professor Goldenbaum and I will occasionally substitute for one another.

2.1. Arriving late to class. Classes at Maryland begin right on the hour. You must arrive on time so that you can get instructions for the lab and have time to finish. If you are more than 10 minutes late, you may not be allowed into the lab and will have to make it up during another section.

2.2. Making up missed Labs. You should make every effort not to miss your regularly scheduled lab. If you miss your regular lab section, you must make arrangements with your instructor to make it up before your next lab if possible. Otherwise, you must make up a missed lab during make-up week at the end of the semester. All labs must be completed to get a passing grade in Physics 276.

2.3. Cell Phone Policy. This class is based on participation, and during the class, your lab activity should be given your full and undivided attention. Therefore, you should not make calls or text during class.

3. TEXTBOOKS

3.1. Required:

- PHYSICS 276 Laboratory Manual, Department of Physics, University of Maryland, College Park (Wiley Custom Learning Solutions, 2010, ISBN 978-0-470-97027-5).
- An error analysis book to be used for reference, such as “An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurement”, John R. Taylor (University Science Books, 1997, ISBN 0-935702-75-X).

3.2. Additional Reference Texts.

- “A Practical Guide to Data Analysis for Physical Science Students by Louis Lyons, Cambridge University Press.
- “Data Reduction and Error Analysis for the Physical Sciences”, Phillip R. Bevington and D. Keith Robinson (McGraw Hill, Inc., 2003, ISBN 0-07-247227-8).
- “Physics for Scientists and Engineers, Volume 2” by F. Tipler, the standard physics textbook, or any equivalent text, will be useful for explaining the basic physics in the course.

4. GRADING

Grading: 60% in-class spreadsheet
10% Lab Reports
10% Presentation (talk)
20% Final Practical Exam

All experiments must be completed to pass the course.

4.1. Experiments. There are seven experiments (Lab 5 is split into two parts) as well as an introductory Lab (Experiment 0). Much of your in-class work will be carried out in Excel spreadsheets and you will need to turn in a copy of your spreadsheet at the end of each lab period. We will use the web (<http://elms.umd.edu>) to collect lab reports and post grades.

Tips for Doing Well:

- (1) Read the lab manual carefully before you go to the lab and attempt an experiment.
- (2) Use your spreadsheet to record, plot and analyze your data in class as you collect it. Keep a complete record in the spreadsheet of the experiment including diagrams of measurement configurations actually used to obtain data, your results, and the analysis used to obtain the results.
- (3) Include estimates for the uncertainties in your measurements. Include systematic errors as well as statistical errors.
- (4) When something in the lab isn't making sense or isn't working raise your hand and discuss with your instructor.
- (5) Do not leave class unless you have finished your data analysis, discussed your results with your instructor and turned in your spreadsheet
- (6) Do not forget to turn in your complete lab report by the start of the next lab when required.

4.2. Lab Reports. You are required to submit a written report of your results for two of the experiments. The reports will be submitted electronically and will be due at the start of lab the following week. Your lab report should be submitted as an MS Word or PDF file, complete with data and figures. Both lab reports must be submitted on time not to incur a penalty. You will be deducted 5% of the maximum grade points allocated a day for each day the lab report is late. You will lose an additional letter grade for the course if you fail to submit both lab reports. An outline of the requirements for the report is available on the class web site.

4.3. In-class Spreadsheets. You are required to submit the spreadsheet you create in class before leaving class. 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.

4.4. General Comments on Spreadsheets and Lab Reports. Finishing and submitting a complete spreadsheet as well as a lab report when required is very important. If you can't completely finish a lab, it is still important to turn in what you do have. When you are working on your spreadsheet or report, feel free to discuss among yourselves to

try to figure out what is going on. By all means get together in small groups and discuss. However, do not use these discussions as an excuse to copy someone else's spreadsheet or report, or let someone else copy yours. That is cheating and is strictly forbidden. It is also very self-defeating since part of your grade will come from a practical test of your knowledge of lab content and procedure. The right way to proceed is to prepare your spreadsheet before class and write up your spreadsheet or report by yourself. 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.

4.5. Late Reports. Late lab reports will be assessed a penalty of 5% per day. 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 in the course.

4.6. Discussions. 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 discussing.

4.7. Talks. Each student will give a 10 minute oral presentation on one of the Experiments. The report should be accompanied by electronic slides written in Power Point format (or equivalent) that is prepared in advance. Presentations should be on one of the Experiments from II to VII.

4.8. Lab Exam. A Practical Lab Exam will be administered at the last session of classes. It will cover the material of the experiments. Students will be expected to be able to repeat some of the experimental work and procedures they did in class as well as be able to explain the physics underlying the experiments. Knowledge of the workings of the instruments used in the lab may also be tested.

4.9. 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 students. As a student, you are responsible for upholding the highest standards of academic integrity in this course and should 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>.

4.10. In case of 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 and TV as well as on the University's homepage.

5. LABORATORY SCHEDULE

Dates	Exp # & Experiment	Reports
Sept. 7 & 12 Sept. 14 & 19	Review & Discussion & Lab 0 I Ohms Law	Spreadsheet Spreadsheet and Analysis & Full Lab Report
Sept. 21 & 26 Sept. 28 & Oct. 3	II Magnetic Fields III RC and LR Circuits with Stepped Input	Spreadsheet and Analysis Spreadsheet and Analysis
Oct. 5 & 10 Oct. 12 & 17	IV RC Circuits with AC Input V-a LRC Circuits and Resonance	Spreadsheet and Analysis Spreadsheet and Analysis & Full Lab Report after V-b
Oct. 19 & 24	V-b LRC Circuits and Resonance	Spreadsheet and Analysis & Full Lab Report for V-a & V-b
Oct. 26 & 31 Nov. 2 & 7	VI Diode VII Transistor	Spreadsheet and Analysis Spreadsheet and Analysis
Nov. 9 & 14 & 16 Nov. 28 & 30 Dec. 5 & Dec. 7	Make-up labs & Lab Exam Practice Talks Lab Exam	