

Physics 276 Syllabus
Fall 2010 - Sections 101/201
(Prof. Johnpierre Paglione)

Course Title: Experimental Physics II: *Electricity and Magnetism*

Official Course Description: *PHYS276 (PermReq) Experimental Physics II: Electricity and Magnetism; (2 credits) Grade Method: REG/P-F/AUD. Prerequisites: PHYS272 and PHYS275. Credit will be granted for only one of the following: PHYS276 or former PHYS295. Third course in the three semester introductory sequence. Methods and rationale of experimental physics. Experiments chosen from the fields of electricity and magnetism including electrostatics, magnetostatics, magnetic induction, AC circuits.*

Course Web Site: <http://www.physics.umd.edu/courses/Phys276/index.html>

ELMS Web Site: <http://www.elms.umd.edu> (uploading work)

Prerequisite: Physics 272 and Physics 275

Laboratory Location - Room 3120 Physics Building

Lab meeting times: **Section 0101** - Monday 2:00 pm - 5:50 pm (Paglione)
Section 0201 - Tuesday 2:00 pm - 5:50 pm (Paglione)
Section 0301 - Friday 12:00 pm - 3:50 pm (Orozco)

Instructor for Section 0301 (Friday section):

Prof. Johnpierre Paglione
Office: Room 1367 Physics Building (CNAM wing)
email: paglione@umd.edu
Phone: 301-405-7115

Office Hours: please make an appointment by email.

Teaching Assistant: to be determined

About the course: Physics 276 is the third class in the Physics 174 - Physics 275 - Physics 276 introductory Physics laboratory sequence. It is intended primarily for physics majors, but with permission is open to all science and engineering students. The experiments involve phenomena in electricity and magnetism, including ac and dc electrical circuits and electromagnetic fields. A major component of this course is to see that you develop skills in record keeping and scientific writing. In addition, the experiments are constructed to improve your understanding of data analysis and error analysis, beyond what you have already learned in Physics 174 and 275. The Lab meets for four hours each week in Room 3120 of the Physics Building. Roughly three hours of this time will be spent working on the lab and one hour in discussion. At the end of each lab period, you must turn in a spreadsheet with your data and analysis. A complete written lab report is due one week later, at the start of the next week's lab.

Required Texts:

- Physics 276 Laboratory Manual, Fall 2010 Edition, Department of Physics, University of Maryland, Wiley Custom Services.

- *"An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurement"*, John R. Taylor (University Science Books, 1997, ISBN 0-935702-75-X).

Recommended Texts:

- *"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).
- The standard Physics 272 textbook, *"Physics for Scientists and Engineers, Volume 2"* by F. Tipler, or any equivalent text, will be useful for explaining the basic physics in the course.

Preliminary Schedule:

Dates (101/201)	Exp#	experiment
Sept. 13/14	0	Intro, error analysis and oscilloscope review
Sept. 20/21	1	Ohm's Law
Sept. 27/28	--	NO CLASS
Oct. 4/5	2	Magnetic fields due to currents
Oct. 11/12	3	RC and LR circuits with stepped input
Oct. 18/19	4	RC circuits with AC Input
Oct. 25/26	5-1	LRC circuits and resonance (sine wave)
Nov. 1/2	5-2	LRC circuits and resonance (square wave)
Nov. 8/9	--	NO CLASS
Nov. 15/16	6	Diode and rectifier circuits
Nov. 22/23	7	Transistors
Nov. 29/30	--	REVIEW (for exam)
Dec.6/7	--	FINAL EXAM (in class)

IMPORTANT NOTE: The first days that sections 101/201 meet are **Monday, Sept. 13 (101)** and **Tuesday, Sept.14 (201)**. An introduction will be given, followed by error analysis and oscilloscope exercises.

Grading: **35 % In-Class Spreadsheet**
 50 % Lab Reports
 15 % Final Practical Exam

NOTE: All experiments must be completed to pass the course!

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.

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 or TA to complete the lab before your next lab.

Experiments: There are seven experiments (with Lab 6 split into two parts). Much of your in-class work will be carried out in *Excel* spreadsheets and you will need to upload your spreadsheet

at the end of each lab period. It is not required, but you are strongly encouraged to use a lab notebook to keep a record of your work – **this will be extremely useful when you are writing up formal reports which require you to list equipment information, circuit configurations, etc.** Some experiments require you to work with a lab partner, and for these experiments you will need to identify your lab partner on your submissions. We will use the web 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) During class, keep a complete record in your lab notebook of the experiment including diagrams of measurement configurations actually used to obtain data, your results, and the analysis used to obtain the results.
- (3) Use your spreadsheet to record, plot and analyze your data **in class as you collect it**.
- (4) Include estimates for the uncertainties in your measurements. Include systematic errors as well as statistical errors.
- (5) When something in the lab isn't making sense or isn't working raise your hand and discuss with your instructor.
- (6) Do not leave class unless you have finished your data analysis, discussed your results with your instructor and turned in your spreadsheet
- (7) Do not forget to turn in your complete lab report by the start of the next lab.

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 20 points as follows:

Lab spreadsheet submitted/uploaded	5
all necessary data taken and recorded	2
errors assigned to all measured numbers (no partial credit)	2
all fits and calculations done (partial credit possible)	7
all error calculations on results done (partial credit possible)	2
spreadsheet neat and well-labeled	2
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TOTAL	20

Lab Reports: You are required to submit a written report of your results for each experiment. The reports will be submitted electronically using Blackboard ELMS system and will be due at the start of lab the following week. Instructions on format and expectations for lab reports as well as an example report can be found on ELMS – **follow this info carefully!!!** Your lab report should be submitted as an **DOC or PDF file**, complete with embedded data and figures. An outline of the requirements for the report is given in the lab manual. **If you had a lab partner for the experiment, you must identify your lab partner on your report.**

General Comments on Lab reports: Finishing all the lab reports 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 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 report, or let someone else copy yours. That is cheating and is strictly forbidden. It is also very self-defeating since the other part of your grade will come from tests. The right way to proceed is to first work through all the analysis and write up your 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.

Late Reports: Late lab reports will be assessed a penalty of 5% (5 points out 100) per day.

Discussions: Some class meetings will mainly 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, therefore 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.

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>.

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](#).