

## PHYS 241 Laboratory Schedule Spring, 2012

<u>Wed.</u>	<u>Fri.</u>	
1/18/12	1/20/12	EM-1 Electric Field Mapping
1/25/12	1/27/12	EM-2 Current as a Flow of Charge
2/1/12	2/3/12	EM-5 Introduction to the Oscilloscope
2/8/12	2/10/12	EM-3B Capacitors (with Computer Analysis)
2/15/12	2/17/12	EM-4 Ohm's Law
2/22/12	2/24/12	EM-6 Wheatstone Bridge
2/29/12	3/2/12	EM-8 Kirchhoff's Laws
3/7/12	3/9/12	<i>Spring Vacation</i> (College closed)
3/14/12	3/16/12	EM-10 Magnetic Effect of an Electric Current
3/21/12	3/23/12	EM-11B Induced Voltage (with Computer Analysis)
3/28/12	3/30/12	EM-12 Capacitive and Inductive Reactance
4/4/12	4/6/12	LO-2 Index of Refraction
4/11/12	4/13/12	LO-3 Image Formation by Lenses
4/18/12	4/20/12	LO-5 The Diffraction Grating
4/25/12	4/27/12	Make-Up

All the above laboratory sessions meet in room W4-23.

Make-up labs may be scheduled during the semester. To schedule a make-up lab, see Mr. Walton or a laboratory assistant in W4-23B. You are permitted no more than two make-up labs.



## PHYS 241-5 Laboratory

9:05 AM to 11:05 AM Fridays

Spring semester, 2012

Instructor: Dr. Cattell

Office: W4-33

Everyone enrolled in Physics 241 is required to be registered for a section of the Physics 241 laboratory, which meets once a week. The schedule of laboratory experiments will be given to you on a separate page.

You should have a copy of the Physics Laboratory Instructions, Volume II. You should read the Purpose and Theory sections of the instructions for the experiment that you are going to do *before* coming to the lab.

### Attendance

Sign the sheet attached to the front laboratory table when you first enter the lab. Attendance will be taken at the beginning of each laboratory period. You should arrive by the scheduled starting time when attendance is taken. After the attendance is taken, the nature of the experiment and use of the equipment is discussed. Special instructions may also be given at this time. It is important that you do not come in late.

### Missed Labs

If you miss a laboratory session you are required to make it up. See Mr. Walton in W4-23B to make an appointment. If you do not make up a missed laboratory session, your laboratory report grade for that session will be a zero. *Note that the deadline for handing in a laboratory report is the same regardless of whether or not the experiment is made up (see below). You are permitted a maximum of two make-up labs.*

### Laboratory Reports

Laboratory reports are due one week after the class does the experiment. For example, the laboratory report for the lab scheduled on Friday, January 20, is due at the beginning of the laboratory session on Friday, January 27.

Laboratory reports are graded on a scale from 0 to 10. Usually, each report will be returned one week after it is turned in. *Note that your lab report average must be at least 60 points out of 100 to pass the course.*

You must follow the Laboratory Report Format, which will be handed out to you. In particular, make sure you follow the *order of sections* specified in the Laboratory Report Format.

State the Purpose of the experiment using your own words. The Procedure section may just refer to the procedure as listed in Volume II of the Physics Laboratory Instructions. Give a reference to the lab manual as you would in a bibliography. Any deviations from the procedure, however, must be explained.

The Purpose, Procedure, Answers to Questions and Analysis and Discussion sections must be typed using a word processor. (Among these sections, each one that is untyped will have ¼ point deducted.) If any of these sections require diagrams, special symbols or formulas you must create these on a computer. You may type the Calculations section as well, if you wish. (Note that to type equations and calculations in a word processor you should use an equation editor.

Your instructor can show you how to do this using Microsoft Word. Example:  $E = \frac{\sigma}{2\epsilon_0} \left( 1 - \frac{z}{\sqrt{z^2 + R^2}} \right)$

### Late Reports

1-7 days late: 1 point deducted (for example, a report which would have had a grade of 8 becomes a 7.)  
8-14 days late: 2 points deducted. **After 14 days the report will not be accepted; it counts as a zero.**

*You are permitted a maximum of three late lab reports.*

$$\% \text{ Error} = \frac{\text{Measured Value} - \text{Accepted Value}}{\text{Accepted Value}} \times 100\%$$

Use the % Error to compare the value of a physical quantity measured in the physics lab with an accepted value which was more accurately determined. % Error measures *accuracy*.

$$\% \text{ Difference} = \frac{|\text{First Value} - \text{Second Value}|}{\left( \frac{\text{First Value} + \text{Second Value}}{2} \right)} \times 100\%$$

Use the % Difference to compare two values of a physical quantity measured in the physics lab using equipment with comparable accuracy. Also use this when comparing a measured value with an estimated value.

% Difference measures *precision*, that is, how close two values are to one another.

## PHYSICS LABORATORY REPORT FORMAT

- Title Page:** Use the form provided.
- Purpose:** A statement of the general physical principle being studied and any particular results to be obtained.
- Procedure:** A paragraph that briefly describes the apparatus, how it was used to obtain the measurements given in your lab report and how the data will be used to verify the theory. Include a formal reference to the procedure section of the original laboratory instructions and state here any deviations from that procedure.
- Data Sheets:** Use the laboratory data sheet provided unless otherwise directed by the laboratory instructor. The data sheet normally includes experimental data, the principal numerical results, and the percent error.
- Graphs and Diagrams:** (If any)
- Calculations:** Show calculations in a neat, orderly outlined form.  
Show formulas, substitutions, and results; but do not include the details of longhand multiplication and division. Where the same types of calculations are repeated many times, only sample calculations need be included in the report.
- Answers to Questions:** Answer all questions in complete, grammatically correct sentences.
- Analysis and Discussion of Results:** All paragraphs must be double spaced.  
Discuss the accuracy of results obtained. Identify possible sources of error. Discuss the experimental results in relation to accepted principles; were these theories verified by the experiment?  
Discuss results obtained with respect to the *stated* purpose of the experiment. Do you have any recommendations for modifications in the equipment or procedure?
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### **Notes:**

1. Assemble report using a staple in the upper left corner.
2. Lab partners may work together on calculation, graphs, and diagrams. Photocopies of these items are not permissible unless stated otherwise by the laboratory instructor. Each individual must turn in a complete report. No student should copy data from anyone who is not his or her lab partner.
3. Each student should write the verbal portions of the report in their own words. Students should not copy these portions of the report from their lab partner or anyone else.

## **PHYSICS LABORATORY REGULATIONS**

1. No smoking and no consumption of food or beverages is permitted in the physics laboratory.
2. Every student taking a physics course with a laboratory is required to attend the laboratory. No student may turn in a laboratory report based on laboratory data taken at a laboratory session from which he or she was absent. Before leaving the student should have the laboratory instructor sign the data sheet as proof that the student attended the laboratory.
3. No student may leave before the end of the period unless: (a) the student has taken all necessary experimental data, (b) the student has completed all calculations called for by the laboratory instructor and (c) the student has allowed laboratory partners to copy down any experimental data they need from the student's data sheet.
4. A laboratory report is required for each experiment in accordance with the format specified on the other side of this paper, unless otherwise directed by the laboratory instructor. The laboratory report is due at the beginning of the laboratory period a week after the experiment was originally scheduled. The instructor is expected to return graded laboratory reports at the laboratory period one week after the due date for those reports received on time.
5. There is a two-week time limit for turning in laboratory reports after the due date. No laboratory reports will be accepted after this two-week time limit. The laboratory instructor determines late penalties.
6. A student who is absent from the laboratory for an excusable reason should perform the experiment as soon as possible at a makeup lab period. See the instructional aide or lab assistant to make an appointment. No more than two makeup labs are permitted. The student should sign the data sheet and ask the instructional aide or lab assistant to sign the data sheet after all experimental data is filled in. In the case of an excusable absence, the report is due one week after the original scheduled date of the experiment, but the laboratory instructor may grant extension under exceptional circumstances.
7. A student who does not have a grade of at least 60% in the laboratory component of a Physics or Engineering course shall be assigned an F grade, even if the student's overall average is passing.

## **Instructions for the Submission of Laboratory Reports by Email**

1. The following instructions refer to Microsoft Office programs. If you are not using Microsoft Office programs (Word, Excel, etc.) you may use similar programs that are on your computer and save your report in Adobe's Portable Document (.pdf) format.
2. All sections must be typed, including the calculations section. Formulas should be created with an equation editor.
3. All drawings must be computer generated. Printed diagrams and graphs may be scanned and the resulting file pasted into a Word document. However, if the graph or diagram was originally on a computer, a screen capture is usually possible so that the graph or diagram can be pasted directly into a Word document without scanning. See your instructor for help with this.
4. Data sheets with the Instructor's initials may be scanned. However, the instructor can, at your request, provide you with a computer version of the data sheet that you can fill in using a computer. (Alternatively, you may use Excel to create a reasonable facsimile.)
5. Try to keep the size of scanned items to a minimum by scanning in lower resolutions, with fewer colors, in gray scale or in line art. (The document, however, must still be legible and presentable.) See the Instructor if you need help with this.
6. All other requirements as outlined in the Laboratory Report Format, such as the order of sections and content, must be followed.
7. The lab report that you submit by email must be COMPLETE and in a SINGLE FILE.
8. Laboratory reports that are submitted electronically must be received by the Instructor by 11:00 PM on the due date. Once received, the Instructor will acknowledge with an email reply that you should save in case there is a question.
9. You may resubmit your lab report by email as many times as you wish BEFORE 11:00 PM on the due date. A lab report submitted after this deadline is late and only ONE late submission will be accepted.



**Declaration of Receipt of the Physics 241-5 Lab Handouts**  
Spring, 2012

I, the undersigned student, attest that I received the following documents from the laboratory instructor, Dr. David Cattell, for Physics 241 lab section 005 at Community College of Philadelphia for the Spring 2012 semester:

- Physics 241 Spring 2012 Laboratory Schedule.
- A document titled “Physics 241-5 Laboratory” which explains policies relating to attendance, missed labs, laboratory reports and late penalties. This document also has formulas for percent error and percent difference on the reverse side.
- A document titled “Physics Laboratory Report Format” which describes the required content and order of the laboratory report and physics laboratory regulations.
- A sample laboratory report that provides an example of how reports are to be organized and presented.
- A document titled “Instructions for the Submission of Laboratory Reports by Email” that explains how laboratory reports are to be prepared for transmission by email.

I also attest that I understand the contents of these documents and agree to abide by any policies they describe.

Name (printed) \_\_\_\_\_ Signature \_\_\_\_\_

ID Number \_\_\_\_\_ Email \_\_\_\_\_ Date \_\_\_\_\_



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