

Classical Physics Laboratory II - Spring 2006

173.116

Monday 6:00 pm to 8:50 pm

Lab Instructor:	George Bruhn	Office:	450 Bloomberg
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Course Description and Objectives

The Classical Physics Laboratory is designed to give students a background in experimental techniques and to reinforce instruction in physical principles in the companion courses. Materials are chosen from both physical and biological sciences. These techniques and principles are quite general and applicable to aspects of all sciences.

This is a one-credit hour class that meets at least once a week for about three hours. Each meeting of the class focuses on a particular experiment described in the lab manual, *Laboratory Experiments in Physics II*. Each experiment is designed to incorporate a new lesson on measurement, data, error, or graphical analysis in addition to illustrating a physical principle of the companion courses. The ordering of the experiments broadly follows the progress in the Classical Physics Lecture course 171.106.

Experiment descriptions in *Laboratory Experiments in Physics II* are not meant to be recipes for performing an experiment, but guidelines. That is, goals for each project are normally spelled out, but decisions regarding the specific procedures to be followed to attain these goals often must be made by the student and his or her partner, under the guidance of the lab instructor.

Adequate preparation before class is therefore the key to success in the laboratory. This preparation has three components: *studying* the project description in the lab manual and the relevant sections in the companion course textbook (referenced in the project description); *doing the problems* in the lab manual and other problems assigned by the lab instructor; and bringing to class the problem solutions and a *concise write-up* of the objectives for the project and a tentative procedure to be followed.

Location: 165 Bloomberg Center, Room B, C, D.

Required Books:

1. *Laboratory Manual Classical Physics II*, Spring 2006 (available at Printing Services in Wyman Park Building)
2. *Lab Report Notebook II* Spring 2006 (available at Printing Services in Wyman Park Building)

Recommended Book:

1. *An Introduction to Error Analysis* by John R. Taylor (available at Bookstore)

Number of Experiments for the semester: 11

Web page: http://www.pha.jhu.edu/courses/2006_spring/173_116/

Course Policies

1. Each student, paired with a lab partner, is assigned to one section under the supervision of one lab instructor with lab hours occurring in one of the four time periods each week. This assignment can be changed during the course of the semester by the lab instructor.
2. You are required to have read the required material and completed any problems associated with that experiment before coming to the lab.
3. The lab will be closed at 11:50 a.m., 3:50 pm or 8:50 pm, depending upon the lab session. Before leaving the lab, make sure you know what experiment you will do next week and that you have the material necessary to prepare yourself. Please leave all the equipment in proper order before you leave the lab.
4. If there are any pre-lab problems for a lab, then they should be handed in at the beginning of the lab period.
5. Each experiment must be performed with your lab partner within the assigned section in the designated time period. *All activities of the experiment, data taking, analysis, and writing the lab report are to be completed during the three-hour period.*
6. Each student is required to write an individual lab report in the lab notebook, although the two lab partners may share the same data of measurements.
7. Your instructor must *sign and date with time* your lab report for that period before you leave.
8. The lab notebooks are *not* to be taken out of the Classical Physics Lab. They remain in Bloomberg 165 or in the instructor's office to be graded by the instructor.
9. The experiment for a particular week may not be in synchronization with the lecture part of Classical Physics. If the subject matter has not been covered by the lectures, the student should read the Classical Physics lecture class textbook to gain the necessary knowledge.

10. **Grading policy:** Each lab will be graded according to a four and half point scale:

Points	Description
4.5	Student's work exceeds expectations (something extra is added)
4.0	Student demonstrates mastery of material
3.0	Not perfect, but student mostly understands what he//she is doing
2.0	Student didn't understand some important things
1.0	Student demonstrates that he/she doesn't understand the material
0.0	Student did not show up or attempt anything

11. **Final grade:** 100% of the grade will be based upon the best 9 of 11 labs.

12. Each student must have an e-mail address to be given to your lab instructor. You *must* check your e-mail messages frequently to receive additional information about this course and your section.

13. Each student is responsible for performing all laboratory experiments at the scheduled times. In case of absence, the student may arrange with his or her lab instructor to make up a missed laboratory experiment. When possible, this make-up session is to be arranged in advance of the absence. An appointment with your lab instructor is required to do a make up lab at the end of the summer session.

14. Food and drinks are not allowed into the laboratory. No Lap-top or student's personal computers are allowed in the lab, unless it is used as assisting device for disabled students. Cell phones should be switched off when you enter the lab.

15. Registration for this course is handled by the Registrar's Office. If you want to add/drop or change sections please do not contact your instructor or the laboratory staff. Please do not contact the physics department office for dropping/adding or section changes. They will not be able to help you.

16. Please see the lab supervisor Mr. Ramesh for more information about the lab instrumentation and any concerns about the lab instructor. Please do not approach the Physics Department's office for any issues related to the lab.

17. Any issues about the lab grading should be first discussed with your lab instructor. If you are not able to resolve it with you instructor, contact the Head TA. If you are still not satisfied, then you should contact your lab professor, Professor M. Swartz. The lab professor's decision is the final decision regarding lab grades. Please do not approach the Dean's Office or the Registrar's Office with issues related to grading of the lab. (*Head TA*: George Bruhn, *e-mail*: gbruhn@pha.jhu.edu *Professor*: Dr. M. Swartz. *e-mail*: morris@pha.jhu.edu)
18. Any student with a disability is urged to see the lab supervisor early in the semester to make necessary arrangements to support a successful learning experience. The student should also have an official letter from the office of disability services, which requests the special arrangement for that student.
19. If a student is registered in a particular section, the student should attend only that section. If the student does not attend that section and consistently attends a different section, the grades of the student will be docked by one full point at the end of semester. (Once in a while a student is permitted to attend another section for making up a missed lab)

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. Report any violations you witness to the instructor. You may consult the associate dean of students and/or the chairman of the Ethics Board beforehand. See the guide on "Academic Ethics for Undergraduates" and the Ethics Board web site (<http://ethics.jhu.edu>) for more information.

Classical Physics Lab 173.116 Spring 2006 Meeting Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
January 30 Introduction <i>First Day of Classes</i>	Jan 31 Introduction	Feb 1 Introduction	Feb 2 Introduction	Feb 3
Feb 6 Experiment 21	Feb 7 Experiment 21	Feb 8 Experiment 21	Feb 9 Experiment 21	Feb 10
Feb 13 Experiment 22	Sept 14 Experiment 22	Sept 15 Experiment 22	Sept 16 Experiment 22	Sept 17
Feb 20 Experiment 24	Feb 21 Experiment 24	Feb 22 Experiment 24	Feb 23 Experiment 24	Feb 24
Feb 27 Experiment 25	Feb 28 Experiment 25	March 1 Experiment 25	Mar 2 Experiment 25	Mar 3
Mar 6 Experiment 27	Mar 7 Experiment 27	Mar 8 Experiment 27	Mar 9 Experiment 27	Mar 10
Mar 13 Experiment 32	Mar 14 Experiment 32	Mar 15 Experiment 32	Mar 16 Experiment 32	Mar 17
Mar 20 <i>Spring Break</i>	Mar 21 <i>Spring Break</i>	Mar 22 <i>Spring Break</i>	Mar 23 <i>Spring Break</i>	Mar 24 <i>Spring Break</i>
Mar 27 Experiment 33	Mar 28 Experiment 33	Mar 29 Experiment 33	Mar 20 Experiment 33	Mar 31
April 3 Experiment 28	Apr 4 Experiment 28	Apr 5 Experiment 28	Apr 6 Experiment 28	Apr 7
Apr 10 Experiment 23	Apr 11 Experiment 23	Apr 12 Experiment 23	Apr 13 Experiment 23	Apr 14
Apr 17 Experiment 29	Apr 18 Experiment 29	Apr 19 Experiment 29	Apr 20 Experiment 29	Apr 21
Apr 24 Experiment 34	Apr 25 Experiment 34	Apr 26 Experiment 34	Apr 27 Experiment 34	Apr 28
May 1	May 2	May 3	May 4	May 5 <i>Last Day of Classes</i>

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Spring 2006 Experiment Schedule and Meeting Rooms

On the first day of lab, your section will meet in Room B. If the same equipment is set up in all the three rooms, your section will meet in Room B

Exp #	Experiment Title	Room
	Introduction: Short lecture on error analysis and graphing (No exp)	B, C, D
21	Oscilloscope Basics	B, C, D
22	What is the Electric Field of a Point Charge?	B
23	Detection of Gamma Rays: The Inverse Square Relationship	B
24	What is the Mass of an Electron?	C
25	The Parallel Plate Capacitor?	D
27	DC Circuits and Ohm's Law	B, C, D
28	Alternating Current Circuits	B, C, D
29	Oscilloscope: Rectification with Diodes	C
32	Geometric Optics	B, C, D
33	Diffraction by Biological specimens	B, C, D
34	The Grating Spectrometer	D

GENERAL GUIDELINES FOR LAB WRITE-UPS

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Follow the instructions given in your Lab Report Notebook and the instructions provided by your lab instructor. The following information may assist you in presenting a good lab write-up.

Title Section:

This section should include the title of the lab, the date, your partner's name, and the lab bench number.

Data:

All data collected during the lab should be clearly presented in a table format when appropriate. Use Microsoft Excel to create the tables. Label the columns, and provide units and error estimates for all of your measurements. When appropriate, include graphs in this section (refer to the section on Experimental Fundamentals II in your lab manual). Consult the lab manual or follow the lab instructor's instructions, for printing out the table. If a table is printed out, cut it neatly and attach it to your lab notebook using scotch tape or glue.

Analysis and Conclusion:

This section describes your final results. Show the equations used to obtain the final information, and if required provide error analysis. Compare your experimental values to the expected results or standard values, when appropriate. This section should include descriptions explaining what the values mean in the context of the experiment. Only some labs may require an Analysis and/or Conclusion.

Questions:

Answer the questions to the point. Be brief and precise. Do not give generalized answers such as "human error" or "computer mistake." Answers should have a scientific explanation

Signature of Your Lab Instructor

Have your lab instructor sign your lab report, with the date and time of its completion.