

General Physics Laboratory II - Spring 2012

173.112 Section ##

xxxxday #:## pm to #:## pm

Lab Instructor:

Office:

Bloomberg

Phone:

6-

Office Hours:

e-mail:

@pha.jhu.edu

Course Description and Objectives

The General 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 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, which is electronically available on *Blackboard*. 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.

Experiment descriptions in *Blackboard* 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. Rather than passively following directions to get through the experiment, you will spend much of the semester engaged in experimental design. In addition to reinforcing the physics concepts, this will give you skills that you can transfer to your major, such as critical thinking and problem solving skills. It will also help you to learn how to identify what data is important, how to collect that data, and then draw conclusions from it. After you finish the lab, you will submit your report online through *Blackboard*. At the end of the lab period, there will either be a short class discussion of everyone's results, or group presentations where you share anything interesting you found, with the class.

Adequate preparation before class is therefore the key to success in the laboratory. This preparation has two components: *studying* the project description in the online lab manual and the relevant sections in the companion course textbook (referenced in the project description).

The lab redesign has also allowed us to implement environmentally sustainable practices in the GPL. We are switching to paperless laboratory: all labs will be available online and all reports submitted online. This will save *several hundred thousand* sheets of paper a year. We also will be asking students to bring their own laptops to use for the experiments (if you do not have one, you may borrow one). This will greatly reduce the amount of electronic waste the labs produce. We will also be switching to more energy efficient monitors. Why have monitors if you will be using laptops? The monitors, which will be mounted on the wall, will allow your TA to walk around and quickly grasp what each group is doing, so that if a group has an interesting result or question it can easily be shared with the class.

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

Laboratory Manual:

Available online through JHU Blackboard website

<https://blackboard.jhu.edu/webapps/login/jhu/> (Login and click on the course link)

Recommended Book:

1. *An Introduction to Error Analysis* by John R. Taylor

Number of Experiments for the semester: 10

Web page: <https://blackboard.jhu.edu/webapps/login/jhu/>

Course Policies

1. Each student, paired with a lab partner, is assigned to one section under the supervision of one lab instructor. This assignment can be changed during the course of the semester by the lab instructor.
2. You should read the required material, in the online lab manual, associated with that day's experiment before coming to the lab.
3. The lab will be closed at 11:50 am, 4:20 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. Please remove all your personal belongings and laptop before leaving the lab.
4. Each experiment must be performed 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 within two-hours and fifty minutes.* There is no work required outside of the lab period, other than reading up on the concepts to be covered in lab that week.

5. **Managing Your Time:** Since there is a lot to do, it is very important to keep to a schedule. The lab handouts suggest a time plan (which in some cases needs to be strictly adhered to). It will help a lot if you focus on your goals and tasks in the lab and don't waste time. If you take a lot of time on irrelevancies you may have trouble finishing. You need to document what you are doing in a lab write-up as you perform the experiment.
6. Each student is required to submit an individual lab report through *Blackboard*, although the two lab partners may share the same data of measurements.
7. The experiment for a particular week may not be in synchronization with the lecture part of General Physics. If the subject matter has not been covered by the lectures, the student should read the General Physics lecture class textbook to gain the necessary knowledge.
10. 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.
11. 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 or the lab supervisor 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 or supervisor is required to do a make up lab at the end of the session. (Please complete the make up labs during the course of the semester. Do not wait till the end of the semester. Only one make-up lab is permitted during the last week of classes)
12. Food and drinks are not allowed into the laboratory. Cell phones should be switched off when you enter the lab.
13. 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, professor 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.
14. Please see the lab supervisor Mr. Ramesh (*e-mail*: ramesh@pha.jhu.edu, *Phone*: 6-4591) for more information about the lab instrumentation, scheduling make-up labs and any concerns about the lab instructor. Please do not approach the Physics Department's office for any issues related to the lab.
15. Any issues about the lab grading should be first discussed with your lab instructor. If you are not able to resolve it with your 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*: Gary Johns, *e-mail*: gjohns@pha.jhu.edu, *Professor*: Dr. M. Swartz. *e-mail*: morris@pha.jhu.edu)

16. 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.
17. 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 the semester. (Once in a while a student is permitted to attend another section for making up a missed lab)

Grading

The emphasis in this course is not just on getting the right answer; rather, it is on the scientific process: can you identify the data you need to answer a question, design an experiment to collect that data, and then interpret that data. In this sense, your errors will not be propagated through the lab. Your experimental design will be graded separately from your data analysis, and both will be graded separately from your conclusions. For example, if your design is flawed, but you collected data properly, analyzed it properly, and then drew conclusions from it that were appropriate for the data, you will only lose points for the flawed design because that is where your error was.

Final Grade

One lowest grade will be dropped. The cumulative of all other experiment/activity grades will be taken into account and the Course Professor will provide you with a letter grade at the end of the semester.

General Physics Lab 173.112 Spring 2012 Meeting Calendar

Monday	Tuesday	Wednesday	Thursday	Friday
January 30 <i>First Day of Classes</i>	Jan 31 <i>No Labs</i>	February 1 <i>No Labs</i>	Feb 2 <i>No Labs</i>	Feb 3
Feb 6 Introduction	Feb 7 Introduction	Feb 8 Introduction	Feb 9 Introduction	Feb 10
Feb 13 Experiment 1	Feb 14 Experiment 1	Feb 15 Experiment 1	Feb 16 Experiment 1	Feb 17
Feb 20 Experiment 2	Feb 21 Experiment 2	Feb 22 Experiment 2	Feb 23 Experiment 2	Feb 24
Feb 27 Experiment 3	Feb 28 Experiment 3	Feb 29 Experiment 3	March 1 Experiment 3	Mar 2
Mar 5 Experiment 5	Mar 6 Experiment 5	Mar 7 Experiment 5	Mar 8 Experiment 5	Mar 9
Mar 12 Experiment 4	Mar 13 Experiment 4	Mar 14 Experiment 4	Mar 15 Experiment 4	Mar 16
Mar 19 <i>Spring Break</i>	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 26 Experiment 6	Mar 27 Experiment 6	Mar 28 Experiment 6	Mar 29 Experiment 6	Mar 30
April 2 Experiment 8	Apr 3 Experiment 8	Mar 4 Experiment 8	April 5 Experiment 8	Apr 6
Apr 9 Experiment 9	Apr 10 Experiment 9	Apr 11 Experiment 9	Apr 12 Experiment 9	Apr 13
Apr 16 Experiment 10	Apr 17 Experiment 10	Apr 18 Experiment 10	Apr 19 Experiment 10	Apr 20
Apr 23 Experiment 11	Apr 24 Experiment 11	Apr 25 Experiment 11	Apr 26 Experiment 11	Apr 27
April 30 Make Up Lab	May 1 Make Up Lab	May 2 Make Up Lab	May 3 Make Up Lab	May 4 <i>Last Day of Classes</i>

General Physics Lab 173.112 Spring 2012 Experiment Schedule

All the experiments will be set up in 165 Bloomberg – Rooms B, C and D.

Exp #	Experiment Title
	Introduction – Software Installation, Error Analysis, Excel, etc.
1	Shocked! The Nature of Charge
2	Visualizing the Electric Field
3	Distance Dependence of Radiation
4	D.C. Circuits: Ohm's Law and Kirchhoff's Law
5	What Factors affect a Path's Resistance?
6	Charge to Mass Ratio of the Electron
8	Making a Transformer
9	AC Circuits
10	Geometric Optics: Making a Telescope
11	Diffraction by Biological Specimens

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 lab data, 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.