

Instructor:

Dr. Howard L. Richards E-mail: Howard.Richards@Marshall.edu
 Office: Science 105 Phone: (304) 696-6466
 Instructor's Schedule (including office hours*):

	Tuesday	Wednesday	Thursday
9:00	Office Hours	PHY 202	Office Hours
10:00			
11:00	PHY 201	Office Hours	PHY 201
12:00			
12:15	Lunch		
1:00	PHY 202	PHY 202	Office Hours
2:00			PHY 101L
3:00	Office Hours	Office Hours	Office Hours
4:00			
5:00	PHY 202		
6:00			

Textbook:

Physics 202 Laboratory Manual, by Elwyn Bellis.

Catalog Description:

202-204 General Physics Laboratory. 1 hr. I, II, S.

Required of all students taking Physics 201-203, unless exempt by special permission. (For 202: CR: PHY 201 or PHY 211. For 204: CR: PHY 203 or PHY 213.)

Grades:

60% Laboratory Report Average	A = 90+
	B = 80-90-
20% Exam 1	C = 70-80-
20% Exam 2	D = 60-70-

Students who fail both exams will fail the class. This is departmental policy.

General Description:

These laboratory exercises accompany the lecture course PHY 201 and cover similar material: mechanics, wave motion, and heat. However, the pace of 202 will generally be different from that of 201, so labs may involve material that has not yet been discussed in the lecture section. **It is important that students read the lab manual and the corresponding sections of the 201 textbook before coming to lab.** The instructor retains the right to give a short (~5 minute) quiz at the beginning of any lab to test whether students are reading the lab manual. If the quiz is given, it will count for 25% of the lab report grade for that lab. Students should also consult their PHY 201 or 211 textbooks for more detailed coverage of the same topics.

* Office hours are subject to change, with notice given in class. The instructor will make a serious effort to be in his office during office hours, but circumstances will sometimes require him to be elsewhere. **Students are strongly urged to make appointments in advance when possible.**

Most labs use a computer and interface apparatus to collect and display data. The computer programs will often plot graphs and display results. Often you are to make predictions, draw your own graphs and then have the computer plot the results to compare with your predictions. You must work through each exercise, make predictions when asked, and complete all lab requirements. Please log in as soon as you arrive in class; it takes some time for the computers to boot and load the programs.

You should cooperate closely with your lab partners. (Normally, three persons to a table.) In many cases you will make predictions based upon a consensus on what is the best prediction. You will need to work steadily for the full lab period if you expect to complete your required lab work. Each student at a table is expected to contribute to all parts of each experiment. Your lab partners' names must be on the first page of the report under your name. Use full names for yourself and your lab partners – not first names or nicknames. (Put LP: in front of each partner's name.) **For “date”, write the time and day of the week when your section meets.**

Students are to work on the lab report during the lab period and have all **measurements** and **observations** finished by the end of the period. **Do not write out lengthy answers until you have finished collecting data; you can flesh out your report outside of lab.** You must have the report initialed. Your report should include all lab manual pages on which data is entered, calculations done, questions answered, etc. Any relevant graphs must be included. Every member of the group must have their own copies of these graphs. Answer all questions in the report.

The discussion or conclusion for every experiment should consist of two paragraphs. The first should make a statement about **what was achieved by doing the experiment. Be specific, discuss numbers and graphs** and how they prove, or do not prove, the object of the experiment. **If you are getting poor marks on your conclusion, it is probably because you are not being specific enough.**

The second paragraph must discuss **errors and uncertainties**. Identify the type of error: is it qualitative or quantitative, due to finite statistics or due to finite instrument precision? Be quantitative whenever possible, and use error propagation (see the appendix to the lab manual) to find the uncertainties in your final results.

Both paragraphs must be typed or word-processed. Handwritten paragraphs will not be accepted.

Students are encouraged to work together on lab reports, but each student must understand all calculations and analyses, just as they must understand how to make each measurement when performing the experiment. Each student must write his/her own paragraphs both before and after the experiment.

Each lab report will be graded on a 10 point maximum basis. **The completed reports are to be stapled and turned in at the immediate beginning of the next lab class. You are not permitted to work on last week's report or homework in lab.** Any report/homework more than 20 minutes late it will be penalized 20%. An unexcused absence results in a zero for the that lab, but the previous week's report may be turned in within 24 hours at a penalty of 20%. **The lowest lab report will be dropped from the average.**

Learning Objectives:

<u>Learning Objective: Students will be able to ...</u>	Evaluated by	
	<u>Lab Reports</u>	<u>Exams</u>
Use standard laboratory equipment to accurately measure mechanical, sonic, and thermal quantities	X	
Apply experimental measurements to test the relations between physical quantities	X	
Identify physical quantities that are presented in graphical form, use graphical methods to solve problems, and present physical answers in graphical form	X	X
Distinguish physical quantities which are probably relevant to a given experiment from ones which are probably irrelevant	X	X
Distinguish the trend from noise in experimental data	X	X
Identify sources of measurement error and estimate their magnitudes	X	X
Calculate statistical uncertainty from a sequence of measurements	X	X
Use methods of error propagation to determine the uncertainty of answers consequent to the uncertainty of measurements	X	X

Attendance and Tardiness:

Students are expected to be on-time and present for all lab meetings. An attendance record will be maintained, with possible entries of Present, Excused, and Absent.

Please see pages 128—130 of the 2007-08 Undergraduate Catalog for university policies on attendance, excused absences, and make-up work. Excused absences will also be granted for documented cases of personal illnesses that are contagious or distracting (such as ones that involve nausea) or for documented cases of family illness where the student is an important caregiver. No excused absences will be given without documentation.

Students who are absent for any reason should attend a different section of the lab in order to make up the missed lab or test. **Students who have excused absences can do this at no penalty; students with unexcused absences will be penalized 20%, but will only be permitted to make up labs with the written permission of both instructors.** If it is impossible for an excused absence to be made up in this way, that lab will simply be dropped from the average. If it is impossible for an unexcused absence to be made up in this way, the student will receive a zero for that lab. Both excused and unexcused absences from tests must be made up, even if no later section is available.

Inclement Weather Policy

See pages 95 and 96 of the *2007-08 Undergraduate Catalog* or www.marshall.edu/ucomm/weather.html for the University's inclement weather policy.

Classroom Behavior:

Disorderly conduct that interferes with the normal classroom atmosphere will not be tolerated. The classroom instructor is the judge of such behavior and may instruct a disorderly student to leave the room with an unexcused absence. More serious misconduct may result in a complaint to the Office of Judicial Affairs. "Official University action will be taken when a student's or student group's behavior violates community standards, interferes either with the University's educational purpose, or with its duty to protect and preserve individual health, welfare, and property. When the behavior is aggravated or presents a continuing danger to the University community, accused students are subject to separation from the institution."¹

All cell phones must be turned off before the beginning of lab unless special permission is granted by the instructor. In that case, the cell phone must be set to silent ring mode, and the student must leave the lab to answer any call. **PLEASE DO NOT SPIT ON THE FLOOR.**

Academic Dishonesty:

"Academic Dishonesty is something that will not be tolerated as these actions are fundamentally opposed to 'assuring the integrity of the curriculum through the maintenance of rigorous standards and high expectations for student learning and performance' as described in Marshall University's Statement of Philosophy."² Cheating and other forms of academic dishonesty will bring serious sanctions, including possible expulsion, as described in pages 106—109 of the *2007-08 Undergraduate Catalog*. **Cheating on an exam will result at minimum in failing the entire course.**

You are encouraged to cooperate on the portion of the report covering in-lab activities, but **do your own work on homework the homework part of the report.**

¹ *Student Handbook*, available at www.marshall.edu/student-affairs/sections/handbook/INDEX.HTML

² Ibid.

Policy for Students with Disabilities:

Marshall University is committed to equal opportunity in education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disabled Student Services (DSS) in Prichard Hall 117, phone 304-696-2271, to provide documentation of their disabilities. Following this, the DSS Coordinator will send a letter to each of the student's instructors outlining the academic accommodation he/she will need to ensure equality in classroom experiences, outside assignment, testing and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, please visit <http://www.marshall.edu/disabled> or contact Disabled Student Services Office at Prichard Hall 11, phone 304-696-2271.

Students with Medical Conditions:

In addition to the above, students with medical conditions, temporary or permanent, that may require special attention or accommodation (including epilepsy) should inform the instructor as soon as possible.

Your privacy will be respected.

More Information About University Policies:

See http://www.marshall.edu/academic-affairs/?page_id=802 for information on University-wide policies regarding

- Academic Dishonesty
- Excused Absence Policy for Undergraduates
- University Computing Service Acceptable Use
- Inclement Weather
- Dead Week
- Students with Disabilities
- Academic Dismissal
- Academic Forgiveness
- Academic Probation and Suspension
- Academic Rights and Responsibilities of Students
- Affirmative Action
- Sexual Harassment

Schedule:

Week of:	Experiment:
Jan. 9-13	Lab 1: Introduction to Motion
Jan. 16-20	Lab 2: Accelerated Motion
Jan. 23-27	Lab 3: Mathematical Description of Motion
Jan. 30-Feb. 3	Lab 4: Projectile Motion
Feb. 6-10	Lab 5: Force and Motion
Feb. 13-17	Lab 6: Circular Motion
Feb. 20-24	Lab 7: Work and Energy
Feb. 27-Mar. 2	Lab 8: Collisions
Mar. 5-9	First Lab Exam: Labs 1 – 6
Mar. 12-16	Lab 9: Simple Harmonic Motion
<i>Mar. 19-23</i>	<i>Spring Break</i>
Mar. 26-30	Lab 10: Periodic Motion of a Pendulum
<i>Apr. 2-6</i>	<i>No Laboratory Due to Assessment Day</i>
Apr. 9-13	Lab 11: Longitudinal Waves and Sound
Apr. 16-20	Lab 12: Temperature and Heat
Apr. 23-27	Second Lab Exam: Labs 7 – 12