

Marshall University
College of Science
Department of Physics

PHY 101L
Conceptual Physics I Lab
Spring 2018

Instructor: Dr. André Wehner, Science 255, wehnera@marshall.edu, 304.696.2755
Office Hours: TTh 11:00-12:30, 4-6, W 6:30-7:30, or by appointment.

Class: W 11:00-12:50, Science 100.

Text: *PHY 101L Lab Manual*, available in the bookstore.

Catalog Description:

A laboratory course designed to include the principles and applications of physics that are introduced in Physics 101 (**corequisite**).

This course has as its **prerequisite** MTH 120/121/123. You are expected to have a working knowledge of college algebra, trigonometry, and high school geometry. Some statistics concepts may come up during lab exercises.

Grading

Your grade will be determined as follows:

2 exams @ 25% each = 50%
Lab Reports 50%

No extra credit assignments will be given and the lowest score will not be dropped.

The grading scale will be as follows:

A:	$\geq 90\%$	B:	$\geq 80\%$	C:	$\geq 70\%$	D:	$\geq 60\%$
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Expectations

This 1-credit hour lab course is a corequisite for the lecture course PHY 101. It is designed to enhance your understanding of basic concepts discussed in these lectures via hands-on experiments. The lectures will not always cover the theory necessary for understanding the labs before the lab meets. You should read the theory and procedures in the *lab manual* before coming. At the start of each lab I will provide a brief introduction to each lab reviewing the concepts and highlight any pitfalls with the equipment or misconceptions before we begin the lab.

Your **lab report** should include all lab manual pages on which data is entered, calculations done, questions answered, and the conclusion. Your lab partner's names must be on the first page of the report under your name. Each student is responsible for his or her own lab report, which should include all data and graphs. Your handout already spells out the procedure and usually contains a drawing or schematic of your experimental setup. You only need to write a **Procedure** section if you deviate from what is described in the handout or if the description in it is incomplete. Add an additional sketch of the experimental setup if it is needed for clarity. One of the most important parts of your lab report is the **Objective** section, which is about **what the experiment is trying to accomplish**. Consider the main comparison you are asked to make. Does this comparison test a principle, like the conservation of energy or the conservation of momentum? Does it test an assumption, like the "theoretical" value for the acceleration due to gravity? Then this is what the lab is about; say so and say why in your first paragraph. Also include in your Objective an explanation of what you measured and what you calculated to make the comparison.

Another important part of your report is the **Error Analysis**. Experimental error is not sloppiness or carelessness. It is the unavoidable uncertainty inherent in the experiment. For example, experimental error can be due to human reaction time when operating a stopwatch, the limited precision of a protractor for measuring angles, a track that is not level, a spring launcher that is not perfectly consistent, etc. Identify the sources of error for your measurements – for example, friction. We will talk about the distinction between **random errors** and **systematic errors** in class. You will usually need to calculate a quantitative measurement of the error – either the **percent error**, if the comparison is with a known value, or the **percent difference**, if you are comparing two experimental measurements.

Finally, you need to write a **Conclusion**. This is where you state what you learned in the lab – that is, did you achieve the goals specified in the Objective? How good is the agreement? Does your experiment support whatever the Objective was trying to establish? If there is disagreement, can you account for it in terms of known sources of experimental error?

The completed reports are to be stapled and turned in at the end of the lab. An unexcused absence results in a zero for that lab, if the lab cannot be made up by attending the other section. Each lab report will be graded on a 10 point maximum basis. Together, the twelve lab reports count as 50% of your grade.

You will need a scientific (or graphing) calculator for this lab, and *you will need to know how to operate it*. You are not allowed to use anything but a calculator on a test. You are encouraged to bring a ruler and graph paper to class.

By enrolling in this course, you agree to the University Policies listed below. The full text of each policy is at <http://www.marshall.edu/academic-affairs/policies> .

Academic Dishonesty/ Excused Absence Policy / Computing Services Acceptable Use/ Dead Week/ Inclement Weather/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities/ Affirmative Action/ Sexual Harassment

The expectation at MU is that the principles of truth and honesty will be rigorously followed in all academic endeavors. This assumes that all work will be done by the person who purports to do the work without unauthorized aids. In addition, when making use of language and some idea not his or her own, whether quoting them directly or paraphrasing them into his or her own words, the student must attribute the source of the material in some standard form, such as naming the source in the text or offering a footnote. University policies are described in detail at: http://www.marshall.edu/academic-affairs/?page_id=802.

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 disability. 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.

Schedule (tentative)

Week	Day	Lab
1	1/10	Velocity & Acceleration [Inclined Plane]
2	1/17	Measurement of “g” [Free Fall]
3	1/24	Conservation of Momentum
4	1/31	Simple Harmonic Motion [Simple Pendulum]
5	2/7	Hooke’s Law
6	2/14	Wave Motion [Vibrating String]
7	2/21	Velocity of Sound [Resonance Column]
8	2/28	Exam 1
9	3/7	Electrostatics
10	3/14	Ohm’s Law & Simple Circuits
11	3/28	Magnetic Fields
12	4/4	The Simple Lens
13	4/11	Measurement of Wavelength [Laser]
14	4/18	Review
15	4/25	Exam 2

Disclaimer: The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning.