

# **Syllabus for Physics 0212**

## **Introduction to Laboratory Physics**

### **Spring 2024**

#### **Course and Instructor Information**

CRNs 10098, 10101, 10143  
Instructor Russell Clark, Ph.D.  
Email [ruc2@pitt.edu](mailto:ruc2@pitt.edu)  
Office hours Monday: 10:30am – 11:30am  
Tuesday: 2:30pm – 3:30pm  
Wednesday: 2:30pm – 3:30pm  
Thursday: 8:30am – 9:30am  
Friday: 7:30am – 8:30am

Other times by appointment: <http://tinyurl.com/Russell-Clark-Appointments>

Prerequisites: PHYS 0111 is a co-requisite for PHYS 0212

General Studies Requirements – This course does not fulfill any general studies requirements.

#### **Course Description and Objectives**

All sciences are a combination of theory (the hypothesis) and measurement (the experiment). A theory has no value unless it can be tested by experiment. Once a theory passes this test, it may be expanded and tested further, which is the way that Physics and other sciences progress. So understanding experimental work is vital to understanding the process of science. A typical introductory physics course sequence, such as Physics 0110 and 0111, teaches you the basic principles of Physics that were learned through the interplay of theory and experiment over several hundred years. Such courses focus on the theory side of Physics. In this course, you will learn how the experimental process works by learning how to obtain and analyze experimental results. You will also see the basic principles that you have learned in action, to see the physical reality behind the equations. Along the way, you will learn to use the basic tools of experimental physics, from simple measuring devices such as a ruler, to sophisticated digital data acquisition systems. You will learn how physical theories are tested within the bounds of experimental uncertainties. By the end of the course, you will have performed experiments and tested theories on the topics of mechanics, energy conservation, electricity, magnetism, and optics.

The course is structured in two parts, a recitation and a lab with attendance required for both. The 50-minute recitation lecture will review the physical principles that are to be demonstrated by the experiments in the lab sessions. The lab sessions will explore the interplay of theory and experiment.

#### **Lab Manual**

*RealTime Physics, Active Learning Laboratories- Custom Edition* by Sokoloff, Laws & Thornton (Wiley).

**WARNING – Used manuals may have missing pages!**

## General Information for the Labs

- 1) **Eating and drinking are not permitted in the labs.** This is both for your safety and to prevent damage to the laboratory equipment.
- 2) **You are responsible for reading and understanding the section in the manual on the scheduled experiment before coming to lab.** Feel free to ask questions about the experiment at any time. A schedule of the experiments is provided below.
- 3) Before each lab session, you will complete a pre-lab assignment from the manual.
- 4) Your lab teaching assistant (TA) will provide some guidance on starting the experiment. **Listen to this presentation very carefully.**
- 5) The lab manual and the lab report template should provide sufficient instruction for using the equipment, but if there is anything that you do not understand then ask your TA.
- 6) You will work in a group of three or four students. **Under no circumstances should a group have more than four students.**
- 7) **Submit your data files (*Logger Pro*) to Canvas as you finish each part of the experiment.**
- 8) Once you finish the experiments, if time permits, then you should try to complete the lab report before you leave. That way, if you have questions about the lab report, your TA will be there to answer them, and if you find that you need to repeat one of the experiments then you will still have access to the equipment.

## Lab Schedule

#	Week	Lab
	1/8/2024	NO LABS - Introduction
	1/15/2024	NO LECTURE OR LABS - MLK, Jr. Day
1	1/22/2024	Force and Motion
2	1/29/2024	Combining Forces
3	2/5/2024	Conservation of Momentum
4	2/12/2024	Projectile Motion
5	2/19/2024	Conservation of Energy
6	2/26/2024	Voltage in Simple DC Circuits
7	3/4/2024	Introduction to Capacitors
	3/11/2024	SPRING BREAK
8	3/18/2024	Magnetism and Electromagnetism
9	3/25/2024	Reflection and Refraction of Light
10	4/1/2024	Geometrical Optics - Lenses
	4/8/2024	MAKE UP LABS
11	4/15/2024	Waves of Light

## Inquiry Based Labs

Inquiry-based labs differ from traditional labs in that they focus on learning the concepts more than following a step-by-step procedure. The manual for the inquiry-based labs will guide you through the process of exploring a concept rather than providing you with a step-by-step procedure. You are also welcome and encouraged to play around and find your own way of exploring each concept.

Each inquiry-based lab will have three parts. The first is a pre-lab assignment that you will complete prior to coming to the lab. The second is a handout based on the manual that you will complete during the lab session. The third is a homework assignment that you should complete after you have finished the lab.

## Grades

The lowest pre-lab, homework and lab report grades will be dropped. **Makeup labs will be given at the discretion of the lecture instructor.** The grades will be weighted according to the table below. The lowest pre-lab, homework and lab report grades will be dropped.

Top Hat Questions (Lecture)	5%
Pre-Lab Assignments	10%
Post-Lab Homeworks	25%
Digital Lab Reports	60%

## Grade Change Policy

Grade cutoffs are chosen to be as fair as possible but ultimately the line has to be drawn somewhere and it has to be drawn straight. Once your final grade for the semester has been submitted to the Registrar it will not be changed unless there is a verifiable error in the grade book, such as a missing grade or a grade that was entered incorrectly.

## Makeup Labs

Makeup labs are only given at the discretion of the instructor. The lowest lab report is automatically dropped, so if you miss a lab for any reason then that will be the lab that is dropped, and no makeup will be allowed. If you miss two labs during the semester and you have a valid reason for missing both, then you will be allowed to makeup one of the missed labs; the other lab will be dropped. Valid reasons include illness (a doctor's note may be required), family emergency, or other events of similar importance.

The make-up lab policy is the same for incomplete labs. **If you arrive late or need to leave early then you cannot be included in the group report.** Likewise, you cannot participate in the lab remotely.

## Canvas

Here you will find your grades and relevant course material such as a copy of the syllabus, lecture notes, lab report templates, etc.

**<http://canvas.pitt.edu>**

## Gradescope

The pre-lab and homework assignments from the lab manual will be handed to your lab TA. The lab reports will be submitted directly to Gradescope, which you can access through Canvas. Please ask your TA or course instructor if you need additional help with using Gradescope. The lab reports are group assignments, but the pre-lab and homework assignments will be completed individually.

## Top Hat – Lecture Questions

During the weekly lecture, you will be given several multiple-choice questions through the Top Hat system (link in Canvas). Correct answers will receive full credit (1 point) and incorrect answers will receive 90% credit (0.9 points).

## Academic Integrity

Students in this course will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity.

You may not use a previously completed lab report, pre-lab or homework for any reason. This includes but not limited to:

- Copying directly from a previous assignment.
- Copying indirectly from a previous assignment.
- Using the data or graphs from a previous assignment.
- Using a previous assignment as “guide” for completing your assignment.

If you see something, say something. Tell your TA or the instructor if you observe anyone in your group using previously completed assignments. You will not be charged with an academic integrity violation if you notify the instructor before the assignment has been graded.

You will submit your data (*Logger Pro*) files to Canvas. The *Logger Pro* files will not be graded, but the data and graphs in these files must match the data and graphs in your report. **If the data in your lab report does not match the data in your *Logger Pro* files, then your lab report will be rejected and you will be charged with an academic integrity violation.** Also, the lab reports may be submitted to Turnitin.com to check for plagiarism.

To learn more about Academic Integrity, visit the Academic Integrity Guide for an overview of the topic. For hands-on practice, complete the Understanding and Avoiding Plagiarism tutorial.

## No Use of Generative AI Permitted

Intellectual integrity is vital to an academic community and for my fair evaluation of your work. All work completed and/or submitted in this course must be your own, completed in accordance with the University's Guidelines on Academic Integrity. You may not engage in unauthorized collaboration or make use of ChatGPT or any other generative AI applications at any time.

## **Disability Services**

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services (DRS), 140 William Pitt Union, (412) 648-7890, [drsrecep@pitt.edu](mailto:drsrecep@pitt.edu), (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

## **Health and Safety Statement**

It is extremely important that you abide by public health regulations and University of Pittsburgh health standards and guidelines. These rules are intended to protect the health and safety of all community members. Failure to comply with current requirements could result in a Student Conduct violation. For the most up-to-date information and guidance, please visit <https://www.coronavirus.pitt.edu/>.

## **Statement on Classroom Recording**

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

## **Email Communication**

Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. Students are expected to read e-mail sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an e-mail forwarding service that allows students to read their e-mail via other service providers (e.g., Hotmail, AOL, Yahoo). Students that choose to forward their e-mail from their pitt.edu address to another address do so at their own risk. If e-mail is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University e-mail address.

## **Title IX:**

Legal text: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." As a professor, I am a mandatory reporter and I am required to report violations of Title IX that I observe, or am made aware of, to the Title IX office. Title IX violations include, but are not limited to, sexual harassment, sexual violence and verbal or sexual abuse. Within the classroom, behavior in violation might appear as suggestive jokes or innuendos, inappropriate touching, and unwanted sexual behavior or advances, but my capacity and obligation to report does not end at the classroom.