

Syllabus for Physics 0219

Basic Laboratory Physics for Science and Engineering

Summer 2021

Course and Instructor Information

CRN	10324
Lecture	WEB Monday & Wednesday 9:00am – 9:50am https://pitt.zoom.us/j/97335273548 , Password: 10326
Instructor	Russell Clark
Email	ruc2@pitt.edu
Office	OEH 404 (https://pitt.zoom.us/j/7744079497)
Office hours	Monday: 3:00pm – 4:00pm Tuesday: 8:00pm – 9:00am Wednesday: 3:00pm – 4:00pm Thursday: 8:00pm – 9:00am Friday: 3:00pm – 4:00pm

Office hours will be conducted by Zoom, unless otherwise noted.

Other times by appointment: <https://www.appointmentquest.com/scheduler/2150061337>

Requisites – PHYS 0175 is a co-requisite for PHYS 0219

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

Course Description and Objectives

A typical introductory physics course sequence, such as Physics 0174 and 0175, 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 and magnetism, and optics.

The course is structured in two parts, a lecture and a lab. The 50-minute lecture will discuss the physical principles that are to be demonstrated by the experiments in the lab sessions. The lab experiments will be conducted by you prior to the lab session, and the scheduled lab times will be used for collaborative assignments with other students. Once the collaborative assignment is finished, you may use the remaining lab time to start the experiments for the following week.

Required Materials

The following materials are required for the course.

- 1) *RealTime Physics, Active Learning Laboratories- Custom Edition* by Sokoloff, Laws & Thornton (Wiley).
WARNING – Used manuals may have missing pages!
- 2) iOLab device: Rent from MacMillan Learning (<https://www.macmillanlearning.com/college/us/product/iOLab-Version-2.0/p/1464101469>). Click on *Students – Buy or rent*.
- 3) Additional materials will be required for the iOLab experiments. These are common items that you may already have in your household. A list will be provided to you.

The Lab Manual and iOLab Device

We are using *RealTime Physics, Active Learning Laboratories – Custom Edition* as the lab manual for this course. This custom edition was specifically produced for the University of Pittsburgh, so you should not purchase other versions of the manual. Also, if you decide to purchase a used copy then check the pages before you buy it. The manual has perforated pages, so it is likely that many pages may have been ripped out.

The publisher, John Wiley & Sons, offers *RealTime Physics* as a four-module set covering the topics of mechanics, thermodynamics, electricity & magnetism and optics. We are only using selected labs out of these four books, so the publisher created a custom edition with just those labs. Therefore, you do not have to purchase four different books, just the custom edition.

Since the custom edition is a composite of the original four module set, there are some oddities. For instance, most pages have two page numbers. The page number at the very bottom is the page number in the custom edition, while the number above it is the page number in the original edition. Likewise, the lab numbers are based on the original edition, so you should go by the title of the lab instead of the number.

Because of the COVID-19 virus, some changes have been made to the way that the labs are conducted. Normally, you would go to the lab room at your scheduled lab time, and the equipment for the experiment would be setup and ready to use. Because we will be learning remotely, it will not be possible to provide you with the equipment. Instead you will be using the iOLab device for the mechanics experiments, and you will complete virtual labs for the circuits, magnetism and optics labs.

Due to the limitations of the iOLab device and the virtual lab simulations, lab assignments are not the same as what is in the custom edition of the lab manual.

General Information for the Course

- 1) The lectures for this course will be presented in Zoom. Attendance is not mandatory, but it is strongly encouraged. The lecture notes will be available in Canvas (see the section on Canvas below).
- 2) All of the lab experiments will be conducted by you prior to your scheduled lab session using either the iOLab device or online (virtual) simulations.
- 3) During the lab sessions you will complete a collaborative assignment with several other students based on the experiments that you performed prior to the lab. Synchronous attendance in the lab sessions is

strongly encouraged. Students who are unable to attend synchronously should contact their TA prior to the lab.

- 4) The schedule for the labs is provided below.
- 5) Each week, the lab assignments will be due at 11:00pm on Friday. Late assignments will be accepted up to 11:00pm on Sunday. Late penalties will be at the discretion of the instructor.
- 6) The lab reports, homework, and collaborative assignments for the iOLab experiments are available in the iOLab software.
- 7) The lab reports for the virtual labs will be available in Canvas, and the homework assignments for the virtual labs are in the lab manual.
- 8) The collaborative assignments for the virtual labs will be in the iOLab software.

Lab Schedule

Lecture	PHYS 0212	Due
6/28/21	iOLab 1: Introduction to iOLab and Software	7/2/21
6/30/21	iOLab 2: Introduction to Motion	7/2/21
7/5/21	iOLab 3: Changing Motion	7/9/21
7/7/21	iOLab 4: Force and Motion	7/9/21
7/12/21	iOLab 5: More About Newton's Laws	7/16/21
7/14/21	iOLab 6: Newton's Third Law and Conservation of Momentum	7/16/21
7/19/21	iOLab 7: Work and Energy	7/23/21
7/21/21	Virtual Lab: Voltage in Simple DC Circuits and Ohm's Law	7/23/21
7/26/21	Virtual Lab: Capacitors and RC Circuits	7/30/21
7/28/21	Virtual Lab: Magnetism & Electromagnetism	7/30/21
8/2/21	Virtual Lab: Reflection and Refraction of Light	8/6/21
8/4/21	Virtual Lab: Geometrical Optics - Lenses	8/6/21

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 and the digital lab reports for the inquiry-based labs will guide you through the process of exploring a concept rather than providing you with a detailed set of instructions. You are also welcome and encouraged to play around and find your own way of exploring each concept.

Asynchronous Participation

You are strongly encouraged to participate synchronously in the collaborative activities in the lab sessions.

However, if you are unable to participate synchronously due to circumstances beyond your control, then complete your portion of the Collaborative assignment and submit it before the due date. After the due date, the instructor will assign you to a collaborative group to complete the assignment.

Grades

The grades are weighted according to the table below.

Collaborative Assignments	40%
Homework Assignments	30%
Digital Lab Reports	30%

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. You can check all of your course grades at any time on Canvas (<http://canvas.pitt.edu/>).

Gradescope

All of the course assignments will be submitted through Gradescope:

<https://www.gradescope.com/>

To access the Gradescope website, follow the link above (also available in Canvas) and follow these directions:

- 1) Click on the “Log In” button.
- 2) A login window will pop up, click on “School Credentials”.
- 3) Select “University of Pittsburgh” and then use the same procedure for accessing your Pitt email, etc.

More detailed instructions on how to submit the assignments will be provided by the instructor.

Zoom

The University of Pittsburgh is using Zoom for online lectures, labs, office hours, etc. You can learn more about this service here: <https://www.technology.pitt.edu/services/zoom-video-conferencing>. The links for the lectures and labs will be available in Canvas (see below).

Canvas

The University of Pittsburgh provides an online portal for participating classes called Canvas. Here you will find your grades and relevant course material such as a copy of the syllabus, lecture notes, recorded lectures, lab materials, etc.

<http://canvas.pitt.edu>

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. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

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.

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, (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

In the midst of this pandemic, it is extremely important that you abide by public health regulations and University of Pittsburgh health standards and guidelines. While in class, at a minimum this means that you must wear a face covering and comply with physical distancing requirements; other requirements may be added by the University during the semester. These rules have been developed to protect the health and safety of all community members.

Failure to comply with these requirements will result in you not being permitted to attend class in person and could result in a Student Conduct violation. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates before each class.

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.