Syllabus for Physics 0212
Introduction to Laboratory Physics
Summer 2020

Course and Instructor Information

CRN	10341
Instructor	Russell Clark
Phone	412-624-9204
Email	ruc2@pitt.edu
Office	Online

Office hours by appointment: http://tinyurl.com/Russell-Clark-Appointments

Requisites – 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

A typical introductory physics course sequence, such as Physics 0110 and 0111, teaches the student 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 recitation and a lab. Due to the fact that the course is being offered online, attendance for the scheduled lecture and lab times is voluntary. The 50-minute recitation lecture will discuss the physical principles that are to be demonstrated by the experiments in the lab sessions. The actual lab experiments will be conducted by you at home, so the lab sessions will include instruction on how to use the equipment and how to perform the experiment.

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 with just those labs. Therefore, you do not have to purchase four different books, just the custom edition.

Since the custom edition is 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 our first lab has the title of Lab 2: Changing Motion. This is because it was the second lab in the mechanics module of the original edition.

There are 13 labs listed in the table of contents, but we will only do 12 labs. That is because Lab 9: Magnetism and Lab 10: Electromagnetism will be treated as one lab. You will only need to complete certain items in both labs, and you will be given a list of these items in advance.

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. Unfortunately, it is not possible to hold in-person labs this semester, so you will have to conduct the experiments at home. It will not be possible to provide you with the equipment that we would normally use, so 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.

The iOLab device (see Required Materials above) comes pre-loaded with many of the chapters from *RealTime Physics, Active Learning Laboratories Module 1: Mechanics*, and most of these overlap with the labs in the custom edition. However, due to the limitations of the device, the pre-loaded labs are not exactly the same as what is in the custom edition so it is worthwhile to read the instructions and descriptions carefully.

General Information for the Course

1) The lectures for this course will be presented in Zoom, though attendance is not mandatory it is encouraged. Recordings of the lectures and 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 at home using either the iOLab device, or online (virtual) simulations. Your TA will be available online during your scheduled lab session to answer questions and provide assistance with the experiments. Attendance for the lab sessions is voluntary.
3) You can work each lab on your own schedule, but you must adhere to the due dates for the lab reports and homework assignments (see the schedule below).

4) The lab report and homework assignment for each lab will due at 11:00pm on the Friday after the scheduled lecture for that lab (see the schedule below). Late assignments will be accepted up to the following Sunday at 11:00pm. Late penalties will be at the discretion of the instructor.
5) The lab reports and homework assignments for the iOLab experiments are embedded in the device. 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.

Lab Schedule

#	Lecture	Lab	Due
1	6/22/2020	iOLab 1: Introduction to iOLab and Software	6/26/2020
2	6/24/2020	iOLab 2: Introduction to Motion	6/26/2020
3	6/29/2020	iOLab 3: Changing Motion	7/3/2020
4	7/1/2020	iOLab 4: Force and Motion	7/3/2020
5	7/6/2020	iOLab 5: More About Newton's Laws	7/10/2020
6	7/8/2020	iOLab 7: Newton's Third Law and Conservation of Momentum	7/10/2020
7	7/13/2020	iOLab 9: Work and Energy	7/17/2020
8	7/15/2020	Virtual Lab: Voltage in Simple DC Circuits and Ohm's Law	7/17/2020
9	7/20/2020	Virtual Lab: Capacitors and RC Circuits	7/24/2020
10	7/22/2020	Virtual Lab: Magnetism & Electromagnetism	7/24/2020
11	7/27/2020	Virtual Lab: Reflection and Refraction of Light	7/31/2020
12	7/29/2020	Virtual Lab: Geometrical Optics - Lenses	7/31/2020

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.

Attendance for the Lectures and Labs

This course will be taught remotely (online), so attendance for the lecture and lab sessions will be voluntary.

The lectures for each lab will be recorded, and posted on Canvas. You are strongly encouraged to watch these videos before attempting the lab experiments. The lecture notes that go with the videos will also be posted on Canvas.

The scheduled lecture time will be used to review the basic physics and present multiple-choice, conceptual questions. These questions will not be graded, but will be used as a basis for discussions on the physics behind each experiment.

You may complete the lab experiments at any time before the due date (see the schedule above), so it is not necessary to do the labs during the scheduled lab sessions. Instead, your TA will be available online during your scheduled lab session to answer questions and provide assistance.

Grades

The grades are weighted according to the table below.

Homework Assignments	30%
Digital Lab Reports	70%

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 instructor will send you a link for the lecture sessions, and also a link for your lab sessions. These links will also 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

The username and password is the same as your Pitt email account. If you need help to get access to Canvas, then contact the Help Desk (https://www.technology.pitt.edu/247-it-help-desk).

Academic Integrity

All students are expected to adhere to the standards of academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action. 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 (https://www.provost.pitt.edu/faculty/academic-integrity-freedom/academic-integrity-guidelines). This may include, but is not limited to the confiscation of the examination of any individual suspected of violating the University Policy.

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, 216 William Pitt Union, (412) 648-7890/(412) 383-7355 (ITY), as early as possible in the term, DRS will verify your disability and determine reasonable accommodations for this course.

Statement on Classroom Recording

The online lecture and lab sessions, using Zoom, may be recorded.

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.

Code of Conduct:

Communication is key to a productive learning environment, and we can maintain productive communication by exhibiting respect for one another. The success of the course for yourself and others depends on all of our commitment to behavior that demonstrates respect for differences, understanding towards others and a willingness to listen and learn. For these reasons, it is unacceptable to harass, discriminate against, or abuse anyone because of race, ethnicity, gender, disability, religious affiliation, sexual orientation, or age. If you witness or are subject to such harassment, please report it to the instructor or to the Office of Diversity and Inclusion.

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.