Syllabus for Physics 0219
Basic Laboratory Physics for Science and Engineering
Spring 2019

Course and Instructor Information

CRN	10137	
Instructor	Russell Clark	
Phone	412-624-9204	
Email	ruc2@pitt.edu	
Office	OEH 404	
Office hours	Monday:	7:00am – 8:00am
	Tuesday:	1:30pm – 2:30pm
	Wednesday:	3:00pm – 4:00pm
	Thursday:	3:00pm – 4:00pm
	Friday:	7:00am – 8:00am
	Other times by appointment: http://tinyurl.com/Russell-Clark-Appointments	
Prerequisites	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

All sciences are a combination of theory (the hypothesis) and measurement (the experiment). A theory has no value unless it can be verified, or 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 0174 and 0175, 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 through inquiry based labs. By the end of the course you will have performed experiments and tested theories on the topics of mechanics, conservation of energy, conservation of momentum, electricity and magnetism, and optics.

The course is structured in two parts, a recitation and a lab with attendance required for both.

Required Materials

The following materials are required for the course.

1) *RealTime Physics, Active Learning Laboratories- Custom Edition* by Sokoloff, Laws & Thornton (Wiley).
2) The *Student Lab Notebook with Spiral Binding* (50 Carbonless Duplicate Sets) by Hayden McNeil.
3) A scientific calculator that has trigonometric, logarithmic, exponential and statistical functions.

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 the lab class.** Make sure that you understand the physical principles to be demonstrated. The more prepared you are, the faster and easier the lab will go. Feel free to ask questions about the experiment at any time. A schedule of the experiments is listed below.
3) Before each lab session you will complete a pre-lab assignment from the lab manual.
4) The lab teaching assistant (TA) will provide instructions on the experiment. **Listen to this presentation very carefully**.
5) Before starting the experiment, make sure that you understand the function of the equipment. If there is anything that you do not understand then ask your TA.
6) Students will work in groups of two with the following exceptions. If a class has an odd number of students, one group will have three people. If a piece of equipment fails and cannot be replaced, the members of that group will split up and join other groups. **Under no circumstances should a group have more than three students.**
7) Once the data is collected, you are encouraged to complete the lab report before you leave.

Lab Notebooks

Each student will keep a lab notebook, which is a vital practice for any scientist. The purpose of the notebook is to record all aspects of the experiment. If you are unsure if something is important then write it down anyway. Be neat, concise, clear and legible when writing in your notebook. Here are some guidelines for what to include:

1) Write down notes about the experimental procedure, possible sources of error, safety considerations, equipment status and any general observations you care to make. Include the title of the experiment, the date and the names of your TA and lab partners.
2) Record the conditions under which you performed the experiment. Some experiments require that you change the parameters each time that you collect data. Make sure you record those parameters before you start. For instance, in the lab on Oscillatory Motion you will record the period of a simple pendulum for five different lengths. You should record each length in your notebook before you begin taking the data.
3) Record your data. In some experiments you will record the data by hand just by writing down your measurements. Be neat and tabulate the data so that it is easy to read. Label the data and include physical units. Having a table of numbers is no good if you do not know what those numbers mean. In other cases a computer will collect and store large data sets. You should store a copy of these data sets on a portable memory device.
4) Record your mistakes. Scientists are human too, so you will sometimes make a mistake in the procedure or in setting up the experiment and you will record flawed data. Do not erase the data or delete it. Just make a note of the mistake, fix the problem and record a new set of data. You should not include the flawed data in your analysis but you should still keep a record of it because you can often learn from your mistakes.
5) **You will turn in the carbon copies of your lab notes at the end of the lab session.** These notes will be checked for organization, clarity and completeness.

Lab Schedule

Lab	Week	Lab Title
1	1/7/2019	Module 1-2 (Changing Motion)
2	1/14/2019	Module 1-3 (Force and Motion)
	1/21/2019	MLK, Jr. Holiday
3	1/28/2019	Module 1-4 (Combining Forces)
4	2/4/2019	Module 1-9 (Conservation of Momentum)
5	2/11/2019	Module 1-10 (Projectile Motion)
6	2/18/2019	Module 1-12 (Conservation of Energy)
7	2/25/2019	Module 3-6 (Voltage in Simple DC Circuits)
8	3/4/2019	Module 3-8 (Introduction to Capacitors)
	3/11/2019	SPRING BREAK
9	3/18/2019	Module 3-9 & 10 (Magnetism)
10	3/25/2019	Module 4-2 (Reflection and Refraction)
11	4/1/2019	Module 4-3 (Geometrical Optics - Lenses)
12	4/8/2019	Module 4-6 (Waves of Light)
	4/15/2019	MAKEUP LABS

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 detailed set of instructions. 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 from the manual that you will complete during the lab session. The third part is a homework assignment that you should complete after you have finished the lab. The handout and homework parts will count as the lab report and will be turned in the following week. Group reports are welcomed and encouraged.

Lecture Questions and Attendance

The recitation lecture will utilize the Student Interactive Response System (SRS). This system consists of hand-held remote controls, called pads or clickers, assigned to individual students, which are used to answer multiple-choice questions. Students will receive full credit for questions that are answered correctly, and 90% for questions that are answered incorrectly.

The pads will be stored in bins on a cart at the front of the room so that you may pick up your pad before lecture and then place it back there at the end of lecture. **Do not take the pads out of the classroom!** Many other classes use the same system and pads. If your pad is missing then notify your instructor.

Grades

The lowest informal report and quiz grades will be dropped. **Makeup labs will be given at the discretion of the lecture instructor.** The grades are weighted according to the table below.

Lecture Questions	5%
Lab Notes (carbon copies)	5%
Pre-Lab Assignment	20%
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 Courseweb (http://Courseweb.pitt.edu/).

Makeup Labs

Makeup labs are only given at the discretion of the instructor. The lowest informal 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.

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 (http://www.provost.pitt.edu/info/acguidelinespdf.pdf). This may include, but is not limited to the confiscation of the examination of any individual suspected of violating the University Policy.

Courseweb

The University of Pittsburgh provides an online portal for participating classes called Courseweb and a site has been created for this course. Here you will find relevant course material such as a copy of the syllabus, sample exams, etc. You may also view your grades online through this site.

http://courseweb.pitt.edu

The username and password is the same as your Pitt email account. If you need to setup your email account or have forgotten your username and password then call the computer center help desk (4-HELP or 412-624-4357).

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

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.