Physics 104 Laboratory
Spring 2023

Instructor: Mrs. Bonnie W. Price
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Course Meeting: Trexler 273
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Office Phone: 540-375-2408
Office Hours: MW: 1:30 pm – 3:30 pm
TTH: 1:00 – 2:00 pm
Other Times By appointment

Required Materials:

Pre-lab materials are available online through Inquire. Lab instructions will be posted on Inquire and you may either print and bring a copy or bring a laptop with a digital version of the file. You may not access the lab on your phone. A bound lab notebook with sewn graph paper pages is needed, as well as a scientific calculator that is not a cellphone, and a pencil or pen.

Goals:

The following five goals will serve as the framework for the activities within the Lab: *the Art of Experimentation*, *Experimental & Analytical Skills*, *Conceptual Learning*, *Communication*, and *Collaborative Learning Skills*. New experimental techniques will be introduced, as well as analytical tools in dealing with errors. Hopefully the laboratory experiments will clarify and expand concepts introduced in Physics 104 lecture, while practicing report writing and your ability to clearly communicate accurate results to your colleagues and instructor.

Intended Learning Outcomes:

Upon completing this course, students will be able to

- Conduct scientific experiments and obtain accurate data
- Discuss the results of an experiment quantitatively and qualitatively
- Identify sources of error that appear in experimental methods and
- Communicate experimental results in a coherent, well organized, written manner.

Attendance Policy/Make-up Labs:

Since 25% of your 104 grade depends on the laboratory, *you must enroll in both the lecture and laboratory sections of 104*, and all experiments must be completed, or your lecture final grade will be reduced a letter grade. The lab starting and ending times are firm, although it may be possible to complete the lab before the published ending time. Special considerations for missing a lab session will be given on a case-by-case basis, due to extenuating circumstances, which could include coronavirus symptoms. In order to make up a lab missed because of a visit /consultation with Health Services, you must give Health Services permission to notify me. All absences caused by consultation with Health Services about coronavirus symptoms or isolation ordered by Health Services will be excused, but the work must still be completed. One missed lab may be completed during the make-up week at the end of the semester, and the report from that make-up lab is due within three days of the completed experiment.

Students will work in pairs. This pairing is student choice initially, but the instructor reserves the right to rearrange groups as the semester progresses.

You are not required to wear a face covering/mask over the mouth and nose while in academic buildings at this time, but you may for personal reasons. **Do NOT come to lab if you have a temperature of 100.4°F or higher, or other coronavirus symptoms, and call Health Services IMMEDIATELY. If you test positive for COVID, you must be in isolation for 5 days, and must wear a mask for the next 5 days. If you have come in contact with a person who has COVID, you must wear a mask for 10 days.**

Pre-lab Assignments:

Prelab assignments are posted on Inquire several days in advance of each experiment. The purpose of the pre-lab assignment is to familiarize the student with the upcoming experiment and to begin getting the lab notebook ready for lab. The prelab assignment is completed in the lab notebook, and the notebook will be checked and initialed by the instructor at the beginning of lab.

No prelab assignments will be accepted after the beginning of lab.

Some of the prelab assignments contain simulations, so it is suggested that access to the simulation be tested before lab is scheduled to meet. The answers to the pre-lab will be discussed at the beginning of the lab session, so your lab notebook must be received before that discussion begins.

Lab Notebooks:

Each student is to purchase and bring a bound notebook with sewn graph paper pages to lab each week. The goal of the lab notebook is to practice recording data and results in a well-organized and legible format.

Each student will submit photos of their lab notebook through an Inquire link within one hour of the posted ending time for the experiment. The only way that a student will be able to complete data collection and analysis in the allotted time is to be prepared with data tables in their notebook and familiarity with the experimental procedure before coming to class. **If a student does not bring their lab notebook, the lab may still be completed on loose-leaf paper and the report submitted, but a grade of zero will be recorded for the lab notebook grade.**

Lab Reports:

Since one of the course objectives is to communicate experimental results in a coherent, well organized, written manner, it is important to practice writing lab reports. Most physics lab reports consist of four sections: *Abstract, Introduction, Data and Results*, and *Discussion.* This course will have each section written during the semester. A separate document will describe the format and content of each section. The last experiment of the semester will require a complete report that contains all four sections.

All reports will be individually submitted, and a separate document will describe the format and content of the abstract and data and results sections. **Reports will be submitted through Turnitin on Inquire and will be due at 11:59 pm on Monday of the following week.** The time stamp placed on the upload by the server will determine when the work was submitted. ***Unless an extension is granted beforehand***, all late items will be reduced by 10% for each 24-hour period beyond the due date and time. As a result, after ten days, no

assignment will be accepted. **The two lowest report grades will be dropped at the end of the semester.**

Academic Integrity:

Although students working within the same group will have the same data, recording of the data into the lab notebook is to be completed individually, written in table format. Group members may share Excel graphs created during lab time in order to be secured in each student's lab notebook. Error values are to be calculated individually in lab notebooks, as well as sample calculations using the data. Results should be organized and recorded in each student's notebook.

Submitted lab reports will be written individually, and must be each student's original work, except for shared data. The student submitting the report must recreate all graphs and tables submitted. In other words, if the submission is a graph that was originally created during lab, it still must be recreated by you for the report, and not simply copied and pasted from the original person who graphed the results. You are not to copy from a website, textbook, or another person's report unless given permission to receive help when writing an Abstract, Introduction, or Discussion section. All reports electronically submitted will come through Turnitin and not through email. The college's academic integrity policies will be enforced.

Grading:

All grades will be recorded on Inquire. Do not discard any graded work until the end of the semester. If there is a discrepancy between the grade recorded on Inquire and on the report, proof of the grade must be produced in order for the grade on Inquire to be changed. All lab grades will be determined using a grading rubric, which includes lab work, lab notebook, and report writing.

At the end of the semester, your overall lab average will be sent to your lecture instructor. No curves will be applied to your lab grade. The final lab average will be determined as the average of the nine highest experiment grades.

Electronic Devices Usage Policy:

Computers in the lab are networked and you are required to log into them with your username and password***. Do not save any work to the lab computers*** unless you save it to your Z: drive or onto a personal USB device; all other drives are purged when you log out. During the class, the computers in this room are to be used only for the completion of assignments directly associated with this course. **Computers, including laptops, are not to be used to check email or access the Internet for personal reasons during class**.

Out of courtesy to others, **all cell phones should be silenced** upon arrival to class and **should be out of sight.** If you are engaged with your cell phone, then you are not engaged with your lab partner and the experiment, and may result in a lower lab work grade. You have been warned, so no additional warning is needed. Also, MP3 players, cameras and other personal devices are not to be used during class. Personal laptops may be used to view the lab instructions and create graphs in MS Excel, but the graphs must be printed for the lab notebook before the notebook photos are submitted.

Additional Policies:

No food is allowed in lab, but drinks may be brought into the lab if in a screw top or enclosed container. **Each member of this class is expected to treat everyone with respect, contribute to a welcoming and inclusive environment, and equally contribute to the work during lab sessions. I will gladly honor your request to address you by an alternate name or gender pronoun, if you advise me of this preference early in the semester so that I may make the change to my records.**

Accessible Education Services (AES) provides reasonable accommodations to students with documented disabilities. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please let me know when you have completed the required forms so that we can meet to discuss possible helpful procedures.

Course Outline:

Date	Lab Topic	Report
January 24	Experiment 1: Electric Field Mapping	Abstract
January 31	Experiment 2: Electric Circuits	Data and Results
February 7	Experiment 3: RC Time Constant	Discussion
February 14	Experiment 4: Magnetic Field of a Current Loop	Data and Results
February 21	Experiment 5: Electromagnetic Induction	Introduction
February 28	Experiment 6: Reflection and Refraction	Discussion
March 7	Spring Break!	
March 14	Experiment 7: Thin Lenses	Data and Results
March 21	Experiment 8: Diffraction	Abstract
March 28	Experiment 9: Hydrogen Spectra	Abstract
April 4	Experiment 10: Radioactivity	Introduction
April 11	Experiment 11: Photoelectric Effect	Complete Report
April 18	Makeup Week	Required Report Due in Three Days