

Physics 102/103 Laboratory
Fall 2024

Meeting: Trexler 274
Instructor: Bonnie W. Price
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Office: Trexler 264B Office Phone: 540-375-2408
Office Hours: M: 11:00 am – 4:00 pm
W: 1:00 pm – 4:00 pm
Other times by appointment

Required Materials:

Pre-lab assignments are available online through Inquire. Lab instructions will be posted on Inquire and you may either print and bring a copy or have a digital version of the file on your laptop brought to lab. **A bound lab notebook (sewn pages, not spiral bound or glued) with graph paper pages is needed, as well as a writing utensil of your choice. MS Excel files will be created individually during lab, so bringing a laptop will allow you to work faster than waiting for the lab computers.**

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 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 102/103 grade depends on the laboratory, you must enroll in both the lecture and laboratory sections of 102/103, and all experiments must be completed, or your lecture final grade will be reduced a letter grade.

You may *only* attend the lab section for which you are registered, unless you have permission from the instructor prior to your regularly scheduled lab section. Special considerations for missing a lab session will be given on a case-by-case basis, due to extenuating circumstances. One missed lab may be completed during the make-up week at the end of the semester.

Students will work in groups, the exact number in the group depending upon the class enrollment. This pairing is student choice initially, but the instructor reserves the right to rearrange groups as the semester progresses.

Pre-lab Assignments:

Pre-lab 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 scanned and submitted through Inquire at**

least 30 minutes before the posted beginning lab time. A grade of zero will be given to any student that does not submit the prelab electronically before the deadline.

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. The choice of using pen or pencil is yours.

At the end of some experiments, students will submit parts of their notebooks as the report for that week before leaving lab. These reports will be handwritten and should be neat and legible.

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 emphasize the *Abstract* and *Data and Results* sections.

Most 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. In class reports will be due at the end of the stated lab time and reports that are written outside of class will be due at 11:59 pm on Friday after the completed experiment.**

All individually submitted reports must be your own work, created and submitted by you. If the report is a group submission, then all names should be on the document, each student should contribute to its content, and each person in the group will receive the same grade for the submitted work. 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/time. 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, each student is expected to record the data in their lab notebook, complete their own data analysis, and write and submit their own individual report. All calculations and error analysis are to be completed individually, without sharing of files.

Individually submitted lab reports must be each student's original work, except for shared data. All reports electronically submitted will come through Turnitin and not through email. The college's academic integrity policies are stated on the webpage at this link https://www.roanoke.edu/inside/a-z_index/academic_affairs/academic_integrity and you should familiarize yourself with the college's policies. **If any report submitted through Turnitin is flagged as having content from another student, except for similar data, or having computer generated content from AI sources, then the student will be reported to the Academic Integrity Council. Using another source, other than your own brain, and submitting it as your work, is considered cheating.**

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 for the grade on Inquire to be changed. All lab grades will be determined using a grading rubric, which includes participation, lab work, prelab, 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. You have been warned, so no additional warning is needed. Also, other personal devices are not to be used during class, except for submissions at the end of lab. Personal laptops may be used to view the lab instructions and analyze data using MS Excel.

Disability Support:

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact me after completing the necessary forms.

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.**

Course Outline:

Date	Lab Topic	Report
September 3	Course Policies Experiment 1: Data Analysis	Individual MS Excel Graph
September 10	Experiment 2: One Dimensional Motion	Group Abstract
September 17	Experiment 3: Projectile Motion	Individual Abstract
September 24	Experiment 4: Force and Equilibrium	Individual Questions
October 1	Experiment 5: Work and Energy	Individual MS Excel Spreadsheet
October 8	Experiment 6: Linear Momentum and Collisions	Individual Abstract
October 15	<i>Fall Break</i>	
October 22	Experiment 7: Energy and Momentum Conservation	Data and Results
October 29	Experiment 8: Torque	Individual Questions
November 5	Experiment 9: Standing Waves in Strings	Individual Data and Results
November 12	Experiment 10: Buoyant Force and Archimedes' Principle	Individual MS Excel Spreadsheet
November 19	Experiment 11: Calorimetry	Individual Abstract
November 26	<i>Thanksgiving Break</i>	
December 3	<i>Make-up Week</i>	Assigned Report due within 3 days of completed lab