

Physics 141 & 153 Lab Syllabus

Overview

Physics 141 lab is a required component of the five credit-hour course Physics 141: *Elementary General Physics I*. Physics 153: *Elements of Physics Laboratory* is a standalone one credit-hour course. Both require a lab fee and meet once weekly for up to two hours and fifty minutes.

This syllabus is subject to change; any changes will be approved by a lab manager and announced by lab instructors. All course announcements will be provided through Canvas.

Prerequisites

Physics 141 requires either completion of Math 102 or higher, or a qualifying score on the Math Placement Exam for Math 106 or higher. Physics 153 requires either completion of or parallel enrollment in Physics 151.

Course Objectives

Of the course of the semester, Physics 141/153 lab will

- Strengthen your understanding of and intuition for basic physics concepts including motion, forces, energy, momentum, waves, and heat.
- Develop your ability to collect, analyze, and formulate meaningful conclusions about data.
- Enhance your ability to communicate results and ideas through scientific writing as well as graphical and functional representations of data.
- Introduce you to various computer-based tools for studying in the sciences.
- Practice your skills at working cooperatively within a team to achieve solutions to given problems.
- Give you experience at relating physics concepts to real-world applications.

Required Materials

Students will need access to the internet and Canvas. They will also need access to Microsoft Word and Microsoft Excel.

Attendance and Makeups

Attendance at all laboratory meetings is mandatory. If a student misses a lab, they must receive permission from the lab manager to schedule a makeup, and the makeup must occur during the same week as the

absence (contact the lab manager at palab@unl.edu). Students who are unable to schedule a makeup must discuss the situation with a lab manager as soon as they are able. **Please do not come to lab if you are ill.** If a student becomes sick or must miss lab for a school event, and provides proper documentation, accommodations will be made, or the lab may be excused. The student must fill out a lab excusal form, found here: <https://www.unl.edu/physics/introlabs/lab-excuse>, and have it approved by the lab manager.

One unexcused absence will reduce a student's lab score by $\frac{1}{2}$. Two unexcused absences will result in a failing grade for lab. More than two unexcused absences will result in a failing grade for the entire course.

When making up a lab, students are responsible for their own lab reports. Any student making up a lab will still work with a group but must submit their own individual lab report on Canvas. The student's normal instructor will grade the lab.

If a student has previously enrolled in Physics 141 and completed all labs, they may discuss their situation with the lecture professor. The professor may allow the student to re-use the final lab grade from their previous enrollment, but the student is still responsible for the appropriate tuition and lab fees. They must also submit a lab grade re-use form to the lab manager. The form can be found on Canvas and must be turned in before the start of AM-02.

Pre-lab Assignments

Students will need to complete the pre-lab assignment on Canvas each week before coming to lab. The Pre-Lab Assignment will be available each week on Friday and will be due by the end of the day on Sunday. This will consist of questions about material covered in the previous week, material and concepts in the lab manual for the coming week, and potentially information included in this syllabus or appendices.

Lab Reports

Experimental lab reports are a crucial component of all technical and scientific work. Students will be required to complete and turn in a lab report each week, covering the procedures outlined in the lab manual. Lab reports will be done digitally using Microsoft Word and the provided template. Please note that all work for the lab report each week is to be completed in class during scheduled lab times. Lab reports are group assignments and will be turned in online via Canvas in the Assignments tab by the end of lab. *Absolutely no late work will be accepted.*

Working in Groups

Having experience successfully working in teams is highly valued by employers in all career fields. Students will work with up to two lab partners, assigned by the instructor, to complete their tasks and write their reports. New lab partners will be assigned periodically. Lab instructors reserve the right to reassign lab partners at any time for any reason.

Each group will submit one lab report per lesson. Every student is expected to participate in all aspects of each lesson. Only one student per group should be writing in the lab report each week. This "scribe" must be

a different group member for each experiment. All group members should agree to the contents of the lab report before it is submitted for the week. Lab instructors reserve the right to penalize any individual student's grade if that student is not sufficiently participating in lab procedures or contributing to the report. If you feel a member of your group is not contributing, then please contact your TA.

Student Expectations

Lab procedures often rely on equipment that is expensive to replace or irreplaceable, and that is meant to be used by hundreds of students each semester. Students are expected to treat the lab equipment with extreme care. Broken or malfunctioning equipment must be reported to the instructor immediately. When lab is over, students are required to clean up their lab station and neatly arrange the equipment before leaving. For students in the last lab of the day, this includes powering down the computer and monitor at their lab station.

Using lab reports from other student's work from previous or current semesters is not allowed! Any student caught copying or referencing a report that is not theirs will receive a zero for that lesson and will be reported to the lab manager, department chair, and the university administration. The student may incur additional penalties in accordance with university policy. All reports will be cross-referenced with other reports via Turnitin to ensure academic integrity.

Students are expected to maintain a positive educational environment as outlined in the Student Code of Conduct. Violations of the Code will be reported to the University administration.

Grading

Each lab report is worth 100 total points. These points are broken down into the categories described below. For each category, points will be awarded in whole point increments. For example, a report could receive a completeness score of 13 or 14 out of 15, but not 13.5 out of 15.

Formatting/Layout (15 points) The lab report is written legibly and is well organized following the guidelines given in the lab syllabus. Questions are labeled with the numbers/letters provided in the lab manual and are answered with complete sentences. Data is organized in tables. All tables and graphs include a title, labels, and units.

Completeness (15 points) All tasks have been completed and all questions have been answered. All relevant data, graphs, and calculations have been included in the lab report. If there are many groups that cannot finish any given lab, this will be taken into account by the instructor when grading.

Data/Results (30 points) The data provided is relevant to the current experiment. All data is taken in a manner to reduce noise/outliers and maximize accuracy and repeatability. This may require taking multiple data runs and/or adjusting alignments or sample rates for equipment. Graphs are used when appropriate. All graphs are scaled appropriately and are easy to read and interpret. Trend lines and

equations are included when necessary. Data analysis is consistent with all data included in the report and all physics equations relevant to the lab.

***Physics Concepts/
Understanding***
(20 points)

The report shows a strong understanding of the physics concepts involved and the procedures and techniques that were carried out. Statements are backed up by evidence, including references to information from the lab manual or experimental results when relevant.

***Accuracy and
Implications***
(20 points)

The Accuracy and Implications sections have been completed using full sentences. Each section is 4 sentences or longer. Each section has been completed meeting the criteria given in the Writing a Lab Report section.

Questions about a score given for a lab report or pre-lab assignment can be discussed with the lab instructor. Discuss concerns privately with the lab instructor at the end of lab or at a time outside of lab. If you feel a score is inappropriate, you should explain why, in writing, and give this written explanation to your lab instructor within one week of when you received the score. Scores will not be reconsidered after the one-week time has passed.

Final lab scores will be based on the average scores of lab reports (85%) and pre-lab assignments (15%). If a lab or pre-lab assignment is missed and neither made up nor excused, it will be graded as a zero. To maintain uniformity across sections with different instructors, lab managers will scale grades for all students in specific lab sections. No grades will be scaled down. The lowest lab report and the lowest prelab assignment grades will not be dropped.