

Syllabus

PHYS 151-4, Mechanics, Spring 2018

Lab Schedule: Tuesday, 12:00 noon
TA: Anirvan Shukla
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Office: WAT 411
Office Hours: Thursday, 12:30 pm to 2:30 pm, in **WAT 421**
Website: <http://go.hawaii.edu/j5u>
Text: Harris, General Physics Laboratory I: Mechanics: Physics 151L and 170L, 2nd Ed.
(<https://he.kendallhunt.com/product/general-physics-laboratory-i-mechanics-physics-151l-and-170l-ebook>)

Student learning outcomes:

- Better understand physics concepts covered in lecture by seeing their application in experiments.
- To understand the importance of experiment as the basis of the scientific method.
- To obtain experience in the techniques employed by scientists in all fields for analyzing data and drawing conclusions from "real world" experiments.
- Report your result in a scientific fashion.

Preparation for the lab:

- Use two notebooks.
- On the book's front cover, print your name, class, section, and name of your TA. Also write table of contents at the beginning of each book, and have the pages numbered prior to use.
- Use a pen for all reports and quizzes.
- Read the lab instructions for the upcoming lab and bring the lab manual to class.
- Bring a scientific calculator, ruler, and tape.
- Wear closed shoes.

What to expect:

- The class will with a 10-15 min quiz, followed by a quick discussion of the answers.
- This is followed by a 30-40 min lecture from the TA. It is expected that the students interact and ask questions. This will make conducting the lab and writing the lab report more efficient.
- For the remaining ~2 hours, the students will conduct the experiments and start the data analysis. Students should pay close attention to the instructions of the TA and the lab manual. Careful experimentation will result in better data. If something is unclear, ask the TA for help.
- Every lab is 2:50 hours long. You are expected to be on time and you are expected to stay until the end of the lab. If you finish early, work on the lab report.
- A random group partner will be assigned every two weeks.
- Nobody should leave without the TA signing your data.

Format of Report:

The idea of the report is that you could go back to the report in a few months and would be able to repeat the measurements without any further instructions using only your report. Start with writing the experiment's title and your partner's name/s. The general structure should be as follows:

- **Objectives:** The purpose of the lab. The objective part should be very short; it should not be longer than two or three lines. Write it in your own words.
- **Notes/Theory:** Write and explain any derivations of formulas you used in the experiment as well as assumptions you made to modify these formulas. (Do not copy the lecture notes!)
- **Procedure:** Write in your own words each step of your experiment. Do not copy the procedure from the lab manual. Draw a sketch of any apparatus and label the different components used in this experiment.
- **Data input:** Include data tables, graphs (before printing any graph ask your TA to check the plot), and charts properly labeled with units. Please tape all extra sheets of paper to your notebook. The data should contain all the information that was given and measured during the experiment.
- **Calculations:** Transform your data into results. **Do not erase.** Write the formulas you are going to use in your calculation, explain what is that formula for, and then use it. Write **units** for all physical quantities. Not using units results in a deduction of points for your lab report.
- **Discussion of errors:** Discuss the systematic and statistical errors involved in your experiment.
- **Conclusion:** Write a conclusion in your own words. Write all your final results as follows: result \pm uncertainty. Your final result must include the error or uncertainty. Giving a measurement without the uncertainty has no physical meaning. Write **units** for all physical quantities. Not using units results in a deduction of points for your lab report. Explain whether the experiment fulfilled its objectives.
- **Questions:** Answer the questions assigned at the beginning of every class.

Grading:

Lab reports:

- Each student is expected to perform all experiments. Please see the rules for making up experiments below.
- Reports must be handed over to your TA at the beginning of each lab.
- The lab reports make up 60% of the grade. If a lab report is not submitted, the grade for the experiment is 0%.
- Penalties for late reports:
 - 1 week – 15% off
 - 2 weeks – The report will not be accepted → **results in one missed lab**

Quiz:

- A ten to fifteen minutes quiz will be given before every lab.
- Will have about five questions from the current lab and the previous lab.
- Prepare for the quiz by reading the relevant chapters from your lab manual, and going over the physics concepts used in the previous lab.
- The quizzes make up 40% of the grade.

Final grades will be curved over all sections. The typical outcome is approximately 25% A's, 40% B's, 35% C's and below. Every experiment/lab carries the same weight for the grade calculation.

Cheating:

- No cheating and copying is allowed. This includes copying data from another student.
- The groups will collaborate to conduct the experiment and also to start the initial analysis in the lab room together. However, the final analysis at home has to be conducted individually.
- No collaboration for quizzes.
- Anyone caught cheating would be given a zero for that lab/quiz (may also lead to an F grade for the course).

Being late:

- The lab has a strict late policy. Missing parts of the lecture can potentially result in safety hazards and damaging behavior to the equipment.
- It is within the discretion of the TA to decide if a late student will be allowed to conduct the experiment or fail the experiment.
- Generally, being late by more than 30 mins automatically results in a missed experiment that has to be made-up if the late arrival was excused with a reasonable explanation. Without a reasonable explanation the lab cannot be made up and the student receives 0% for the experiment.

Missed Labs:

- To receive full credit, a student must inform (email or call) his/her TA before or immediately after the missed lab. The student is responsible for arranging for a make-up experiment. The TA will assist the student with this process. The TA is not responsible for contacting the student after a missed lab to schedule a make-up experiment.
- If the TA was not contacted on the same day and the student cannot produce a doctor's note or any other evidence the lab cannot be made up. In this case, the student receives 0% for the experiment.
- A total of **two** make-up experiments is allowed. Any further misses will result in failing the course. Special circumstances requiring to soften this rule should be brought to the attention of the TA as soon as possible and will be decided on a case-by-case basis. The lab will be either made up in the other section of the TA or with another TA.
- In case of scheduling conflicts, it is the student's responsibility to make time for the make-up experiment. It cannot be expected that the TA will conduct the experiment exclusively with the student. Special arrangements will be found for missing a lab in the last week of the semester.
- On a case-by-case basis, the TA will decide if she/he will provide a make-up quiz as well.
- Making-up of missed labs will be during the same week or by the following week. If a student is excused for a longer period, special arrangements will be made on a case-by-case basis. This should be brought to the attention of the TA as soon as possible.
- **Only one lab can be missed without making it up to be able to pass the class.** This will result in a 0% score for both quiz and report. A second lab that is missed and not made up (see rules for make-ups above) will result in failing the course.