Physics 1310 Lab

Spring 2022

Section 06/CRN 45297

Class Time:	Wednesday 4:30 - 6:50 PM
Class Location:	Workman 105
Instructor:	Andrew Douglas
Contact Email:	andrew.douglas@student.nmt.edu
Office:	Workman 318
Office Hours:	By appointment - You may drop in any time I am in the office, but please email me beforehand to make sure I am available.

Course Goals

Labs are an important part of your general physics courses. Interacting with physics in the world around you helps solidify concepts learned in the lecture. After completing this course, students should gain a deeper understanding of the physical relationships described in lecture; understand the experimentation process, including writing down a theory, making observations, and analyzing data; develop the skills needed to write technical reports; and learn to successfully collaborate and document shared work. Proficiency in algebra, geometry, and trigonometry will be assumed.

Course Materials

Physics 1310 Lab manual (on canvas), calculator, and a notebook.

Policies

1. Please be ON TIME. I will give a short introduction to each lab at the beginning of class. If you are not there for this lecture, I will not repeat it for you.
2. Please set cell phones to vibrate mode during class.
3. Read the labs before coming to class. I reserve the right to give a pop quiz about the lab for that day!
4. A lab report that is turned in more than one week past the deadline, unless you have obtained my permission, is an automatic zero and cannot be dropped.
5. As a general rule, no make-up labs are allowed. You need to bring any issue with missing classes and deadlines to my attention well ahead of time for any consideration. There may be exceptions for emergencies on a case by case basis. I will require proof (such as a doctor's note) before accommodations can be made. (see Attendance section.)
6. Questions in class are encouraged, and questions out of class are always welcome! You can email me, stop by my office. When emailing me, please include your name, class, and section (or day/time).
7. Additionally, this syllabus is subject to change at any time, at the instructor's discretion.

Attendance

Attendance is **mandatory** as well as a significant portion of your grade! I expect you to attend every lab session. If you want to use an absence as your dropped grade (see Grading section below), you need to inform me of your absence **well in advance**. If your absence is due to an emergency, I will require proof (such as a doctor's note), and you may make up the lab by attending another section that **same week**, as long as I can get permission from another TA.

Grading

There are 13 labs all of which will have worksheets and there will only be 4 lab reports.The first 2 reports have 1 draft, while the last 2 report have 1 draft. For the first 2 reports I will make comments on the first draft and turn it back with a raw score. You then have a week to fix any mistakes and address any comments for your second draft. Only the score on your second draft counts towards your grade. For the final 2 reports there is only a final draft. You are expected to turn in your reports and worksheets three days after the Lab is completed. In general, no lab work past due more than a week will be accepted, but I may accept late submissions under extenuating circumstances. There are no makeup labs, but under extenuating circumstances, I may grant a request. The four labs with reports you will turn the worksheet in with your raw data sheet, but the work done on your worksheet will not be graded and any analysis done on the worksheet must be typed up in the report. The other 9 labs you will be graded on the worksheet.

1. At the beginning of the report, include the name of the lab, your name, the TA's name, the date, and the names of all your group members.
2. Introduction: write several sentences that describe the purpose of the lab (consider what the lab is about and what you are trying to accomplish).Do not copy from the manual!(5 pts).
3. Methods: this section should be a brief description of the lab set-up and procedures. (10 pts)
4. Data: include the raw data from the worksheet in this section, make sure to include units. (20 pts)
5. Analysis: Organize the data in clearly labeled tables (when necessary), and include any graphs (which also must be clearly labeled!). Any plots that include best fit curves must include the equation of the line or curve that is being fit to your data. Include your error analysis in this section of the report. Discuss your results and compare them to your theories and predictions. Provide sources of error and explain how they can affect your results.Make sure to answer any questions stated in the lab, with complete sentences.(40 pts)
6. Conclusion: Write a small paragraph discussing the results of your experiment(s) and describe the physics that you learned. (10 pts)
7. Presentation: I do not require a specific template, but make sure each section is clearly defined and all equations,graphs, and tables are neatly presented. (15 pts)
8. Draft:You must include your first draft with your final lab report.

Each report must contain the following:

1. **Heading:** At the beginning of the report, in the header, include the name of the experiment, your name, the TAs name, the date of the experiment, and the names of all your group members.
2. **Raw Data:** The data recorded during the lab on the Raw Data Sheet needs to be attached/stapled to your write-up. This is NOT considered the report itself. To receive full credit, the raw data has to be checked and signed by the TA before you leave the lab that day!
3. **Introduction:** Write several sentences that describe the purpose of the lab in your own words. What is the lab about and what are you trying to accomplish or learn? **DO NOT COPY STRAIGHT FROM THE LAB MANUAL!!!**
4. **Methods:** A brief paragraph describing the lab setup and procedures taken, including a labeled sketch or photo of the instrument setup. Do not use bullet points!
5. **Analysis:** Complete all tasks listed in the Analysis portion of the lab manual. If asked for in the lab manual, organize any data or results in clearly labeled tables and/or plots. Include sample calculations for each equation used in the analysis (e.g. if asked to calculate velocity, write down the general form of the equation, then use one data point to carry out the calculation, showing all work and including all units: $v = \frac{x}{t} \rightarrow v = \frac{5\,\text{cm}}{1.0\,\text{s}} = 5.0\,\text{cm/s}$). Also include any error analysis asked for in the lab manual.
6. **Discussion/Conclusion:** Discuss your results and compare them to those predicted by theory, both numerically and in words (using your error analysis here is quite useful!). Discuss possible sources of error and explain how they affect your results. Or, if the error is negligible, explain why in the context of the lab. Conclude with 1-2 sentences explaining if your results reflected the purpose and goals stated in your introduction.

7. **Presentation:** Your report must be written in a consistent tense, in complete sentences, and with proper grammar, punctuation, and spelling. All quantities must include their associated units. Any external help received or source used **MUST** be properly acknowledged.

Letter grades will be based on the following numerical scores (+/- grades given rarely at my discretion):
A: 90-100
B: 80-90
C: 70-80
D: 60-70

Academic Honesty

Please turn in your own work!!! New Mexico Tech's Academic Honesty Policy can be found in the NMT Undergraduate Catalog accessible on the school's website and is strictly enforced. You are responsible for knowing, understanding, and following this policy.
Labs are a group effort and I encourage you to discuss them with your labmates, but plagiarism will NOT be tolerated. Data obtained during the lab session will be the same within each group, as well as some of the data analysis, but all other sections of the lab report *must be your own work*. Any suspicion of a violation of the letter or intent of the NMT policy will be reported to the Lab Director, who will determine the appropriate charges to bring to the office of the Associate Vice President for Academic Affairs. In general, obtaining answers that in any way bypass the need to think about the assignment is a violation of the academic honesty policy and can have serious consequences. If you are ever in doubt, **ask me!!!** Do not turn in anything that is not from your own mind without giving proper credit. This includes any material from the lab manual!

Disability and Counseling Services

New Mexico Tech is committed to protecting the rights of individuals with disabilities. Qualified individuals who require reasonable accommodations are invited to make their needs known to the Office of Counseling and Disability Services (OCDS) as soon as possible. In addition, New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. The confidential services are provided free of charge by licensed professionals. To schedule an appointment, please call (575) 835-6619.

Emergencies and Campus Police

In the event of an emergency where we are required to evacuate the building, follow all of your TAs instructions. Our meeting place in an evacuation event is the small koi pond and fountain behind Workman. Please convene there so that I may verify everyone is safe.

In the event of any emergency where campus police must be notified, their emergency number is (575) 835-5555. If you need to contact their non-emergency line, the number is (575) 835-5011. The non-emergency services they provide include jump-starting dead car batteries, extracting keys locked in vehicles, safety escorts to anywhere on campus, assistance with dorm room lockouts, first aid, and more.

Note: A portion of the content of this syllabus was adapted from a document provided by Dr. Tina Güth for the NMT Physics Department.