

Physics 1320L

Section 01, CRN:45308

Spring, 2022

Workman 115

Monday, 2:00 pm – 4:20 pm

Instructor: Mariam Mojtabai

email: mariam.mojtabai@student.nmt.edu

phone: (505) 974-1479

Office: Workman 327

Office Hours: By appointment

Course Description: Experiments from the subject matter of PHYS 1320.

This course addresses a cross-section of the concepts introduced in the lecture. It introduces techniques for obtaining and analyzing experimental observations using diverse methods and equipment. In general, students are asked to report their activities and results clearly and concisely in formats ranging from "worksheets" to a formal Lab report write-up. The time spent outside of Lab on preparation, data analysis, and presentation will vary somewhat, but an average of no more than three hours of outside work per Lab is encouraged.

Pre-requisites: N/A

Co-requisites: Phys 1320

Mode of Instruction: This Lab is delivered face-to-face.

Course Schedule: Laboratory exercises are performed weekly. Their sequence is given in the Lab Manual. Preliminary material is covered during the first week of classes; the first Lab is performed during the second week.

Place in Curriculum: This course is a general education core course and part of the required Curriculum for all Tech's students.

Learning Outcomes:

- Acquire first-hand knowledge of the fundamental principles of Newtonian Mechanics.
- Learn basic techniques for obtaining and analyzing experimental data.
- Develop the skills needed to write technical reports.

Materials: The required Lab Manual is provided to you in PDF form; it has all the relevant information to perform each Lab. You are expected to read it before the Lab and bring it with you to the Lab. You are also expected to bring a laptop computer to perform some of the data analysis. Be ready to work with all needed materials (pencil, notebooks, Laboratory Manual, personal computer, etc.).

Grading: There will be a mix of lab reports and worksheets. For two of the lab reports, you will write a first draft that I will grade and hand back. Then you will write a final draft that will be due one week after you receive your graded draft.

We will also have prelab assignments: before each lab, read through the lab manual and write down one piece of equipment that we will be using in that day's lab. This will be turned at the beginning of class.

Each of these assignments will be worth:

- Lab reports: 100 points each
- Lab report drafts: 50 points each
- Worksheets: 75 points each
- Prelabs: 5 points each

At the end of the semester, the lowest grade will be dropped. This drop grade may also be used if you have an emergency or a pre-arranged absence.

Assignments are due one week after the lab session by midnight. They will be primarily turned in through canvas, but you may turn in physical copies if you need to.

The grade will be reduced by 5% for each day it is late, up to one week after it was due. Any assignment turned in more than a week late will receive an automatic zero and CANNOT be used as a drop grade.

Lab report format:

Your reports must be typed and each page numbered. They must be written using *complete sentences and paragraphs* with no bullet points. Though typing is preferred, you may leave space to hand-write derivations or draw sketches. However, if I am unable to read your handwriting, I will not grade it. You can receive extra credit by writing your reports in LaTeX. In order to receive the extra credit, submit the source code along with your lab report.

1. **At the beginning of the report:** include the title of the lab, your name, the TA's name, the date, and the names of all of your group members. (2.5 pts)
2. **Abstract:** A short (2-5 sentences) paragraph that summarizes what was done in the lab and the final results. (2.5 pts)
3. **Introduction:** Describe the purpose of the lab. This includes any background information on the topic and the goals of the experiment. It should not include the steps carried out during the lab. (10 pts)
4. **Methods:** A brief description of the experiments and procedures. (10 pts)
5. **Data:** Reorganize your data from your raw data sheet and add any other data that you think is necessary. (10 pts)

6. **Analysis:** Answer any questions asked in the lab manual. Add any figures and graphs that are required. All tables and figures **MUST** be labeled and numbered. 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. (35 pts)
7. **Discussion/Conclusion:** State and discuss your results along with their errors. Did they reflect your purpose and goals from your introduction? (10 pts)
8. **Raw Data Sheet:** The data recorded during the lab on the Raw Data Sheet needs to be attached/stapled to your write-up, with the TA's signature (this will count as your attendance as well). Data from the raw data sheet must be used in any calculations. (10 pts)
9. **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 should be properly acknowledged. (10 pts)

Attendance and Participation: Attendance is mandatory! Punctuality in attendance and completion of all assignments on time is required (see Grading for more details). If you are unable to attend a lab, you must inform me well in advance. You may be able make up the lab by attending another section that week, as long as you have both my permission and permission from that lab's TA. If your absence is due to an emergency and you are unable to attend another section, you may be able to use the week before finals to make up the missing lab. If you have to miss a lab due to quarantine, let me know as soon as possible so that we can make accommodations.

Rotation of individual roles in a team is required to ensure everyone's participation in the exercises. Make sure to get your instructor signs off your raw data before leaving the Lab.

Laboratory Policies: For safety, No food is allowed in the Lab; beverages should be carried in spill-proof containers. If you need to bring food, please step outside of the lab to eat. You are also expected to follow the instructions for each Lab carefully. Furthermore, It is required that you comply with the COVID-19 procedures given below for reducing the risk of transmission in the Lab. Make sure you read and understand them.

Approach all issues with professional courtesy and respect the efforts, opinions, and property of others. Disruptive behavior, including horseplay and reckless use of equipment, will not be tolerated. To minimize disruptions in the Lab, you are required to abide by the following rules of etiquette. **Cell phones should be set to vibrate or silent.** If you must take a call, please take it outside the Lab. If you are late, please try to keep the disruption to a minimum while joining your team.

NMT Academic Honesty: New Mexico Tech's Academic Honesty Policy for undergraduate and graduate students is found in the student handbook, which can be found at: <https://www.nmt.edu/studenthandbook/>. You are responsible for knowing, understanding, and following this policy.

Laboratory exercises are a group effort, and discussing the material with each other is encouraged. Unless your instructor specifically directs sharing data with other teams, only data you collect with your team can be shared within the team, which must be acknowledged. It is not permissible to

give or receive data for your analysis from any other source. Data obtained during the lab session is expected to be the same within each group (tables, graphs, etc.).

However, **your written assignment must be your own work**; any help received must be acknowledged, and proper citation of the utilized sources must be included. Plagiarism is not tolerated. 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 in doubt, please ask your instructor before submitting any work as your own.**

Reasonable Accommodations: 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 for Disability Services (ODS) as soon as possible. They will describe the process by which you can request such accommodations for this course. To schedule an appointment, please call 835-6209, or email disability@nmt.edu.

Counseling Services: New Mexico Tech offers individual and couples counseling, safety assessments, crisis intervention and consultations through The Counseling Center. These confidential services are provided free of charge by licensed professionals. For more information, please call 835-6619, email counseling@nmt.edu or complete an Intake Form on our website at <https://www.nmt.edu/cds/>. All services are provided via phone or Zoom during the Covid-19 pandemic.

Respect Statement: New Mexico Tech supports freedom of expression within the parameters of a respectful learning environment. As stated in the New Mexico Tech Guide to Conduct and Citizenship: "New Mexico Tech's primary purpose is education, which includes teaching, research, discussion, learning, and service. An atmosphere of free and open inquiry is essential to the pursuit of education. Tech seeks to protect academic freedom and build on individual responsibility to create and maintain an academic atmosphere that is a purposeful, just, open, disciplined, and caring community."

COVID-19 Safety Issues for Face-to-Face Instruction: According to current guidance from the Center for Disease Control, the State of New Mexico, and university officials (i.e., the President and the Board of Regents), NMT is requiring all students, faculty and staff to wear a mask in public indoor settings on New Mexico Tech property, including off campus offices. This expectation applies to all individuals, whether vaccinated or unvaccinated, unless they are alone in an office, lab, classroom, or residence hall room. Instructors and TAs will not ask for proof of vaccination. Please note that these provisions are subject to change as the situation evolves.

Students are still asked not to come to class if they are feeling ill and to follow any quarantine guidelines that they are given in the event of exposure to COVID-19. If you do miss class, please contact the instructor for missed assignments, contact the Student Health Center, and consider getting tested for COVID-19. For the most up-to-date guidelines, please consult NMT's COVID-19 information page: <https://www.nmt.edu/covid19/> .

Title IX Reporting: Sexual misconduct, sexual violence and other forms of sexual misconduct and gender-based discrimination are contrary to the University's mission and core values, violate

university policies, and may also violate state and federal law (Title IX). Faculty members are considered "Responsible Employees" and are required to report incidents of these prohibited behaviors. Any such reports should be directed to Tech's Title IX Coordinator (Dr. Peter Phaijah, 216 Brown Hall, 575-835-5880 (O), 575-322-0001 (C), titleixcoordinator@nmt.edu). Please visit Tech's Title IX Website (www.nmt.edu/titleix) for additional information and resources.