Syllabus & Guide for Physics 1310L

Department of Physics
NMT

Spring 2026

Contents

Disclaimer

Although the Instructor will try to preserve the general intent of the syllabus, the Instructor reserves the right to modify the letter of the syllabus to accommodate emergent situations during the semester.

Physics 1310L

Section 1, CRN:1000. This section meets on Mondays from 14:00 to 16:20 in Workman 115.

Instructor

Carlos Lopez Carrillo.
email: carlos.lopezcarrillo@nmt.edu
phone: 575.835.5047
Office: 111 Workman Bldg.
Office hours: Tue & Thu, 13:00–13:50; other times by appointment.

Grading

The final grade is composed as follows, but for relevant information, see the policies section below: A 100-point scale is used to grade papers and worksheets; points are converted to

Lab Reports	50%
Worksheets	50%

Table 1: Final Grade composition.

the NMT letter grading system (published in the current catalog) using the following table.

Points	[90,94]	[95,100]	
Letter Grade	A-	A	
Points	[80,82]	[83,86]	[87,89]
Letter Grade	B-	B	B+
Points	[70,72]	[73,76]	[77,79]
Letter Grade	C-	C	C+
Points	[0,59]	[60,66]	[67,69]
Letter Grade	F	D	D+

Table 2: Equivalence between points in a 100-point scale and letter grades as reported to the registrar.

Course Description

A series of laboratory experiments associated with the material presented in Calculus-based Physics I. Students will apply the principles and concepts highlighting the main objectives covered in coursework for Calculus-based Physics I.

The hands-on experiments in this lab offer the possibility to explore and gain a complementary perspective for the concepts introduced in the lecture. The lab introduces techniques for obtaining and analyzing experimental observations using diverse methods and equipment. Furthermore, the students have the opportunity to develop communication skills. 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 Lab on preparation, data analysis, and presentation will vary somewhat, but an average of up to three hours of outside work per Lab is encouraged.

Pre-requisites

N/A

Co-requisites

Phys-1310

Mode of Instruction:

This Lab is delivered face-to-face.

Place in Curriculum:

This course is a General Education Core requirement in Science. It corresponds to New Mexico Area III and satisfy Essential Skills in Quantitative Reasoning, Critical Thinking, and Personal and Social Responsibilities.

Course Learning Outcomes

By the end of this course, it is expected that students will have acquired first-hand knowledge of the fundamental principles of Newtonian Mechanics. In addition, the students should have learned basic techniques for obtaining and analyzing experimental data in a matter consistent with academic integrity. Furthermore, the students will develop basic communication skills to report experimental results.

Program Learning Outcomes

Apply quantitative analysis to scientific problems and Communicate scientific information.

Course Requirements

The required Lab Manual is provided to you; it has all the relevant information to perform each Lab. You are expected to read it before the Lab and bring it 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 (pencils, notebooks, Laboratory Manual, personal computer, etc.).

There will be four lab experiments for which you will be assigned a lab report; for the first two reports, you'll have the opportunity to submit a draft to receive feedback before you submit the final version. For the rest of the experiments, you will be assigned a worksheet. In contrast to the group effort during the experiments, all materials submitted for grading are individual efforts.

For safety, No food is allowed in the Lab; beverages should be carried in spill-proof containers. 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 to reduce the risk of transmission in the Lab. Make sure you read and understand them.

Attendance is mandatory. Punctuality in attendance and completion of all assignments on time is required. You are expected to submit your reports a week after the Lab is completed.

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

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 reserved for emergencies –no text. If you must accept a

call, please take it outside the Lab. If you are late to the Lab, please keep the disruption to a minimum while joining your team. Abusers may be asked to leave the Lab.

Policies

- The lowest grade on a worksheet is not counted toward the final grade. In contrast, all grades from Lab reports are counted.
- Lab reports are graded according to the rubric posted on CANVAS.
- In general, there are no makeup labs, but the Instructor may grant a request under extenuating circumstances.
- Under no circumstances are students allowed to take the Lab with a different TA –this is a FERPA violation.
- Excused absences. To be an excused absence, a legitimate note (e.g., a Medical note.) has to be submitted to the Instructor. At the Instructor's discretion, the student can prepare and submit the corresponding Report or Worksheet using only Instructor's provided data. No penalty is accessed in this case.
- Unexcused absences. Depending on the specific case, at the Instructor's discretion, the student may be allowed to submit the corresponding Report or Worksheet using only Instructor's provided data. In this case, however, a report can earn at most 80% of the grade, while worksheets only 50%.
- Late work. Lab work submitted late for grading but not more than a week past due will be accepted but will earn at most 80% of the grade. No lab work past due more than a week will be generally accepted, but at the Instructor's discretion, it may be accepted under extenuating circumstances.
- The use of generative AI tools (e.g. ChatGPT, Dall-e) is only permitted in this course for checking grammar and style. All other uses (e.g. Producing drafts for writing assignment, writing entire paragraphs or papers to complete assignments) are not permitted and violations to the academic honesty Policy.

Academic Honesty in the Physics Labs

You are responsible for knowing, understanding, and following NMT Academic Honesty –see paragraph below. 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.

Although Laboratory exercises are a group effort, discussing the material with each other is encouraged, and Data obtained during the lab session is expected to be the same within each group (tables, graphs, etc.), your written assignments must be your own work; any help received must be acknowledged, and proper citations of the utilized sources must be included (even for your own work, not specifically created for the assignment). Failure to properly acknowledge sources constitutes plagiarism and is not tolerated. *If in doubt, please ask your Instructor before submitting any work as your own.*

Only data you collect with your team can be used for work submitted for grading. Giving or receiving data for your analysis from any other source is not permissible unless your Instructor specifically directs sharing data, in which case the source must be acknowledged.

Course Schedule

Laboratory exercises are performed weekly. However, preliminary material is covered during the first week of classes, and the first Lab is performed during the second week. A tentative schedule is given below. An overview of the Lab exercises is given in the last section, but the Lab Manual is the main reference for working in the lab.

Table 3: Tentative Lab Schedule.

Week	Begins On	Note	Lab No.	Lab
1	01-19	First Week (MLK Monday)	-	Setup Contingency Plans
2	01-26		1	Vector Addition and Forces
3	02-02		2	Kinematics
4	02-09		3	Projectile Motion
5	02-16		4	Newton's Laws (part I)
6	02-23		5	Newton's Laws (part II)
7	03-02		6	Conservation of Energy
8	03-09		7	Binary System
9	03-16	Spring Break	-	No Lab
10	03-23	Midterm Grades Due(Monday, 23)	8	Collision in 1 & 2 D
11	03-30		9	Inelastic Collisions
12	04-06		10	Torque and Moment of Inertia
13	04-13		11	Rolling whitout Slipping
14	04-20		12	Angular Momentum
15	04-27		13	Harmonic Oscillations
16	05-04	Last Week	-	No Lab
17	05-11	Finals	-	No Lab

New Mexico Tech Services and Policies

Student Resources: Wondering where to go for help? Please see the offices below or visit the "Where NMT Students Should Go for Help" website.

NMT Academic Honesty: New Mexico Tech's Academic Honesty Policy for undergraduate and graduate students is found in the catalog (https://www.nmt.edu/registrar/catalogs.php/). Further information about academic honesty can be found on the Academic Affairs website: https://www.nmt.edu/academicaffairs/avpaa/academic_honesty.php
You are responsible for knowing, understanding, and following this policy.

Student Success: New Mexico Tech offers numerous services for students in need of academic assistance. This includes someone who can check their work or who could provide friendly advice. Several locations where this assistance is available includes the Office of Student Learning (Skeen Library, https://www.nmt.edu/osl/), Math Helproom (https://www.nmt.edu/academics/math/ugrad/mathhelproom.php), the Writing and Communication Lab (Skeen Library, https://www.nmt.edu/academics/class/center.php), and numerous department-run centers. **These services are free of charge to students!** Students may also consult the Dean for Student Success Initiatives, Elaine DeBrine Howell (Fidel, rm. 237; 575-835-5208; elaine.debrinehowell@nmt.edu) or may receive emails from her if they are struggling in class. Please visit the "Where NMT Students Should Go for Help" website for more information.

Reasonable Accommodations: New Mexico Tech is committed to protecting the rights of individuals with disabilities and providing access and full participation in the educational experience. Students with disabilities who require reasonable accommodations are invited to make their needs known to the Office for Student Access Services (SAS) as soon as possible. Accommodations are not retroactive and may take some time to implement. The process for requesting accommodations can be found at their website https://nmt.edu/ds/for_students.php.

You can contact SAS in person at the Fidel Center Room 245, call 575-835-6209, email access@nmt.edu or book through the link on their website.

Counseling Services: The Counseling Center has partnered with UWill, to provide students free, immediate access to teletherapy, a direct crisis connection, and wellness programming. UWill also offers students a direct crisis connection with help available 24/7/365. Students also have free access to on-demand wellness programming through UWill's platform, such as yoga, meditation, and mindfulness. In-person sessions on campus or this virtual healthcare are available for those degree-seeking students currently enrolled. Requests for on-campus counseling and UWill services are available on the counseling website (https://www.nmt.edu/cds/). The Counseling Center offers peer support with trained students, 'peer supporters', who understand the challenges of college and how to help navigate them. For more information on services at NMT, please call 835-6619, email counsel-

ing@nmt.edu.

Respect Statement: New Mexico Tech supports academic freedom and freedom of expression within the parameters of a respectful learning environment. As stated in the Student Code of Conduct Policy: "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." Furthermore, "Tech seeks to provide an environment that enables a positive learning experience and maintains an academic atmosphere that is a purposeful, just, open, disciplined, and caring community."

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 Phaiah, 238 Fidel Student Center, 575-835-5953 (O), 575-322-0001 (C), titleixcoordinator@nmt.edu) or reports can be filed online to Tech's Title IX ; Sexual Misconduct Report. Please visit Tech's Title IX Website (`www.nmt.edu/titleix`) for additional information and resources.

List of Laboratory Exercises

Vector Addition of Forces In this lab, we introduce vectors and demonstrate vector addition using a familiar vector quantity –force. We do this experimentally by using a force table, which allows three separate forces to be in *static equilibrium*. We also balance the forces graphically and mathematically.

Kinematics In this lab, we study the description of a particle's motion. The objective is to recognize constant velocity and various types of accelerated motion from looking at the track left by a moving particle.

Projectile Motion In this lab, projectile motion is studied with emphasis on the vectorial aspect of the equations of motion, which are decomposed into Cartesian components for their analysis. The range of a projectile is measured for different launch configurations and then compared to the values predicted by theory.

Newton's Laws –Part I In this Lab, we start the study of Newton's second and third laws of motion. The relevant variables, velocity, acceleration, and force, are measured using a computerized system for data acquisition. These measurements are performed on air track.

Newton's Laws –Part II In this lab, we continue the study of Newton's second and third laws of motion. As in the previous lab, the relevant variables, velocity, acceleration, and

force, are measured using a computerized system for data acquisition. In particular, we explore the Atwood's machine and static and dynamic friction coefficients.

Conservation of Energy In this laboratory exercise, conservation of energy is used to analyze the motion of a wheeled car "sliding down" a fancy ramp.

Binary System In this lab, we study the conservation of energy and momentum in a binary system that allows for orbital motion. The orbits of two spring-coupled masses are examined in the reference frame of their center of mass. Make sure that you bring your laptop for to this lab.

Collisions in 1-D and 2-D In this lab, momentum and energy conservation are investigated. Specifically, we examine elastic collisions in one and two dimensions, as well as partially and totally inelastic collisions in one dimension.

Inelastic Collisions In this lab, conservation of momentum is investigated in two kinds of inelastic collisions: the ballistic pendulum and the angular collision.

Torque and Moment of Inertia In this lab, the relationship between torque and angular acceleration is used to determine the moment of inertia of a disklike object with respect to its center of mass.

Rolling Without Slipping In this lab, the translational and rotational motion of an object rolling down a ramp are analyzed using the conservation of energy approach. The results are then compared to values obtained directly from the definition of the moment of inertia for each of the rolling objects.

Angular Momentum In this exercise, the conservation of angular momentum is investigated during the following situations: orbital motion, internal changes in the moment of inertia, and changes in orientation of the axis of rotation.

Harmonic Oscillators In this lab, the behavior of harmonic oscillators is investigated. The classic mass-spring system is studied under forced and unforced conditions. Simple and conical pendulums are also studied in this lab.