Physics 1320L

Section x, CRN:nnnnnn
Fall 2025
Workman 107
Day, time

Instructor: Instructor Name.
Office: RoomNuber Workman Bldg.
Phone: 575.835.5047
Email: `official.email@nmt.edu`

Office Hours: Days, hours; other times by appointment.

Course Description: A series of Laboratory experiments associated with the material presented in Calculus-Based Physics II. Students will apply the principles and concepts highlighting the main objectives covered in coursework for Calculus-Based Physics II.

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: Phys-1310

Co-requisites: Phys-1320

Grading: The final grade is composed as follows, but for relevant information, see the policies section below:

Lab Reports	50%
Worksheets	50%

A 100-point scale is used to grade papers and worksheets; points are converted to the NMT letter grading system (published in the current catalog) using the following table.

Letter Grade	F	D	D+	C-	C	C+	B-	B	B+	A-	A
100-point scale	[0,59]	[60,67]	[67,69]	[70,72]	[73,76]	[77,79]	[80,82]	[83,86]	[87,89]	[90,92]	[93,100]

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

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.

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 electro and magnetostatic phenomena. 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.

New Mexico Tech Services and Policy

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 counseling@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

Wave Superposition In this Lab exercise, we investigate standing waves on a string under tension to introduce the concept of superposition. Superposition is at the base of the study of electromagnetic phenomena and will be investigated in that context in a later lab.

Oscilloscopes This lab is a tutorial on oscilloscopes. It is introduced here in preparation for some of the labs dealing with signals that change in time. Nevertheless, it gives you hands-on practice with wave concepts like amplitude and frequency. The important concept of Voltage and its relationship to work is introduced later in the semester, but here it is used as an example of a time-varying signal.

Coulomb's Law In this lab, we investigate Coulomb's law using a torsion balance to measure the repulsion force between two charged spheres.

Electric Field and Superposition Principle This exercise uses a computer simulation to explore further the concept of superposition in the context of electricity. In particular, we study the resultant electric field from various charge configurations.

Electric Field Mapping This Lab exercise uses the electric equipotential lines to map the electric field produced by an electrode configuration.

Capacitors and Dielectrics In this lab, we use an LCR meter to measure the value of the capacitance for various geometries and the effective capacitance for capacitors connected in series and parallel. In addition, the effect of a dielectric material inside the parallel plate capacitor is also explored.

Ohm's Law In this lab, the relationship between the voltage across, and the current flowing through, a so-called Ohmic material is explored. The measuring techniques developed in this lab will be essential in the following labs.

Kirchhoff's Laws This lab explores the Kirchhoff's loop and node laws using direct current circuits. In this context, we also examine the voltage divider, a simple but widely used circuit.

Magnetic Forces This experiment investigates the magnetic field produced by an electrical current and the force exerted on moving charge by a magnetic field. These effects are described respectively by Ampere's Law and the magnetic force law. Furthermore, a hands-on demonstration of applying the right-hand rule is provided.

Magnetic Forces II In this lab, we investigate the magnetic force on individual charges. In the process, we estimate the charge-to-mass ratio for electrons.

Faraday's Law In this lab, Faraday's Law is applied to determine the magnetic field in a permanent magnet's gap and the inside of a solenoid.

Mutual Inductance In this Lab, we investigate the Mutual Inductance between two coils in a concentric configuration.

Displacement Current In this Lab, we investigate the displacement current through a Capacitor in an LR-circuit. We compare the displacement and conduction current in this circuit.

Tentative Schedule

Week	Begins On	Note	Lab No.	Lab	Requires	Student's Work Due
1	01-19	First Week (MLK Monday)	-	Setup Contingency Plans	Plans	
2	01-26		1	WaveSuperp	Draft & Final Report	
3	02-02		2	Oscilloscopes	In-Lab-Work-Sheet	Draft Report Due (Lab1)
4	02-09		3	Coulomb's law	WSheet	
5	02-16		4	ElectricField Super	WSheet	Final Report Due (Lab1)
6	02-23		5	ElectricField Mapping	WSheet	
7	03-02		6	Capacitors	Draft & Final Report	
8	03-09		7	Ohm's law	WSheet	Draft Report Due (Lab 6)
9	03-16	Spring Break	-	No Lab		
10	03-23	Midterm Grades Due(Monday, 23)	8	Kirchhoff's laws	WSheet	Final Report Due (Lab 6)
11	03-30		9	Magnetic Forces	Report	
12	04-06		10	Magnetic Forces II	WSheet	Final Report Due (Lab 10)
13	04-13		11	Faraday's Law	Report	
14	04-20		12	Mutual Inductance	WSheet	Final Report Due (Lab 12)
15	04-27		13	Displacement Current	In-Lab-Work-Sheet	
16	05-04	Last Week	-	No Lab		
17	05-11	Finals	-	No Lab		