

Physics I Lab (1230L & 1310L) Syllabus UNM-Valencia Fall 2024 Tuesdays 12 noon -2:45p Room A126

Professor: Clifton Murray (Mr., Professor, Dr.)

Instructor's Available Hours: Remotely, W Noon-4:00p wcmurray@unm.edu, In Person Thursday Room A126A 11:45a-12:15p, 1:15-2:45p, and by appointment

wcmurray@unm.edu 505-925-8727

Pre- or co-requisite: Algebra- or Calc-based Physics I (1230 or 1310)

Course Purpose & Description: Physics I Lab consists primarily of hands-on experiments designed to give the student a more intuitive grasp of topics discussed in class. The lab also gives the students the opportunity to test some physics principles for themselves, by measurement, direct observation or experience. Laboratory work also provides the student with the ability to correctly use measuring instruments, and with skill at propagating measured values and units through mathematical calculations. At the instructor's discretion, extra lab time may occasionally be used to answer questions from lecture, for recitation (practice problems), and/or as "overtime" for tests from physics lecture. But there will always be some hands-on lab work at the first of the lab period.

Credit Hours: 1.0 credit hour. The labs are structured such that you should be able to complete the lab work, including written reports when required, within the 2 hour and 45-minute lab period.

Course learning objectives: By semester's end, the student with a B or higher grade should be able to perform at least 12 of the following activities, including the bold-numbered items:

- 1) read analog instruments, including the meter stick, Vernier caliper, and mass scale, to correct precision.
- 2) correctly propagate measurements through calculations.
- 3) test, by experiment, certain formulas describing velocity and acceleration, and experience these phenomena directly,
- 4) use appropriate formulae and equipment to measure the acceleration of gravity (free-fall).
- 5) design and conduct an experiment to test the theory of ideal two-dimensional projectile motion.
- 6) test the 2nd law of motion by applying it to physical situations involving net force and acceleration.
- 7) calculate gravitational potential energy, power, and work from measurements taken of an actual physical process.
- 8) test the principle of conservation of mechanical energy in a low-friction environment.
- 9) find the coefficient of friction between two materials multiple ways, and in doing so confirm some of the analytical techniques which can be used for this purpose.
- 10) determine by experiment whether momentum and energy are conserved through elastic and inelastic collisions, respectively.
- 11) directly produce a centripetal force, and calculate centripetal force and acceleration.
- 12) directly experience effects of the law of conservation of angular momentum, and explain the behavior of selected rotating objects—including the students themselves--using that principle.
- 13) observe by measurement thermal energy transfer between materials, and test the veracity of formulas describing that transfer.
- 14) predict the period and frequency of a spring-mass oscillator and of a pendulum
- 15) determine the acceleration of gravity using a simple pendulum and its theory, and in so doing confirm the Simple-pendulum period formula.
- 16) Via written reports, communicate the scientific reasoning used and results found in lab investigations.

The professor reserves the right to create new laboratory exercises, based upon inspiration and/or new equipment availability. These may supplant non-boldface items in the above list. But any such new labs will either parallel or complement topics studied in lecture.

Academic dishonesty, including copying from another student's lab without having attended the activity, will be cause for a lowered grade or being dropped from the course.

Disruptive or unruly behavior, such as ridiculing another student or the instructor, will result in being expelled from the class.

Accommodations: Should you have a disability requiring special accommodation, please bring the instructor appropriate documentation from Accessibility Services. You can do an online search for UNM-Valencia Accessibility Services, and/or email Sarah Clawson at sjclawson@unm.edu, and/or call 505-925-8540.

Title IX: The University of New Mexico and its faculty are committed to supporting our students and providing an environment that is free of bias, discrimination, and harassment. The University's programs and activities, including the classroom, should always provide a space of mutual respect, kindness, and support without fear of harassment, violence, or discrimination. Discrimination on the basis of sex includes discrimination on the basis of assigned sex at birth, sex characteristics, pregnancy and pregnancy related conditions, sexual orientation and gender identity. If you have encountered any form of discrimination on the basis of sex, including sexual harassment, sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. You can access the confidential resources available on campus at the LoboRESPECT Advocacy Center (<https://loborespect.unm.edu>), the Women's Resource Center (<https://women.unm.edu>), and the LGBTQ Resource Center (<https://lgbtqrc.unm.edu>). If you speak with an instructor (including a TA or a GA) regarding an incident connected to discrimination on the basis of sex, they must notify UNM's Title IX Coordinator that you shared an experience relating to Title IX, even if you ask the instructor not to disclose it. The Title IX Coordinator is available to assist you in understanding your options and in connecting you with all possible resources on and off campus. For more information on the campus policy regarding sexual misconduct and reporting, please see <https://policy.unm.edu/university-policies/2000/2740.html> and CEEO's website.

If you are pregnant or experiencing a pregnancy-related condition, you may contact UNM's Office of Compliance, Ethics, and Equal Opportunity at ceeo@unm.edu. The CEEO staff will provide you with access to available resources and supportive measures and assist you in understanding your rights.

Lab Turn-In: Lab handouts with reports (if applicable) are due by the end of each lab, *viz.* no later than 2:45p.

Grading: Each lab will be accompanied by a worksheet handout, which will outline theory and procedures, and which will contain space for showing measurements, reasoning, calculations, and answering questions. The professor will go over the worksheet before actual measurement, data recording, calculations, etc. begin. The worksheet will be turned in at the end of the lab for scoring. The score is based on the worksheet as well as lab attendance and participation.

The overall course grade will be determined according to the following points-earned scheme, given here as a percentage:

$97.5 \leq x \leq 100\%$	A+	(unless a lab is missed.)
$92.5 \leq x < 97.5$	A	
$90 \leq x < 92.5$	A-	
$87.5 \leq x < 90$	B+	
$82.5 \leq x < 87.5$	B	
$80 \leq x < 82.5$	B-	
$77.5 \leq x < 80$	C+	
$72.5 \leq x < 77.5$	C	
$70 \leq x < 72.5$	C- *	
$60 \leq x < 70$	D	
Below 60%	F	

*Note that a C- grade may not satisfy the prerequisite for a future course or degree. For example, a C- in this lab will not qualify you to take Phys 1240 L. It is your responsibility to know whether this applies to other courses you intend to take.

**No incomplete ("I") grades will be given.