Physics 216N: Physics Laboratory I with Calculus

Fall 2023

Instructor: Brianna Beller

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Office Hours: Mondays 2-3pm, and by appointment

Overview

This class is designed to give you a sound introduction to classical experimental physics. This will include studying some basic concepts in physics, developing problem-solving skills, learning laboratory techniques, and some basic programming skills for data analysis. It is essential that you keep up from the start as the concepts in this course build on each other. Co-requisite to this course is PHSX 215N.

Learning Objectives

The goals of this course are:

- To learn how to properly take measurements and record data.
- To learn how to interpret results both statistically and graphically.
- To experimentally confirm theories presented in lecture.

Course Expectations

There will be 11 two-hour labs during the semester. You are expected to have read through the lab instructions and to have completed the associated pre-lab quiz prior to the lab. Pre-lab quizzes are taken on Moodle; they will open at 8am on Thursday and close at 11:59pm on Monday.

You will be required to attend the labs, take measurements, analyze the data, then either write up a full lab report *or* take a post-lab quiz for each lab.

Two of the labs will require a full lab report. Each student must submit their own lab report written *in their own words* (not the words of a lab partner or the lab handout).

The other nine labs will have post-lab quizzes, which are taken individually during the first 15-20 minutes of the following lab period. When you arrive for the quiz you are expected to be prepared to state your results and show your work.

Grading

The grading for the course will be broken down as follows:

Pre-lab quizzes:	**10%**	*(lowest score dropped)*
Post-lab quizzes:	**65%**	*(lowest score dropped)*
Lab reports:	**25%**	

Final course grades are assigned based on the final distribution of total scores. Students will not be given a lower grade than what is traditionally assigned to a given final percentage, e.g. a grade of 80% will be *at least* a B-.

The course can only be taken with the traditional grading option, i.e. it cannot be taken on the credit/no credit basis.

Drop/Add Policy

You can find the University's policy on registration changes at the Office of the Registrar's website.

Academic Honesty

Students at the University of Montana are expected to practice academic honesty at all times. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Code of Conduct.

Accessibility Statement

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at 406-243-2243 or ode@umontana.edu, or visit the Office of Disability Equity website for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish.

Land Acknowledgment

The University of Montana acknowledges that we are in the aboriginal territories of Seliš (Salish) and Qlispé (Kalispel) people. We honor the path they have always shown us in caring for this place for the generations to come.

Course Schedule

PHSX 216N

(subject to change)

Week	Lab	Important Dates
Week 1 *Aug 28-Sept 3*	NO LAB	
Week 2 *Sept 4-10*	Measuring Instruments & Error Analysis	M – Labor Day *[no classes, offices closed]* M – Measuring Instruments & Errors pre-lab quiz due
Week 3 *Sept 11-17*	Acceleration Due to Gravity	M – Acceleration Due to Gravity pre-lab quiz due Tu/W– Measuring Instruments & Errors quiz *(in class)*
Week 4 *Sept 18-24*	Projectile Motion	M – Projectile Motion pre-lab quiz due Tu/W – Acceleration Due to Gravity quiz *(in class)*
Week 5 *Sept 25-Oct 1*	NO LAB	
Week 6 *Oct 2-8*	Uniform Circular Motion ***FULL LAB REPORT***	M – Uniform Circular Motion pre-lab quiz due Tu/W – Projectile Motion quiz *(in class)*
Week 7 *Oct 9-15*	Hooke's Law	M – Hooke's Law pre-lab quiz due Su – Uniform Circular Motion Lab Report due at 11:59pm
Week 8 *Oct 16-22*	Ballistic Pendulum	M – Ballistic Pendulum pre-lab quiz due Tu/W – Hooke's Law quiz *(in class)*
Week 9 *Oct 23-29*	Collisions	M – Collisions pre-lab quiz due Tu/W – Ballistic Pendulum quiz *(in class)*
Week 10 *Oct 30-Nov 5*	NO LAB	
Week 11 *Nov 6-12*	Moment of Inertia ***FULL LAB REPORT***	M – Moment of Inertia pre-lab quiz due Tu/W – Collisions quiz *(in class)* F – Veterans Day (Observed) *[no classes, offices closed]*
Week 12 *Nov 13-19*	Archimedes' Principle	M – Archimedes' Principle pre-lab quiz due Su – Moment of Inertia Lab Report due at 11:59pm
Week 13 *Nov 20-26*	NO LAB	W – Student travel day *[no classes]* Th/F – Thanksgiving holiday *[no classes, offices closed]*
Week 14 *Nov 27-Dec 3*	Standing Waves	M – Standing Waves pre-lab quiz due Tu/W – Archimedes' Principle quiz *(in class)*
Week 15 *Dec 4-10*	Thermal Expansion	M – Thermal Expansion pre-lab quiz due Tu/W – Standing Waves & Thermal Expansion quizzes *(in class)*
Week 16 *Dec 11-17*	NO LAB	(Finals Week)