

GENERAL PHYSICS I LABORATORY

Prerequisites: Concurrent registration in PHY 130 is required. Knowledge of algebra-level math is both required and useful. If you feel you have a weakness in math, please see me about it.

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Office Hours: MWR 10:00 - 10:30 a.m. & MWR 1:00 - 1:30 p.m. Feel free to come by and see me at any other time too! If I'm in my office, I'll be glad to help with any questions or concerns you may have.

Objectives: As you go through the lab experiments, you will learn how to:

- Design and set up small experiments
- Measure and record data for analysis
- Analyze experiments experimentally, graphically and analytically
- Compare and discuss your predictions with the experimental outcomes
- Work in a team to complete each assignment.

Outcomes: Through this course, you should be able to

- Use basic measuring instruments to make and analyze simple measurements
- Develop and apply the rules of vector addition using a Force Table
- Predict, draw and analyze graphs of accelerated motion, and calculate the acceleration of a glider on a frictionless air-track using kinematics equations
- Analyze Newton's 2nd law using graphical and analytical methods of data analysis
- Develop concepts of static and kinetic friction; graph the relationship between kinetic friction and Normal forces; calculate the coefficients of friction for wood on wood interaction.
- Compare theoretical predictions and experimental observations of momentum conservation
- Study the behavior of simple machines, including the inclined plane and the pulley
- Investigate the law of conservation of mechanical energy for frictionless, accelerated motion
- Develop and apply the definition of torques and balance for rigid body equilibrium
- Analyze Newton's 2nd law for rotational acceleration for the case of a rotating disk
- Design an experiment to observe and analyze the behavior of a simple pendulum and an oscillating spring.

Textbook: There is no required textbook for this course. For each lab experiment, you will be provided a lab manual, which will not only help you complete the experiment, but will also assign questions to be answered in your lab reports.

Requirements:

- a) Attendance at all lab sessions is mandatory. **You must come to class on time!**
- b) Make sure you take all required data during the allotted lab time.
- c) **All data sheets must be signed by the instructor** before you leave the lab.
- d) Each group working on an experiment should hand in one lab report.
- e) **One original, signed data set should be attached to the lab report.**
- f) No collaboration allowed on quizzes and individual submissions.
- g) **If you miss 2 or more lab experiments during the semester, you will receive an F grade!**

Reports: For a few experiments, you will be required to hand in a standard lab report to be completed by the group. These reports should be in the format and order specified below -

- a) A cover page with the experiment title, names, and sections number.
- b) A one-page write-up of the experiment, including the objectives and methods.
- c) Data tables and experimental values - complete, neat and labeled.
- d) One set of sample calculations, with equations used and units involved.
- e) All required graphs and calculations - values tabulated, graphs neatly labeled and analyzed.
- f) Answers to all questions asked in the lab manual.

h) One set of signed, original data sheets from the lab experiment.

For other experiments, you will be instructed on the format of the group report required. All reports are due at the beginning of the next lab session, unless otherwise specified. **Late reports will not be accepted!** Reports form 70% of your final grade.

Quizzes: There will be a series of quizzes during the semester. These quizzes will form the individual component of your grade. Most quizzes will be given at the beginning of the lab session. You will be quizzed on material from the preceding week's laboratory. The format of the quizzes may vary. Quizzes form 30% of your grade.

Grading: Each report will be graded out of 20 points. Generally, a score of 16/20 and above is considered a good score, leading to a letter grade around B or better

Grades:

93-100	: A	71-76	: B-
88-92	: A-	65-70	: C
83-87	: B+	60-64	: D
77-82	: B	<59	: F

Remember:

September 13	: Last day to add a class
October 1	: Last day to drop a course without a "W"
October 26	: Mid-term grades due
November 22	: Last day to withdraw from class

Honesty: The fundamental assumption under which the University operates is that work submitted by a student is the product of her or his own legitimate efforts. In other words, make sure the assignments (homework, exams etc) you submit reflect your own work! Any student suspected of cheating or plagiarism will be dealt with according to the policy set out in the Engineering and Science Student Handbook.

Schedule: A tentative schedule of the experiments to be completed during the semester is given below. This may be revised from time to time.

WEEK	EXPERIMENT	COMMENTS
Sep 13	Introduction to Measurements	
Sep 20	Uniform Motion	
Sep 27	Uniformly Accelerated Motion	
Oct 4	Newton's Second Law	
Oct 11	Forces as Vectors	
Oct 18	Friction	
Oct 25	Conservation of Momentum & Work-Energy Theorem	Each group will work on one of the two experiments.
Nov 1	Conservation of Momentum & Work-Energy Theorem	Switch experiments this week.
Nov 8	Conservation of Energy	
Nov 15	Equilibrium of a Rigid Body	
Nov 22	No Experiments this Week	Thanksgiving Holiday
Nov 29	Torque & Rotational Acceleration	
Dec 6	Simple Harmonic Motion	