

PHYSICS 4A LABORATORY SYLLABUS-SPRING 2017

COURSE/UNITS: PHY 4A / 4 units
INSTRUCTOR: Laura Fatuzzo
OFFICE:
EMAIL: lfatuzzo@hartnell.edu

SEMESTER: Spring 2017
PHONE: (831) 770.7017
OFFICE HRS: M, W: 11:00-11:50 AM
F: 10:30-11:30 AM

LAB-ROOM MEETING TIMES & LOCATION

PHY-4A- 1151 - THU 11:00 AM - 1:50 PM IN ROOM S208

PHY-4A- 1152 - THU 2:00 PM - 4:50 PM IN ROOM S208

CATALOG DESCRIPTION:

Lectures and laboratories covering vectors, particle kinematics and dynamics, work, energy, momentum, angular momentum, conservation laws, rotation of rigid bodies, torque, Newton's Law of Gravitation, oscillations, statics, and dynamics of fluids. Required for engineering and physical science majors. Strongly recommended for math majors.

SLO FOR LAB:

Given appropriate direction, the student will be able to set up laboratory equipment safely and efficiently, plan and carry out experimental procedures, identify possible sources of error, implement techniques that enhance precision, reduce and interpret data by hand and/or using computers and report verbally and in written language the experimental data, results and conclusion.

LAB CONTENT (TENTATIVE):

1. Measurement and Graphing	9. Conservation of Mechanical Energy
2. Acceleration of Gravity	10. The Simple Pendulum
3. Vector Addition of Forces	11. Inelastic Collisions
4. A Projectile Motion Simulation	12. The Ballistic Pendulum
5. Drag force on Coffee Filters	13. Balanced Torque and Center of Mass
6. Newton's Second Law	14. Rotational Dynamics
7. Newton's Third Law	15. Density and Archimedes' Principle
8. Centripetal Force	16. Simple Harmonic Motion

PHYSICS LABORATORY GUIDELINES

I. LAB MATERIALS

- Lab Manual, to be purchased from bookstore to be brought to each laboratory session
- Quadrille notebook (notebook with squares, not lines) to be brought to each laboratory session
- 15-cm clear plastic ruler to be brought to each laboratory session
- Protractor to be brought during the lab on vectors
- Glue stick to be brought to each laboratory session
- 3 or 4 colored pencils to be brought to each laboratory session

Note: part of your lab grade will include "lab preparedness points". You need to bring the materials listed above (except protractor) to lab beginning the second week of school to earn preparedness points.

II. LAB NOTEBOOK

You need to keep a lab notebook (quadrille) for the lab. The notebook must include the following:

- **Front Cover:** Name, section number
- **First Page:** Table of contents
- **Second and Third Page:** Sheet on safety (see last two pages of this handout)
- **Fourth Page:** Significant Figures
- **Fifth Page:** Errors

In your notebook, for each experiment performed, you need to write a brief written lab report that is due at the end of the lab period. To earn full credit, the report needs to include the following:

1. **Heading:** Date and title of the experiment
2. **Purpose:** One or two sentences describing what you are trying to accomplish with the experiment.
3. **Procedure:** A two-to four paragraph explanation, in complete sentences, of how the data was obtained and what equipment was used to do the experiment.
4. **Sketches or diagrams:** Include sketches or diagrams if requested by your instructor. Use the ruler and colored pencils when drawing them.
5. **Data:** Data taken during the experiment and calculated values are to be displayed in neat tables and graphs as instructed in the write-up or your instructor. Often you will be using Excel.
6. **Calculations:**
 - a. **If asked to use Excel,** include two print-outs: one with the values and one showing the formulas used.
 - b. **If you are not asked to use Excel,** include a sample calculation for each different formula used. Each sample calculation should contain three lines as shown in the sample below:

$$A = 4 \pi r^2 \quad \text{(formula used)}$$
$$A = 4 \pi (6.32 \text{ cm})^2 \quad \text{(substitute data from your experiment)}$$
$$A = 502 \text{ cm}^2 \quad \text{(final result of calculation)}$$
 - c. Be sure to include units in your calculation and include the proper number of significant digits in your results
7. **Questions:** Answer all questions if asked in the write up or by the instructor, using complete sentences.
8. **Conclusions:** Write the conclusion using complete sentences following the directions given in the write-up or given by your instructor.

III. LAB GRADING POLICY

Your instructor will review and grade your lab report before you leave the laboratory, or will collect the notebooks at the end of lab if running late, as decided by the instructor. You must complete the lab reports by the end of the lab period unless your instructor gives you permission to hand it in later. Each lab report will be worth 20 pts, except for when the lab is divided in two lab periods, and then the report may be worth up to 40 pts. Since each lab varies from the other, the breakdown of points will vary as well. However, here are some general points to consider:

- a. **Preparedness:** Your instructor will check that you have brought to lab the required materials such as the lab manual, notebook, glue stick, and 15cm ruler. You need to present your work with everything glued in your notebook or you may lose points
- b. **Completeness:** You must have satisfactorily completed the items listed on the previous page.
- c. **Neatness and general readability.** You may be deducted for sloppy or illegible work.
- d. **Indication that you really understand what you did.** The instructor may ask questions throughout the lab to check for understanding.

NOTE: At the end of the semester, your instructor will collect the lab notebooks and will assign a grade based on organization, neatness, and completeness of your lab notebook as a whole. This is worth 25 pts. Your lab notebooks will be returned to you.

IV. LAB QUIZZES

Lab quizzes may be given at any time. Lab quizzes are worth from 5-15 pts.

V. OTHER TYPES OF LAB ACTIVITIES

Lab time may be used for group work and study-/reading- skills activities, videos, discussion etc. These activities will be worth from 5-15 pts.

VI. LAB GRADE

Your overall lab grade will be 20% of your overall class grade. The overall lab grade will include lab report points, notebook points, lab quizzes, pre-lab study guides, and all other work done in lab and pertaining to the lab.

VII. COMING TO LAB LATE

If you are late for lab and the instructor deems you have missed too much of the lab, the lab may be counted as a missed lab. No labs or lab quizzes can be made up.

VIII. MISSING A LAB

If you are unable to attend a lab, notify the instructor BY EMAIL BEFORE LAB. Labs and lab quizzes CANNOT BE MADE UP. The lowest lab grade will be dropped. If you do all the labs, you will earn bonus points.

IX. VISITORS

Because of liability issues, no visitors are allowed during lab, including friends, family members and children.

X. LAB GROUPS

The instructor may choose to assign you to a different group each week to ensure that you experience collaboration with others, and to ensure that everyone does his/her fair share of the work.

XI. CHANGES TO LAB WRITE-UP: THE INSTRUCTOR MAY MAKE CHANGES TO THE LAB WRITE UP AS DEEMED APPROPRIATE

XII. IMPORTANT: NO ONE WILL BE GIVEN A PASSING GRADE IN THE COURSE UNLESS AT LEAST $\frac{3}{4}$ OF THE REQUIRED LAB REPORTS ARE SATISFACTORILY COMPLETED BY THE END OF THE SEMESTER.

XIII. IMPORTANT STATEMENT

THE ABOVE SCHEDULE, POLICIES, PROCEDURES, AND ASSIGNMENTS IN THIS COURSE ARE SUBJECT TO CHANGE IN THE EVENT OF EXTENUATING CIRCUMSTANCES, BY MUTUAL AGREEMENT, AND/OR TO ENSURE BETTER STUDENT LEARNING.

DO NOT ASK ME, THE INSTRUCTOR, TO BEND THE RULES FOR YOU, MAKING IT UNFAIR TO THE REST OF THE CLASS.