PHYSICS 2341 Physics I Laboratory

Spring 2023

Class Web page: https://jpastro.net/PHYS2341/syll-Phys2341.html (this page!)

Instructor: **Dr. Jason Pinkney**
Office hours in 111 Science Annex at these times : 9-11am(R), 10am(T), 1-3pm(T).
Email j-pinkney@onu.edu or call 419-772-2740.
Instructor's Home page: https://jpastro.net

Section CRN, Time and Place:
PHYS2341-06 CRN: 30785, Time and place: Thur 12:00-2:45 pm, Meyer 121 (TA=Jeff Baker)
PHYS2341-07 CRN: 30787, Time and place: Thur 3:00-3:45 pm, Meyer 121 (TA=Peyton Burden)

Course Description:
This is the lab associated with Physics 2311 (Physics I) and Physics 2111 (General Physics 1). The student will perform experiments in Newtonian mechanics (projectile motion, collisions, conservation of energy, etc), Oscillatory motion (the pendulum), and thermodynamics (specific heat, thermal expansion).

Prerequisites: You should, ideally, be taking PHYS 2311 (or PHYS 2111) concurrently with this lab. It is also acceptable to have already taken PHYS 2311 (or PHYS 2111).

Course Objectives: At the end of the course, students will be able to:

- Use the scientific method of inquiry in order to complete data collection, analysis, and interpretation.
- Apply principles of Newtonian mechanics, oscillations and thermodynamics to explain natural physical processes such as freefall, collisions, pendulums, thermal expansion and heat transfer.
- Understand the procedure and instructions to carry out the experiments.
- Use the appropriate physical principles, mathematics, and error propagation to analyze data.
- Quantify uncertainties in measurements using instrumental resolution, standard deviation, fractional errors, and fractional discrepancies.
- Interpret and communicate the results of the data analysis.

Manual and notebook: You need to buy the orange manual "Experiments in Mechanics, Waves, and Thermodynamics", the Physics I lab manual, for $13. You will also need to get a quad-ruled notebook for writing up your labs. We sell the notebooks for $2 although you can buy one elsewhere. Buy your lab manual and notebook ($15 total) from the instructor on the first day of class. Bring cash, preferably exact change. If that fails, then find Dr Pinkney during his office hours in SciAnx 111 before the 2nd lab meeting.

EXTRA Materials

Error Propagation rules.
Example of error propagation (applied to calorimetry). In this PDF file, I have taken a student's lab measurements (top left side) and used them to calculate the specific heat of copper, C_{Cu}.
Hyperphysics A nice supplement to your textbook which can be used to review concepts and equations.

Grading:
Your final letter grade is determined based on the average of your lab report scores. Each lab is scored out of 10 points. The scores are determined by your TA with guidance (a rubric) from your instructor. The instructor will take the scores from the TA and convert them into a grade. Typically, 90% and up is an A and 80-90% is a B. However, if the class mean is very high compared to other sections, the instructor may adjust the A-B cutoff. Usually, if any change is made, the cutoff is lowered to 89 or 88. But the cut-off could be raised to 91 or even 92% in order to keep different sections consistent.
Here is a rubric showing deductions for problems with lab reports.