



General Physics I Laboratory  
PHYS 2051-2  
Fall 2020  
August 24<sup>th</sup> – December 11<sup>th</sup>  
Wednesday  
12:00pm – 2:40pm  
LAB – 3<sup>rd</sup> floor at HLC, room AC303

**NO FINAL EXAM**

Welcome to PHYS 2051 – General Physics I Lab!

We will be using standard lab practices

- Experimental goals will be presented at the BEGINNING of lab
- You will be given the rest of the period to meet these goals and record your observation
- A summary lab report will be due at the BEGINNING of the next lab period.

\*\*The lecture (PHYS 2050) is a separate course

#### INSTRUCTOR INFORMATION

**Instructor:** Nathan J. Dawson

**Email:** [ndawson@hpu.edu](mailto:ndawson@hpu.edu)

**Office:** AC 311A

**Virtual office hours:** Tues and Thurs 10:30am – 12:00pm

#### COURSE INFORMATION AND REQUIREMENTS

**Course meeting location:** All classes will meet in **AC303** at Hawaii Loa Campus.

**Course meeting time:** 12:00pm – 2:40pm.

**Required Resources:** Sovereign, grid lined lab book.

#### COURSE DESCRIPTION

**Course Description:** This is the laboratory component of PHYS 2050. A physics lab is where the basic behavior of reality is studied by proscribing and conducting properly constructed experiments. Experiments in mechanics will be conducted and recorded in your experimental journal. Scientific method will be discussed in instructor and student discourse.

**Prerequisite:** Completion of or concurrent enrollment in PHYS 2050.

**Method of Instruction:** This is a hands-on laboratory course

**Learning Outcomes:**

By the end of the course, students should be able to:

- Follow experimental procedures laid out for them.
- Describe the physics of basic classical mechanics systems.
- Communicate scientific observations.
- Demonstrate competency with scientific set up and mathematical relationships.
- Learn to evaluate the quality of science being performed by a third party.

#### ASSESSMENT, GRADING SCHEME, and COURSE SCHEDULE

There are 11 labs, all related to carrying out experiment concerning the lecture material. Your grade will breakdown as follows:

**Lab Journal** will consist of your notes and data from participation in the laboratory. This is what you will use to generate your summary reports. It will be turned in at the end of the term for participation. Remember, science is

messy! Don't worry about making mistakes in here. This is where you want to record "what happened." Your summary report will be the one with the final clean analysis.

**Summary lab reports** are to be completed and turned in one week after the completion of a lab requiring a summary lab report. I will designate the lab as requiring a summary lab report at the beginning of that laboratory assignment. **You must include all assignment requests written in blue in your report and in the lab notebook.**

*Grading scheme for in-person laboratories*

Participation/Lab journal	20%
Labs (5 reports – 16% each)	80%

A	92 – 100%
A–	90 – 91%
B+	87 – 89%
B	82 – 86%
B–	80 – 81%
C+	77 – 79%
C	72 – 76%
C–	70 – 71%
D+	67 – 69%
D	60 – 66%
F	0 – 59%

**Course Schedule:** (Student learning objectives for each chapter are assessed on the respective labs)

Wk date	Topic	Activities & Assignments	Backup simulation assignments
08/26	Overview of expectations; Lab notebook and lab format	Syllabus, safety agreements	
09/02	Units, Precision and Error	LAB 1 – Measurement, uncertainty, propagation of error, graphing, & linear regression	O-LAB 1 – Measurement, uncertainty, error, graphing, & regression
09/09	Binning, Variation, Reference, Control	LAB 2 – Darts, statistics, and the normal distribution	O-LAB 2 – Projectile motion
09/16	Motion in two dimensions	LAB 3 – Projectile motion	O-LAB 3 – Hooke's law
09/23	Frames, Vectors, and Newton's 1 <sup>st</sup> law	LAB 4 – Forces as vectors	O-LAB 4 – Kinetic and potential energy
09/30	Static and dynamic friction	LAB 5 – Friction	O-LAB 5 – Collisions
10/07	Work done by gravity	LAB 6 – Work and kinetic energy	O-LAB 6 – Rotational motion
10/14	Spring potential energy	LAB 7 – Conservation of mechanical energy	O-LAB 7 – Gravitational force
10/21	Conservation of linear momentum	LAB 8 – Elastic and inelastic collisions	O-LAB 8 – Pressure and fluids
10/28	Torque and moment of inertia	LAB 9 – Torque and rotational motion	O-LAB 9 – Simple pendulum
11/04	Conservation of angular momentum	LAB 10 – Angular momentum	O-LAB 10 – Transverse waves
11/11	<b>Veteran's day</b>	<b>Holiday – No Laboratory</b>	
11/18	Simple Harmonic Motion	LAB 11 – Spring-mass oscillations	O-LAB 11 – Sound waves
11/25	Standing waves, sound, and resonance	LAB 12 – Resonant waves in pipes	O-LAB 12 – States of matter
12/02	Final laboratory meeting	Turn in your laboratory journals	

In the event that a laboratory assignment is missed due to illness or a University-wide shutdown, there will be 11 supplemental simulation labs (O-LABs) available. If the lab report is missed due to a situation occurring as described above, then two supplemental simulation labs will be required to make up the missing report, i.e., worksheets are worth **8%** each of your total laboratory grade (subject to approval). Students must obtain approval from the instructor with an excused absence prior to the simulation laboratory worksheets being used as a replacement for a report from an in-class laboratory assignment. All sets of data in the replacement simulation assignments must also be present in your laboratory notebook at the end of the year.

## INSTRUCTOR POLICIES AND EXPECTATIONS

### Attendance and Participation:

- One must attend class to do each lab. If you are excused from meeting in lab, then simulation assignments will act as replacements to the in-class laboratory assignments as described above.
- Each student will keep their own lab journal even if working in groups. Lab journals should not be redone at the end of the semester, but be kept as one would a diary.
- Participation will be assessed throughout the lab by interaction with the instructor. When asked: "What have you discovered?" or "What have you learned?" A response is required.

**Instructor availability:** I will be available in my office after each laboratory. If this is not an option, students are encouraged to visit any of my office hours and send emails to me using [ndawson@hpu.edu](mailto:ndawson@hpu.edu). I will check email at least once per day and respond as necessary within a 24 hour period. I should receive your email, but if you do not receive a response within this time-frame, send a follow up email in case I did not receive the original email.

**Make-up Work:** All absences, periods of time when a student is unable to complete course work due to a reason such as illness, military duty, or family emergency, must be coordinated with the instructor. Students should make every effort to notify the instructor **PRIOR** to the absence. If you are unable to notify the instructor prior to your absence, then please send the notification as soon as possible after the absence.

**Late Work:** Assigned work from an in-class laboratory assignment is due the following week. In-class laboratory assignments will be docked 1 point (out of 16 total points) for each day late. Simulation labs from excused absences are due no later than one week from the agreed upon assignments after being excused from the missing laboratory. Late simulation laboratory assignments (O-LABs) will not be accepted.

**Withdrawal:** If you need to make any changes to your registration, including withdrawing from or adding courses, return to your HPU advisor for assistance.

For specific deadlines regarding dropping the course with a withdrawal "W" grade and with no GPA penalty, but possible loss of some or all of the tuition. Pay particular attention to the dates associated with withdrawing from the course. It could determine whether you get any tuition back in the event you need to drop the course.

**Incomplete:** Students who are unable to complete course requirements due to circumstances beyond their control (e.g. Military duty, illness, natural disaster ...) can make a written application to me with documentation for an incomplete "I" grade and complete the course requirements after the end of the course.

**Extra Credit:** **There is no extra credit in this course.**

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**Academic Honesty:** All Students are expected to adhere to the University's policies regarding academic honesty. The policy of Hawai'i Pacific University is clear regarding academic dishonesty. Any student, who cheats on an academic exercise, lends assistance to others, or who hands in, as a completed assignment, work that is not his or her own will be penalized. The ultimate penalty is suspension from the University. The term "academic exercise"

includes all forms of work submitted for points, grades, or credit. Please see the Student Handbook for the full policy at [www.hpu.edu/studenthandbook](http://www.hpu.edu/studenthandbook).

## UNIVERSITY POLICY AND SUPPORT

**HPU's Online Help:** HPU Client Services at (808) 566-2411 or email: [helpdesk@hpu.edu](mailto:helpdesk@hpu.edu) for technical assistance.

**Bookstore:** Books are available at the HPU Bookstore at the campus where this course is offered (Downtown or Hawaii Loa) and online (all campuses) at [www.hpu.bncollege.com](http://www.hpu.bncollege.com). Rentals and eBooks are available for many of the course materials. You can contact the HPU Bookstore at 808.544.0290 if you have any questions.

**Accessibility Services (ADA Accommodations):** Under the Rehabilitation Act of 1973 (Section 504), the Americans with Disabilities Act Amendments Act 2008 (ADAAA), and Title III (Public Accommodations) Hawaii Pacific University does not discriminate against individuals with disabilities. Any student who feels he/she may need an accommodation based on the impact of a disability is invited to contact Accessibility Services at HPU (808-544-1197); at [access@hpu.edu](mailto:access@hpu.edu), or at the LB Bldg., Suite 602, 1060 Bishop Street). This is a necessary step in order to ensure reasonable accommodations in a course. Students are not expected to disclose their specific disability to the professor; Accessibility Services will provide a letter for an instructor explaining the accommodations and NOT the nature of the disability. If you would like to discuss other concerns, such as medical emergencies or arrangements in the event of an emergency evacuation, please make an appointment to talk with the professor as soon as possible.

**Counseling & Behavioral Health Services (CBHS):** CBHS provides current HPU students with free and confidential psychological counseling. Sometimes the stress of school along with personal issues can be too much to handle. CBHS provides the opportunity for students to discuss any personal problems or concerns and explore solutions. Appointments can be scheduled by phone at 808-687-7076 or in person at the Downtown campus at UB 905. Office hours are Monday–Friday, 8:00 a.m. to 5:00 p.m.

**Military Veteran Center (MVC):** MVC has one full time mental health provider from the Veterans Administration who offers confidential psychological counseling to military veterans. Sometimes, the transition from military to civilian life, managing school, and other personal issues can be challenging. MVC has an onsite provider at the downtown campus and appointments can be scheduled by phone at 808-763-7470. Office hours are Monday–Thursday, 8:00 a.m. to 5:00 p.m.

**Title IX - Sexual Discrimination and Sexual Misconduct Policy:** HPU is committed to providing an educational environment free from sexual discrimination. Students, faculty and staff must report violations of sexual harassment, sexual assaults, stalking, domestic violence, dating violence, and retaliation to trigger corrective and preventative actions as well as victim support services. Victim support services include assistance with filing police reports, referrals to counseling and medical providers, assignment of a victim advocate, and assistance with academic accommodations. Faculty and students who become aware of such violations should contact the Title IX Coordinator (808-687-7014) or file an anonymous report using the Compliance Hotline (877-270-5054 or [www.tnvinc.com/hpu](http://www.tnvinc.com/hpu)). More details can be found at [www.hpu.edu/studenthandbook](http://www.hpu.edu/studenthandbook).

**Security & Safety:** Help keep our campus safe and secure. For emergency situations, call 911; for non-emergencies, contact HPU security (808-544-1400). Timely reports of observations to security and the police can go a long way in preventing future crimes. Also, HPU security provides transportation or a walking escort at the Hawaii Loa campus, and a walking escort on the Downtown campus for anyone walking alone on foot to any university parking lot, facility or city bus stop. Call 808-236-3515 (Hawaii Loa) and 808-544-1400 (Downtown)—a security officer will be sent to your location. At military base locations, call Base Security at 808-474-2222. To

receive critical information via text messaging, update your mobile number with Rave Alert (<http://phone.hpu.edu>), HPU's emergency text program. Go to <https://www.hpu.edu/security/index.html> for more about campus security and emergency preparedness.

**Tutoring:**

Email: [tutoring@hpu.edu](mailto:tutoring@hpu.edu)

Phone: (808) 544-9334

**Summary Lab Report** (Tell me what you learned. Attempt to limit it to 2 or 3 pages not including attachment pages.)

date  
your name  
lab partner's names

**Title/Purpose:** what is the general purpose of the lab? (1 – 2 sentences) What question are you trying to answer?

**Sketch:** the lab set-up. Label all of the equipment.

**Results:** describe your results and relevant findings here. Display all tabulated data, relevant graph information (slope, intercept, etc.), final numbers referenced in the discussion and conclusion, and all relevant uncertainties associated with the results.

**Discussion and Conclusion:** What does this mean? How did the results match up to your expectations? What conclusions can you draw? What are the limitations of your data? (Based on the data we collected, we can approximate the gravitational constant  $g = (9.4 \pm 0.5) \text{ m/s}^2$ , where  $9.8 \text{ m/s}^2$  is within... Contributions to the error include... This experiment was limited by...).

**Note Regarding Graphical and Tabular Attachments:** Graphs should be at least 1/2 page in size and attached as a separate page or printed on the back side of the paper. All tables should be formatted to display data using the same font size used in your write-up. Other work you find necessary to reference in your results or discussion/conclusion should be added as attachments such as computer code or force table worksheet diagrams.

## Lab Journal

**\*\* Data:** All original data should be recorded in your journal. If you use scraps of paper, information can be lost. In the analysis you will be able to clean this up. Don't be afraid to write things down... If something turns out to be wrong, simply cross it out but don't erase it, you might decide you like it later on! Make sure all of your data has units and labels.

For example:

Height [cm]	Distance travelled [cm]
10	12
20	20
30	30
40	55
50	70
60	82
70	150
80	275
90	400

What is the "error" or uncertainty in your measurements? Note the possible environmental conditions that might affect your results. Did you have to stop in the middle for a fire drill? What is the measurement limitation of your ruler? Are there other possible effects?