

General Physics Lab 1 – Winter 2021**Thursdays, 10:00 am – 12:27 pm****First week: online – From Jan 21: in-person****Location:** Rooms 110 & 120 HH (Hannah Hall)**Instructors:** Hannah Bradley **Office:** 110 HH hbradley@oakland.eduWalter Krell **Office:** 120 HH walterkrell@oakland.edu**Supervisor:** K. C. Castoldi castoldi@oakland.edu, phone: 734-994-7114 (h)**Corequisite:** PHY 1010 or PHY 1510**Course Goals and Objectives:**

This laboratory for PHY 1010 and PHY 1510 students is aimed at introducing the students to the scientific method of investigation of physics phenomena and principles.

These laboratories consist of an introduction to hand-drawn and computer-generated graphs, straight-line fits, error analysis, and a series of experiments on the topics covered by the course.

In this laboratory, the students will

- learn how to use basic physical measuring devices;
- become familiar with selected physics laws and phenomena;
- get experience taking data and drawing conclusions from these;
- learn how to estimate and combine experimental errors;
- experience team work.

Summary of experiments:

- Exercise 1 Eye-hand reaction time; Intro. To Error Analysis
- Exercise 2 Extension of a rubber band; Graphing
- M-1 Acceleration down an Incline
- M-2 Stiffness of a Spring
- M-3 Energy Conservation
- M-4 Centripetal Force
- F-1 Archimedes' Principle
- H-1 Latent Heat of Nitrogen
- H-2 Thermal Expansion
- H-5 Specific Heat of Metals at Cryogenic Temperatures
- S-2 Sound Resonance in Tubes
- S-3 Standing Waves in Strings

Lab Manual: Physics 1 Laboratory Manual – 4th Edition

Kendall-Hunt Publishing – ISBN: 9781524920500

[Required]

Available options for purchasing the manual:

- At the Campus bookstore – Barnes & Noble – Oakland Center for \$34.60
- Online, directly from the publisher for \$25.95 at:

<https://he.kendallhunt.com/product/general-physics-laboratory-i-experiments>

Introduction: The laboratory meets weekly for 2 ½ hours and consist of two introductory exercises and ten experiments to be performed in groups of two students.

Please choose your partner for the term by the second meeting.

Best practice would be to exchange e-mail addresses and phone numbers.

Purchase of a Lab Manual is required.

Lab Safety Protocol:

- To maintain social distancing, room capacity is reduced to 30%
- We will utilize only 6 tables with 2 students max per table
- At each table, the students must be at least 6 feet apart. That is, one at the edge of the table and the other by the computer
- Lab instructors will self-monitor according to OU policy; they will be wearing a KN95 mask, which is 95% protective
- Lab instructors are responsible for sanitizing the equipment and the computer of each station at the end of the lab session
- Make-up labs will be in place for students who are sick during the term to ensure that students do not attend the lab if they do not feel well or have symptoms.
- One-way traffic is setup around the rooms to minimize interaction
- We will keep both doors of the room open to facilitate air circulation

Virus protection instructions:

- ***Students entering the room:***
 - Prior to entering the lab, the TA will take each student's temperature
 - Students will enter the room one at the time
 - Students must wear a face mask; if not, they will be handed a disposable one
 - Students must wash their hands at the sink and then move to their lab station
 - If a student wants to wear gloves, they will find boxes of gloves by the sink
 - The stools must stay in place and should not be moved. This guarantees proper distancing among students, which must be maintained throughout lab time
- ***Students exiting the room:***
 - Students must wash their hands before leaving the room

Attendance: Attendance to all laboratories is mandatory.

In case of illness, or if unavoidable circumstances prevent you from attending the lab, please e-mail Dr. Castoldi as soon as possible.

You may be able to make-up the lab during a different session or else Dr. Castoldi will send you data and you can complete the analysis of that experiment online.

Documentation for absences is required.

Grades for missed labs, reports and quizzes will be taken as zero.

Groups: At the end of the second week, the students will be divided into two groups: Group A and Group B. Make a note of the Group you belong to. The Calendar at the end of this syllabus lists the lab sequence by group.

Equipment: Lab manual, scientific calculator, retractable pencil, pen, eraser, and a clear plastic metric ruler

Week 1: **Online.** During the first week, please watch the recorded Introduction to the Labs and Error Analysis Power Points on Moodle and go over the Lab Safety Regulations on the Lab Manual.

The **Lab Safety Quiz** is on Moodle and is due by January 15.

Week 2: **In-person.** The first in-person meeting is dedicated to Error Analysis, and a short exercise on Measurements.

Week 3: The second meeting is dedicated to familiarizing with significant figures and errors (Exercise #1) and graphing (Exercise #2).

Reports for these Exercises are due at the beginning of the next class meeting.

Week 4 on: The remaining meetings are dedicated to various laboratory experiences on topics related to Mechanics, Fluids, Thermodynamics, and Sound. Power Point presentations for all the labs are available on Moodle.

Reports are due at the beginning of the next class meeting.

Quizzes: There will also be two in-person Quizzes of the duration of 30 min each. The dates of the quizzes are listed on the calendar at the end of the syllabus.

Please notice: It is mandatory that each student takes both Quizzes in order to pass the Lab.

| | | |
|---------------------|--------------------------------|------|
| Final grade: | Measurements exercise: | 5% |
| | Exercises 1 and 2 (7.5% each): | 15% |
| | Experiments (6% each): | 60% |
| | Quizzes (10% each): | 20% |
| <hr/> | | |
| | Total | 100% |

Grading Scale:

| | |
|-----------|----------------|
| A | 96-100 |
| A- | 90-95 |
| B+ | 85-89 |
| B | 80-84 |
| B- | 75-79 |
| C+ | 70-74 |
| C | 65-69 |
| C- | 60-64 |
| D+ | 55-59 |
| D | 50-54 |
| F | < 50 |

Common Courtesy Guidelines:

For your benefit and the benefit of your fellow students and your instructor, you are expected to practice common courtesy with regard to all course interactions.

- Show up for the lab on time.
- Turn off your cell phone and store away any iPod or other devices before entering the lab.
- **Do not bring any food or drinks to the lab.**
- Be attentive during the presentation and participate actively to the lab.
- If you must be late or leave early on a particular day, please inform your instructor well in advance. Documentation is required.
- Be kind and respectful to your fellow students and the instructor.

You may expect your grade to be lowered if you do not practice common courtesy.

Add/Drops

The University's add/drop policy will be explicitly followed. It is the student's responsibility to be aware of the university deadline dates for dropping courses.

Reasonable Accommodations

Accessibility and Accommodations: It is the University's goal that learning experiences be as accessible as possible. Students with disabilities who have questions about course accessibility are encouraged to contact the instructor immediately. The Office of Disability and Support Services (DSS) is available to help. The DSS office is located in room 103A North Foundation Hall.

For more information, call 248-370-3266 or visit <https://www.oakland.edu/dss>

Policy on Academic Misconduct

The University's regulations that relate to academic misconduct will be fully enforced. Any student suspected of cheating and/or plagiarism will be reported to the Dean of Students and, thereafter, to the Academic Conduct Committee for adjudication. Anyone found guilty of academic misconduct in this course may receive a course grade of F, in addition to any penalty assigned by the Academic Conduct Committee. Students found guilty of academic misconduct by the Academic Conduct Committee may face suspension or permanent dismissal. The full policy on academic misconduct can be found in the General Information section of the Undergraduate Catalog.

Excused Absence Policy

The University excused absence policy applies to participation as an athlete, manager or student trainer in NCAA intercollegiate competitions, or participation as a representative of Oakland University at academic events and artistic performances approved by the Provost or designee.

For the excused absence policy, see

<https://www.oakland.edu/provost/policies-and-procedures/>

Bereavement Policy

In the event of the death of certain members within families or among loved ones, the University grants necessary bereavement absences upon student request.

For the official bereavement policy, see:

<https://www.oakland.edu/provost/policies-and-procedures/>

Student Preferred Name/Pronoun Policy

The University recognizes that as a community many of its members use names other than their legal names to identify themselves. As long as the use of this different name is not for the purposes of misrepresentation or a legal name is required by University business, policy or legal need, the University acknowledges that a "preferred name" will be used wherever possible. The University reserves the right to not accept a preferred name if it is deemed inappropriate, including a preferred name that is vulgar, offensive, fanciful, or creates confusion with another person.

Notes on the Labs

- **Preparing for the Lab:**
 - Before you come to the lab, read carefully the description of the experiment in the lab manual and review the topic in your Physics textbook. This will allow you to better understand the experiment and to finish it within the laboratory period.
 - Reviewing the Power Point posted on Moodle before coming to the lab will also help you to be better prepared.
- **During the Lab:**
 - Before you start the experiment, familiarize yourself with the apparatus and make a few trials before you start the actual data taking.
 - Perform the experiment following the instructions in the lab manual.
The data must be written using a pen.
The **hand-graphs** are better done **in pencil**, so you can make corrections.
 - Perform the data analysis in the lab. This will help you understand if the data you collected is good. If you notice some discrepancy, you will still have time to take a new set of data and improve the results of your experiment.
 - If this is the case, strike through the old data with a pen, and write the new data above.
Do not use whiteout. The reason for the revised data should be noted on the report.
 - Please handle the equipment carefully. Report promptly any damage to the instructor.
 - Before you leave the lab, the original **data pages must be initialed by the instructor.** Reports with non-initialed data pages will not be graded and will count as zero.
- **Reports:**
 - Each student must submit an **individual report**.
 - The report is due **at the beginning of the next class meeting**. Late reports will not be graded and will count as zero. The instructor is allowed one week to grade the report.
 - **Hand-in the report to the instructor** at the beginning of the next lab. If you need to turn in the report late, place it in the **black boxes** outside the labs and inform the TA.
 - The reports will be graded based on your preparation, performance, quality and accuracy of the data, analysis, and conclusions.
 - The lab instructors will be available for office hours in the lab.
 - Sample calculations of derived quantities and errors should be included in the report. Significant figures should be used properly.
 - The graded reports will be **returned in the lab**.
 - Any **questions on the grading** should be directed to your lab instructor.
 - Lab grades will be posted on Moodle every two weeks.

The following are *academic misconduct*, leading to a grade of zero for the labs and a referral to the Academic Conduct Committee:

- **Identical lab analysis (data and graphs should be the same for all group members)**
- **Borrowed data or reports from previous years.**

General Physics Lab 1 Calendar – Winter 2021

Thursdays, 10:00 am – 12:27 pm

| Date | Group A | Group B | Remark |
|--------|--------------|--------------|--|
| Jan 7 | - | - | No lab |
| Jan 14 | Introduction | Introduction | Online – Introduction to the Lab, Lab Safety Quiz due Jan 15 |
| Jan 21 | Error Anal. | Error Anal. | In-person – Error Analysis, Measurements exercise |
| Jan 28 | Ex. 1 & 2 | Ex. 1 & 2 | Exercise 1 & Exercise 2 |
| Feb 4 | M-1 | M-2 | M-1 meets in Room 110, M-2 in 120 |
| Feb 11 | M-2 | M-1 | M-1 meets in Room 110, M-2 in 120 |
| Feb 18 | M-3 | M-4 | |
| Feb 25 | - | - | No lab |
| Mar 4 | M-4 | M-3 | Quiz #1 (Error Analysis, Exercise 1, Exercise 2, M-1, M-2) |
| Mar 11 | F-1 | H-1 | |
| Mar 18 | H-1 | F-1 | |
| Mar 25 | H-2 | H-5 | |
| Apr 1 | H-5 | H-2 | |
| Apr 8 | S-3 | S-2 | Turn-in the report at the end of class |
| Apr 15 | S-2 | S-3 | Quiz #2 (M-3, M-4, through H-2, H-5) Turn-in the report at the end of class |

General Physics Lab 1 – Winter 2021 Schedule

| TUESDAY 10:00 – 12:27 pm | WEDNESDAY 8:00 – 10:27 am 3:00 – 5:27 pm | THURSDAY 10:00 – 12:27 pm 3:00 – 5:27 pm | FRIDAY 8:00 – 10:27 am |
|--|---|---|--|
| 1/5 No lab | 1/6 No lab | 1/7 No lab | 1/8 No lab |
| 1/12 (online) Introduction Lab Safety Quiz | 1/13 (online) Introduction Lab Safety Quiz | 1/14 (online) Introduction Lab Safety Quiz | 1/15 (online) Introduction Lab Safety Quiz |
| 1/19 Error Analysis Measurements | 1/20 Error Analysis Measurements | 1/21 Error Analysis Measurements | 1/22 Error Analysis Measurements |
| 1/26 Exercises 1 & 2 | 1/27 Exercises 1 & 2 | 1/28 Exercises 1 & 2 | 1/29 Exercises 1 & 2 |
| 2/2 M-1 & M-2 | 2/3 M-1 & M-2 | 2/4 M-1 & M-2 | 2/5 M-1 & M-2 |
| 2/9 M-1 & M-2 | 2/10 M-1 & M-2 | 2/11 M-1 & M-2 | 2/12 M-1 & M-2 |
| 2/16 M-3 & M-4 | 2/17 M-3 & M-4 | 2/18 M-3 & M-4 | 2/19 M-3 & M-4 |
| 2/23 No lab | 2/24 No lab | 2/25 No lab | 2/26 No lab |
| 3/2 M-3 & M-4 Quiz 1 | 3/3 M-3 & M-4 Quiz 1 | 3/4 M-3 & M-4 Quiz 1 | 3/5 M-3 & M-4 Quiz 1 |
| 3/9 F-1 & H-1 | 3/10 F-1 & H-1 | 3/11 F-1 & H-1 | 3/12 F-1 & H-1 |
| 3/16 F-1 & H-1 | 3/17 F-1 & H-1 | 3/18 F-1 & H-1 | 3/19 F-1 & H-1 |
| 3/23 H-2 & H-5 | 3/24 H-2 & H-5 | 3/25 H-2 & H-5 | 3/26 H-2 & H-5 |
| 3/30 H-2 & H-5 | 3/31 H-2 & H-5 | 4/1 H-2 & H-5 | 4/2 H-2 & H-5 |
| 4/6 S-3 & S-2 | 4/7 S-3 & S-2 | 4/8 S-3 & S-2 | 4/9 S-3 & S-2 |
| 4/13 S-3 & S-2 Quiz 2 | 4/14 S-3 & S-2 Quiz 2 | 4/15 S-3 & S-2 Quiz 2 | 4/16 S-3 & S-2 Quiz 2 |