

## General Physics Lab 1 – Fall 2020

**Mondays, 12:00 – 2:27 pm**

**Location:** Rooms 110 & 120 HH (Hannah Hall)

**Instructors:** Austin Tetmeyer      **Office:** 110 HH      [adtetmeyer@oakland.edu](mailto:adtetmeyer@oakland.edu)

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**Supervisor:** K. C. Castoldi      [castoldi@oakland.edu](mailto: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 each 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

**Virus protection instructions:**

- Keep both doors open to facilitate air circulation
- ***Students entering the room:***
  - Students will enter the room one at the time
  - Students must wear a face mask; if not, they will be handed a disposable one
  - Student must first wash their hands at the sink, then move to the lab station
  - If a student wants to wear gloves, they will find a box 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. Documentation 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 Schedule 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:** The first meeting is dedicated to Introduction, Lab Safety instructions, Error Analysis, and a short exercise on Measurements.  
Students joining the course late will find on Moodle recorded Power Points on Lab Introduction and Error Analysis.  
**Lab Safety Quiz** is on Moodle and is due by September 15.
- Week 2:** 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 3 on:** The remaining meetings are dedicated to a number of 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 Quizzes of the duration of 30 min each.  
The quizzes will be online on Moodle and will be available all day on the specific date.  
*Please notice: it is mandatory that each student takes both Quizzes in order to pass the Lab.*

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

**Grading Scale:**

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

**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 put 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 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 reasonable. If you notice some discrepancy, you will still have time to take a new set of data.
- 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 have to turn in the report late, place it in the **black ballot boxes** outside the labs.
- 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, or in Room 156 HH.
- 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 Schedule – Fall 2020

Mondays, 12:00 – 2:27 pm

| Date    | Group A      | Group B      | Remark   |
|---------|--------------|--------------|--|
| Sep. 7  | No Lab       | No Lab       |  |
| Sep. 14 | Introduction | Introduction | Introduction, Safety Information, Error Analysis, Measurements                 |
| Sep. 21 | Ex. 1 & 2    | Ex. 1 & 2    | Exercise 1 & Exercise 2  |
| Sep. 28 | M-1          | M-2          | M-1 meets in Room 110, M-2 in 120  |
| Oct. 5  | M-2          | M-1          | M-1 meets in Room 110, M-2 in 120  |
| Oct. 12 | M-3          | M-4          |  |
| Oct. 19 | M-4          | M-3          |  |
| Oct. 26 | F-1          | H-1          | Quiz #1 (Error Analysis, Exercise 1, Exercise 2, M-1, M-2)                     |
| Nov. 2  | H-1          | F-1          |  |
| Nov. 9  | H-2          | H-5          |  |
| Nov. 16 | H-5          | H-2          |  |
| Nov. 23 | S-3          | S-2          | Turn-in the report at the end of class   |
| Nov. 30 | S-2          | S-3          | Quiz #2 (M-3, M-4, through H-2, H-5)<br>Turn-in the report at the end of class |

### General Physics Lab 1 – Overall Schedule – Fall 2020

| <b>MONDAY</b><br>8:00 – 10:27 am<br>12:00 – 2:27 pm<br>5:30 – 7:57 pm | <b>TUESDAY</b><br>10:00 – 12:27 pm<br>3:00 – 5:27 pm<br>6:30 – 8:57 pm | <b>WEDNESDAY</b><br>8:00 – 10:27 am<br>12:00 – 2:27 pm<br>5:30 – 7:57 pm | <b>THURSDAY</b><br>10:00 – 12:27 pm<br>3:00 – 5:27 pm<br>6:30 – 8:57 pm | <b>FRIDAY</b><br>10:00 – 12:27 pm<br>5:30 – 7:57 pm | <b>SATURDAY</b><br>10:00 – 12:27 pm    |
|---|--|--|---|---|--|
|   |  |  | 9/3<br>No Lab   | 9/4<br>Introduction,<br>Error Analysis              | 9/5<br>Introduction,<br>Error Analysis |
| 9/7<br>No Lab   | 9/8<br>Introduction,<br>Error Analysis                                 | 9/9<br>Introduction,<br>Error Analysis                                   | 9/10<br>Introduction,<br>Error Analysis                                 | 9/11<br>Exercises 1 & 2                             | 9/12<br>Exercises 1 & 2                |
| 9/14<br>Introduction,<br>Error Analysis                               | 9/15<br>Exercises 1 & 2  | 9/16<br>Exercises 1 & 2  | 9/17<br>Exercises 1 & 2   | 9/18<br>M-1 & M-2                                   | 9/19<br>M-1 & M-2                      |
| 9/21<br>Exercises 1 & 2   | 9/22<br>M-1 & M-2  | 9/23<br>M-1 & M-2  | 9/24<br>M-1 & M-2   | 9/25<br>M-1 & M-2                                   | 9/26<br>M-1 & M-2                      |
| 9/28<br>M-1 & M-2   | 9/29<br>M-1 & M-2  | 9/30<br>M-1 & M-2  | 10/1<br>M-1 & M-2   | 10/2<br>M-3 & M-4                                   | 10/3<br>M-3 & M-4                      |
| 10/5<br>M-1 & M-2   | 10/6<br>M-3 & M-4  | 10/7<br>M-3 & M-4  | 10/8<br>M-3 & M-4   | 10/9<br>M-3 & M-4                                   | 10/10<br>M-3 & M-4                     |
| 10/12<br>M-3 & M-4  | 10/13<br>M-3 & M-4   | 10/14<br>M-3 & M-4   | 10/15<br>M-3 & M-4  | 10/16<br>No Lab                                     | 10/17<br>No Lab                        |



|                              |                              |                              |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 10/19<br>M-3 & M-4           | 10/20<br>F-1 & H-1           | 10/21<br>F-1 & H-1           | 10/22<br>F-1 & H-1           | 10/23<br>F-1 & H-1           | 10/24<br>F-1 & H-1           |
| 10/26<br>F-1 & H-1<br>Quiz 1 | 10/27<br>F-1 & H-1<br>Quiz 1 | 10/28<br>F-1 & H-1<br>Quiz 1 | 10/29<br>F-1 & H-1<br>Quiz 1 | 10/30<br>F-1 & H-1<br>Quiz 1 | 10/31<br>F-1 & H-1<br>Quiz 1 |
| 11/2<br>F-1 & H-1            | 11/3<br>H-2 & H-5            | 11/4<br>H-2 & H-5            | 11/5<br>H-2 & H-5            | 11/6<br>H-2 & H-5            | 11/7<br>H-2 & H-5            |
| 11/9<br>H-2 & H-5            | 11/10<br>H-2 & H-5           | 11/11<br>H-2 & H-5           | 11/12<br>H-2 & H-5           | 11/13<br>H-2 & H-5           | 11/14<br>H-2 & H-5           |
| 11/16<br>H-2 & H-5           | 11/17<br>S-3 & S-2           | 11/18<br>S-3 & S-2           | 11/19<br>S-3 & S-2           | 11/20<br>S-3 & S-2           | 11/21<br>S-3 & S-2           |
| 11/23<br>S-3 & S-2           | 11/24<br>Make-up Labs        | 11/25<br>Make-up Labs        | 11/26<br>No Lab              | 11/27<br>No Lab              | 11/28<br>No Lab              |
| 11/30<br>S-3 & S-2<br>Quiz 2 | 12/1<br>S-3 & S-2<br>Quiz 2  | 12/2<br>S-3 & S-2<br>Quiz 2  | 12/3<br>S-3 & S-2<br>Quiz 2  | 12/4<br>S-3 & S-2<br>Quiz 2  | 12/5<br>S-3 & S-2<br>Quiz 2  |