

# PHYS 150-L Physics I LAB

Fall 2019

Dr. Johnny B. Holmes

**CATALOG DESCRIPTION:** PHYS 150-L Physics I LAB  
Laboratory to accompany PHYS 150. Corequisite: enrollment in PHYS 150.

**TEXT:** Manual of lab experiments available (for free) – see below.

**INSTRUCTOR:** Dr. Johnny B. Holmes, Professor of Physics;  
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## **PREREQUISITES BY TOPIC:**

1. Basic algebra, trigonometry, calculus (differentiation and integration)

## **GOALS:**

This laboratory course supplements the lecture course, so it is designed to assist you in reaching the goals of Phys 150. The additional goals of this course are:

1. To provide a hands-on experience with some of the properties of mechanics studied in PHYS 150.
2. To test the models developed in Phys 150 in the real-world environment of the laboratory, and to see how well the models work and to find their limitations.
3. To acquaint the student with lab techniques.
4. To show the limitations of experimental verification of scientific theories.

## **EXPERIMENTS:**

1. Composition of Concurrent Forces
2. \*Acceleration Due to Gravity
3. Acceleration along an Inclined Ramp
4. \*Newton's Second Law (without Friction)
5. Centripetal Force
6. Newton's Second Law (with Friction)
7. \*The Atwood Machine
8. Hooke's Law and Potential Energy
9. Moments of Parallel Forces (Torque)
10. Moment of Inertia
11. Oscillations

\* indicates these labs will have a formal write-up

**GRADING:** Each of the 12 lab sessions (one of the labs will be done over two lab sessions) will be worth up to 15 points based on your participation and an oral report at the end of the session (180 points). Each of the three experiments marked with an \* requires a written report worth up to 100 points (300 points). This makes for a total of 480 points.

A: Be present for all 12 lab sessions and accumulate at least 447 points.

B: Be present for all 12 lab sessions and accumulate at least 423 points.

C: Be present for at least 11 lab sessions and accumulate at least 379 points.

D: Be present for at least 10 lab sessions and accumulate at least 350 points.

F: Anything less than the minimum requirements for a D.

Written reports are due at the beginning of the lab period two weeks after the experiment is completed. There will be a penalty of 2 points per lecture class day for each day a written report is late. Any late reports will not be accepted after the last day of classes. For more information on the written reports see the guide at the bottom of the page.

Oral reports are worth 15 points maximum. For a smooth report 14 points will normally be awarded. For an especially good report, 15 points may be awarded. If the group has to go back and check on something, points may be subtracted. If at the end of the lab not all parts are completed, points will be subtracted. If the report is not smooth or if incorrect conclusions are drawn, points may be subtracted.

NOTE: Feel free to ask questions any time before you begin your formal oral report. No points will be subtracted for questions before you begin your formal oral report.

**ABSENCES:**

If you know you will miss a lab, you may make arrangements with the instructor before the lab to make the lab up at a later time. If you miss a lab without notice and wish to make up the lab, you may do so by the last day of classes, but there will be a 5 point penalty plus 2 points per lecture class day that you fail to make arrangements.

## SCHEDULE FOR LABS:

	M/T	Aug 19/20	<i>none</i>
1	M/T	Aug 26/27	<u>Composition of Concurrent Forces</u>
		<b>Labor Day</b>	<i>None – Labor Day</i>
2	M/T	Sept 9/10	* <u>*Acceleration Due to Gravity</u> <u>Computer help on acceleration due to gravity</u> <u>experiment (to download program)</u>
3	M/T	Sept 16/17	<u>Acceleration Along an Inclined Ramp</u>
4	M/T	Sept 23/24	* <u>*Newton's Second Law without Friction</u> – P 1-4
5	M/T	Sept 30/Oct 1	* <u>*Newton's Second Law without Friction</u> – P 5-6
6	M/T	Oct 7/8	<u>Newton's Second Law with Friction</u>
		<b>Fall Break</b>	<i>None – Fall Break</i>
7	M/T	Oct 21/22	<u>Centripetal Force</u>
8	M/T	Oct 28/29	* <u>*Atwood's Machine</u>
9	M/T	Nov 4/5	<u>Hooke's Law</u>
10	M/T	Nov 11/12	<u>Torque</u>
11	M/T	Nov 18/19	<u>Moment of Inertia</u>
12	M/T	Nov 25/26	<u>Oscillations</u>
	M/T	Dec 2/3	<i>None – make-up week</i>

## WRITTEN LAB REPORT GUIDE:

1. Each of the three written lab reports (marked with an \* above) should be typed (computer assisted print is fine). You may hand-write calculations and hand-write annotations on graphs. Points will be subtracted for neatness if the report is hard to read or hard to follow.
2. Each written lab report should have the following:
  - a. **Title** of experiment, student name, partner's name, date of experiment
  - b. **Object** of the experiment (one or two sentences) – you may use the object on the lab guide.
  - c. **Data** (what you actually measure before calculations are performed- and with units). A **table** is often a good way of presenting your data.
  - d. **Graphs** where appropriate (with labels and slope calculations if appropriate; must use computer graphing program such as Excel or use graph paper)
  - e. **Calculations** (including a statement of the equation and a sample calculation **with units**)
  - f. Statement of **results** with appropriate comparisons (be sure to clearly mark this; include a discussion of the meaning of each graph). A **table** is often a very good way of presenting your results that make comparisons easy to see.
  - g. Discussion of **experimental uncertainties** and accuracy of results
3. Use correct English grammar and spelling.

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