

PHYS 202-L Introductory Physics II LAB

Spring 2020

Dr. Johnny B. Holmes

CATALOG DESCRIPTION: PHYS 202-L Introductory Physics II LAB Laboratory to accompany [PHYS 202](#). Corequisite: enrollment in PHYS 202.

TEXT: Lab experiment instructions in pdf form are available below under Schedule of Labs section.

We encourage students to bring their laptops or tablets to lab. Pc's will be available for those who do not have laptops or tablets.

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PREREQUISITES BY TOPIC:

1. Basic algebra (solving for an unknown) and solution of simultaneous equations.
2. Basic Motion (position, velocity, acceleration) and Vectors.
3. Newton's Laws of Motion and Newton's Law of Gravity.
4. Conservation of Energy

GOALS:

This laboratory course supplements the lecture course, so it is designed to assist you in reaching the goals of Phys 202. The additional goals of this course are:

1. To provide a hands-on experience with some of the properties of electricity, magnetism, light and radioactivity studied in PHYS 202.
2. To test the models developed in Phys 202 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. Electric Fields Simulations
2. *Ohm's Law
3. Magnetic Deflection
4. Electromagnetic Induction
5. Reflection and Refraction
6. *Thin Lenses: Basics
7. Thin Lenses: The Microscope
8. Diffraction Grating and the Spectrum of Light
9. *Charge to Mass Ratio for the Electron
10. Oscilloscope
11. Investigating Radioactivity

* indicates these labs will have a formal write-up

GRADING: Each of the 12 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 5 points per lab class day for each day a written report is late. Any late reports will not be accepted after Monday, April 29. 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. Only for an especially good report will the full 15 points be awarded. If you are late for the lab, one or more points may be subtracted. 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 Thursday, April 25, but there will be a 5 point penalty plus 5 points per lab class day that you failed to make arrangements.

SCHEDULE FOR LABS:

(click on link to download pdf of lab instructions for each experiment)

	W	Jan. 8		<i>none</i>
1	W	Jan. 15		Electric Fields Simulations click here to download simulation program
2	W	Jan. 22	*	* Ohm's Law , Parts 1-3
3	W	Jan 29	*	* Ohm's Law , Parts 4-5
4	W	Feb. 5		Magnetic Deflection
5	W	Feb. 12		Electromagnetic Induction
6	W	Feb. 19		Reflection/Refraction
7	W	Feb 26	*	* Thin Lenses: Basics
	W	Mar. 4		<i>none- Spring Break</i>
8	W	Mar. 11		Thin Lenses: The Microscope
9	W	Mar. 18	*	* Charge to Mass Ratio for the Electron
	W	Mar. 25		Diffraction Grating and the Spectrum of Light
10	W	April 1		Oscilloscope
11	W	April 8		<i>none - Holy Thursday & Good Friday</i>
12	W	April 15		Investigating Radioactivity
	W	Apr 22		<i>none or make-up</i>

WRITTEN LAB REPORT GUIDE:

Written lab reports are required from each student. Partners in a lab experiment will have the same data and may have the same graphs. However, the analysis and reports of experimental uncertainty need to be done and written up by each student and should not be the same as their partner's.

1. Each lab report should be typed (computer assisted print is fine), or at least be clearly legible. 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's name, partner's name, date of experiment.
 - b. Object of the experiment (one or two sentences). You may use the objective in the instructions for the lab.
 - 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).
 - 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 errors and accuracy of results.
3. Use correct English grammar and spelling.

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