Syllabus for
PHY 102L-61—General Physics II Laboratory
1 Credit Hour
Spring 2017

I. COURSE DESCRIPTION

Lab exercises to supplement PHY 102 Lecture.
Corequisite: PHY 102 Lecture.
Lab fee: $75.

General Physics II laboratory provides practical hands-on experiments in beginning physics. The topics included are mechanics, heat, and sound. The experiments that are done in this laboratory course complement the topics under discussion in the corequisite lecture course PHY 101.

II. COURSE GOALS

The purpose of this course is to enable the student to do the following:

A. Gain practical experience for the concepts discussed in the General Physics II Lecture course.

B. Obtain an understanding of experimental techniques generally applicable to research in physical sciences.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

A. Terminal Objectives

As a result of successfully completing this course, the student will be able to do the following:

1. Set up and correctly use the apparatus encountered during the course.
2. Identify apparatus and measurements with the physical concepts with which they deal.
3. Correctly execute appropriate systematic and mathematical analysis of problems similar to those encountered during the course.
4. Discuss the sources and magnitude of errors inherent in the measurements utilized during the course.

B. Unit Objectives

As a result of successfully completing each unit, the student will be able to do the following:

1. Unit 1: Fields and Equipotentials
   a. Discuss the Coulomb's Law.
   b. Draw some electric and magnetic field configurations.
2. Unit 2: Resistances in Series and Parallel
   a. Draw the circuit characteristics of resistors in series and parallel.
   b. Measure the current, voltage, and resistance in both circuits.
3. Unit 3: The Measurement of Resistance: Wheatstone bridge
   a. Operate a slide-wire Wheatstone bridge.
   b. Measure an unknown resistance using a Wheatstone bridge.

4. Unit 4: The Potentiometer
    a. Operate the potentiometer.
    b. Measure resistance's accurately using the potentiometer
5. Unit 5: Joule's Law
    a. Measure the joule equivalent of the calorie of heat energy.
    b. Measure electric heating.
6. Unit 6: The RC Circuit
    a. Construct an RC circuit.
    b. Measure the time constant of an RC circuit.
7. Unit 7: Electromagnetic Induction
    a. Measure the amount, direction, and duration of an induced current.
    b. Construct a transformer.
8. Unit 8: Reflection and Refraction
    a. Discuss the laws of reflection.
    b. Discuss the laws of refraction.
9. Unit 9: Spherical Mirrors and Lenses
    a. Measure the focal length of several lenses and mirrors.
    b. Explain the parameters that govern the use of spherical mirrors and lenses.
10. Unit 10: Optic of the Eye
    a. Explain how the eye is an optical instrument.
    b. Explain how lenses are used to correct visual defects.
11. Unit 11: The Transmission Diffraction Grating: Spectrometer Method
    a. Use a spectrometer.
    b. Discuss the optical spectra.
12. Unit 12: Detection of Nuclear Radiation
    a. Explain the characteristics of the Geiger tube.
    b. Explain the inverse-square relationship for nuclear radiation.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

A. Required Materials

1. Textbooks

   Wilson, Jerry D. *Physics Laboratory Experiments*. 8th ed. Boston: Houghton Mifflin, 2010. ISBN-13: 9781285738635

2. Other

   Scientific calculator

B. Optional Materials

1. Textbooks

   None

2. Other

   None

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.

2. A fee of $15.00 is assessed for all late exams. The university's late exam policy applies to all exams taken without notifying the professor prior to the regularly scheduled exam time and to all exams taken late without an administrative excuse.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:
   a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
   b. Failing to meet group assignment or project requirements while claiming to have done so;
   c. Failing to cite sources used in a paper;
   d. Creating results for experiments, observations, interviews, or projects that were not done;
   e. Receiving or giving unauthorized help on assignments.

   By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.
5. Students are to be in compliance with University, school, and departmental policies regarding Whole Person Assessment (WPA) requirements. Students should consult the WPA handbooks for requirements regarding general education and the students' majors.
   a. The penalty for not submitting electronically or for incorrectly submitting an artifact is a zero for that assignment.
   b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Department Policies and Procedures

Any student whose unexcused absences total 33% or more of the total number of class sessions receives an F for the course grade.

C. Course Policies and Procedures

1. Evaluation Procedures

a.	12 lab write-ups	45%
	Lab final (written and/or practical)	30%
	3 quizzes	25%
	Total	100%

b. Grading scale:
A = 100- 90%
B = 89- 80%
C = 79-70%
D = 69- 60%
F = 59-0%

2. Whole Person Assessment Requirements
   a. In conjunction with lab #6, RC time constant, a special assessment of the results of the exercise is required to be submitted as a part of the WPA assignment.
   b. Instructions for completing this assignment are handed out in lab. They are also available on the Eli Web site under the category "Whole Person Assessment" as part of the General Education Handbook.
3. Other Policies and/or Procedures
   a. The lab manual for this course contains procedural instructions, theoretical explanations, and relevant questions for each experiment. Results from the procedures and answers to the questions are written in the designated areas within the manual. Then a discussion or conclusion of the experiment should be written on a separate sheet of paper and attached to the report. The conclusion should be concise and to the point and not over half a page.
   b. Students will have three hours in the lab to complete each day's experiment and must hand in their written report at the end of the period, whenever possible.
   c. Each student is expected to read the experiment before the lab period and complete the Advance Study Assignment that precedes each experiment, which is collected at the beginning of the lab period.
   d. Make-up assignments (for full credit) are given only in extremely unavoidable situations **upon prior arrangement with instructor** or with valid medical excuse; otherwise, missed assignments are graded with a 25% penalty.
   e. Show all work for the full credit.
   f. Messy papers (nontrimmed, nonstapled, or nonreadable) result in a lower grade.
   g. Late work is assessed a 20% per week penalty.
   h. Students are responsible for the University materials that they use during the lab period and are assessed an appropriate fee for any items that are lost, damaged, or broken.
   i. Students should leave their table and apparatus in good order (i.e., weights put away, instruments returned, scrap paper picked up, etc.)
   j. Please, turn off your cell phones.
   k. No food in the classroom without valid medical reason.

VI. COURSE CALENDAR

Lab	Topic
1	Fields and Equipotentials, handout
2	Resistance's in Series and Parallel, Experiment 21
3	The Measurement of Resistance (Wheatstone), Experiment 19
4	The Potentiometer, Experiment 41 (handout)
5	Measurement of Planck's constant using LED'S (Handout)
	Quiz 1 over Labs 1-4
6	The RC Time Constant, handout
7	Electromagnetic Induction, Experiment 48 (handout)
8	Reflection and Refraction, Experiment 25
	Quiz 2 over Labs 5-8
9	Spherical Mirrors and Lenses, Experiment 26
10	Optic of the Eye, handout
	Spring Break
11	The Transmission Diffraction Grating Spectrometer Method, Experiment 30
12	Detection of Nuclear Radiation, Experiment 31
13	**Make-up, Review**
14	**Quiz over Labs 9-12**
15	**Final**

Instructor may change the assignment schedule AT ANY TIME by verbal or written notification to the class.

Lecture LRC 113F /Lab GC 1A18
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Course Inventory for ORU's Student Learning Outcomes
PHY 102L-61—General Physics II Lab
Spring 2017

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

	OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1	**Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A	Biblical knowledge			X	
1B	Sensitivity to the Holy Spirit			X	
1C	Evangelistic capability				X
1D	Ethical behavior			X	
2	**Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy			X	
2C	Global & historical perspectives			X	
2D	Aesthetic appreciation			X	
2E	Intellectual creativity			X	
3	**Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A	Healthy lifestyle			X	
3B	Physically disciplined lifestyle			X	
4	**Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A	Communication skills			X	
4B	Interpersonal skills			X	
4C	Appreciation of cultural & linguistic differences				X
4D	Responsible citizenship			X	
4E	Leadership capacity			X	