Syllabus for
PHY 101—General Physics I Laboratory
1 Credit Hour
Fall 2001

I. COURSE DESCRIPTION

Lab exercises to supplement PHY 101 Lecture.
Corequisite: PHY 101 Lecture.
Lab fee: $25.

General Physics I 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

This course is designed to enable the student to do the following:

A. gain practical experience for the concepts discussed in the General Physics I Lecture course.

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

III. COURSE OBJECTIVES

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. recognize the sources and magnitude of errors inherent in the measurements utilized during the course.

B. Unit Objectives

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

1. Mass, Volume and Density
   a. perform measurements using the vernier calipers, the micrometer calipers, and the triple-beam balance.
   b. measure the density of several materials.

2. Acceleration of Gravity
   a. measure and record the location, velocity, and acceleration of an accelerated object.
   b. calculate the acceleration of gravity and to inductively prove it is a constant.

3. Vectors
   a. resolve and add vectors using graphs and using trigonometry.
   b. add vectors for forces in equilibrium using a force table.

4. The Atwood Machine (computer assisted)
   a. measure the acceleration of a mass.
   b. relate acceleration to mass and net force.

5. Friction
   a. calculate the coefficients of static and kinetic friction of a system.
   b. analyze motion on an inclined plane.

6. Equilibrium
   a. measure the net force on an object in equilibrium.
   b. measure the net torque on an object in equilibrium.

7. Collisions (computer assisted)
   a. study conservation of momentum and conservation of kinetic energy for elastic collisions.
   b. study conservation of momentum for inelastic collisions.

8. Calorimetry and Specific Heat
   a. measure the temperature change of a given mass of material produced by a quantity of heat.
   b. determine the specific heat of different metals.

9. Heat of Fusion and Heat of Vaporization
   a. measure the heat of fusion of ice.
   b. measure the heat of vaporization of water.

10. Simple Harmonic Motion
   a. measure the acceleration of gravity using the period of a pendulum.
   b. measure the period of vibration of a spring and to compare the theoretical and measured values.

11. Standing Waves
   a. measure the frequency of a vibrating string.
   b. calculate the wave velocity in the string.

12. Resonance
   a. measure resonance length of the air columns.
   b. calculate the velocity of sound in air.

IV. TEXTBOOKS

A. Required Textbooks

Wilson, Jerry D. Physics Laboratory Experiments, 5th ed. Boston: Houghton Mifflin Company, 1998.

B. Supplementary Textbook

Serway and Faughn. College Physics, 5th ed. Orlando: Saunders College, 1999.

C. Other Material
Handout Sheets (to be given out in lab)
A scientific calculator

V. POLICIES AND PROCEDURES

A. University Policies and Procedures
1. Attendance at each class or laboratory is mandatory at Oral Roberts University.
2 Double cuts will be assessed for absences immediately proceeding or following holidays or breaks.
3. Excessive absences can reduce a student's grade or deny credit for the course.
4. Students taking a late exam because of an unauthorized absence will be charged a late exam fee.
5. Students and faculty at Oral Roberts University ascribe to all laws addressing the ethical use of others' materials, whether it is in the form of print, video, multimedia, or computer software.
6. 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.

B. Course Policies and Procedures
1. Evaluation Procedures
a. The laboratory manual for this course contains procedural instructions, theoretical explanations, and relevant questions for each experiment. Results from the procedures and answers to the questions will be written in the designated areas within the manual. Then a discussion or conclusion of the experiment should be written on a separate piece of paper and attached to the report. The conclusion should be concise and to the point, not over half a page.
b. The student will have three hours in the laboratory to complete each day's experiment, and must hand in his 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 will be collected at the beginning of the laboratory period.

60% for 12 lab write-ups (50 pts. Each)		=	600 pts
25% for lab final (written and/or practical)		=	250 pts.
15% for 3 quizzes ()50 pts. Each)		=	150 pts.
100%	Total	=	1000 pts.

d. The letter grade is assigned in accordance with the following percentage ranges:

A	=	100 - 90
B	=	89 - 80
C	=	79 - 70
D	=	69 - 60
F	=	59- 0

2. Other Policies and/or Procedures
   a. Students are responsible for the University materials that they use during the laboratory period and will be assessed an appropriate fee for any items that are lost, damaged, or broken.
   b. Students should leave their table and apparatus in good order; i.e., weights put away, instruments returned, scrap paper picked up, etc.

VI. COURSE CALENDAR

Lab. No.	**Lab**
1	Mass, Volume, and Density. Experiment 2
2	Uniformly Accelerated Motion - Free Fall. Handout like Experiment 4
3	The Addition and Resolution of Vectors. Experiment 5
4	Atwood Machine and Smart Pulley (computer assisted). Handout like Experiment 6
5	Collisions (Computer Assisted) Handout like Experiment 7
6	Torques, Equilibrium and Center of Gravity. Experiment 12
	Quiz 1 over Labs 1-4
7	Archimedes' Principle Handout like Experiment 23
	Fall Break
8	Specific Heat of Metals and Heat of Fusion. Experiment 20
9	Heat of Fusion and Vaporization (computed assisted). Experiment 20
10	Hooke's Law and Simple Harmonic Motion. Experiment 16
	Quiz 2 over Labs 5-8
11	Standing Waves in a String Experiment 17
12	Air Column Resonance: The Speed of Sound in Air. Experiment 18
	Thanksgiving Week – No Labs
13	**Make-up, Review, Quiz 3 over Labs 9-12.**
14	**Final**

Prof. Robin Akbar &
Dr. William.Redmond
Name of Instructor

PHY 101-61
Course No.

General Physics I Lab
Title of Course

Engineering and Physics
Name of Department

MISSION

The lifestyle at ORU is rooted in the word "Wholeness." ORU seeks to educate the whole person, with balanced emphasis placed on the development of mind, spirit, and body.

GENERAL OUTCOMES

1. Spiritual Development
2. Physical Development
3. Communication
4. Analysis
5. Problem Solving
6. Valuing in Decision-making
7. Social Interaction
8. Global Perspectives
9. Effective Citizenship
10. Aesthetic Responsiveness

MAJOR OUTCOMES

Analysis/Problem Solving: Has the ability to analyze, design, and obtain effective solutions to real world engineering and physics problems.

Communication/Team Work: Demonstrates ability to work on teams and communicate effectively in written and oral forms.

Fundamental Knowledge Base: Possesses fundamental knowledge of principles of engineering, physical sciences, and mathematics.

Christian Stewardship and Ethics: Ethically applies engineering technology to the solution of human problems using Christian principles.

COURSE GOALS

Practice instruments use and zero corrections.

Perform experiments with proven techniques including computers

- Mass, volume, density
- Vectors
- Momentum
- Speed, velocity, and acceleration
- Specific and latent heat
- Standing waves on string
- Sound

ASSESSMENT OF COURSE GOALS

STIMULI:

- Laboratory experiments/ reports
- Quizzes
- Final

CRITERIA:

See Syllabus.