

Las Positas College
3000 Campus Hill Drive
Livermore, CA 94551-7650
(925) 424-1000
(925) 443-0742 (Fax)

Course Outline for PHYS 10L

DESCRIPTIVE PHYSICS LAB

Effective: Fall 2018

I. CATALOG DESCRIPTION:

PHYS 10L — DESCRIPTIVE PHYSICS LAB — 1.00 units

Introduction to laboratory principles and techniques with emphasis on the basic concepts of physics such as mechanics, thermodynamics, energy, electricity, magnetism, and optics.

1.00 Units Lab

Prerequisite

MATH 107 - Pre-Algebra
with a minimum grade of C
or

MATH 107B - Pre-Algebra B
with a minimum grade of C

Corequisite

PHYS 10 - Descriptive Physics
(may also be taken after successful completion of PHYS 10)

Grading Methods:

Letter Grade

Discipline:

- Physics/Astronomy

	<u>MIN</u>
Lab Hours:	54.00
Total Hours:	54.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. MATH107

1. perform accurate computations with whole numbers, fractions and decimals, signed and unsigned, without using a calculator;
2. simplify and evaluate variable expressions;
3. demonstrate a knowledge of ratios, proportions and percentages and their application;
4. demonstrate knowledge of geometric figures and their properties;
5. demonstrate a knowledge of the English and metric units of length, area, volume, mass, temperature and time;
6. solve linear equations involving multiple steps;
7. analyze and construct graphs of data;
8. construct graphs of linear equations in two variables in a rectangular coordinate system;
9. calculate mean, median and mode from a set of data;
10. apply the concepts learned to specific real-life applications, such as, simple interest, business and finance, restaurants, bank statements, etc.

B. MATH107B

IV. MEASURABLE OBJECTIVES:

Upon completion of this course, the student should be able to:

- A. Conduct and/or design experiments to measure physical quantities and validate theoretical predictions.
- B. Analyze laboratory data using computer- and calculator-based spreadsheet and graphing applications.
- C. Operate standard laboratory equipment, including digital data acquisition systems.
- D. Perform experiments using interactive computer-based simulations of physics phenomena and analyze the results.
- E. Write comprehensive laboratory reports (including the introduction, methods, data analysis, and conclusions).

V. CONTENT:

- A. Measurement of Physical Quantities
 1. Standards of length, mass, and time.

2. Dimensional analysis.
3. Uncertainty in measurements
4. Significant figures.
5. Conversion of units.
6. Order-of-magnitude calculations.
7. Coordinate systems.
- B. Principles of laboratory safety and use of laboratory equipment.
- C. Experiments and investigations of physics principles
 1. Motion in one and two dimensions
 2. Instantaneous speed, velocity, and acceleration.
 3. Applications of Newton's laws
 4. Verification of conservation laws (such as energy, momentum, or angular momentum)
 5. Relationships between temperature, pressure, volume, and other thermodynamic quantities
 6. Wave Motion
 7. Electric force, electric field, and electric potential
 8. Magnetic force, magnetic field, and electromagnetic induction
 9. Electric circuits
 10. Optics, lenses, and simple telescopes.
 11. Modern physics (such as nuclear and/or particle physics)

VI. METHODS OF INSTRUCTION:

- A. **Lab** -
- B. **Classroom Activity** - Individual and group skill building activities (may include problem worksheets, hands-on experimentation, movies, and/or computer simulations)
- C. **Lecture** - A brief summary of relevant physics concepts may precede experiments.

VII. TYPICAL ASSIGNMENTS:

- A. Weekly laboratory experiments
- B. Weekly or biweekly laboratory reports (or assigned at the discretion of the instructor)

VIII. EVALUATION:

A. **Methods**

1. Exams/Tests
2. Papers
3. Lab Activities

B. **Frequency**

1. A final laboratory exam may be given at the end of the semester.
2. Lab report papers may be assigned weekly, biweekly, or at the discretion of the instructor.
3. Laboratory activities should take place every week.

IX. TYPICAL TEXTS:

1. Hewitt, Paul. *Conceptual Physics*. 12th ed., Pearson, 2015.
2. Griffith, W., and Juliet Brosing. *Physics of Everyday Phenomena*. 8th ed., McGraw-Hill Education, 2015.
3. Muller, Richard. *Physics and Technology for Future Presidents*. 1st ed., Princeton University Press, 2010.
4. Las Positas College Faculty. LPC Physics 10L Lab Manual. online , 2017.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Calculator
- B. Computer and Internet Access