

# TROY UNIVERSITY

## PHY 2252

### 1. Course Listing, Number, Title, Number of Semester Hours:

PHY 2252 General Physics I (3)

### 2. Accurate Course Description:

Emphasis is on the laws of mechanics and thermodynamics, including linear motion, laws of motion, energy and momentum, rotational motion and dynamics, thermal processes and laws of thermodynamics. Prerequisite: MTH 1114 or 1115 with at least a C. Co-requisite PHY L252.

### 3. Course Textbooks, Manuals, or Required Materials:

*College Physics* by Raymond A. Serway, Jerry S. Faughn, Chris Vuille, and Charles A. Bennett, 2006, Thomson Brooks/Cole, ISBN 0-534-99723-6

### 4. Course Objectives:

A basic knowledge of the first-year college physics based on the textbook to include:

1. System International (SI) units (m, kg, s) and conversion of various units.
2. Measurement of distance, speed, and acceleration in one dimensional kinematics and its dependence on time.
3. Difference between scalars and vectors and the means to work with vectors.
4. Newton's laws of motion and the nature of the forces (weight, friction, normal force, tension, etc.) involved in a given problem or a real physical situation.
5. Work and energy, difference between kinetic and potential energies, momentum and energy conservations in collisions.
6. Difference between temperature and heat, heat transfer and thermodynamic processes in solid, liquid, and gas.
7. Ideal gas law, quantitative behavior and kinetic theory of gases.
8. Use critical thinking and problem solving strategies in the application of basic mechanics and thermodynamics concepts.

### 5. Course Outline of Topics

1. Standards of measurements and units
2. Linear motion (displacement, velocity, and acceleration) in one dimension
3. Vectors and motion in two dimensions
4. Newton's laws of motion and forces
5. Work and energy
6. Momentum and collisions
7. Rotational motion, angular momentum, and torque
8. Temperature and the laws of thermodynamics
9. Ideal gas law and kinetic theory of gases
10. Heat and thermal processes

# TROY UNIVERSITY

## PHY L252

### 1. Course Listing, Number, Title, Number of Semester Hours:

PHY L252 General Physics I Laboratory (1)

### 2. Accurate Course Description:

Lab work emphasizes basic principles of mechanics and thermodynamics, in particular, experiments in one dimensional motion, addition of forces, conservation of energy and momentum, heat and thermal processes, etc., and the use of measuring instruments and the interpretation of data. Prerequisite: MTH 1114 or 1115 with at least a C. Co-requisite PHY 2252.

### 3. Course Textbooks, Manuals, or Required Materials:

*Physics Laboratory Experiments*, 6<sup>th</sup> Edition by Jerry D. Wilson and Cecilia A. Hernandez, 2005, Houghton Mifflin Company, ISBN 0-618-38259-3  
Presently, this manual is supplemented by instructor-provided modified lab handouts for several experiments. The above Lab Manual is subject to change if another manual fits out laboratory experiments better in the future.

### 4. Course Objectives:

A basic knowledge of the first-year college physics laboratory based on the lab textbook and handouts provided by the instructor to include:

1. Data analyses, percent error and percent difference.
2. One dimensional motion and measurement of acceleration due to gravity.
3. Addition of two or three forces – graphical, experimental, and analytical techniques.
4. Application to Newton's 2<sup>nd</sup> law of motion – measurement of acceleration.
5. Measurement of coefficient of friction, or work done against gravity.
6. Investigation of initial and final momentums in collision between equal-equal, equal-unequal masses.
7. Conservation of energy and momentum in projectile motion.
8. Ideal gas law and the measurement of absolute zero temperature.
9. Heat transfer and measurement of specific heat in aluminum, iron, and lead.
10. Measurement of heat of fusion and vaporization for water.

### 5. Course Outline of Laboratory Experiments

1. Uncertainty and Data Analyses
2. Free fall – measurement of acceleration due to gravity
3. Force table – addition and resolution of vectors
4. The Atwood machine – application of Newton's 2<sup>nd</sup> law
5. Inclined plane – frictional forces, or work done against gravity.

6. Conservation of linear momentum
7. The Ballistic Pendulum – projectile motion, (conservation of energy, and conservation of linear momentum)
8. Ideal gas law – absolute zero temperature
9. Thermal processes – specific heat of metals
10. Heat of fusion/vaporization of water