



### HONORS PHYSICS

2013-2014

#### Course Description:

Honors Physics is a laboratory science course which focuses on several different areas of Physics. The first and main consideration is the branch of physics known as mechanics, which includes the sub-branches of kinematics (the study of motion) and dynamics (the study of forces). Other areas are thermodynamics (heat) and waves and their properties. The honors section will also have an introductory study in electricity (static electricity and simple, direct current circuits). The course requires rigorous mathematical capability as well as the ability to solve problems and use critical thinking skills. The lab component compliments the area of study and involves hands-on skills and the practical application of learned material.

#### Course Content:

##### I. Introduction

- Math tool kit, metric system, significant figures
- Algebra skills
- Precision: commonly used instruments in labs
- Lab: measurement and precision

##### II. Motion

- Acceleration, velocity
- Kinematic equations
- Gravity
- Labs: accelerated motion, motion at a constant velocity, acceleration due to gravity

##### III. Forces

- Newton's three laws of motion
- Frictional forces
- Labs: force of friction, force board

##### IV. Vectors

- Vector addition
- Vector resolution
- Forces on an incline
- Labs: vector components, vector addition, forces on an incline

##### V. Motion in Two Dimensions

- Projectile Motion
- Circular Motion
- Simple harmonic motion
- Labs: projectile motion, circular motion, pendulum, spring

- VI. Universal Gravitation
  - Astronomical history
  - Kepler's laws
  - Newton's Law of Universal Gravitation
  
- VII. Momentum
  - Impulse and change of momentum
  - Conservation of momentum
  - Labs: impulse/change of momentum and conservation of momentum
  
- VIII. Work and Power
  - Introduction to the work-energy theorem
  - Lab: horsepower
  
- IX. Energy
  - Potential and kinetic energy
  - Reinforcement of the work-energy theorem
  - Labs: conservation of energy labs
  
- X. Thermodynamics
  - Laws of thermodynamics
  - Heat energy and changes state
  - Labs: specific heat, heat of fusion
  
- XI. Waves
  - Properties
  - Sound
  - Light
  
- XII. Optics
  - Mirrors
  - Lenses
  - Labs: focal points with mirrors and lenses
  
- XIII. Electricity
  - Static electricity, electric fields
  - Direct current electricity
    1. Series circuits
    2. Parallel circuits
    3. Compound circuits
    4. Labs: DC circuitry, electric field

Required Textbooks and/or Other Reading/Research Materials

The textbook is used as a supplemental source for additional examples and problems.

*Physics: Principles & Problems* by Zitzewitz, Haase, Harper. Glencoe, 2013.

Course Requirements:

Prerequisites: Completion of PRE-CALCULUS or PRE-CALCULUS taken currently

Grade Components/Assessments:

Grades will be weighted based on a category percentage. Sapphire will automatically give a student's grade total as a weighted percentage based on the following category percentage breakdown:

Test/Quizzes: 50%

Labs/Projects: 30%

Homework/Class participation: 20%

Each marking period is worth 20% of a student's overall grade. The midterm and final exam are each worth 10% of a student's overall average:

Quarter 1	20%
Quarter 2	20%
<b>Midterm</b>	<b>10%</b>
Quarter 3	20%
Quarter 4	20%
<b>Final</b>	<b>10%</b>

Required Summer Reading/Assignments:

There are no summer reading assignments.