



---

**PINEWOOD – THE AMERICAN INTERNATIONAL SCHOOL OF THESSALONIKI, GREECE**

**NAME OF COURSE: Physics IB1**

**GRADE LEVEL: 11**

**SCHOOL YEAR: 2011 – 2012**

### **COURSE DESCRIPTION**

This course provides a general introduction to the principles, applications and ideas of physics, based on the IB Physics syllabus. The material covered includes topics such as kinematics, mechanics, work and power, concepts of energy and thermal physics, vibrations and waves, electricity, energy production and climate change.

Throughout the course, emphasis is placed on laboratory work, mathematical modeling in physics, interpretation of graphs and real-life applications.

Prerequisites: Chemistry, Geometry

### **LEARNING OBJECTIVES**

- To gain understanding of conversion of units, the basic process of measurement, significant digits and the graphing of data.
- To be introduced to the fundamentals of kinematics and solve problems involving uniform motion, uniformly accelerated motion and free fall.
- To be introduced to dynamics and solve problems involving Newton's laws of motion.
- To be introduced to the concepts of momentum, work and power.
- To understand energy and its conversion and solve problems involving transformations of energy.
- To understand the fundamental concepts related to gravitational fields, gravitational potential energy and orbital motion.
- To be introduced to the kinematics and energy changes of simple harmonic motion.
- To be introduced to the basic concepts of thermal physics, thermal properties of matter and thermodynamics.

### **SCOPE AND SEQUENCE \***

#### **QUARTER I**

*Measurements – Uncertainties*

#### *Kinematics*

- Vector and scalar quantities
- Kinematics – graphical representation of motion
- Measurement and uncertainties
- Uniformly accelerated motion
- Free fall
- Projectile motion

### *Forces and Dynamics*

- Forces and free-body diagrams
- Newton's laws of motion

## **QUARTER II**

### *Work, Energy and Power*

- Work-Kinetic Energy Theorem
- Kinetic, Gravitational Potential and Elastic Potential Energy
- Conservation of Energy
- Power

### *Momentum and collisions*

- Momentum
- Impulse
- Conservation of Momentum
- Elastic and Inelastic Collisions

### *Rotational motion*

- Tangential and angular speed
- Tangential and angular acceleration
- Centripetal Force

## **QUARTER III**

### *Thermal Physics*

- Thermal concepts
- Thermal properties of matter
- Kinetic model of an ideal gas

### *Simple Harmonic Motion*

- Period, frequency and amplitude
- Displacement, velocity and acceleration in simple harmonic motion
- Energy changes during simple harmonic motion
- Forced oscillations and resonance

### *Waves*

- Wave characteristics
- Reflection, refraction and diffraction
- Principle of superposition

## **QUARTER IV**

### *Current Electricity*

- Electric current, potential difference and resistance
- Ohm's Law
- Electric Circuits
- Resistances in series and parallel
- Electromotive force and internal resistance

### *Energy, Power and Climate Change*

- World energy sources
- Fossil and non-fossil fuel power production
- Greenhouse effect
- Global warming

*\*Note that the order in scope and sequence is subject to change during the school year.*

## **HOMEWORK POLICY**

- All homework assignments must be handed in on due date before class starts. A 10% reduction is applied for assignments handed in one day late, 20% for two days. Assignments that are handed in three days after the due date or later will not be accepted.
- Homework assignments must be written in pen on A4 lined paper with margins on both sides. Graphs must be drawn on graph (millimeter) paper and date, name of the student and the assignment description must be clearly indicated at the top of the first page.
- Lab reports are typed and must be completed within 7 days from the completion of the experiment. Graphs must be drawn by hand on graph (millimeter) paper unless otherwise specified by the teacher. Lab reports not in line with the above may receive reduced marks.
- Lab reports are typed and must be completed within 7 days from the completion of the experiment. All lab reports are marked according to the IB criteria and the IB mark is converted to a percentage grade.

## **ASSESSMENT**

- Homework assignments
- Tests and quizzes on a regular basis
- Laboratory exercises
- Two semester exams
- Group science project (Group 4) – experimental project and presentation
  - Tests: 40%
  - Quizzes: 10%
  - Homework: 20%
  - Lab reports: 20%
  - Class Participation: 10%

## **RESOURCES**

- Textbook: C. Hamper, *Pearson Baccalaureate: Higher Level Physics*, Pearson Education, 2009
- Several Web sites related to Physics.

## **ACADEMIC HONESTY**

Academic honesty is fundamental to the integrity and operation of our school. Acts of academic dishonesty, including plagiarism (the act of presenting others' words and ideas as one's own without crediting the source), stealing in quizzes and tests, copying work from other students or allowing their own work to be copied, or using notes during a test, are considered serious offences. The consequences of academic dishonesty will be a zero grade on the specific test/assignment, and additional disciplinary action. The said student will be ineligible or removed from the National Honor Society.