**Curriculum**

**Advanced Placement Physics**

**Course Overview**

The course is based on the assumption that the student has a previous basic Physics course. This allows for each topic to be reviewed and more advanced material to be incorporated. The goal is the development of a cohesive and in-depth understanding of both Classical and Modern Physics concepts and their applications. AP students will have ample opportunity to prepare for the Advanced Placement Physics “B” Examination in May.

**Department Standards**

**STANDARD 1: THE NATURE OF SCIENCE**

**STANDARD 2: SCIENCE AND TECHNOLOGY**

**STANDARD 3: THE PHYSICAL SETTING**

**STANDARD 4: THE LIVING ENVIRONMENT**

**STANDARD 5: SCIENCE AND SOCIETY**

**Benchmarks**:

[Science Department Standards & Benchmarks](http://acidale.on-rev.com/dante/Science/Standards&BenchmarksK-12.docx)

**Performance Indicators**

**AP Physics**

**Performance Indicators**

See "Learning Objectives for AP Physics", College Board, Advanced Placement Program.

<http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2262.html>

**Assessments**

**AP Physics**

**Assessments**

**First Quarter**

Unit Tests

Review Activities

AP Past Questions

Laboratories

Non-uniform Motion

Projectile Motion

Newton’s 2nd Law

Coefficients of friction

**Second Quarter**

Unit Tests

Review Activities

AP Past Questions

Laboratories

Collision/ Explosions in 2D

Hooke’s Law

Investigation of a Simple Pendulum

**Third Quarter**

Unit Tests

Review Activities

AP Past Questions

Laboratory Exercises

Images formed by Curved Mirrors

Convex and Concave Lenses

Measuring the Wavelength of Light

Electromagnetic Induction

Planck’s Constant Determination

**Fourth Quarter**

Practice AP Exams

Mock AP Exam

Physics C preparation/Final Project

**Core Topics**

**AP Physics**

**Core Topics**

**First Quarter**

Intro: Scientific Lab and Experiment Situations

I. Mechanics

A. Kinematics (including projectile motion)

B. Forces and Dynamics

C. Work, Energy and Power

**Second Quarter**

I. Mechanics (cont’d)

D. Systems of particles, linear momentum

E. Circular Motion and Torque

F. Oscillations and Gravitation

II. Fluid Mechanics and Thermal Physics

A. Fluid MechanicsB. Temperature and heat

C. Kinetic theory and thermodynamics

IV. Waves and Optics

A. Wave motion

**Third Quarter**

IV. Waves and Optics (cont’d)

B. Physical Optics

C. Geometric Optics

III. Electricity and Magnetism

A. Electrostatics

B. Conductors, capacitors and dielectrics

C. Electric Circuits

D. Magnetic Fields

E. Electromagnetism

V. Atomic Physics and Quantum effects

A. Atomic Physics and Quantum effects

B. Nuclear Physics

Integrated Review of all Topics

Review of Previous AP Exams

**Fourth Quarter**

Paper 1 (Multiple Choice)

Paper 2 (Written Response)

Final Project

**Specific Content**

**AP Physics**

**Specific Content**

**First Quarter**

I.A.1 Motion in one dimension

I.A.1 Motion in two dimensions

I.B.1 static equilibrium (1st Law)

I.B.2 Dynamics of a single particle (2nd Law)

I.B.3 Systems of two or more objects (3rd Law)

I.C.1 Work and the work-energy theorem

I.C.2 Forces and potential energy

I.C.3 Conservation of Energy

I.C.4 Power

**Second Quarter**

I.D.2 Impulse and momentum

I.D.3 Conservation of linear momentum, collisions

I.E.1 Uniform Circular Motion

I.E.2 Torque

I.F.4 Universal Gravitation/Gravitational Field

I.F.5 Orbital Motion

I.F.1 Simple Harmonic Motion

I.F.2 Mass on a spring

I.F.3 Pendulum and other oscillations

II.A.1 Hydrostatic pressure

II.B.1 Mechanical Equivalent of heat

II.B.2 Heat transfer and thermal expansion

II.B.1 Ideal gases

II.B.2 Laws of thermodynamics

IV.A.1 Traveling waves

IV.A.2 Wave propagation

IV.A.3 Standing Waves

IV.A.4 Superposition

**Third Quarter**

IV.B.1 Interference and Diffraction

IV.B.2 Dispersion of light and the EM spectrum

IV.C.1 Reflection and refraction

IV.C.2 Mirrors

IV.C.3 Lenses

III.A.1 Electrostatics

III.A.2 Electric field and electric potential

III.B.1 Electrostatics with conductors

III.B.2 Capacitors

III.C.1 Current, resistance, power

III.C.2 DC circuits with batteries and resistors

III.C.3 Capacitors in circuits

III.D.1 Moving charges in magnetic fields

III.D.2 Forces on current-carrying wire

III.D.3 Magnetic field from current-carrying wires

III.E.1 Electromagnetic Induction

V.A.1a. Photons

V.A.1b. Photoelectric effect

V.A.1c. Compton scattering

V.A.1d. x-rays

V.A.2 Atomic energy levels

V.A.3 wave-particle duality

V.B.1 Nuclear reactions

V.B.2 Mass-energy equivalence

**Resources**

**AP Physics**

**Resources**

Jewett, John W., and Raymond A. Serway. *Physics for scientists and engineers* . 7. ed., internat. student ed. Belmont, Calif. [u.a.: Thomson, Brooks/Cole, 2008. Print.

Leduc, Steven A.. *Cracking the AP physics B & C exams* . 2006-2007 ed. New York: Random House, 2006. Print.

*How to prepare for the IB Physics B AP Exam*. Hauppauge: Barron's, 2003. Print.