

A Planned Course of Study

for

Advanced Placement Physics C

ASHS Course # 0440

Abington School District

Abington, Pennsylvania

September, 2016

I. Objectives

Students will demonstrate the appropriate level of proficiency in each of the following areas related to

Physics:

- A. Kinematics (including vectors, vector algebra, components of vectors, coordinate systems, displacement, velocity and acceleration)
- B. Newton's laws of motion
- C. Work, energy, power
- D. Systems of particles, linear momentum
- E. Circular motion and rotation
- F. Oscillations and Gravitation
- **G.** Electrostatics
- H. Conductors, capacitors, dielectrics
- I. Electric circuits
- J. Magnetic Fields
- K. Electromagnetism
- L. Reading Informational Text in Science and Technical Subjects
- M. Writing in Science and Technical Subjects
- II. Major Concepts

A.Kinematics (including vectors, vector algebra, components of vectors, coordinate systems, displacement, velocity and acceleration)

- 1. Motion in one dimension
- 2. Motion in two dimensions, including projectile motion

B.Newton's laws of motion

- 1. Static equilibrium (first law)
- 2.Dynamics of a single particle (second law)
- 3. Systems of two or more objects (third law)

B. Work, energy, power

- 1. Work and the work-energy theorem
- 2. Forces and potential energy
- 3. Conservation of energy
- 4. Power

C. Systems of particles, linear momentum

- 1. Center of mass
- 2. Impulse and momentum
- 3. Conservation of linear momentum, collisions

D. Circular motion and rotation

- 1. Uniform circular motion
- 2. Torque and rotational statics
- 3. Rotational kinematics and dynamics
- 4. Angular momentum and its conservation

E. Oscillations and Gravitation

- 1. Simple harmonic motion (dynamics and energy relationships)
- 2. Mass on a spring
- 3. Pendulum and other oscillations
- 4. Newton's law of gravity
- 5. Orbits of planets and satellites

F. Electrostatics

- 1. Charge and Coulomb's Law
- 2. Electric Field and Electric Potential (including point charges)
- 3. Gauss's Law
- 4. Fields and potentials in other charge distributions

G. Conducts, capacitors, dielectrics

- 1. Electrostatics with conductors
- 2. Capacitors
- 3. Dielectrics

H. Electric Circuits

- 1. Current, resistance, power
- 2. Steady-state direct current circuits with batteries and resistors only
- 3. Capacitors in circuits

I. Magnetic Fields

- 1. Forces on moving charges in magnetic fields
- 2. Forces on current-carrying wires in magnetic fields
- 3. Fields of long current-carrying wires
- 4. Biot-Savart law and Ampere's law

J. Electromagnetism

- 1. Electromagnetic induction (including Faraday's law and Lenz's law)
- 2. Inductance (including LR and LC circuits)
- 3. Maxwell's Equations

L. Reading Informational Text in Science and Technical Subjects

- 1. Key Ideas and Details
- 2. Craft and Structure
- 3. Integration of Knowledge and Ideas
- 4. Range and Level of Complex Texts

M. Writing in Science and Technical Subjects

- 1. Text Types and Purposes
- 2. Production and Distribution of Writing
- 3. Research to Build and Present Knowledge
- 4. Range of Writing

III. Instruction

A. Course Schedule

1. 6 periods per week, for full year, 48 minutes per period

B. Pacing

- 1. Marking Period 1
 - a. Kinematics
 - b. Newton's Laws and Forces
 - c. Work, Energy, and Power
- 2. Marking Period 2
 - a. Rotational Motion
 - b. Oscillations and Gravitation
 - c. Electrostatics
- 3. Marking Period 3
 - a. Electric Potential, Conductors, and Capacitors
 - b. Electric Circuits
 - c. Magnetism
- 4. Marking Period 4
 - a. Electromagnetism

C. Methods

- 1. Inquiry-based instruction
- 2. Cooperative learning activities
- 3. Lab Simulations
- 4. Group problem solving sessions with guided practice
- 5. Lecture

D. Technology

1. Google Classroom

- 2. Digital data collection through Labquests
- 3. Online formative assessments
- 4. Interactive Promethean Board presentations

E. Resources

1. Course textbook: Serway, Raymond, and Robert J. Beichner. *Physics for Scientists and Enginers, 5th ed.* Fort Worth: Saunders College Publishing, 2000.

IV. Assessment

A. Procedures for Evaluation

- 1. Summative assessments
 - a. A departmental common assessment will be administered at the end of each unit.
 - b. A departmental common assessment will be administered at the end of the course.
- 2. Formative assessments will be administered in a variety of formats.
- 3. Accommodations aligned with those permitted for the PSSA/Keystone Exams and included in IEP's will be provided for Special Education students who are enrolled in this course.

B. Expected Levels of Achievement

Students are expected to achieve at least a minimum level of proficiency. Proficiency and related grades are defined as follows:

Α	.90	_	100%
В	.80	-	89%
C	.70	-	79%
D	.60	-	69%