



***Department of Teaching & Learning***  
***Parent/Student Course Information***

***Advanced Placement Physics 1***

***(SC 4530)***

***One credit, one year***

***Grades 11-12***

*Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.*

**COURSE DESCRIPTION**

Advanced Placement Physics 1 is an algebra-based college-level course that examines the principles of physics in detail. Topics, such as Newtonian mechanics, work, energy and power; mechanical waves and sounds; and introductory, simple circuits are explored. This course is designed in accord with the requirements of the College Board. Students are expected to take the Advanced Placement Physics 1 Examination at the end of the course.

**COURSE GOALS**

- Develop an in-depth understanding of the concepts, principles and processes of physics and applying these principles in the solution of problems
- Develop an understanding of the means by which information about physics is collected, how it is recorded and interpreted, how hypotheses are formulated from available data and how further predictions are made
- Develop the ability to think clearly and to express ideas orally and in writing with clarity and logic
- Engage in science practices, such as asking investigative questions, designing experiments, analyzing data and constructing arguments
- Develop an understanding that science is a human endeavor with social consequences

**PREREQUISITE**

Algebra II/Trigonometry

**OPTIONS FOR NEXT COURSE**

Advanced Placement Physics 2

Advanced Placement Physics C: Mechanics (Algebra II/Trigonometry and Calculus prerequisite)

Advanced Placement Environmental Science (Biology and Chemistry prerequisite)

Advanced Placement Biology (Biology and Chemistry prerequisite)

Advanced Placement Chemistry (Chemistry prerequisite)

Oceanography (Earth Science prerequisite)

**REQUIRED TEXTBOOK**

*Physics: Principles with Applications, AP\* Edition, Pearson Publishing (2014)*

**MINIMUM REQUIREMENTS**

- Demonstrate knowledge and understanding of all core objectives through laboratory investigations, projects, oral and/or written tests, quizzes and reports
- Read and study assigned chapters in the textbook
- Participate in the laboratory activities, prepare written laboratory reports and adhere to all safety procedures

- Read science journals, magazines and books to expand the ideas and topics presented in class
- The Knowledge, Skills and Attitudes that Comprise the Advanced Placement Physics 1 Course are Summarized as Follows From the Prescribed Curriculum:**

## **BIG IDEAS AND KNOWLEDGE**

**Big Idea 1:** Objects and systems have properties such as mass and charge. Systems may have internal structure.

**Big Idea 2:** Fields existing in space can be used to explain interactions.

**Big Idea 3:** The interactions of an object with other objects can be described by forces.

**Big Idea 4:** Interactions between systems can result in changes in those systems.

**Big Idea 5:** Changes that occur as a result of interactions are constrained by conservation laws.

**Big Idea 6:** Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomena.

**Big Idea 7:** The mathematics of probability can be used to describe the behavior of complex systems and to interpret the behavior of quantum mechanical systems.

## **COURSE TOPICS**

- Kinematics
- Dynamics: Newton's Laws
- Circular Motion and universal law of gravitation
- Simple harmonic motion: simple pendulum and mass-spring systems
- Impulse, linear momentum and conservation of linear momentum: collisions
- Work, energy and conservation of energy
- Rotational motion: torque, rotational kinematics and energy, rotational dynamics and conservation of angular momentum
- Electrostatics: Electric charge and electric force
- DC circuits: resistors only
- Mechanical waves and sounds

## **LABORATORY EXPERIENCES**

A minimum of twenty-five percent (25%) of a student's time should be spent conducting hands-on laboratory work. Great emphasis is placed on inquiry-based investigations that provide students with rich opportunities to apply the science practices.

## **SCIENCE PRACTICES**

Students will focus on these disciplinary practices in a rigorous and engaging environment. Students will use evidence to develop and revise explanations and predictions of natural phenomena. Such practices require that students:

- Use representations and models to communicate scientific phenomena and solve scientific problems
- Use mathematics appropriately
- Engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course
- Plan and implement data collection strategies in relation to a particular scientific question
- Perform data analysis and evaluation of evidence
- Work with scientific explanations and theories
- Connect and relate knowledge across various scales, concepts and representations in and across domains

**NOTE:** Students should keep a record of their laboratory work so they will be in a position to validate their AP Physics 1 course as equivalent to the corresponding college course. Most college placement policies presume that students have had laboratory experience.

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For further information please call (757) 263-1070.

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