



Radnor High School  
Course Syllabus

Advanced Physics II  
0372

### General Information

**Credits:** 1.0

**Weighted:** N/A

**Length:** Year

**Format:** Meets Daily

**Grade:** 12th

**Prerequisite:** Advanced Physics or higher

### Course Description

Advanced Physics II is a college-preparatory course that provides an opportunity for students to continue studying physics in-depth for an additional year. Topics will include content from Advanced/Honors Physics covered in greater depth and new topics, such as: fluid dynamics; thermal physics; nuclear physics; and some contemporary topics in physics. The course emphasizes concepts, problem-solving, applications, and projects in physics.

### Course Objectives:

- To apply the principles and concepts of physics to real-life applications.
- To enable students to understand and quantify the physical world.
- To prepare students to perform rigorous scientific experiments.
- To prepare students to interpret experiment results and communicate their findings.
- To enhance problem-solving ability.
- To utilize technology appropriately.

### Materials & Texts

**TEXT:** *How things work: the physics of everyday life*; 4<sup>th</sup> edition, Louis A. Bloomfield, Wiley Publishing, 2010

**MATERIALS:** Scientific or graphing calculator; protractor; ruler

### Common Core Standards

#### Key Ideas and Details

- Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (CC.3.5.11-12.A.)
- Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but accurate terms. (CC.3.5.11-12.B.)
- Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. (CC.3.5.11-12.C.)

#### Craft and Structure

- Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*. (CC.3.5.11-12.D.)
- Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. (CC.3.5.11-12.E.)

- Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. (CC.3.5.11-12.F.)

### **Integration of Knowledge and Ideas**

- Evaluate the hypothesis, data analysis, and conclusions in a science text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. (CC.3.5.11-12.H.)
- Synthesize information from a range of sources into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. (CC.3.5.11-12.I.)

### **Range of Reading and Level of Text Complexity**

- By the end of grade 12, read and comprehend science/technical texts in the grades 11-12 text complexity band independently and proficiently. (CC.3.5.11-12.J.)

### **Text Types and Purposes**

- Write arguments focused on *discipline-specific content*. (CC.3.6.11-12.A.)
  - Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence.
  - Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns.
  - Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
  - Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
  - Provide a concluding statement or section that follows from or supports the argument presented.
- Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (CC.3.6.11-12.B.)
  - Introduce a topic and organize ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting, graphics, and multimedia when useful to aiding comprehension.
  - Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
  - Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts.
  - Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
  - Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

### **Production and Distribution of Writing**

- Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (CC.3.5.11-12.C.)
- Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. (CC.3.5.11-12.E.)

## **Keystone Connections:**

**3.2. P.B1:** Differentiate among translational motion, simple harmonic motion, and rotational motion in

terms of position, **velocity**, and acceleration. Use force and **mass** to explain translational motion or simple harmonic motion of objects. Relate **torque** and rotational **inertia** to explain rotational motion.

**3.2. P.B2:** Explain the translation and simple harmonic motion of objects using conservation of energy and conservation of momentum. Describe the rotational motion of objects using the conservation of energy and conservation of **angular momentum**. Explain how gravitational, electrical, and magnetic forces and torques give rise to rotational motion.

**3.2. P.B3:** Analyze the factors that influence **convection, conduction, and radiation** between objects or regions that are at different temperatures.

**3.2. P.B4:** Explain how stationary and moving particles result in electricity and magnetism. Develop qualitative and quantitative understanding of current, voltage, resistance, and the connections among them. Explain how electrical induction is applied in technology.

**3.2. P.B5:** Explain how waves transfer energy without transferring matter. Explain how waves carry information from remote sources that can be detected and interpreted. Describe the causes of wave frequency, speed, and wave length.