Kolbe Academy

PHYSICS WITH LAB

Physics Principles with Applications, Seventh Edition
Douglas C. Giancoli Pearson © 2014

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Kolbe Academy
Napa, CA

♦ SYLLABUS ♦

Physics with Lab
High School Science

COURSE TITLE: Physics with Lab

COURSE DESCRIPTION:
This course is designed to give an understanding of classical physics. Physics is the science of the natural laws of the physical universe, which, like the natural moral law, flow through creation, having as their origin the goodness of God. "The beauty of creation reflects the infinite beauty of the Creator and ought to inspire the respect and submission of man's intellect and will" (New Catechism of the Catholic Church 342). This course is typically done in 11th or 12th grade and includes the following topics: measurement, motion in one direction, vectors, motion in two and three dimensions, forces, Newton's Laws, work, energy, power, momentum circular motion, rotational kinematics, rotational dynamics, static equilibrium and elasticity, gravity and orbitals, oscillations and harmonic motion, wave motion, sound, wave superposition and interference, electric charge and Coulomb's Law, electric current and resistance, capacitors, and direct current circuits.

Kolbe Academy recommends that Physics be taken by the high school student in 11th or 12th grade after the successful completion of Intro to Physics and Chemistry in 8th or 9th, Biology in 9th or 10th, and Chemistry in 10th or 11th. Physics students need to have completed Geometry and Algebra 2 at a minimum.

COURSE TEXTS:
- *Physics Principles with Applications, Seventh Edition* by Douglas C. Giancoli; Pearson © 2014
- *Kolbe Academy Physical Science Answer Key*

SCOPE AND SEQUENCE:
Semester 1:
- Chapter 1 Measurement, Estimating
- Chapter 2 Describing Motion: Kinematics in One Dimension
- Chapter 3 Kinematics in Two Dimensions; Vectors
- Chapter 4 Dynamics: Newton's Laws of Motion
- Chapter 5 Circular Motion; Gravitation
- Chapter 6 Work and Energy
- Chapter 7 Linear Momentum
- Chapter 8 Rotational Motion (sections 8-1to 8-4, and 8-8)
- Chapter 11 Oscillations and Waves
- Chapter 12 Sound

Semester 2:
- Chapter 16 Electric Charge and Electric Field
- Chapter 17 Electric Potential
- Chapter 18 Electric Currents
- Chapter 19 DC Circuits
- Chapter 20 Magnetism
- Chapter 21 Electromagnetic Induction and Faraday's Law (sections 21-1 to 21-7)
- Chapter 22 Electromagnetic Waves
- Chapter 23 Light: Geometric Optics
- Chapter 24 The Wave Nature of Light

COURSE PLAN "AT A GLANCE" OUTLINE:

Semester 1

Weeks 1-5: Chapters 1-3, Exam I; Begin Chapter 4
Weeks 6-10: Chapters 4-6, Exam II
Weeks 11-16: Chapters 7, 8, 11, 12, Exam III
Weeks 17-18: Semester Review, Semester Exam

Semester 2

Weeks 1-7: Chapters 16-19, Exam IV; Begin Chapter 20
Weeks 8-12: Chapters 20-22, Exam V; Begin Chapter 23
Weeks 13-16: Chapters 23-24, Exam VI
Week 17-18: Semester Review, Semester Exam

Be sure to refer to the course plan that follows for specific guidance on assignments and exams.

COURSE PLAN METHODOLOGY:

The chapters have been laid out in the course plan with specific sections assigned. Please pay special care to the assignments, as several topics are skipped because they are beyond the scope of this course. Problems corresponding to each section are also assigned. Some of the problems are strictly conceptual in nature while others require that the student use higher level Algebra and Trigonometry skills for solving. Students may prefer to do all the reading for a chapter prior to attempting the problems, or they may prefer to alternate between reading and doing problems as the course plan suggests.

Some students may choose to take an additional lab credit. To qualify the course as a lab science, students should spend an average of one hour per week doing some type of lab work. Students may receive lab credit by using the Virtual Physics Lab or other means such as a home school co-op, hands-on lab at home, college lab course, etc. A separate grade should NOT be given for the lab work but should be incorporated into the overall grade given for the course. Parents may determine the weight the lab component will have on the final grade, but typical values range from 15-25% of the total grade.

There are 2 exams included with this course plan: one for each semester. Each exam reflects the content of what is assigned in the weekly course plans throughout that semester. If students do the work assigned during the week, they should be adequately prepared for any question that arises on the exams. The exams consist of different types of questions including multiple choice and problems, and cover both conceptual and mathematical concepts studied within that semester. Students may not skip or alter questions except when specified by the directions within the exam itself. As parents are the primary educator, they may alter the course plan or exams as needed if the student does not desire the Kolbe Core (K) designation on the transcript. The Kolbe Core (K) course is designed to give the student a general understanding of the concepts in classical physics and will give an appropriate background for a student planning to take any intro or general physics class at a university. Students interested in taking the AP® Physics 1 exam for college credit would find the Kolbe Honors (H) track appropriate for preparation.

The following key will help the parent and student understand how chapter assignments are laid out.

Reading: Daily reading assignments for students to read in the *Physics Principles with Applications, Seventh Edition* textbook include the chapter introductions, specified lessons within the chapters, and end-of-chapter summaries.

Questions and Problem Examples within Text: There are both questions and sample mathematical problems embedded within the sections. The questions will help the student form a deeper understanding of the concepts within the section, and the sample problems provide essential problem-solving examples for the lesson. Students should try their best to answer any questions within the reading assignments, as well as thoroughly examine the sample problems within the text. These questions will help the student prepare for problem assignments as well as the semester exams.

Problem Assignments: Because of the mathematical nature of Physics, most lessons will have problems assignments to practice the concepts and equations within the section. The textbook has these problems broken into levels based on difficulty. The Core (K) course will focus solely on Level I problems. These problems will help the student prepare for the semester exam.

End-of-Chapter Assignments: At the end of each chapter, a Chapter Summary is assigned as part of the reading assignment. It is meant as a review of the key concepts within that chapter. The student should be familiar with the key concepts and may look back on the chapter for additional review if needed. The end-of-chapter MisConceptual Questions are multiple choice assignments that may serve as the chapter assessment if desired. These questions, along with the lesson Problems, will help the student prepare for the semester exams.

Exams: There are 2 end-of-semester exams incorporated into this course (1 per semester). These tests reflect the content of what was assigned in the weekly course plans, consisting of both multiple choice and problem-working questions that will cover both conceptual and mathematical concepts. At the end of each semester, there is time dedicated to reviewing the semester's course work as a preparation for the exam. Students should review the Chapter Summaries, MisConceptual Questions, and Problems from that semester. If a student is comfortable with the work completed each week, he should be adequately prepared for any question that arises on the tests. Students are not expected to memorize basic equations as they will be provided on the exams. However, they may need to derive certain equations from the given equations in order to solve an exam problem.

HIGH SCHOOL* DIPLOMA REQUIREMENTS:

See Kolbe Academy Handbook.

SEMESTER REPORTING REQUIREMENTS:

Designation*	No Designation		K (Kolbe Core)		H (Honors)
Course Title	**Physics**	**Physics w/ Lab**	**Physics**	**Physics w/ Lab**	
Semester 1	1. Any two written, graded samples.	1. Any two written, graded samples. 2. Two graded lab reports.	1. Exam II 2. Semester Exam I Each completed fully and graded.	1. Exam II 2. Semester Exam I Each completed fully and graded. 3. Two graded lab reports.	Please use the Honors version of the Pearson Physics course plan if you would like to seek the Honors designation.
Semester 2	1. Any two written, graded samples.	1. Any two written, graded samples. 2. Two graded lab reports.	1. Exam V 2. Semester Exam II Each completed fully and graded.	1. Exam V 2. Semester Exam II Each completed fully and graded. 4. Two graded lab reports.	

***Designation refers to designation type on transcript. K designates a Kolbe Academy Core course.**

If the student wishes to have the course distinguished on the transcript with a (K) as a Kolbe Academy Core course, please be sure to send the correct exams and components each semester for verification as specified above. If no designation on the transcript is desired, parents may alter the lesson plan and any written sample work is acceptable to receive credit for the course each semester.

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♦ COURSE PLAN ♦

Physics with Lab
High School Science

SEMESTER 1			
Week	**Day**	**Reading Lesson(s)**	**Assignment/Problems**
1	1	Course Intro pp. xviii-xix Read Chapter 1 Intro, and 1-1 to 1-3	Work out question samples and review key concepts in these lessons.
	2	Read 1-4	p. 18 - Problems 1-3
	3	Read 1-5 to 1-6	p. 18 - Problems 12-14
	4	Read 1-7	pp. 18-19 - Problems 25a-d
2	1	Read 1-8, Chapter 1 Summary	pp. 19 - Problem 36, and p. 17 - MisConceptual Questions 1-7
	2	Read Chapter 2 Intro, and 2-1 to 2-3	p. 43 - Problems 1-5
	3	Read 2-4	p. 43 - Problems 17-18
	4	Read 2-5 to 2-6	p. 44 - Problems 22-24
3	1	Read 2-7	p. 44 - Problems 39-40
	2	Read 2-8	Work out question samples and review key concepts in these lessons.
	3	Chapter 2 Summary	p. 42 - MisConceptual Questions 1-9
	4	Read Chapter 3 Intro, and 3-1 to 3-3	Work out question samples and review key concepts in these lessons.
4	1	Read 3-4	p. 68 - Problems 1-3
	2	Read 3-5 to 3-6	p. 69 - Problems 17-18
	3	Read 3-8	p. 70 - Problems 38-39
	4	Chapter 3 Summary	p. 67-68 - MisConceptual Questions 1-12
5	1	Review Chapters 1-3 Summary, Problems & MisConceptual Questions	
	2	EXAM I - Chapters 1-3	
	3	Read Chapter 4 Intro, and 4-1 to 4-3	Work out question samples and review key concepts in these lessons.
	4	Read 4-4 to 4-5	Work out question samples and review key concepts in these lessons.
6	1	Read 4-6	p. 101 - Problems 1-3
	2	Read 4-7	p. 102 - Problems 20-22
	3	Read 4-8	p. 103 - Problems 36-38
	4	Chapter 4 Summary	p. 99-100 - MisConceptual Questions 1-13