

AP Physics B

Goals

- You will focus on learning.
Points and grades often get in the way of this.
- You will develop critical thinking and problem solving skills.
This requires you to take risks, make mistakes, and try again. You should be rewarded for this and not penalized.
- You will know what you understand and demonstrate it to me.
This requires frequent, useful feedback. 8/10 is not useful feedback.
- You will be responsible for your own learning.
This requires you to have the information, tools, and freedom to do so.
- Your final grade will reflect your understanding of the standards for this course.
This requires grades to be associated with standards and you to have multiple opportunities to demonstrate your understanding.

Contact Info

Web site: <http://canvas.com/>
Email: gschmit@naperville203.org

Office: 150; Classroom: 143
Available: 1, 5 (lunch)

Materials

- Textbook (covered; name inside)
- Flash drive
- Scientific calculator (name inside)
- Pen, pencil, paper

Fall Semester Units

Special Relativity
Kinematics
Statics and Dynamics
Fluid Mechanics
Work, Energy, Power

Thermodynamics
Linear Momentum
Oscillations and Gravity
Waves

Spring Semester Units

Electrostatics
Electric Circuits
Magnetic Fields
Electromagnetism
Geometric Optics

Physical Optics
Particle Physics
Atomic Physics and Quantum Effects
Nuclear Physics
Cosmology

The Details...

Instructor: Mr. Schmit

I graduated from Case Western Reserve University with my Bachelors of Science and Masters of Science in computer engineering. I earned my Masters in Teaching from National-Louis University. I have worked for 11 years as a software engineer. This is my sixth year teaching full-time. I love exciting students about science, technology, and engineering.

Purpose

The purpose of this course is to contribute to the achievement of the District's Mission, which is to educate students to be self-directed learners, collaborative workers, complex thinkers, quality producers and community contributors; and to master the learning targets that comprise this physics course. To achieve this, you will develop a conceptual understanding of our physical world. You will learn how to think critically, solve challenging problems, and reflect on your understandings. Through this process you will become better prepared for the structure of college classes and the expectations placed on professionals in the workplace. This is a demanding course designed for college-bound students interested in science and, potentially but not necessarily, planning a career in science or engineering. We use a college text, but move at a slower pace than a college course. This course, in combination with Physics or Honors Physics, is the equivalent of a two-semester algebra-based college physics course. You will be well prepared for the AP Physics B exam. However, this course will explore topics beyond the AP Physics B curriculum.

Learning Activities and Summative Assessments

You develop understanding of the learning standards for this physics course by completing a variety of learning activities such as homework reading, questions, and problems; whiteboarding in groups; and lab activities. While these activities don't directly affect your grade, they are essential in that they are your opportunity to explore, discover, take risks, make mistakes, ask questions, help each other, practice, and get feedback before having to demonstrate your understanding. You demonstrate your understanding through summative exams at the end of the unit and labs throughout the unit. Your grade directly reflects your demonstration of your understanding.

- I. **Homework Reading, Questions, and Problems.** The standards calendar lists the learning standards for each the unit and reading, questions, and problems to be completed as homework to reinforce or practice those standards. Homework is a learning activity – an opportunity to develop understanding. The homework problems are available on the WebAssign web site (<http://webassign.net/>). Your homework problem solutions should be complete, detailed, and well organized (e.g., diagram, givens, unknowns, equations, substitution, answer with units). Please note that the problem numbers in WebAssign are not the same as those in the text but are sequential. The standards calendar always refers to the the problem numbers in the text.
- II. **Whiteboarding.** Whiteboarding consists of small groups preparing on a whiteboard their solution to a previously assigned homework problem that they sign up for on the front board. The questions that are asked, debated, and answered during the discussion is critical to the learning of the class. There is not time in class to figure out how to solve your group's problem; so, it is essential that you have at least made a valid attempt at solving these problems before class. Therefore, the homework should be completed by the day listed on the standards calendar.
- III. **Lecture and Demonstrations:** At times, I will introduce new concepts by presenting the new material with a lecture or demonstration. Sometimes, I will model how to solve problems by leading the class through sample problems.
- IV. **Lab Activities.** At times, you will explore new concepts in a lab activity and we will discuss our observations and results after the activity. You will develop understanding of many learning

standards through these activities and associated notes in your lab notebook. This is an excellent opportunity to practice and receive feedback on your understanding.

- V. **Quizzes.** You will take a quiz for each unit to help you assess your understanding of the more challenging standards.
- VI. **Lab Practicums and Lab Reports.** You will demonstrate understanding of some learning standards through the completion of lab practicums and lab reports in your electronic lab notebook. The standards calendar will specify which learning standards are being assessed for that lab practicum or report.
- VII. **Summative Exam.** You will demonstrate your understanding of most learning standards through summative exams. Summative exams are a combination of multiple choice and free-response problems. On the multiple choice portion of the exam, you are only allowed to use the AP Physics B Table of Information; on the free response portion, you are allowed to use a calculator and the AP Physics B Table of Information and Equation sheets. You must show all your work to earn credit on free-response problems as they are assessed in the same manner as on the AP Physics B exam. Your work, rather than the final answer demonstrates your understanding. That is, you can demonstrate almost complete understanding of a learning standard even though you obtained the wrong answer if you have the correct process. Similarly, you cannot demonstrate understanding if your process is incorrect even though your final answer is correct.
- VIII. **Reassessments.** If you are still developing your understanding after the summative exam, you may, at my discretion, have another opportunity to demonstrate your understanding. Please note that reassessments are designed to be at least as challenging as the summative exam. Before you attempt a reassessment, you should complete additional practice to prepare. At a minimum, you are required to make corrections to your summative exam and discuss your learning with me. You are responsible for determining and completing the additional practice before the reassessment. Reassessments must be requested in advanced and are scheduled at my convenience. Usually, reassessments are not available for lab practicums, but revisions may be made in your electronic lab notebook.
- IX. **Capstone Project.** You will complete a capstone project during the first semester. This is considered the “final exam.” However, it is an iterative process and you need to receive and incorporate feedback throughout the project. There is a great deal of flexibility in both the content and form of your capstone project. More details will be provided during the semester as needed.

Communication

Learning activities and summative assessments are enumerated on the standards calendar for each unit. Class information is posted to the web site. The web site also hosts a forum in which only we (i.e., students and physics teachers) can ask and provide answers to questions. To fully access the web site, you need to login with your school login user name and a password which you will be provided. Please feel free to visit me in my office or classrooms when I don't have class. If you let me know in advance that you are coming, I will ensure that I'm there. If you can't arrange to talk with me in person and you don't wish to post your question on the web forum, e-mail is an excellent way to reach me. I will respond the same night to all messages that are received by 9 p.m.

Class Expectations

- We help each other learn.
- We respect each other's learning. For example:
 - We have our materials and are learning from the bell until I dismiss the class.
 - We handle lab equipment, text books, and lab manuals with care.
 - We accept and respect each other's differences.
 - We help create a safe environment in which we all feel comfortable asking questions.
- We have misconceptions about science that we wish to overcome.
- While you are encouraged to collaborate on assignments, all assignments must be your original work. Assignments that are identical, either in whole or in part, result in no evidence of mastery. This affects everyone who has identical assignments regardless of who may have done the original work. Referrals may also be written.
- Cheating or plagiarizing will result in no credit and a referral to your Dean.
- If you are absent, you are responsible for obtaining handouts and notes and then also checking with me to make arrangements for extra help or to make-up exams, labs, or activities.

Grading

Grading is done on an individual basis, you are not competing with your classmates. Most summative assessments are graded on a 1-5 scale in a manner consistent with the AP Physics B exam:

5: Extremely well qualified

4: Well qualified

3: Qualified

2: Possibly qualified

1: No recommendation

This scale is converted to percentages as reported in Infinite Campus. A 5 corresponds to a 100%; a 4, 88%; a 3, 75%; a 2, 62%; a 1, 50%.

The summative assessments are weighted to comprise the overall grade per unit:

Lab Notebook: 30%; Unit Exams: 70%.

The units are weighted to comprise the overall coursework grade:

Fall: Special Relativity: 10%; Kinematics: 8%; Statics and Dynamics: 15%; Fluid Mechanics: 20%; Work, Energy, Power: 5%; Thermodynamics: 20%; Linear Momentum: 6%; Oscillations and Gravity: 10%; Waves: 6%

Spring: Electrostatics: 10%; Electric Circuits: 8%; Magnetic Fields: 5%; Electromagnetism: 8%; Geometric Optics: 8%; Physical Optics: 8%; Particle Physics: 10%; Atomic Physics and Quantum Effects: 20%; Nuclear Physics: 15%; Cosmology: 8%

The fall semester grade is determined by a combination of the coursework grade (85%) and the capstone project (15%). The spring semester grade is determined by a combination of the coursework grade (85%) and the AP practice final exam (15%).

The semester grade is determined by percentage:

A: 100% - 90% B: < 90% - 80% C: < 80% - 70% D: < 70% - 60% F: < 60% - 0%

Any questions about grades will be address outside of class. Please keep all graded materials until the end of semester. The most current grade that I have for you is available on the school website. Grades of A, B, and C are counted as weighted grades.