

ADVANCED PLACEMENT PHYSICS B 2002-2003 Marc Reif, Teacher

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INTRODUCTION

Congratulations on choosing physics, the ultimate science! The goal of physics is to describe models that predict the behavior of the universe and everything in it. A background in basic physics will help you with many career paths, especially, those in science and engineering. The concepts you learn in this class will develop your thinking ability and help you to understand the world around you.

This is a college-level course equivalent to what is called "College Physics" at many undergraduate institutions. This is the most difficult course many students take in the first two years of college. FHS students usually take this class because they are interested in a career in medicine, biology, or other sciences. Others are considering engineering or physical science but aren't in calculus. Some just want a challenge!

We will have several goals in this class: to develop a correct conceptual understanding of basic physics, to develop your analytical, computational, and experimental skills, and to prepare for the APPB exam (Monday, 12 May 2003). The mathematics on the exam is relatively simple, but the exam covers many topics. You must understand a lot of physics to be able to tackle the different kinds of problems on the test. We will have to move quickly in order to address approximately 3/4 of the exam material in class. Students who **understand** this amount of material stand a good chance of a qualifying score (3, 4, or 5).

First Semester TOPICS and Text Correlation

Newtonian Mechanics - (35% of exam)

Introduction to physics, displacement, velocity, acceleration, projectile motion, vectors (7% of exam)

Chapters 1-3

Newton's laws (incl. friction and centripetal force) (9%) *Chapters 4-5*

Universal gravitation, planetary orbits, (approx. 3%) *Chapter 5*

Work, energy, power (5%) *Chapter 6*

Linear momentum (4%) *Chapter 7*

Simple harmonic motion, pendulum, mass & spring, (approx. 3%) *Chapter 10*

Circular motion, torque and rotational statics (4%) *Chapters 5 and 8*

Second Semester TOPICS and Text Correlation

Fluid Mechanics and Thermal Physics (15% of Exam)

Fluid Mechanics, hydrostatic pressure, buoyancy, fluid flow continuity, and Bernoulli's equation (5%)

Chapter 9

Temperature and heat, kinetic theory and thermodynamics (10%) *Chapters 12-14*

Waves and Optics, Atomic and Nuclear Physics (25% of Exam)

Waves, sound (5%) *Chapter 11*

Interference, diffraction, dispersion & spectrum, reflection, refraction, mirrors, and lenses (10%) *Chapter 22-25*

Photons & photoelectric effect, Atomic energy levels, wave-particle duality (7% of exam) *Chapters 27-29*

Nuclear reactions, mass-energy equivalence (3% of exam) *Chapter 30*

Electricity and Magnetism- (25% of Exam)

Charge, field, potential, Coulomb's law, capacitors (5%) *Chapters 15, 16*

Conductors, current, resistance, power, DC circuits, circuits with capacitors (11%) *Chapters 17, 18*

Magnetic fields, forces on charges in magnetic fields, forces on wires in magnetic fields, fields of long wires, induction, Faraday's and Lenz's laws (9%) *Chapters 19, 20*

AP Exam Monday, 12 May 2003.

HOMEWORK

Homework will be assigned nearly every day (a few problems, an AP problem, or a reading assignment). You will be asked a few times each quarter to present the solution to a homework problem to the class for a grade. You are always expected to attempt assignments, no matter how difficult.

You must attempt the work on your own in order to develop your skill. If you don't keep up with the homework, you will not do well in the class. It is strongly suggested that you form alliances with other physics students for the purposes of studying together, clarifying homework assignments, working on projects, etc. Try to find a "study buddy" early, and meet regularly, particularly if you are having problems. If you've tried your other options and they don't help, you may email me, or as a last resort, call me at home.

LABS

Completed labs will be pasted in your composition notebook. This notebook should contain your best work. **Colleges may ask to see a student's lab notebook before awarding AP credit.**

TESTS & QUIZZES

Expect one or two difficult tests per quarter, and at least three quizzes (some announced, some unannounced). Please see me if you have concerns about your test grades. All students will be expected to take the fall final (it will be a practice test for the AP exam).

AP EXAM

Because of time constraints, it will be impossible to cover all of the material on the AP exam in class. Later on, we will discuss outside study sessions to cover additional material. Your attendance is expected. You will be tested over some of the material presented at these sessions. This extra time is a relatively small price to pay for the chance to earn eight hours of credit in a difficult course.

GRADING

Mr. Reif only discusses grades outside of class.

Grading will be on a points basis. The points will vary from quarter to quarter, so make sure you are aware of which scheme is in effect. You are expected to follow the handbook policy regarding late work. For each day that work is late, a penalty of 10% will be exacted. After the third day that work should have been turned in, you may no longer turn in the assignment and it becomes a zero. This includes late make-up assignments.

All graded work is important! Don't neglect any aspect of the class. Don't ask me to raise your grade just because you're close. An 89 is an 89. Do not ask me to "come up with" something for extra credit.

BEHAVIOR

You are expected to: use physics class time only for activities related to physics class, and to act responsibly and in a way that promotes learning (both your own and others) whenever you are involved in a physics activity, both in the classroom and out. Expect to work every day in this class. You must follow all school rules, and my rules.

Recommended MATERIALS—Please see me if any of the following present any problems.

Pencil, paper, 3-ring binder with organized sections.

Calculator (TI-83+ or TI-89 preferred).

Good quality mechanical pencil and eraser.

Access to a computer with Internet hook-up.

Composition notebook for labs and writing assignments.

The Science Department is assessing a charge of \$10 per student for each science class taken to cover the cost of consumable items. If this presents a hardship for you, please talk with me or have your parent or guardian contact me.