

Physics AP - C

Mechanics and Electricity & Magnetism

INSTRUCTOR: Adam Randall

TEXT: Serway and Jewett. Physics For Scientists and Engineers 7th Ed.
Thomson Brooks/Cole.

RECOMMENDED Completion of Physics, Honors Physics or Summer Physics Course

PREREQUISITES: Excellent understanding of Algebra & Trigonometry. Previous or concurrent enrollment in Calculus BC.

LENGTH: 1 year

CREDITS: 10/year, 5/semester

This course meets both UC and CSU requirements.

COURSE DESCRIPTION:

The focus of this course is to prepare students to successfully take both the Advanced Placement Physics C - Mechanics Exam and the Electricity & Magnetism Exam in May. The curriculum for this course is determined by the College Board. Students will learn to build detailed mathematical models of the physical universe using Algebra, Geometry, Trigonometry and Calculus. Instructional approaches include demonstration, lecture, laboratory activities & experiments, class discussions, practice AP Physics FRQ's, homework, quizzes, tests, guest speakers and field trips.

EXPECTED SCHOOL WIDE LEARNING RESULTS

1. **Collaborative Learners** - Students will be able to complete cognitive and hands-on physics assignments in cooperative student groups. Students will acknowledge and fulfill their responsibilities in the group and be active contributors.
2. **Effective Communicators** - Students will be able to interpret information through reading, listening and inquiry. Students will be able to convey acquired knowledge in Physics through a variety of media such as laboratories, class discussions, student worksheets, homework, frequent quizzes, unit tests, and student projects.

Quarter grading:	Grading Scale:	Semester Grading:
60% Unit Tests	A = 100-90%	40% Quarter 1 or 3
20% Quizzes	B = 89-80%	40% Quarter 2 or 4
15% Lab Work	C = 79-70%	20% Final Exam
5% Homework	D = 69-60%	
	F = 59-0%	

Homework (5% of Qtr. grade)

Homework book and from supplementary handouts. **Homework is due at the beginning of the period** on the due date (not later on that day). Don't expect all solutions to problems to be fully worked out to their conclusion in class; however, problem solving strategies and hints will be discussed. Solution manuals are available for additional help.

Grading Homework – With the goal of training you to become an Effective Communicator of your work, homework and supplementary handouts should always include:

- A sketch of the situation described in the problem, initial condition and a coordinate system.
- Correct fundamental concept(s) in fundamental equation(s) form written in variable form.
- Logical, step-by-step, mathematical reasoning used to solve the problem for the variable quantity in question.
- Correct substitution of variable values into equation(s) and a correct numerical answer boxed.
- A brief description of the meaning of the numerical result with units of measure.

Laboratory Activities & Experiments (15% of Qtr. grade)

The laboratory activities and experiments will extend student's knowledge of physics and will test their ability to apply physics knowledge to real world situations. Laboratory experiments will often be performed over many consecutive days in an attempt to give the students time to refine their experimental technique, use spreadsheets to organize and analyze data and to allow for more data to be taken when the analysis reveals flaws in experimental technique. Lab books will be used for building mathematical models, organizing material lists and procedures. Spreadsheets will be used to organize data and analytical results.

Laboratory Activities are designed for students to verify existing scientific theories. For example, students would make a mathematical model of a simple harmonic oscillator, like a mass on a spring, using Newton's 2nd law of motion. The model would be manipulated to make a prediction of the period of oscillation by solving the resulting 2nd order differential equation. Students will physically set a mass oscillating on a spring and verify that Newton's 2nd law made a valid, testable prediction.

Laboratory Experiments are designed for students to actually discover something for themselves by doing science. For example, students would hypothesize about the relationship between the size of a moving object and the aerodynamic drag force that it feels. Students would design and perform an experiment to test their hypothesis and modify their hypothesis based on experimental results. Eventually, students would be required to develop their own scientific theory that makes a testable prediction. At which point a laboratory activity would be performed to verify the students theoretical prediction.

Teacher guided laboratory activities and experiments are performed with lots of support and written instructions in a "cook book" type format. Emphasis is placed on laboratory technique, measurement, data organization and analysis.

Student guided laboratory activities and experiments are performed with limited teacher support and almost no written instructions. Emphasis is placed on students working together in groups of two and thinking for themselves.

If a student is absent on the day of a lab, it is their responsibility make arrangements with the instructor to perform the lab within 1 calendar week of the day of your return to class. NO make-up labs can be done after the 1 week make-up time limit. Make-up lab reports are due when all lab reports are due or two days after you perform the lab, whichever comes later. Otherwise, **LATE LAB REPORTS ARE NOT ACCEPTED.**

QUIZZES (20% of Qtr. grade)

Students can expect to have 15 minute quizzes based on released College Board FRQ's (Free Response Questions). These conceptual and/or mathematical quizzes will be based on previously discussed material or on the previous night's reading and homework. Student should read the textbook and look at and be able to answer all Checkpoint questions within the textbook chapters and conceptual problems in the Questions section at the end of each chapter .

Solutions to problems should follow the "*perfect solution*" format to earn full credit. The release College Board rubric will be used to determine partial credit. A perfect solution should include:

- A clearly drawn diagram and labeled initial conditions given in the problem.
 - The concept formulae used to solve the problem.
 - Logical, symbolic step by step algebraic manipulations used to solve for the variable in question.
 - The correct significant figure numerical answer with units of measure.
 - A box around the answer and a brief explanation of its meaning.
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- You can miss only 1 quiz per unit and have the test % for that unit apply to the quiz.
 - If you are late (unexcused), you must take the quiz in the allotted remaining time.
 - If you arrive (unexcused) after the allotted quiz time, you get a zero on that quiz.
 - For any excused tardy/absence your test % for that unit applies to the missed quiz.

UNIT TESTS (60% of Qtr. grade)

You can expect a test after each unit. Each test will be similar in format to the AP Physics test given by the College Board in which there are 2 sections - Multiple Choice (MC) and Free Response (FR). There will be one free response problem worth 15 points and ten MC problems worth 2 points each. Unit tests will not be curved.

Grade Book Update Policy:

I will update my grade book bi-monthly.

Attendance Policy:

Students may receive a failing grade "F" in a class where they accumulate 15 or more unexcused absences. All LAHS attendance policies will be enforced.

CLASSROOM RULES

You are expected to act as professionals in this class. This includes punctuality, using appropriate professional language (greeting one another courteously, using correct names of others, using correct terminology when talking about physics), respecting and showing common courtesy to others in the classroom, professional conduct about the lesson and the classroom equipment. Professionalism includes remaining in your seat until the period ends. Non-professional behavior will result in a call home and/or Parent/Teacher/Student Conference. Attendance, dress code, cell-phone and cheating policies as described in the LAHS Parents/Student Handbook will be enforced.

HELP / OTHER RESOURCES - I am available 7th period and tutorial in my room, 705.