



AP PHYSICS C

Course Goals and Overview

The AP Physics C course builds on the conceptual understanding attained in a high school physics first course. The course is designed to be equivalent to year-one college foundation course in physics for students majoring in the physical sciences or engineering. The course emphasizes solving a variety of physics problems focused specifically on Newtonian Mechanics and Electricity & Magnetism along with the intensive use of knowledge of calculus. The course also includes laboratory components constituting a minimum of 25% of instructional time. Students are encouraged to keep copies of their laboratory work for use in determining college credit or placement (<http://apcentral.collegeboard.com>)

By the end of the course, each student should possess the skills to

- Acquiring analytical knowledge of the discipline of physics including phenomenology, theories and techniques, concepts, and generalizing principles.
- Asking questions and obtaining solutions to physical concerns through the use of qualitative and quantitative reasoning and experimental investigation.
- Fostering important attributes such as appreciation of the physical world, curiosity, creativity, and reasoned skepticism.
- Understanding the connections of physics to other disciplines and societal issues

General Course of Study

Topic	Suggested Time
Kinematics: (including vectors, vector algebra, components of vectors, coordinate systems, displacement, velocity, and acceleration); motion in one dimension; motion in two dimensions including projectile motion	1.5 weeks
Newton's Laws of Motion: static equilibrium (first law); dynamics of a single particle (second law); systems of two or more objects (third law)	1.5 weeks
Work, Energy, Power: work and work-energy theorem; forces and potential energy; conservation of energy; power	1.5 weeks

Systems of particles, linear momentum: center of mass; impulse and momentum; conservation of linear momentum, collisions	1.5 weeks
Circular Motion and Rotation: uniform circular motion, torque and rotational statics; rotational kinematics and dynamics; angular momentum and its conservation	4 weeks
Oscillations and Gravitation: simple harmonic motion (dynamics and energy relationships); mass on a spring; pendulum and other oscillations; Newton's law of gravity; orbits of planets and satellites (circular and general)	2 weeks
Electrostatics: charge and Coulomb's law; electric field and electric potential (including point charges); Gauss' law; fields and potentials of other charge distributions	5 weeks
Conductors, capacitors, dielectrics: electrostatics with conductors; capacitors (capacitance, parallel plate, and spherical and cylindrical); dielectrics	3 weeks
Electric circuits: Current, resistance, power; steady-state direct current circuits with batteries and resistors only; capacitors in circuits (steady state and transients in RC circuits)	3 weeks
Magnetic Fields: forces on moving charges in magnetic fields; forces on current-carrying wires in magnetic fields; fields of long current-carrying wires; Biot-Savart law and Ampere's law	5 weeks
Electromagnetism: electromagnetic induction (including Faraday's law and Lenz's law); inductance (including LR and LC circuits); Maxwell's equations	4 weeks