

AP PHYSICS — 8-MONTH SYLLABUS

2 Classes per Week • 8 Months • Approximately 64 Classes

Course Length	8 Months
Class Frequency	2 classes per week
Approx. Total	64 classes (8 months $\times$ 8 weeks)
Course Level	AP Physics
Focus	Mechanics • Energy • Momentum • Rotation • Waves • Electricity • Magnetism • AP Exam Preparation

MONTH 1 • Kinematics & Forces

- Week 1 — Class 1: Units, vectors, scalars and significant figures. | Class 2: One-dimensional motion, position, velocity and acceleration.
- Week 2 — Class 1: Motion graphs and interpreting slopes/areas. | Class 2: Constant-acceleration equations and free-fall.
- Week 3 — Class 1: Two-dimensional motion and projectile motion. | Class 2: Vector components and relative motion.
- Week 4 — Class 1: Newton's laws and free-body diagrams. | Class 2: Friction, tension and inclined planes; Unit review/test.

MONTH 2 • Applications of Forces & Circular Motion

- Week 5 — Class 1: Connected objects and pulley systems. | Class 2: Static and dynamic equilibrium.
- Week 6 — Class 1: Uniform circular motion. | Class 2: Centripetal acceleration and centripetal force.
- Week 7 — Class 1: Gravitational force and orbital motion. | Class 2: Springs, Hooke's law and elastic forces.
- Week 8 — Class 1: Mixed force problems and experimental analysis. | Class 2: AP-style MCQs/FRQs and assessment.

MONTH 3 • Energy & Momentum

- Week 9 — Class 1: Work and work-energy theorem. | Class 2: Kinetic energy and potential energy.
- Week 10 — Class 1: Conservation of mechanical energy. | Class 2: Power, efficiency and energy diagrams.
- Week 11 — Class 1: Momentum and impulse. | Class 2: Conservation of momentum and collisions.
- Week 12 — Class 1: Center of mass and explosion/collision applications. | Class 2: Energy-momentum review and AP-style assessment.

MONTH 4 • Rotation & Gravitation

- Week 13 — Class 1: Angular position, velocity and acceleration. | Class 2: Rotational kinematics.
- Week 14 — Class 1: Torque and rotational equilibrium. | Class 2: Moment of inertia and rotational dynamics.
- Week 15 — Class 1: Rotational kinetic energy and angular momentum. | Class 2: Conservation of angular momentum.
- Week 16 — Class 1: Rolling motion and rotational applications. | Class 2: Gravitation, orbits and unit assessment.

MONTH 5 • Oscillations & Waves

- Week 17 — Class 1: Simple harmonic motion. | Class 2: Springs and pendulums.
- Week 18 — Class 1: Energy in oscillating systems. | Class 2: Period, frequency and phase.
- Week 19 — Class 1: Wave properties and mathematical models. | Class 2: Superposition, interference and standing waves.
- Week 20 — Class 1: Sound, resonance and Doppler effect. | Class 2: Oscillations/waves review and assessment.

MONTH 6 • Electricity & Circuits

- Week 21 — Class 1: Electric charge and Coulomb's law. | Class 2: Electric fields and field diagrams.
- Week 22 — Class 1: Electric potential and potential energy. | Class 2: Voltage and equipotential surfaces.
- Week 23 — Class 1: Current, resistance and Ohm's law. | Class 2: Series and parallel circuits.
- Week 24 — Class 1: Kirchhoff's rules and circuit analysis. | Class 2: Electrical power, capacitors and assessment.

MONTH 7 • Magnetism & Electromagnetism

- Week 25 — Class 1: Magnetic fields and magnetic forces. | Class 2: Charged particles in magnetic fields.
- Week 26 — Class 1: Current-carrying wires and magnetic fields. | Class 2: Ampère's law and applications.
- Week 27 — Class 1: Electromagnetic induction and Faraday's law. | Class 2: Lenz's law and induced emf.
- Week 28 — Class 1: Generators, motors and transformers. | Class 2: Electromagnetic applications and unit review.

MONTH 8 • Comprehensive AP Physics Review & Exam Preparation

- Week 29 — Class 1: Mechanics comprehensive review. | Class 2: AP-style mixed MCQs and quantitative problems.
- Week 30 — Class 1: Energy, momentum and rotation review. | Class 2: Waves, oscillations and experimental data analysis.
- Week 31 — Class 1: Electricity and circuits review. | Class 2: Magnetism, induction and timed AP-style FRQ practice.
- Week 32 — Class 1: Full-length AP Physics practice exam and error analysis. | Class 2: Final targeted review, FRQs and exam strategy.

Assessment & AP Exam Preparation

Component	Recommended Approach
Every Class	5–10 min retrieval practice • concept instruction • diagrams/free-body models • quantitative problem solving • AP-style questions
Weekly	Targeted practice, graph/data analysis or short AP-style check
Monthly	Unit assessment with MCQs, quantitative problems and FRQ-style responses
Mid-Course	Cumulative assessment after Month 4 with timed practice
Final Month	Full-length practice exam, FRQ scoring, error analysis and targeted revision

Learning Outcomes

- Analyze one- and two-dimensional motion using vectors, graphs and kinematic models.
- Apply Newton's laws and free-body diagrams to force and equilibrium problems.
- Use conservation of energy, momentum and angular momentum to solve complex systems.
- Analyze rotational motion, torque, moment of inertia and rolling systems.
- Explain oscillations, wave behavior, interference and resonance using mathematical models.
- Calculate electric force, electric fields, potential, current and circuit quantities.
- Analyze series/parallel circuits, Kirchhoff's rules and electrical power.
- Explain magnetic forces, electromagnetic induction and practical applications.
- Interpret experimental data, graphs, equations and uncertainty in physics investigations.
- Communicate solutions effectively in AP-style multiple-choice and free-response questions.

Pacing Note

This plan is designed specifically for two classes per week over eight months. Demonstrations, laboratory investigations, simulations, data-analysis activities and AP-style practice can be integrated according to available time and resources.