

Honors Physics Class Syllabus

- I. Introduction:
 - A. Study Methods
 - B. The Scientific Method
 - C. SI units
 - D. Conversions, measurements and mathematical recording

- II. Linear Motion
 - A. Speed, velocity and acceleration
 - B. Free fall
 - C. Graphing linear motion
 - D. Air resistance and falling objects

- III. Projectile Motion
 - A. Vector and Scalar Quantities
 - B. Vector problems
 - C. Rockets and Satellites

First Test

- IV. Law of Inertia
 - A. Ancient views of earth and the heavens
 - B. Galileo
 - C. Mass
 - D. Net force and equilibrium
 - E. Applications of motion

- V. Acceleration
 - A. Newton's second law
 - B. Friction
 - C. Pressure
 - D. Free fall and air resistance

- VI. Newton's 3rd law

- VII. Momentum
 - A. Impulse
 - B. Conservation of momentum
 - C. Collisions

- VIII. Energy and Work
 - A. Work
 - B. Power
 - C. Mechanical, Potential and Kinetic energy
 - D. Machines

Second test

- IX. Circular motion and center of gravity
 - A. Rotation
 - B. Centripetal and centrifugal forces
 - C. Center of gravity
 - D. Balance
 - E. Exercise physiology

- X. Rotational Mechanics and Gravitation
 - A. Torque
 - B. Universal gravitation law
 - C. Planetary movement
 - D. Tides
 - E. Black holes

- XI. Space and special relativity
 - A. Special relativity
 - B. String Theory

3rd Test

- XII. Atomic nature of matter
 - A. Evidence for atoms
 - B. Atomic structure
 - C. Elements molecules and compounds
 - D. Phases of matter

- XIII. Solids, liquids and gases
 - A. Crystal structure
 - B. Elasticity compression and tension
 - C. Liquids pressure and buoyancy
 - D. Pascal's Principle
 - E. Gases
 - F. Boyle's law
 - G. Bernoulli's Principle
 - H. Plasma

4th Test

- XIV. Atomic Theory
 - A. Photoelectric effect and the quanta
 - B. Duality of nature

- XV. Atomic nucleus
 - A. Radioactive decay
 - B. Isotopes and Half-Life

- C. Transmutation
- D. Carbon and Uranium dating
- E. Radioactive tracers

XVI. Fission and Fusion

- A. Fission
- B. Fusion

5th Test

XVII. Heat, Temperature and Expansion

- A. Thermal energy and molecular movement
- B. Specific heat
- C. Special properties of water

XVIII. Heat Transfer

- A. Conduction, Convection and Radiation
- B. Absorption and Emission
- C. Newton's Law of cooling
- D. Global warming

XIX. Change of Phase

- A. Evaporation and condensation
- B. Boiling, freezing and sublimation
- C. Energy changes

XX. Thermodynamics

- A. Absolute zero
- B. 1st and 2nd laws of thermodynamics
- C. Heat engines
- D. Entropy

6th Test

XXI. Vibrations and Waves

- A. Pendulum motion
- B. Transverse and longitudinal waves
- C. Interference
- D. Doppler Effect

XXII. Sound

- A. Media
- B. Speed of Sound
- C. Resonance
- D. Interference and beats
- E. Musical instruments

Quest I

XXIII. Light

- A. Speed of light
- B. Electromagnetic waves
- C. Opaque, translucent and transparent
- D. Polarization

XXIV. Color

- A. Spectrum
- B. Complimentary colors
- C. Pigments
- D. Atomic spectra
- E. The eye

XXV. Reflection and Refraction

- A. Law of reflection
- B. Refraction and prisms
- C. The rainbow

XXVI. Lenses

- A. Convergent and divergent lenses
- B. Glasses

XXVII. Diffraction and interference

- A. Interference
- B. Lasers and Holograms

7th Test

XXVIII. Electrostatics

- A. Charge
- B. Coulomb's law
- C. Electrical fields and potential
- D. Grounding and shielding

XXIX. Electric Current

- A. Current
- B. Voltage sources
- C. Ohm's law
- D. DC and AC
- E. Electrical Power

- XXX. Circuits
 - A. Battery and bulb
 - B. Parallel and series circuits
 - C. Electric power

8th Test

XXXI. Magnetism

- A. Poles
- B. Motors

XXXII. Electromagnetic Induction

- A. Faraday's Law
- B. Generators
- C. Transformers

XXXIII. The car

- A. 4 Cycle engine
- B. Electrical system
- C. Cooling system
- D. Tires, drive and steering
- E. Integration

9th Test