



# Physics

Curriculum for Grade XII

## Class 12 Physics Curriculum Overview

The Class 12 Physics curriculum is structured around two core textbooks, Physics Part I and Physics Part II, covering foundational and advanced concepts in both classical and modern physics.

### Textbook 1: Physics Part I

#### 1. Electric Charges and Fields

Students explore electric charge, Coulomb's law, electric fields, and Gauss's law. These concepts lay the groundwork for understanding how charges interact and how electric fields are structured.

#### 2. Electrostatic Potential and Capacitance

This unit deals with electrostatic potential, energy in systems of charges, capacitors, and the concept of capacitance, including how capacitors store and release energy.

#### 3. Current Electricity

The focus here is on electric current, Ohm's law, resistance, and electrical circuits. Key topics include the behavior of electrical conductors, energy in electric circuits, and Kirchhoff's rules for circuit analysis.



#### 4. Moving Charges and Magnetism

Students learn about the relationship between electric currents and magnetic fields, with a detailed study of the Biot-Savart law, Ampere's law, and the motion of charged particles in magnetic fields.

#### 5. Magnetism and Matter

This chapter introduces the properties of magnetic materials, the bar magnet, and Earth's magnetism, along with how magnetic fields interact with matter.

#### 6. Electromagnetic Induction

Faraday's laws of electromagnetic induction are discussed, along with concepts like motional electromotive force, inductance, and the working principles of AC generators.

#### 7. Alternating Current

This chapter focuses on AC circuits, their behavior when voltage is applied to different components, and the concept of power in AC systems. It also includes practical applications such as transformers.

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## 8. **Electromagnetic Waves**

Students explore Maxwell's theory of electromagnetism, the concept of displacement current, and the electromagnetic spectrum.

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### **Textbook 2: Physics Part II**

## 9. **Ray Optics and Optical Instruments**

This unit covers the reflection and refraction of light, total internal reflection, and optical instruments like lenses and mirrors, explaining how they form images.

## 10. **Wave Optics**

Wave optics introduces Huygens' principle, interference, diffraction, and polarization. These phenomena explain how light behaves as a wave.

## 11. **Dual Nature of Radiation and Matter**

The dual nature of light and matter is introduced, with a focus on the photoelectric effect and the quantum theory of radiation. This chapter bridges classical and quantum physics.

## 12. **Atoms**

Students study atomic models, including Rutherford's nuclear model and Bohr's model of the hydrogen atom, gaining insights into atomic structure and spectra.

## 13. **Nuclei**

This chapter deals with nuclear physics, including the composition, size, and energy of nuclei, as well as radioactivity and nuclear energy applications.

## 14. **Semiconductor Electronics: Materials, Devices, and Circuits**

The final chapter focuses on semiconductor devices, their applications in electronics, and how they function in circuits, including diodes and transistors.

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The curriculum offers students a thorough grounding in fundamental physics, ensuring they grasp key concepts and can apply them in both theoretical and practical contexts.

