

CLASS XII (2020-21)**Physics Syllabus**

Unit	Topics	Marks
Unit-I	Electrostatics	16
	Chapter-1: Electric Charges and Fields	
	Chapter-2: Electrostatic Potential and Capacitance	
Unit-II	Current Electricity	
	Chapter-3: Current Electricity	
Unit-III	Magnetic Effects of Current and Magnetism	17
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	Chapter-5: Magnetism and Matter	
Unit-IV	Electromagnetic Induction and Alternating Currents	
	Chapter-6: Electromagnetic Induction	
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Unit-V	Electromagnetic Waves	18
	Chapter-8: Electromagnetic Waves	
Unit-VI	Optics	
	Chapter-9: Ray Optics and Optical Instruments	
	Chapter-10: Wave Optics	
Unit-VII	Dual Nature of Radiation and Matter	12
	Chapter-11: Dual Nature of Radiation and Matter	
Unit-VIII	Atoms and Nuclei	
	Chapter-12: Atoms	
	Chapter-13: Nuclei	
Unit-IX	Electronic Devices	7
	Chapter-14: Semiconductor Electronics: Materials, Devices and Simple Circuits	
Total		70

Revised PHYSICS

Class XII (Code N. 042)

(2020-21)

Unit I:Electrostatics

Chapter–1: Electric Charges and Fields

Electric Charges; Conservation of charge, Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electric field, electric field due to a point charge, electric field lines, electric dipole, electric field due to a dipole, torque on a dipole in uniform electric field. Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet

Chapter–2: Electrostatic Potential and Capacitance

Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field.

Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor.

Unit II: Current Electricity

Chapter–3: Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity; temperature dependence of resistance.

Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's laws and simple applications, Wheatstone bridge, metre bridge(qualitative ideas only) Potentiometer - principle and its applications to measure potential difference and for comparing EMF of two cells; measurement of internal resistance of a cell(qualitative ideas only)

Unit III: Magnetic Effects of Current and Magnetism

Chapter-4: Moving Charges and Magnetism

Concept of magnetic field, Oersted's experiment.

Biot - Savart law and its application to current carrying circular loop. Ampere's law and its applications to infinitely long straight wire. Straight and toroidal solenoids (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields

Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-definition of ampere, torque experienced by a current loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.

Chapter-5: Magnetism and Matter

Current loop as a magnetic dipole and its magnetic dipole moment, magnetic dipole moment of a revolving electron, bar magnet as an equivalent solenoid,

magnetic field lines; earth's magnetic field and magnetic elements. **Unit IV:**

Electromagnetic Induction and Alternating Currents

Chapter–6: Electromagnetic Induction

Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Eddy currents. Self and mutual induction.

Chapter–7: Alternating Current

Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits

AC generator and transformer.

Unit V: Electromagnetic waves

Chapter–8: Electromagnetic Waves

Electromagnetic waves, their characteristics, their Transverse nature (qualitative ideas only).

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics

Chapter–9: Ray Optics and Optical Instruments

Ray Optics: Refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lensmaker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism.

Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Chapter–10: Wave Optics

Wave optics: Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection

and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light, diffraction due to a single slit, width of central maximum

Unit VII: Dual Nature of Radiation and Matter

Chapter–11: Dual Nature of Radiation and Matter

Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light.

Experimental study of photoelectric effect

Matter waves-wave nature of particles, de-Broglie relation

Unit VIII: Atoms and Nuclei

Chapter–12: Atoms

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum.

Chapter–13: Nuclei

Composition and size of nucleus Nuclear force

Mass-energy relation, mass defect, nuclear fission, nuclear fusion.

Unit IX: Electronic Devices

Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits

Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Semiconductor diode - I-V characteristics in forward and reverse bias, diode as a rectifier; Special purpose p-n junction diodes: LED, photodiode, solar cell.