

# HBSE Class 12 Physics Syllabus

## Class – XII Subject- Physics Syllabus

Month	Name of Book	Chapter & Topics	Teaching Period	Revision period	Practical
April	Physics Class 12 <sup>th</sup>	Unit-1 Electrostatics Chapter-1- Electric Charges Fields Chapter-2- Electrostatic potential & capacitance	22	6	7
May	do	Unit-2 Current electricity Unit-3 Magnetic effect of current Chapter-4- Moving charges & Magnetism	14 8	4 2	14
June	Summer Vacation				
July	do	Unit-3 Magnetic effect of current and magnetism Chapter-5 Magnetism & matter Unit-4 Electro magnetic Induction & Alternating current Chapter-6 Electro magnetic Induction	12 10	2 2	7 7
August	do	Unit-4 Electromagnetic Induction & Alternating current Chapter-7 Alternating current Unit-5 Electro magnetic waves	18	6	12
September	do	Unit-6 Optics Chapter-9 Ray optics & optical Instruments	18	2	6
October	do	Unit-6 Optics Chapter- 10 Wave optics Unit-7 Dual nature of matter & radiation	21	3	10
November	do	Unit-8 Atoms & nuclei	22	4	8
December	do	Unit-9 Electronic Devices	19	3	8
January	do	Unit-10 Communication System	16	4	6
February		Revision & practical Exam			
March		Exam			

**Class 12<sup>th</sup>**  
**Subject-Physics**  
**Syllabus**

**Unit :I : Electrostatics:**

**Chapter No.-One**      April

**Electric Charges and Fields:**

Electric charge, conductors and insulators, Charging by conduction and induction, Basic properties of electric charges coulomb's Law-force between two point charges, forces between multiple charges , dielectric Constant, Superposition principle, Electric field, Electric field due to point charge, Electric field due to system of charges, Electric field lines and their general properties, Electric flux , Electric dipole, Field of an electric dipole on axial and equatorial line , Dipole in a uniform External field, Continuous Charge distribution, Torque on a dipole in Uniform Electric field, Potential Energy of dipole in Electric field.. Gauss's of Law, and its application to find field due to infinitely long straight wire uniformly charged thin spherical Shell, field due to two parallel uniformly charged planesheets.

**Chapter No.-Two** April

**Electrostatic potential and capacitance:**

Electrostatic potential, potential due to a point charge, Potential due to an electric dipole and system of charges Equipotential of surfaces, Relation between field and potential, Potential Energy of system of two point charges in an external field, conductors, Electrostatic shielding, Dielectrics and polarization, Capacitors and Capacitance, The Parallel plate Capacitor, Effect of dielectrics on capacitance , Combination of Capacitors in series and in parallel, Energy stored in a capacitor, grouping of capacitors.

**Unit :II : Current Electricity:**

**Chapter No.-Three**      May

## Current Electricity:

Electric Current, Flow of electric charge in a metallic conductor, Drift velocity, Mobility and their relation with Electric Current Ohm's Law, current density, electrical resistance, resistivity and conductivity. VI characteristics, limitations of Ohm's Law, carbon resistors, colour code for carbon resistors, Temperature dependence of resistivity, Electrical energy and power, Combination of resistors- Series and parallel, EMF, Internal resistance of a cell, potential Difference of a cell, Combination of cells in series and parallel, Kirchhoff's Rules. Wheatstone Bridge, meter Bridge.

Potentiometer: Principle and its applications to measure potential difference and for comparing EMF of two cells, measurement of internal resistance of a cell.

### **June Summer Vacation**

## Unit :III : Magnetic Effects of Current and Magnetism: July

### Chapter No.-Four

#### Moving Charges and Magnetism:

Magnetic force; Sources and field, oersted's experiments; concept of Magnetic field, Lorentz force

Magnetic field due to a current Element, Biot- Savart Law and its application to current carrying circular loop on its axis. Ampere's circuital Law and its application to infinitely long straight wire. The Solenoid and the toroid.

Force on moving charge in uniform magnetic and electric fields, cyclotron,

Force on a current carrying conductor in a uniform magnetic field, force between two parallel currents carrying conductors. Definition of ampere. Torque experienced by a current loop in uniform magnetic field. Magnetic dipole, current loop as a magnetic dipole, Magnetic moment of a revolving electron. The moving coil Galvanometer- its current sensitivity, and conversion to ammeter and voltmeter.

## Chapter No.-Five

### Magnetism and Matter:

The bar magnet, magnetic field lines, magnetic field intensity due to a magnetic dipole(bar magnet) along its axis and perpendicular to its axis . Torque on a magnetic dipole(bas magnet) in a uniform magnetic field, Bar magnet as an equivalent solenoid.

Earth” magnetic field, magnetic elements of earth

Dia-para and ferro magnetic substances, with example, permanent magnets and electromagnets and factors affecting their strengths.

## Unit : IV : Electromagnetic Induction and Alternating Currents:

### Chapter No.-Six      August

#### Electromagnetic Induction:

Electromagnetic Induction, Magnetic flux, Faraday” Law of electromagnetic induction, Lenz’s Law and conservation of energy, Motional Electromotive force, Eddy currents, -Self and mutual Induction- Self inductance of a long solenoid, A.C. Generator .

### Chapter No.-Seven

#### Alternating Current:

Alternating currents, peak and r.m.s. value of alternating current voltage, reactance and impedance, LC oscillation (qualitative treatment only), LCR series circuit, phasor-Diagram solution, Resonance. Power in AC circuits , watt less current.

Transformer, Energy losses in the transformers.

## Unit : V : Electromagnetic waves:

### Chapter No.-Eight      August

#### Electromagnetic waves:

Basic Idea of displacement current, Electromagnetic waves, Sources, and Characteristics of EMW, Transverse Nature of EMW(qualitative Ideas only) Electromagnetic Spectrum,(Radio waves, Microwaves, infrared visible, ultraviolet, X-rays, gamma rays). including elementary facts about their uses.

Unit : VI : Optics: September

### Chapter No.-Nine

#### Ray optics and optical instruments:

Ray optics: Reflection of light by spherical mirrors, Mirror formula, refraction of light, lateral shift of a ray refraction through a glass slab, real and apparant depth, Advance Sunrise and delayed sun set due to atmospheric refraction, Total internal reflection, and its applications, Optical fibre, Mirage, Totally reflecting prism, Brilliancy of diamond, Refraction at convex spherical surfaces. Lenses, Refraction by a lens, Power of a lens, Combination of thin lenses and mirror in contact, lens formula lens maker's formula.

Refraction and Dispersion of light through a prism, plattering of light- blue colour of sky and reddish appear of the sun at sunrise and sunset. Some Natural phenomena due to sunlight- The rainbow.

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

### Chapter No.-Ten October

#### Wave optics:

Wave front and Huygen's principle, refraction and reflection of plane waves at a plane surface using Huygens principle. Proof of law of reflection and refraction using Huygen's principle. Interference of light waves. Young's double slit experiment and expression for fringe width, Coherent Sources and sustained Interference of light. Diffraction, Diffraction due to a Single Slit width of Central maxima, resolving power of microscopes and telescopes. Polarisation, plane polarsised light. Brewster's law, Uses of plane Polarised light & polaroids.

#### Unit :VII : Dual Nature of Radiation and Matter:

## Chapter No.-Eleven

### Dual Nature of Radiation and Matter:

Dual Nature of radiation, photoelectric effect, Hertz, Hallwoch's and Lenard's sobservatin's effect of intensity of light on photo current, Effect of potential on photoelectric current, effect of frequency of incident radiation on stopping potential. Einstein's Photoelectric equation- particle Nature of light, photon Matter waves- Wave nature of particle , de Broglie relation, Davisson- Germer experiment( experimental details, should be omitted, only conclusion should be explained)

### Unit : VIII : Atoms and nuclei:

## Chapter No.-Twelve

### Atoms:

Alpha- particle Scattering experiment. Rutherford's Model of atom, Drawbacks of Rutherford's Model. Bohr's Model of hydrogen atom- postulates, Bohar radius, Total Energy of electron in nth orbit. Energy levels of hydrogen atom The line spectra of hydrogen atom.

## Chapter No.-Thirteen

### Nuclei:

Atomic masses & composition of Nucleus, Size of nucleus isotopes, isobars isotones Mass energy relation, Nuclear Binding Energy and Mass Defect. Binding Energy and Mass Defect. Binding Energy Curve, Radioactivity. Law of radioactive decay, Alpha, Beta & Gamma particles/rays and their properties, Nuclear fission and fusion.

### Unit : IX : Electronic Devices:

## Chapter No.-Fourteen

### Semiconductor Electronics, Materials, Devices & Simple Circuits:

Energy bands in Conductors, Semiconductor & Insulators ( Qualitative Ideas only).  
Intrinsic & Extrinsic Semiconductor, Semiconductor diode-I-V Characteristics in Forward and reverse bias. Diode as full wave & half wave rectifier Special purpose p-n junction diodes- Zener Diode and their Characteristics, Zener Diode as a Voltage regulator, LED, Photodiode, Solar Cell

Junction Transistor, Transistor Action, Characteristics of a transistor , transistor as an amplifier( C.E. Configuration) basic Idea of analog & digital signal, logic gates(OR,AND,NOT, NAND, NOR)

## Unit : X : Communication System:

### Chapter No.-Fifteen

#### Communication Systems:

Elements of a Communication System(Block Diagram only) Bandwidth of Signals (Speech, TV and digital Data), Band width of transmission medium, Propagation of Electromagnetic waves in the atmosphere, Sky and Space wave propagation.

Satellite Communication, Need for modulation, Amplitude modulation, Basic Ideas of internet, mobile telephony and global positioning system(GPS)