

PHYSICS SYLLABUS EFFECTIVE FROM 26-7-2021

**Class-XII (Code No. 042)
SESSION 2021-2022**

Senior Secondary stage of school education is a stage of transition from general education to discipline-based focus on curriculum. The present updated syllabus keeps in view the rigour and depth of disciplinary approach as well as the comprehension level of learners. Due care has also been taken that the syllabus is comparable to the international standards. Salient features of the syllabus include:

Emphasis on basic conceptual understanding of the content.

Emphasis on use of SI units, symbols, nomenclature of physical quantities and formulations as per international standards.

Providing logical sequencing of units of the subject matter and proper placement of concepts with their linkage for better learning.

Reducing the curriculum load by eliminating overlapping of concepts/content within the discipline and other disciplines.

Promotion of process-skills, problem-solving abilities and applications of Physics concepts.

Besides, the syllabus also attempts to

Strengthen the concepts developed at the secondary stage to provide firm foundation for further learning in the subject.

Expose the learners to different processes used in Physics-related industrial and technological applications.

Develop process-skills and experimental, observational, manipulative, decision making and investigatory skills in the learners.

Promote problem solving abilities and creative thinking in learners.

Develop conceptual competence in the learners and make them realize and appreciate the interface of Physics with other disciplines

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**Physics Class XII (Code N. 042) (2021-22)
Syllabus assigned for Term I (Theory)**

Time: 90 Minutes

Max Marks: 35

CLASS XII (2021-2022)

(THEORY TERM - I)

Time:90Min.

Max Marks: 35

		No. of Periods	Marks
Unit-I	Electrostatics		
	Chapter-1: Electric Charges and Fields	23	17
	Chapter-2: Electrostatic Potential and Capacitance		
Unit-II	Current Electricity	15	
	Chapter-3: Current Electricity		
Unit-III	Magnetic Effects of Current and Magnetism	16	18
	Chapter-4: Moving Charges and Magnetism		
	Chapter-5: Magnetism and Matter		
Unit-IV	Electromagnetic Induction and Alternating Currents	19	
	Chapter-6: Electromagnetic Induction		
	Chapter-7: Alternating Current		
Total		73	35

Unit I: Electrostatics

23 Periods

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.

PRACTICAL: 1. . To determine resistivity of two / three wires by plotting a graph between potential

difference versus current.

Activities

- 1. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.**
- 3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.**

Unit II: Current Electricity

15 Periods

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)

PRACTICAL 2. To find resistance of a given wire / standard resistor using metre bridge.
OR

To verify the laws of combination (series) of resistances using a metre bridge.

Activities

- 2. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.**

Unit III: Magnetic Effects of Current and Magnetism

16 Periods

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.

PRACTICAL 3. To compare the EMF of two given primary cells using potentiometer.
OR

To determine the internal resistance of given primary cell using potentiometer.

Activities

- 3. . To assemble the components of a given electrical circuit**

Unit IV: Electromagnetic Induction and Alternating Currents

19 Periods

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.

PRACTICAL 4 . To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.

Syllabus assigned for Practical for Term I

Total Periods:16

First term practical examination will be organised by schools as per the directions of CBSE. The record to be submitted by the students at the time of first term examination has to include a record of at least 4

Experiments and 3 Activities to be demonstrated by teacher.

Evaluation Scheme

Time Allowed: one and half hours

Max. Marks: 15

Two experiments to be performed by students at time of examination

8 marks

Practical record [experiments and activities]

2 marks

Viva on experiments, and activities

5 marks

Total 15 marks

Class XII Syllabus assigned for Term II (Theory)

Time: 2 Hours

Max Marks: 35

Unit–V	Electromagnetic Waves	02	
	Chapter–8: Electromagnetic Waves		
Unit–VI	Optics		17
	Chapter–9: Ray Optics and Optical Instruments	18	
Unit –VII	Chapter–10: Wave Optics		
Unit–VIII	Dual Nature of Radiation and Matter	07	
	Chapter–11: Dual Nature of Radiation and Matter		11
Unit- IX	Atoms and Nuclei		
	Chapter–12: Atoms	11	
	Chapter–13: Nuclei		
Unit–X	Electronic Devices	7	
	Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits		7
	Total	45	35

Unit V: Electromagnetic waves

02 Periods

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.

PRACTICAL: 1

To find the focal length of a convex lens by plotting graphs between u and v or between $1/u$ and $1/v$.

Activities 1

To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.

Unit VI: Optics

18 Periods

Chapter–9: Ray Optics and Optical Instruments

Ray Optics: Refraction of light, total internal reflection and its applications, optical fibers, 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

PRACTICAL: 2 To find the focal length of a convex mirror, using a convex lens.

OR

To find the focal length of a concave lens, using a convex lens.

Activities 2

To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.

Unit VIII: Dual Nature of Radiation and Matter

07 Periods

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

PRACTICAL: 3. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.

ACTIVITY 3

To study the nature and size of the image formed by a (i) convex lens, (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror)

Unit IX: Atoms and Nuclei

11 Periods

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.

PRACTICAL: 4.

To draw the I-V characteristic curve for a p-n junction diode in forward bias and reverse bias.

Unit IX: Electronic Devices

7 Period

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.

Syllabus assigned for Practical for Term II

Total Periods: 16

The second term practical examination will be organised by schools as per the directions of CBSE and viva will be taken by both internal and external observers. The record to be submitted by the students at the time of second term examination has to include a record of at least 4 Experiments and 3 Activities to be demonstrated by teacher.

Evaluation Scheme

Time Allowed: one and half hours Max. Marks: 15

Two experiments to be performed **8 marks**

by students at time of examination

Practical record [experiments and activities] **2 marks**

Viva on experiments, and activities **5 marks**

Total 15 marks

Prescribed Books:

1. **Physics, Class XI, Part -I and II, Published by NCERT.**
2. **Physics, Class XII, Part -I and II, Published by NCERT.**
3. **Laboratory Manual of Physics for class XII Published by NCERT.**
4. **The list of other related books and manuals brought out by NCERT (consider multimedia also).**

QUESTION PAPER DESIGN (Class: XI/XII)