HANSRAJ MODEL SCHOOL
PUNJABI BAGH, NEW DELHI
ACADEMIC PLAN
SESSION: 2024-2025
SUBJECT: PHYSICS
CLASS: XII

MONTH	TOPIC / SUBTOPICS	LEARNING INTENTIONS	ACTIVITIES	ASSIGNMENTS
April	**Chapter -Electric Field and charges** Coulomb's Force, electric field, dipole, Gauss Law and its applications **Chapter- Electric Potential and capacitance** Electric potential, potential difference, capacitance of parallel plate capacitor with and without dielectric,)	Student will be able to * Understand concept of electrostatic force and field. *State the Coulomb's law of electrostatic force. *Apply the concept of static electricity in selection of clothes as per the weather conditions *By using the concept of electrostatics students can protect themselves from lightning. *Understand the concept potential. * Understand the electric dipole and electric field due to an electric dipole. **SKILL DEVELOPMENT** Critical Thinking Problem Solving	To demonstrate frictional electricity for introducing the topic. **ART INTEGRATION** To construct electroscope and explain different methods of charging a body.	NCERT CW Ex Q 1.1,1.2,1.6,1.8,1.9,1.10,1.12 -1.23 HW Q 1.3,1.4,1.5,1.7,1.11 ExQ CW 2.1-2.8, 2.11 HW 2.9,2.10

May	**Chapter- Electric Potential and capacitance(ctd)** combination of capacitors, energy stored in capacitor(only formula) **Chapter-Current Electricity** Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, V-I characteristics (linear and nonlinear), 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 rules, Wheatstone bridge. **Chapter- Electronic Devices** Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier.	Student will be able to *Understand the concept of capacitor Student will be able to: *Understand the concept of electric current and potential difference . * Understand the difference between drift velocity and mobility of electrons in a conductor. *State the Ohm's law and understand the Ohmic conductor. * Understand the concept of electric power, electrical resistivity *Know the difference between emf and potential difference. * State theKirchhoff's voltage and current law. *Understand principle of wheatstone bridge *Apply the concept for electrical power and energy to calculate the electricity bill of their home, factory or office The students will be able to *Understand the energy band gaps in conductor,semiconductor and insulator *Understand the n type and p type	Using regulators of a fan ,the construction and working of capacitors will be discussed. Activities : i.To demonstrate the emf of a cell purchased from market. ii.To show the electrolyte used in different cells which are being used in the laboratory. Lab activities : i. Measurement of unknown resistance by wheatstone bridge. **ART INTEGRATION** Identify and draw different electrical components. To demonstrate characteristic of PN junction diode. **ART INTEGRATION** 1 To draw the formation of the depletion layer	NCERT Ex Q CW 3.1-3.4, 3.7,3.9 HW 3.5,3.6 NCERT Ex Q CW 14.1,14.3,14.4,14.6 HW 14.2,14.5

		semiconductor *Understand the working of diode in forward and reverse biasing	using coloured diagram. 2 Crossword puzzle.	
July	**Chapter- Electromagnetic Waves** Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative idea only). Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses. **Chapter-Moving charges and magnetism** Biot - Savart law and its application to the current carrying circular loop. Ampere's law and its applications to infinitely long straight wire. Straight solenoid (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; Current loop as a magnetic dipole and its magnetic dipole moment,	Student will be able to *Understand the concept of displacement current *understand the detection and applications of various parts of em spectrum Student will be able to: * Understand the concept of magnetic field and Oersted experiment . * State the Biot savart's law and Ampere's law and apply the Ampere's law to calculate the magnetic field due to infinitely long straight wire, *Understand the force on a moving charge in uniform magnetic and electric fields. * Understand force between two parallel current-carrying conductors-definition of ampere.	**ART INTEGRATION** To discuss uses of various parts (rays) in daily use e.g. use of X rays,UV rays ,microwaves. Paste photographs of uses of em wave spectrum in class registers. Crossword puzzle *.To Demonstrate the presence of magnetic field due to current carrying conductor. *To demonstrate the force experience by current carrying conductor placed in uniform magnetic field **ART INTEGRATION**	NCERT ExQ CW 8.2-8.8 HW 8.9-8.10 NCERT Ex Q 4.1-4.3, 4.5-4.7, 4.9,4.10,4.12,4.13 HW Q 4.4,4.11 Assignment

	moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter. **Chapter- Magnetism and Matter** Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), magnetic field lines. Magnetic properties of materials- Para-, dia- and ferro -magnetic substances with examples, Magnetization of materials, effect of temperature on magnetic properties	Understand the torque experienced by current loop in uniform magnetic field SKILL DEVELOPMENT Communication skill Problem solving skills	Draw magnetic field patterns for Bar magnet , Two infinitely long wires carrying current. Diamagnetic, Paramagnetic Ferromagnetic substance when placed in an external magnetic field . On an A4 size sheet. *To demonstrate the magnetic lines of force due to a bar magnet *To demonstrate the solenoid and its magnetic poles	
August	**Chapter-: Electromagnetic Induction** Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Self and mutual induction. **Chapter: Alternating Current** Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit (phasors only), resonance, power in AC circuits, power factor, wattless current. AC generator, Transformer.	The students will be able to *assess and analyze various situations where magnetic flux is varied and justify their answer. *recognize applications of these concepts in everyday life. They will correlate physics concepts to industrial and technological application.	*To demonstrate the construction and working of a generator and transformer. * To demonstrate self and mutual induction and factors affecting mutual induction	NCERT ExQ 6.1,6.2,6.4,6.5,6.7 HW Q 6.3,6.8 Ex Q 7.1,7.2,7.4,7.8 HW Q 7.3,7.5,7.7

		SKILL DEVELOPMENT Technical skills,team work		
September	Chapter–: 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.	The students will be able to Apply the concept of dual nature in day to day life SKILL DEVELOPMENT problem solving critical thinking	**ART INTEGRATION** Graphical study of photoelectric effect.	NCERT Ex Q 11.2,11.3,11.6,11.7,11.11 HW Q 11.1,11.4,11.5,11.8-11.10
October	**Chapter– Wave Optics** Wave optics: Wavefront and Huygens principle, Proof of laws of reflection and refraction using Huygens principle. Interference, Young's double slit experiment and expression for fringe width (No derivation final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only). **Chapter- Ray Optics and Optical Instruments** Ray Optics: Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers,	The students will be able to *understand Huygens principle * apply Huygens principle to reflection and refraction of light *Understand the concept of reflection of light, spherical mirrors, mirror formula. * Understand the Refraction of light,	*To demonstrate diffraction and interference using lasers *To demonstrate total internal reflection **ART INTEGRATION** Draw image formation in telescope and compound microscope.	NCERT Ex Q 10.2,10.4,10.5,10.6 HW Q 10.1,10.3, ExQ 9.2,9.4,9.6,9.7,9.8,9.11,9.13,9.17,9.19,9.25-9.27 HW Q 9.1,9.3,9.5,9.10

	refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula,magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism.	total internal reflection. *Apply The concept of TIR in cables used in computers and transmission of Data. *apply the concept of focal length to calculate the focal length of combination of lenses.	*To study the image formation for different positions of the object treating candle flame as object	
November	Chapter-: Atoms Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in nth orbit, hydrogen line spectra (qualitative treatment only). Chapter– Nuclei Composition and size of nucleus, nuclear force,Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.	The students will be able to *Bohr model of hydrogen atom *find radius of orbit, energy of electron in any orbit SKILL DEVELOPMENT problem solving critical thinking	To demonstrate Bohr model of Hydrogen atom **ART INTEGRATION** To draw the hydrogen spectrum showing various series of lymen balmer,paschen .	NCERT ExQ 12.3-12.9 HW Q 12.1,12.2 NCERT ExQ 13.1,13.4,13.5,13.10 HW Q 13.6-13.9