BISHOP SCOTT BOYS' SCHOOL

STUDENT CURRICULUM MANUAL

Subject : Physics	**Class : XII**	**Academic Plan : 2025 -26**

Month	Course Description	Learning Outcome	Activity	No. of Periods	Portion for PT & TERM Assessment
April	Electrostatics Chapter - 1 *Electric charge and field (Electric charge ,conservation of charge , coulomb's law, force between multiple charges, superposition principal and continuous charge distribution. Electric field , Electric field due to a point charge ,Electric field lines, Electric dipole , Electric field due to dipole ,Torque on a dipole in uniform electric field ,Electric flux , statement of Gauss theorem and its application to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell.	• a learning outcomes presentation on electrostatics good typically include the ability to define an explain basic concepts like electric charge coulomb's law electric field electric potential and Gauss's law calculate the electric field and potential due to various charge distribution understanding the concept of electric field lines and equipotential surface, apply the concept to solve problems related to static charge and their interactions and discuss real world applications of electrostatic like capacitors and photo copies	*To determine the resistance per cm. of a given wire by plotting a graph for potential difference versus current	10 periods	

	Chapter - 2. Electrostatic potential and capacitance (* Electric potential and potential difference *Electric potential due to a point charge a dipole and system of charges; equipotential surface , * Electric potential energy of a system of two point charges and of electric dipole in an electrostatic field *Conductors , insulators, free charges and bound charges inside a conductor. *Dielectric and electric polarization capacitors and capacitance combination of capacitors in series and parallel capacitance of a parallel plate capacitors with and without dielectric medium between the plates *Energy stored in a capacitor (no derivation formula only).		* To find resistance of a given wire using meter-bridge and has to determine the resistivity of its material.	10 periods	

Month	Course Description	Learning Outcome	Activity	No. of Periods	Portion for PT & TERM Assessment
May	Current electricity Chapter - 3 *Electric current flow of electric charge in a metallic conductor Drift velocity, mobility and relations with electric current. *Ohm's law V- I characteristic 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 rule wheat-stone bridge.	• After studying current electricity a learner should be able to define and understand the concept of electric current potential difference resistance and their relationship as described by ohm's law identify and analyse different type of electric circuit series and parallel. Calculate current, voltage and resistance in circuit using Ohm's law and explain the factor affecting resistance in conductor difference between direct current and alternating current and understand the basic principle of electrical power and energy uses	*To verify the laws of combination series and parallel of resistance using a meter- bridge.	12 periods	

Month	Course Description	Learning Outcome	Activity	No. of Periods	Portion for PT & TERM Assessment
June	Magnetic effects of current and Magnetism Chapter – 4 *Concept of magnetic field Oersted experiment Biot-Savert law and its application to current carrying circular loop and Ampere's law and its application, To infinitely long straight wire , solenoid(only qualitative treatment) *Force on a current carrying conductor in a uniform magnetic field, force between two parallel current carrying conductor definition of ampere torque experienced by a circular loop in uniform magnetic field current loop in uniform magnetic field *Current loop as a magnetic dipole. And it's magnetic dipole moment * Moving coil galvanometer it's current sensitivity and conversion to ammeter and voltmeter.	• When studying the magnetic effect of current learning outcomes are understanding the electric current produces a magnetic field identifying the direction of the magnetic field around a current carrying wire explain the concept of an electromagnet apply the right hand rule to determine magnetic field direction and recognizing practical application of electromagnetic light motors and generators, while also being able to calculate the strength of the magnetic field using relevant formula like amperes law.	*To determine resistance of a galvanometer by half deflection method and to find its figure of merit.	15 periods	

Month	Course Description	Learning Outcome	Activity	No. of Periods	Portion for PT & TERM Assessment
July	Magnetism and Matter Chapter - 5 *Bar magnet, bar magnet equivalent solenoid, magnetic field intensity due to a magnetic dipole (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 substance with examples. *Magnetization of materials effect of temperature on magnetic properties	• Understand what magnetic is identify the properties of magnet differentiate between magnetic poles and explain how like pole repels and unlike poles attract describe what a magnetic field is visualize it during field lines and analyze the earth magnetic field and its significance describe what a magnetic field is Categorised material as ferromagnetic, paramagnetic or diamagnetic understanding how they are magnetic poles align within a magnetic field		7 Periods	PT – 1 Electrostatic (chapter – 1&2) *Current electricity (chapter 3) * Magnetic effect of current (chapter 4)

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July	Electromagnetic induction Chapter - 6 *Electromagnetic inductions ,Faraday law, induced EMF and current, Lenz's law, self inductance and mutual inductance.	• Understanding the concept of changing magnetic field, induced electromotive force in a circuit , applying Faraday law to calculate the induced EMF. Lenz's law to determine the direction of the induced current recognising the application of electromagnetic induction in device like generator and transformer and being able to analyse the relationship between magnetic flux induces voltage in different scenarios.		10 periods	
	Alternating Current Chapter -- 7 *Alternating current peak and RMS value of alternating current /voltage reactance and impedance. * *LCR series circuit, resonance , power in AC circuit ,power factor, wattless current, AC generator , transformer.	• Understanding the concept of AC as a current that periodically reverses direction differentiating it from direct current, defining key AC parameters like frequency, peak voltage, RMS value and phase angle explaining the behaviour of AC circuit with resistor capacitors and inductors calculating power in AC circuits and		10 periods	

		recognising the advantages of AC for power transmission due to the ability to easy transform voltage levels using Transformers			
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August	Electromagnetic waves Chapter – 8 *Basic idea of displacement current, electromagnetic waves their characteristic their transverse nature qualitative Idea only, electromagnetic spectrum (radio wave microwave infrared visible ultraviolet x-ray Gamma rays) including elementary facts about their uses	• Understanding the fundamental concept of electromagnetic wave as a self propagating wave generated by oscillating electric and magnetic field, identifying the different components of the electromagnetic spectrum based on wavelength and frequency explaining the relationship between wavelength frequency and energy applying knowledge of electromagnetic waves to real world applications like radio communications light microwave and medical imaging etc		4 periods	

Month	Course Description	Learning Outcome	Activity	No. of Periods	Portion for PT & TERM Assessment
August	Ray optics and optical instruments Chapter – 9 *Reflection , spherical mirror formula, refraction of light ,total internal reflection ,and optical fibres refraction at a spherical surface ,lenses thin lens formula, lens maker formula, magnification power of lens, combination of thin lens in contact, refraction of light through prism. *Optical instruments - microscope and astronomical telescope(reflecting and refracting) and their magnifying power.	• Learning outcomes of optical includes the ability to explain the behaviour of light includes reflection, refraction, interference and diffraction. Apply these concept to analyse optical system like lenses mirrors and prism understanding the construction and function of common optical instruments such as microscope telescope due to the fractions and aberrations essential gaining a comprehensive understanding of how light interacts with the matter and principal behind optical device.	*To find the value of v for different value of u in case of a concave mirror and to find the focal length *2 to find the focal length of a convex mirror using a convex lens	15 periods	

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September	Wave optics Chapter – 10 Wave Front and Hygiene's principal reflection and refraction of plane wave at a plane surface using wave fronts proof of laws of reflection and refraction using Hygiene's , interference young double slit experiment and expression for fringe width (no derivation find expression only)coherent sources and sustained interference of light, diffraction due to a single slit , width of Central Maxima (treatment only)	• Able to explain the wave nature of light apply Hygiene's principle understanding the light behave as electromagnetic wave with property like wavelength, frequency , amplitude and uses this concept to explain the various optical phenomenon like interference and diffraction	*To find the focal length of a convex lens by plotting graph between u and v or between 1/u and 1/v	10 periods	Half yearly exam Chapter – 1 Chapter - 2 Chapter – 3 Chapter – 4 Chapter - 5 Chapter - 6 Chapter - 7 Chapter - 8

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October	Dual nature of matter and Radiation Chapter ----11 *Dual nature of radiation, photoelectric effect heartz and Lenard observation Einstein photoelectric effect , particle nature of light ,experimental study of photoelectric effect, matter waves nature of particle De Broglie relation	• Understanding the concept of web particles to LED explain how both light and metal can exhibit characteristic of both wave and particles depending on the situation including the idea of quantum as a discrete packet of energy calculate the wavelength associated with a moving partly based on its momentum and understanding the implication of this wavelength for different type of particles describe in the photoelectric effect.	*To find the focal length of a concave lens using a convex lens	8 periods	

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October	Atoms Chapter – 12 Alpha particle scattering experiment Rutherford model of atom Bohr's model of hydrogen atom expression for radius of nth possible orbit ,velocity and energy of electron in nth orbit hydrogen like spectra qualitative treatment only	• Understanding that atoms are the basic building blocks of matter identifying the three subatomic particles protons neutrons and electrons recognising how the number of protons determines and element explaining the structure of an atom with its nucleus containing protons and neutrons and being able to interpret information about 8 arms from the periodic table including atomic number.		8 periods	

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November	Nuclei Chapter 13 *Composition and size of nucleus, nuclear forces ,mass energy relation, mass defect , binding energy per nucleon and its variation with mass number, Nuclear fission, nuclear fusion.	• Understanding the composition and structure of atomic nuclei explaining the forces holding them together identifying different types of nuclear reactions like fission and fusion calculating nuclear binding energy.		7 periods	PT - 2 Chapter - 9 Chapter - 10 Chapter - 11 Chapter - 12 Chapter - 13
November	Semiconductor electronic materials devices and simple circuits Chapter – 14 • Energy band in conductor semiconductors and insulator, (qualitative Idea only) intrinsic and extrinsic , p and n type, P-N junction semi conductor diode. I – V characteristic in forward and reverse bias application of junction diode , diode as a rectifier.	• Refers to study of how semiconductor material like silicon and germanium can be used to create electronic components like diodes and transistor which forms the basis for a building basic electrical circuit by manipulating their electrical property through doping and junction formations.		10 Periods	