TENTATIVE LESSON PLAN (SEMESTERS)

SESSION: 2023-24

Name of the Teacher: Mr. kamaljeet Singh Department: Physics

Subject/Course: Solid State and Nano Physics Programme: Bachelor of Science

Semester: 6th (Section A & B)

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Unit I: Crystal Structure I** Crystalline and glassy forms, liquid crystals, crystal structure, periodicity, lattice and basis, crystal translational vectors and axes. Unit cell and Primitive Cell, Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal, Bravais lattices in two and three dimensions. Crystal planes and Miller indices, Interplaner spacing, Crystal structures of Zinc Sulphide, Sodium Chloride and Diamond. Class test	31-1-24 to 24-02-24
2.	**Unit II: Crystal Structure II** X-ray diffraction, Bragg's Law and experimental X-ray diffraction methods. K-space and reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c. and f.c.c. Assignment	26-02-24 to 22-03-24
3.	**Unit III: Super conductivity** Historical introduction, Survey of superconductivity, Super conducting systems, High Tc Super conductors, Isotopic Effect, Critical Magnetic Field, Meissner Effect, London Theory and Pippards' equation, Classification of Superconductors (type I and Type II), BCS Theory of Superconductivity, Flux quantization, Josephson Effect (AC and DC), Practical Applications of superconductivity and their limitations, power application of superconductors.	28-03-24 to 24-04-24
4.	**Unit IV: Introduction to Nano Physics** Definition, Length scale, Importance of Nano-scale and technology, History of Nantechnology, Benefits and challenges in molecular manufacturing. Molecular assembler concept, Understanding advanced capabilities. Vision and objective of Nano-technology, Nanotechnology in different field, Automobile, Electronics, Nano-biotechnology, Materials, Medicine.	25-04-24 to 11-05-24
	Revision	13-05-24 onwards

Name of the Teacher: Mr. Mukesh Department: Physics

Subject/Course: Wave & Optics II Programme: Bachelor of Science

Semester: 4th (Section A & B)

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Unit-1: Polarization** Polarization: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light. Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light. Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz). Assignment	31-1-24 to 24-02-24
2.	**Unit-II: Fourier analysis** Fourier theorem and Fourier series, evaluation of Fourier coefficient, importance and limitations of Fourier theorem, even and odd functions, Fourier series of functions f(x) between (i) 0 to 2pi, (ii) –pi to pi, (iii) 0 to pi, (iv) –L to L, complex form of Fourier series, Application of Fourier theorem for analysis of complex waves: solution of triangular and rectangular waves , half and full wave rectifier outputs, Parseval identity for Fourier Series, Fourier integrals. Class test	26-02-24 to 22-03-24
3.	**Unit III: Fourier transforms** Fourier transforms and its properties, Application of Fourier transform (i) for evaluation of integrals, (ii) for solution of ordinary differential equations, (iii) to the following functions: 1. f(x)= e- x2/2 1 |X|<a 2 . f(x) = 0 |X |>a Geometrical Optics I Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses.	28-03-24 to 24-04-24
4.	**Unit-IV: Geometrical Optics II** Chromatic, spherical, coma, astigmatism and distortion aberrations and their remedies. Fiber Optics Optical fiber, Critical angle of propagation, Mode of Propagation, Acceptance angle, Fractional refractive index change, Numerical aperture, Types of optics fiber, Normalized frequency, Pulse dispersion, Attenuation, Applications, Fiber optic Communication, Advantages.	25-04-24 to 11-05-24
	Revision	13-05-24 onwards

Name of the Teacher: Dr. Narender Kumar Department: Physics

Subject/Course: Atomic and Molecular spectroscopy Programme: Bachelor of Science

Semester: 6th (Section A & B)

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Unit – I: Historical background of atomic spectroscopy** Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model(Bohr's postulates) , spectra of Hydrogen atom , explanation of spectral series in Hydrogen atom, un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass), variation in Rydberg constant due to finite mass, short comings of Bohr's theory, Wilson sommerfeld quantization rule, de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory, Vector atom model; space quantization, electron spin, coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules. Assignment	31-1-24 to 24-02-24
2.	**Unit –II: Vector Atom Model (single valance electron)** Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic filed; Larmors' precession and theorem. Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model; Quantum defect, spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non-penetrating orbits. quantum mechanical relativity correction, Hydrogen fine spectra, Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms. observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets, comparison of Alkali spectra and Hydrogen spectrum . Class test	26-02-24 to 22-03-24
3.	**UNIT-III: Vector Atom model (two valance electrons)** Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom: application of spectra. Coupling Schemes; LS or Russell – Saunders Coupling Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp, pd configuration), Lande interval rule, Pauli principal and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration), equivalent and non-equivalent electrons, Two valance electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling. Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin.	28-03-24 to 24-04-24
4.	**Unit –IV: Atom in External Field** Zeeman Effect (normal and Anomalous),Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect(classical and quantum mechanical), Explanation of anomalous Zeeman effect(Lande g-factor), Zeeman pattern of D1 and D2 lines of Na atom, Paschen-Back effect of a single valence electron system. Weak field Stark effect of Hydrogen atom. Molecular Physics General Considerations, Electronic States of Diatomic Molecules, Rotational Spectra (Far IR and Microwave Region), Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra.	25-04-24 to 11-05-24
	Revision	13-05-24 onwards

Name of the Teacher: Mr. Ashish Kumar Department: Physics

Subject/Course: Statistical Physics Programme: Bachelor of Science

Semester: 4th (Section A & B)

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Unit –I: Statistical Physics I** Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability, A- priori Probability and relation between them, probability theorems, some probability considerations, combinations possessing maximum probability, combination possessing minimum probability, Tossing of 2,3 and any number of Coins, Permutations and combinations, distributions of N (for N= 2,3,4) distinguishable and indistinguishable particles in two boxes of equal size, Micro and Macro states, Thermodynamical probability, Constraints and Accessible states, Statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes, Condition of equilibrium between two systems in thermal contact-- β parameter, Entropy and Probability (Boltzman's relation). Assignment	31-1-24 to 24-02-24
2.	**Unit –II: Statistical Physics II** Postulates of statistical physics, Phase space, Division of Phase space into cells, three kinds of statistics, basic approach in three statistics. M. B. statistics applied to an ideal gas in equilibrium- energy distribution law (including evaluation of σ and β) , speed distribution law & velocity distribution law. Expression for average speed, r.m.s. speed, average velocity, r. m. s. velocity, most probable energy & mean energy for Maxwellian distribution. Class test	26-02-24 to 22-03-24
3.	**Unit-III: Quantum Statistics** Need for Quantum Statistics: Bose-Einstein energy distribution law, Application of B.E. statistics to Planck's radiation law B.E. gas, Degeneracy and B.E. Condensation, FermiDirac energy distribution law, F.D. gas and Degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law, Fermi Dirac gas and degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law for electron gas in metals, Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions, Comparison of three statistics.	28-03-24 to 24-04-24
4.	**Unit-IV: Theory of Specific Heat of Solids** Dulong and Petit law. Derivation of Dulong and Petit law from classical physics. Specific heat at low temperature, Einstein theory of specific heat, Criticism of Einstein theory, Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.	25-04-24 to 11-05-24
	Revision	13-05-24 onwards

Name of the Teacher: Mr. Yashpal Department: Physics

Subject/Course: Atomic and Molecular spectroscopy Programme: Bachelor of Science

Semester: 6th (Section C)

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Unit – I: Historical background of atomic spectroscopy** Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model(Bohr's postulates) , spectra of Hydrogen atom , explanation of spectral series in Hydrogen atom, un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass), variation in Rydberg constant due to finite mass, short comings of Bohr's theory, Wilson sommerfeld quantization rule, de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory, Vector atom model; space quantization, electron spin, coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules. Assignment	31-1-24 to 24-02-24
2.	**Unit –II: Vector Atom Model (single valance electron)** Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic filed; Larmors' precession and theorem. Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model; Quantum defect, spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non-penetrating orbits. quantum mechanical relativity correction, Hydrogen fine spectra, Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms. observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets, comparison of Alkali spectra and Hydrogen spectrum . Class test	26-02-24 to 22-03-24
3.	**UNIT-III: Vector Atom model (two valance electrons)** Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom: application of spectra. Coupling Schemes; LS or Russell – Saunders Coupling Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp, pd configuration), Lande interval rule, Pauli principal and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration), equivalent and non-equivalent electrons, Two valance electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling. Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin.	28-03-24 to 24-04-24
4.	**Unit –IV: Atom in External Field** Zeeman Effect (normal and Anomalous),Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect(classical and quantum mechanical), Explanation of anomalous Zeeman effect(Lande g-factor), Zeeman pattern of D1 and D2 lines of Na atom, Paschen-Back effect of a single valence electron system. Weak field Stark effect of Hydrogen atom. Molecular Physics General Considerations, Electronic States of Diatomic Molecules, Rotational Spectra (Far IR and Microwave Region), Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra.	25-04-24 to 11-05-24
	Revision	13-05-24 onwards

Name of the Teacher: Mrs. Rachna Department: Physics

Subject/Course: Solid State and Nano Physics Programme: B. Sc-III (Non-Medical), Section-B

Semester: Sixth (6^{th})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Crystal Structure I** Crystalline and glassy forms, liquid crystals, crystal structure, periodicity, lattice and basis, crystal translational vectors and axes. Unit cell and Primitive Cell, Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal, Bravais lattices in two and three dimensions. Crystal planes and Miller indices, Interplaner spacing, Crystal structures of Zinc Sulphide, Sodium Chloride and Diamond. Discussion and problems taken	31-1-24 to 22-02-24
2.	**Crystal Structure II** X-ray diffraction, Bragg's Law and experimental X-ray diffraction methods. K-space and reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c. and f.c.c. Discussion and problems taken Assignment-1	23-02-24 to 20-03-24
3.	**Super conductivity** Historical introduction, Survey of superconductivity, Super conducting systems, High Tc, Super conductors, Isotopic Effect, Critical Magnetic Field, Meissner Effect, London Theory and Pippards' equation, Classification of Superconductors (type I and Type II), BCS Theory of Superconductivity, Flux quantization, Josephson Effect (AC and DC), Practical Applications of superconductivity and their limitations, power application of superconductors. Assignment-II , Class Test	21-03-24 to 23-04-24
4.	**Introduction to Nano Physics** Definition, Length scale, Importance of Nano-scale and technology, History of Nantechnology, Benefits and challenges in molecular manufacturing. Molecular assembler concept, Understanding advanced capabilities. Vision and objective of Nano-technology, Nanotechnology in different field, Automobile, Electronics, Nano-biotechnology, Materials, Medicine. Discussion and problems taken	24-04-24 to 11-05-24
	Revision of chapters	13-05-24 onwards

Name of the Teacher: Mrs. Rachna Department: Physics

Subject/Course: Electricity and Magnet.& EM Theory(CC) Programme: B. Sc-I (Physical Sc.), Section-B

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Vector Background and Electric Field:** Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance, Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem, Stoke's theorem. Conservative nature of Electrostatic Field, Electrostatic Potential, Potential as line integral of field, potential difference, Derivation of electric field E from potential as gradient. Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's law and applications of Gauss's law. Mechanical force of charged surface, Energy per unit volume. Discussion and problems taken	31-1-24 to 22-02-24
2.	**Magnetic Field:** Biot-Savart law and its simple applications: straight wire and circular loop, Current Loop as a Magnetic Dipole and its Dipole Moment, Ampere's Circuital Law and its applications to (1) Solenoid and (2) Toroid, properties of B: curl and divergence **Magnetic Properties of Matter:** Force on a dipole in an external field, Electric currents in Atoms, Electron spin and Magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic Intensity (H), Magnetic Susceptibility and permeability, Relation between B, H and M, Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory), Cycle of Magnetization- B-H curve and hysteresis loop: Energy dissipation, Hysteresis loss and importance of Hysteresis Curve. Discussion and problems taken Assignment	23-02-24 to 20-03-24
3.	**Time-varying electromagnetic fields:** Electromagnetic induction, Faraday's laws of induction and Lenz's Law, Self-inductance, Mutual inductance, Energy stored in a Magnetic field, Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and integral form and their physical significance. **Electromagnetic Waves:** Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting's theorem. Propagation of Plane electromagnetic waves in free space & Dielectrics Mid-Term Exam	21-03-24 to 23-04-24
4.	**DC current Circuits:** Electric current and current density, Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks, Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem. **Alternating Current Circuits:** A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and LC Circuits, Series LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit. Discussion and problems taken	24-04-24 to 11-05-24
	Revision of chapters	13-05-24 onwards

Name of the Teacher: Mrs. Rachna Department: Physics

Subject/Course: Human Values and Ethics (VAC) Programme: B. A- I, Section-A&C

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Course Introduction -** Need, Content and Process for Value Education Understanding the need, content and process for Value Education. (Students should be aware of the difference among skills, values and ethics and their respective need sin life.) Classification of Value Education: understanding Personal Values, Social Values, **Moral Values & Spiritual Values**; Understanding the difference between ideology and values. Understanding Harmony with self, Society and Nature. **Practical**: Debate and discussion on the need and nature of value education; Students should be encouraged to find and analyze suitable case studies to Understand various types of values. Discussion and problems taken	02-03-2024 to 12-03-2024
2.	**Human Values and Ethics:** Meaning and nature of human values; Significance of human values in life;Relation between values and ethics. Relevance of Human values: Integrity Empathy, Loksangrah, Brahmvihara, Theory of Naya (Jainism), Deontology, Virtue Ethics, Utilitarianism Practical: Students should be divided in small groups and should be motivated to reflect upon their values, Teacher should make an environment to make them realize that everyone has a set of values arisen from their family, social, cultural, religious, and political contexts, someof which correspond to more "human" and "universal" frameworks. This exercise is to encourage students to articulate their values and put them into conversation with values from other contexts. Discussion and problems taken Assignment	13-03-2024 to 31-03-2024
3.	**Integrated Personality and Well-being;** Understanding the relationship among: Self, Identity and Personality. Understanding Integrated Personality – with the three gunas theory of Sankhya, the four Antah-karanas (inner instruments) in Yoga, and Panchkosha (five sheaths) in Upanishad. Approaching comprehensive understanding of well-being and its relation to Happiness. Practical: BhrumadhyaDhyan, Chakra Dhyan, PrekshaDhyan, Sakshi Bhava Dhyan, Vipassana, YogNidra, Partipakshabhava (yogic way of cognitive restructuring) Mid-Term Exam	01-04-24 to 23-04-24
4.	**Professional Ethics and Global Citizenship:**Nature, characteristics and scope of professional ethics; Types of Professional Ethics Professional Values: Trusteeship, Inclusiveness, Commitment, Sustainability, Accountability, Transparency, and Impartiality. Values for Global Citizenship: Equality, Justice, and Human Dignity. Nature and need of competency based education; Types of Competencies, CoreCompetencies: communication, teamwork, planning and achieving goals, Functional Competencies: analytical thinking, knowledge sharing and learning, decision making, partnership building. Discussion and problems taken Revision of chapters	24-04-24 to 11-05-24
	Revision of chapters	13-05-24 onwards

Name of the Teacher: Mrs. Reena Rani Department: Physics

Subject/Course: Physics Fundamentals-II (MDC) Programme: B.A. /B. Com/B.A.(Hons)-I, Section-A &B

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Light and Optics**-Nature and properties of light, its speed, frequency andwavelength; Reflection of light-types of reflection and their importance in daily life, laws of reflection, multiple reflection by mirrors and their applications. **Refraction of light-** laws of refraction, refractive index, refraction of light through prism (dispersion of light), formation Rainbow, twinkling of stars, advance Sunrise and delayed Sunset; Scattering of light and blue colour of the sky; apparent depth, total internal reflection and its important applications Discussion and problems taken	16-03-2024 to 31-03-2024
2.	**Image formation through reflection-**images formed by plane mirrors, multiple images formed by two flat mirrors and optical illusions; images formed by parabolic mirrors and spherical mirrors- Concave and convex mirrors, ray diagrams, mirror equation and magnification; applications of plane and curved mirrors in daily life. **Image formation through refraction-** images by convex and concave lenses, ray diagrams and lens equation. Discussion and problems taken Assignment	01-04-2024 to 15-04-2024
3.	**Electricity-** electric charge, types of charges, unit of charge, frictional electricity, electricity by conduction and electric current, units of electric current, measurement of current, conductors and insulators; resistance, resistivity and Ohm's law, electric potential and potential difference, emf; **Electric circuit-** resistor, capacitor, battery, ammeter and voltmeter; Series and parallel combinations of resistors, electrical wiring in houses and electrical safety (fuse, hot wire, neutral, ground and short circuit), electric power and electric power transmission; Heating effect of current and its practical applications. **Magnetic effect of electric current-** Magnetic field and field lines, bar magnet, magnetic field and direction of field due to a current- through straight conductor. Mid-Term Exam	16-04-2024 to 30-04-2024
4.	**Structure of an atom-** Rutherford's model of an atom, Bohr's model of an atom and composition of the atom-electron, proton and neutron, orbits or shells (energy levels in an atom), distribution of electrons in different shells of the atom, atomic number and atomic mass of an atom, core shell and outer shell, valency of an atom, excitation and ionization of the atom, meaning of atomic transitions Discussion and problems taken	01-05-24 to 11-05-24
	Revision of Chapters	13-05-24 onwards

Name of the Teacher: Mrs. Reena Rani Department: Physics

Subject/Course: Basic I.T Tool (Computer SEC) Programme: B.A-I (Physical Sciences), Setion-B

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	Introduction to Computer: Computer and Latest IT gadgets, Evolution of Computers & its applications, Basics of Hardware and Software, Application Software, Systems Software, Utility Software. Central Processing Unit, Input devices, Output devices, Computer Memory & storage, Mobile App **Discussion and problems taken**	16-03-2024 to 31-03-2024
2.	Introduction to Operating System, Functions of the Operating system, Operating Systems for Desktop and Laptop, Operating Systems for Mobile Phone and Tablets, User Interface for Desktop and Laptop, Task Bar, Icons & shortcuts, Running an Application, Operating System Simple Setting, Changing System Date and Time, Changing Display Properties, To Add or Remove Program and Features, Adding, Removing & Sharing Printers, File and Folder Management. **Discussion and problems taken** **Assignment**	01-04-2024 to 15-04-2024
3.	Introduction to Internet and World Wide Web, Basic of Computer Networks, Local Area Network (LAN), Wide Area Network (WAN), Network Topology, Internet, Applications of Internet, Website Address and URL, Popular Web Browsers (Internet Explorer/Edge, Chrome, Mozilla Firefox, Opera etc.), Popular Search Engines, Searching on the Internet. **Mid-Term Exam**	16-04-2024 to 30-04-2024
4.	E-mail: Using E-mails, Opening Email account, Mailbox: Inbox and Outbox, Creating and Sending a new Email, replying to an E-mail message, forwarding an E-mail message, searching emails, and Attaching files with email, Email Signature. Social Networking: Facebook, Twitter, LinkedIn, Instagram, Instant Messaging (WhatsApp, Facebook Messenger, Telegram), Introduction to Blogs, Digital Locker. **Discussion and problems taken**	01-05-24 to 11-05-24
	Revision of Chapters	13-05-24 onwards

Name of the Teacher: Dr. Balkrishna Kandpal Department: Physics

Subject/Course: Electricity and Magnet.& EM Theory(CC) Programme: B. Sc-I (Physical Sc.), Section-A& B

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Vector Background and Electric Field:** Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance, Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem, Stoke's theorem. Conservative nature of Electrostatic Field, Electrostatic Potential, Potential as line integral of field, potential difference, Derivation of electric field E from potential as gradient. Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's law and applications of Gauss's law. Mechanical force of charged surface, Energy per unit volume. Discussion and problems taken	31-1-24 to 22-02-24
2.	**Magnetic Field:** Biot-Savart law and its simple applications: straight wire and circular loop, Current Loop as a Magnetic Dipole and its Dipole Moment, Ampere's Circuital Law and its applications to (1) Solenoid and (2) Toroid, properties of B: curl and divergence **Magnetic Properties of Matter:** Force on a dipole in an external field, Electric currents in Atoms, Electron spin and Magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic Intensity (H), Magnetic Susceptibility and permeability, Relation between B, H and M, Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory), Cycle of Magnetization- B-H curve and hysteresis loop: Energy dissipation, Hysteresis loss and importance of Hysteresis Curve. Discussion and problems taken Assignment	23-02-24 to 20-03-24
3.	**Time-varying electromagnetic fields:** Electromagnetic induction, Faraday's laws of induction and Lenz's Law, Self-inductance, Mutual inductance, Energy stored in a Magnetic field, Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and integral form and their physical significance. **Electromagnetic Waves:** Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting's theorem. Propagation of Plane electromagnetic waves in free space & Dielectrics Mid-Term Exam	21-03-24 to 23-04-24
4.	**DC current Circuits:** Electric current and current density, Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks, Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem. **Alternating Current Circuits:** A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and LC Circuits, Series LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit. Discussion and problems taken	24-04-24 to 11-05-24
	Revision of Chapters	13-05-24 onwards

Name of the Teacher: Dr. Balkrishna Kandpal Department: Physics

Subject/Course: Physics Fundamentals-II (MDC) Programme: B.A. /B. Com/B.A.(Hons)-I, Section-A &B

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Light and Optics**-Nature and properties of light, its speed, frequency andwavelength; Reflection of light-types of reflection and their importance in daily life, laws of reflection, multiple reflection by mirrors and their applications. **Refraction of light-** laws of refraction, refractive index, refraction of light through prism (dispersion of light), formation Rainbow, twinkling of stars, advance Sunrise and delayed Sunset; Scattering of light and blue colour of the sky; apparent depth, total internal reflection and its important applications Discussion and problems taken	31-1-24 to 22-02-24
2.	**Image formation through reflection**-images formed by plane mirrors, multiple images formed by two flat mirrors and optical illusions; images formed by parabolic mirrors and spherical mirrors- Concave and convex mirrors, ray diagrams, mirror equation and magnification; applications of plane and curved mirrors in daily life. **Image formation through refraction-** images by convex and concave lenses, ray diagrams and lens equation. Discussion and problems taken Assignment	23-02-24 to 20-03-24
3.	**Electricity-** electric charge, types of charges, unit of charge, frictional electricity, electricity by conduction and electric current, units of electric current, measurement of current, conductors and insulators; resistance, resistivity and Ohm's law, electric potential and potential difference, emf; **Electric circuit-** resistor, capacitor, battery, ammeter and voltmeter; Series and parallel combinations of resistors, electrical wiring in houses and electrical safety (fuse, hot wire, neutral, ground and short circuit), electric power and electric power transmission; Heating effect of current and its practical applications. **Magnetic effect of electric current**- Magnetic field and field lines, bar magnet, magnetic field and direction of field due to a current- through straight conductor. Mid-Term Exam	21-03-24 to 23-04-24
4.	**Structure of an atom-** Rutherford's model of an atom, Bohr's model of an atom and composition of the atom-electron, proton and neutron, orbits or shells (energy levels in an atom), distribution of electrons in different shells of the atom, atomic number and atomic mass of an atom, core shell and outer shell, valency of an atom, excitation and ionization of the atom, meaning of atomic transitions Discussion and problems taken	24-04-24 to 11-05-24
	Revision of Chapters	13-05-24 onwards

Name of the Teacher: Dr. Balkrishna Kandpal Department: Physics

Subject/Course: Electrical Circuit Network Skills (SEC) Programme: B. Sc-I (Physical Sciences), Setion-A

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Introduction to Electricity and Circuits:** Basics of Electricity, Electric charges (positive and negative), Conductors, Insulators, Basic components of a circuit: battery, wires, bulb, switch etc. **Basic Electricity Principles:** Voltage, Current, Resistance, and Power, Ohm's law, Series, Parallel, and series-parallel combinations. Heating effects of current and applications, AC Electricity (Live, Neutral and Earth), frequency, DC Electricity (Positive and Negative poles). Discussion and problems taken	02-03-2024 to 12-03-2024
2.	**Understanding Electrical Circuits:** AC and DC Voltage Sources, Current and voltage drop across the DC circuit elements. Kirchhoff's laws. Instruments to measure current, voltage, power in DC and AC circuits. Familiarization with multimeter, voltmeter, and ammeter, Insulation. Preparation of extension board. Joints in electrical conductors. Techniques of soldering. Discussion and problems taken Assignment	13-03-2024 to 31-03-2024
3.	**Electrical Protection:** Relays, Fuses and disconnect switches, Circuit breakers, Overload devices, Surge protection. Ground-fault protection. Earthing and its types. **Smart Technology**: Smart Switches, Wi fi enabled switches, Smart Bulbs, Ways to make Smart home. Estimation of electric load, average electricity bill calculation. Mid-Term Exam	01-04-24 to 23-04-24
4.	**Electrical Appliances:** Fan, Bulb, Electric Iron, LEDs, Working of DC & AC Motor, Water Pump, Water Cooler and Air Conditioner. Comparison of Invertor & Non-Invertor Air Conditioners. Invertor, Offgrid&ongrid Solar Systems for home. Ways to save electricity. Discussion and problems taken	24-04-24 to 11-05-24
	Revision of Chapters	13-05-24 onwards

Name of the Teacher: Dr. Balkrishna Kandpal Department: Physics

Subject/Course: Human Values and Ethics (VAC) Programme: B.A. /B.A.(Hons)-I, Section-B&D

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Course Introduction -** Need, Content and Process for Value Education Understanding the need, content and process for Value Education. (Students should be aware of the difference among skills, values and ethics and their respective need sin life.) Classification of Value Education: understanding Personal Values, Social Values, **Moral Values & Spiritual Values**; Understanding the difference between ideology and values. Understanding Harmony with self, Society and Nature. **Practical**: Debate and discussion on the need and nature of value education; Students should be encouraged to find and analyze suitable case studies to Understand various types of values. Discussion and problems taken	02-03-2024 to 12-03-2024
2.	**Human Values and Ethics:** Meaning and nature of human values; Significance of human values in life;Relation between values and ethics. Relevance of Human values: Integrity Empathy, Loksangrah, Brahmvihara, Theory of Naya (Jainism), Deontology, Virtue Ethics, Utilitarianism Practical: Students should be divided in small groups and should be motivated to reflect upon their values, Teacher should make an environment to make them realize that everyone has a set of values arisen from their family, social, cultural, religious, and political contexts, someof which correspond to more "human" and "universal" frameworks. This exercise is to encourage students to articulate their values and put them into conversation with values from other contexts. Discussion and problems taken Assignment	13-03-2024 to 31-03-2024
3.	**Integrated Personality and Well-being;** Understanding the relationship among: Self, Identity and Personality. Understanding Integrated Personality – with the three gunas theory of Sankhya, the four Antah-karanas (inner instruments) in Yoga, and Panchkosha (five sheaths) in Upanishad. Approaching comprehensive understanding of well-being and its relation to Happiness. Practical: BhrumadhyaDhyan, Chakra Dhyan, PrekshaDhyan, Sakshi Bhava Dhyan, Vipassana, YogNidra, Partipakshabhava (yogic way of cognitive restructuring) Mid-Term Exam	01-04-24 to 23-04-24
4.	**Professional Ethics and Global Citizenship:**Nature, characteristics and scope of professional ethics; Types of Professional Ethics Professional Values: Trusteeship, Inclusiveness, Commitment, Sustainability, Accountability, Transparency, and Impartiality. Values for Global Citizenship: Equality, Justice, and Human Dignity. Nature and need of competency based education; Types of Competencies, CoreCompetencies: communication, teamwork, planning and achieving goals, Functional Competencies: analytical thinking, knowledge sharing and learning, decision making, partnership building. Discussion and problems taken	24-04-24 to 11-05-24
	Revision of hapters	13-05-24 onwards

Name of the Teacher: Mrs. Renu Jakhar Department: Physics

Subject/Course: Electricity and Magnet. & EM Theory (CC) Programme: B. Sc-I (Physical Sc.), Section-B

Semester: Second (2^{nd})

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	**Vector Background and Electric Field:** Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance, Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem, Stoke's theorem. Conservative nature of Electrostatic Field, Electrostatic Potential, Potential as line integral of field, potential difference, Derivation of electric field E from potential as gradient. Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's law and applications of Gauss's law. Mechanical force of charged surface, Energy per unit volume. Discussion and problems taken	16-03-2024 to 31-03-2024
2.	**Magnetic Field:** Biot-Savart law and its simple applications: straight wire and circular loop, Current Loop as a Magnetic Dipole and its Dipole Moment, Ampere's Circuital Law and its applications to (1) Solenoid and (2) Toroid, properties of B: curl and divergence **Magnetic Properties of Matter:** Force on a dipole in an external field, Electric currents in Atoms, Electron spin and Magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic Intensity (H), Magnetic Susceptibility and permeability, Relation between B, H and M, Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory), Cycle of Magnetization- B-H curve and hysteresis loop: Energy dissipation, Hysteresis loss and importance of Hysteresis Curve. Discussion and problems taken Assignment	01-04-2024 to 15-04-2024
3.	**Time-varying electromagnetic fields:** Electromagnetic induction, Faraday's laws of induction and Lenz's Law, Self-inductance, Mutual inductance, Energy stored in a Magnetic field, Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and integral form and their physical significance. **Electromagnetic Waves:** Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting's theorem. Propagation of Plane electromagnetic waves in free space & Dielectrics Mid-Term Exam	16-04-2024 to 30-04-2024
4.	**DC current Circuits:** Electric current and current density, Electrical conductivity and Ohm's law (Review), Kirchhoff's laws for D.C. networks, Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem. **Alternating Current Circuits:** A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and LC Circuits, Series LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit. Discussion and problems taken	01-05-24 to 11-05-24
	Revision of Chapters	13-05-24 onwards

Name of the Teacher: Mrs. Renu Jakhar Department: Physics

Subject/Course: sec computer Programme: B.A. -I, Section-A,B & D

Semester: 2

Unit	Name of Topic/Contents	Tentative Dates/Days
1.	Introduction to Computer: Computer and Latest IT gadgets, Evolution of Computers & its applications, Basics of Hardware and Software, Application Software, Systems Software, Utility Software. Central Processing Unit, Input devices, Output devices, Computer Memory & storage, Mobile App	02-03-2024 to 12-03-2024
2.	Introduction to Operating System, Functions of the Operating system, Operating Systems for Desktop and Laptop, Operating Systems for Mobile Phone and Tablets, User Interface for Desktop and Laptop, Task Bar, Icons & shortcuts, Running an Application, Operating System Simple Setting, Changing System Date and Time, Changing Display Properties, To Add or Remove Program and Features, Adding, Removing & Sharing Printers, File and Folder Management. Test Assignment	13-03-2024 to 31-03-2024
3.	Introduction to Internet and World Wide Web, Basic of Computer Networks, Local Area Network (LAN), Wide Area Network (WAN), Network Topology, Internet, Applications of Internet, Website Address and URL, Popular Web Browsers (Internet Explorer/Edge, Chrome, Mozilla Firefox, Opera etc.), Popular Search Engines, Searching on the Internet.	01-04-2024 to 23-04-2024
4.	E-mail: Using E-mails, Opening Email account, Mailbox: Inbox and Outbox, Creating and Sending a new Email, replying to an E-mail message, forwarding an E-mail message, searching emails, Attaching files with email, Email Signature. Social Networking: Facebook, Twitter, LinkedIn, Instagram, Instant Messaging (WhatsApp, Facebook Messenger, Telegram), Introduction to Blogs, Digital Locker.	24-04-24 to 11-05-24
	Revision	13-05-24 onwards