

Lesson Plan of July to November

Name of the Assistant professor: Rohit Kumar

Class: B.Sc. 1st semester

Course-1 (DSC-1): Mechanics and Theory of Relativity (Theory)

Month	Topic
July	Unit -I Mechanics of single and system of particles, Conservation law of linear momentum, Angular momentum and mechanical energy for a particle and a system of particles, Centre of Mass and equation of motion, Constrained Motion. Presentation Revision and Test
August	Work and Kinetic Energy Theorem. Conservative and nonconservative forces. Potential Energy. Energy diagram. Stable and unstable equilibrium. Elastic potential energy. Force as gradient of potential energy. Work & Potential energy. Work done by non-conservative forces. Law of conservation of Energy. Presentation Revision and Test
September	Generalized Notations: Degrees of freedom and Generalized coordinates, Transformation equations, Generalized Displacement, Velocity, Acceleration, Momentum, Force and Potential, Components of Velocity and Acceleration in Cylindrical and Spherical Coordinate Systems. Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle, Linear Harmonic oscillator, Simple pendulum, Atwood's machine Presentation Revision and Test
October	Unit-III Rotational Dynamics: Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation. Theorems of perpendicular and parallel axes with proof. Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section. Acceleration of a body rolling down on an inclined plane. Kinetic energy of rotation. Motion involving both translation and rotation.. Presentation Revision and Test
November	Unit 4 Special Theory of Relativity: Non-inertial frames and fictitious forces. Uniformly rotating frame. Laws of Physics in rotating coordinate systems. Centrifugal force. Coriolis force and its applications. Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity. Lorentz Transformations. Simultaneity and order of events. Lorentz

	contraction. Time dilation. Relativistic transformation of velocity, frequency and wave number. Relativistic addition of velocities. Variation of mass with velocity. Massless Particles. Mass-energy Equivalence. Relativistic Doppler effect. Relativistic Kinematics. Transformation of Energy and Momentum. Energy-Momentum Four Vector. Presentation Revision and Test
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Lesson Plan of July to November

Name of the Assistant Professor: Rohit Kumar

B.Sc. (Multidisciplinary) Physics as one Subject Semester – I Skill Enhancement

Course -1 (SEC-1): ELECTRICAL CIRCUIT & INSTRUMENTATION SKILLS

Month	Topic
July	Unit I Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter, Multimeter: Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance. Electronic Voltmeter: Principles of voltage, measurement (block diagram only). Presentation Revision and Test
August	Specifications of an electronic Voltmeter/ Multimeter and their significance. AC millivoltmeter: Type of AC millivoltmeters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac millivoltmeter, specifications and their significance Unit 2 Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence & chemical composition. Presentation Revision and Test

September	Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. (6 Lectures) Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working. Presentation Revision and Test
October	Unit 3 Digital Instruments: Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter. (3 Lectures) Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution Presentation Revision and Test
November	Unit-IV Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers. Electric Motors: Singlephase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor. Presentation Revision and Test

Lesson Plan of July to November

Name of the Assistant/ Associate Professor: Rohit Kumar

Class: B.Sc. 3rd semester

Subject: B.Sc. (Physical Sciences) Optics

Month	Topic
July	Unit I

	INTERFERENCE: Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference, Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet, phase change on reflection. Presentation Revision and Test
August	Interference by Division of Amplitude: Plane parallel thin film, production of colours in thin films, classification of fringes in films, Interference due to transmitted light and reflected light, wedge shaped film, Newton's rings Unit-II DIFFRACTION Fresnel's diffraction: Huygens-Fresnel's theory, Fresnel's assumptions, rectilinear propagation of light, diffraction at a straight edge, rectangular slit and diffraction at a circular aperture. Presentation Revision and Test
September	Fraunhofer diffraction: Single slit diffraction, double slit diffraction, plane transmission grating spectrum, dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating. Presentation Revision and Test
October	Unit-III POLARIZATION: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction, Huygens'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) Presentation Revision and Test
November	Unit-IV

	population inversion; Main components of lasers: (i) Active Medium (ii) Pumping (iii) Optical Resonator; Properties of laser beam: Monochromaticity, Directionality, Intensity, Coherence (Spatial & Temporal coherence); Metastable state, Excitation mechanism and Types of Lasers (He-Ne Laser & Ruby Laser), Applications of Lasers. FIBRE OPTICS: Optical fibres and their properties, Principal of light propagation through a optical fibre, Acceptance angle and numerical aperture, Types of optical fibres: Single mode and multimode fibres, Advantages and Disadvantages of optical fibres Presentation Revision and Test
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Lesson Plan of July to November

Name of the Assistant/ Associate Professor: Rohit Kumar

Class: B.Sc. 5th semester

Subject: Solid State Physics

Month	Topic
July	Crystalline and glassy forms, liquid crystals. Crystal structure, periodicity, lattice and basis, crystal translational vectors and axes, Presentation Revision and Test
August	Unit cell and primitive cell, Wigner Seitz primitive Cell, symmetry operations for a two-dimensional crystal, Bravais lattices in two and three dimensions, crystal planes and Miller indices, Interplanar spacing, Crystal structures of Zinc sulphide, Sodium Chloride and diamond Presentation Revision and Test
September	Reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, body centred cubic lattice and face centred cubic lattice; Presentation Revision and Test

October	X-ray diffraction, Bragg's Law and experimental x-ray diffraction methods; Specific heat: Specific heat of solids, Einstein's theory of specific heat, Debye model of specific heat of solids. Presentation Revision and Test
November	Presentation Revision and Test