

## 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. <b>Presentation Revision and Test</b>
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. <b>Presentation Revision and Test</b>
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 <b>Presentation Revision and Test</b>
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.. <b>Presentation Revision and Test</b>
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

	<p>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.</p> <p><b>Presentation Revision and Test</b></p>
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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	<p><b>Unit I</b>            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).</p> <p><b>Presentation Revision and Test</b></p>
August	<p>Specifications of an electronic Voltmeter/ Multimeter and their significance. AC millivoltmeter: Type of AC millivolts: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac millivoltmeter, specifications and their significance</p> <p><b>Unit 2</b></p> <p>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 &amp; chemical composition.</p> <p><b>Presentation Revision and Test</b></p>

September	<p>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.  <b>Presentation Revision and Test</b></p>
October	<p>Unit 3          Digital Instruments: Principle and working of digital meters. Comparison of analog &amp; 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  <b>Presentation Revision and Test</b></p>
November	<p>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 &amp; DC motors. Basic design. Interfacing DC or AC sources to control heaters &amp; motors. Speed &amp; power of ac motor.  <b>Presentation Revision and Test</b></p>

## Lesson Plan of July to November

Name of the Assistant/ Associate Professor: Rohit Kumar

Class: B.Sc. 3rd semester

Subject: Paper I- Optics

Month	Topic
July	<p><b>Unit I</b>            Fourier Analysis and Fourier Transforms : Speed of transverse waves on a uniform string. Speed of longitudinal</p>

	waves in a fluid, superposition of waves (physical idea), <b>Presentation Revision and Test</b>
August	Fourier Analysis of complex waves and its application for the solution of triangular and rectangular waves, half and full wave rectifier out puts. Fourier transforms and its properties. Application of fourier transform to following function. (I) $f(x) = e^{-x^2/2}$ (II) $f(x) = I [x] a$ <b>Presentation Revision and Test</b>
September	Unit 3 Geometrical Optics : Matrix methods in paraxial optics, effects of translation and refraction <b>Presentation Revision and Test</b>
October	Derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses, Chromatic, spherical coma, astigmatism and distortion aberrations and their remedies. <b>Presentation Revision and Test</b>
November	Unit-III Interference : Interference by Division of Wavefront : Fresnel's Biprism and its applications to determination of wave length of sodium light and thickness of a mica sheet, Lloyd's mirror, phase change on reflection, <b>Presentation Revision and Test</b>