Lesson Plan (2025-26) **(Physics)**

Scheme UG A1: B.Sc. in Physical Science (Physics)

Semester-I *Course ID - 240/PHYP/CC101* *Subject: MECHANICS*

Max. Marks: 50
Internal Assessment: 25

Credit 3 (45Hrs)
Time: 3 hrs

July 2025 **Unit – I**

Time derivative of a vector, Motion in Plane Polar coordinates, Newton's Law, Mechanics of single and system of particles, conservation of laws of linear momentum, angular momentum and mechanical energy, Central forces, fictitious forces, Centrifugal force, Coriolis force and its applications.

August-2025 **Unit – II**

Centre of mass and equation of motion, Constrained motion, degrees of freedom, Generalised coordinates, displacement, velocity, acceleration, momentum, force and potential. Hamilton's variational principle, Lagrange's equation of motion from Hamilton's Principle. Linear Harmonic oscillator, simple pendulum, Atwood's machine.

September-2025 **Unit – III**

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.

October/November-2025 **Unit – IV**

Inertial and Non-Inertial Frames and their examples, Invariance of Newton's Laws of motion under Galilean transformations. Postulates of Special Theory of Relativity, Length Contraction, Time Dilation, Variation of Mass with Velocity, Mass-Energy Equivalence.

8/10/25

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Lesson Plan (2025-26) (Physics)

Semester-III

Course ID - 240/PHYP/CC301

(WAVES AND OPTICS)

Credit 3(45Hrs)
Time: 3 hrs

Max. Marks: 50
Internal Assessment: 25

UNIT-I

July-2025

Waves: Oscillatory motion, Simple harmonic motion, Wave motion, Wave Equation and its solution, Transverse and longitudinal waves and their examples, Waves in One Dimension: Superposition of Waves; Stationary Waves; Waves on a Stretched String with Fixed Ends; Phase Velocity and Group Velocity; Light as a transverse wave.

UNIT-II

August-2025

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. 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-III

September-2025

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. Fraunhoffer 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.

UNIT-IV

Oct/November-2025

Polarisation: 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 polarised Light. Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarised light (ii) Circularly polarised light and (iii) Elliptically polarised light. Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz).

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Lesson Plan (Physics)

Lesson Plan (2025-26)

Name:- Vijay kumar **Class:- B.Sc.3rd**

Subject:- Physics **Semester:-5th**

Month	Topics
July	Crystalline and gallssy 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 tattices in two and three dimensions, crystal planes and Miller indices, Interplanner spacing, Crystal structures of Zinc sulphide, Sodium Chloride and diamond, X-ray diffraction
August	Bragg's Law and experimental x-ray diffraction methods, K-space, Unit-III Reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c and f.c.c. Specific heat : Specific heat of solids, Einstein's theory of specific heat, Debye model of specific heat of solids.
September	Failure of (Classical) E.M. Theory, quantum theory of radiatio (old quantum theory), Photon, photoelectric effect and Einsteins photoelectric equation compton effect (theory and result). Inadequancy of old quantum theory, de-Broglie hypothesis, Davisson and Germer experiment, G.P. Thomson experiment, Phase velocity group velocity, Heisenberg's uncertainty principle, Time-energy and angular momentum, position uncertainty Uncertainty principle from de-Broglie wave, (wave-partice duality), Gamma Ray Macroscope, Electron diffraction from a slit.
October-November	Derivation of time dependent Schrodinger wave equation, eigen values, eigen functions, wave functions and its significance, Normalization of wave function, concept of observable and operator. Solution of Schrodinger equation for harmomic oscillator ground states and excited states. Application of Schrodinger equation in the solution of the following one-dimensional problems : Free particle in one dimensional box (solution of schrodinger wave equation, eigen function, eigen values, quantization of energy and momentum, nodes and antinodes, zero point energy). i) One-dimensional potential barrie E>V0 (Reflection and Transmission coefficient. ii) One-dimensional potential barrier, E>V0 (Reflection Coefficient, penetration of leakage coefficient, penetration depth).

8/10/25

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Lesson Plan (2025-26) (Physics)

Semester-I (Skill Enhancement Courses) (Physics)

Course ID - 240/PHYP/SE101

BASICS OF INSTRUMENTATION SKILLS

Marks (Theory): 20
Marks (Internal Assessment): 05

Credits:1 (15 lectures)
Time: 3 Hrs

July-2025

Unit I

Basic of Measurement: Instrument accuracy, precision, sensitivity, Resolution range, etc. Errors in measurements and loading effects, Random and systematic errors, Error propagation, Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity.

August-2025

Unit II

Principles of measurement of DC voltage and DC current, AC voltage, AC current and resistance. Specifications of a multimeter and their significance, Electronic Voltmeter/Multimeter: their advantages and significance, Digital Instruments: Comparison of analog & digital instruments. Characteristics of a digital meter.

September-2025

Unit III

Oscilloscope: Block diagram of basic CRO, CRT, electrostatic focusing and acceleration (qualitative only), brief discussion on screen phosphor, visual persistence, Time base operation, synchronization, Use for the measurement of voltage (dc and ac), frequency and time period.

Oct/November-2025

Unit IV

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.

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Lesson Plan (2025-26) **(Physics)**

Multidisciplinary Course (Physics)

Course ID-240/PHYP/MD101

Course Code Course Title Course ID	Course Code Course Title Course ID	Course Code Course Title Course ID	L	T	P	L	T	P	Total Credits	MARKS				
										TI	TE	PI	PE	Total
			(Hrs)			Credits								
MDC-1	Rational Thinking and Science	240/PHYP/MD101	2	1	0	2	1	0	3	25	50	0	0	75

Rational Thinking and Science

Marks (Theory): 50
Marks (Internal Assessment) : 25

Credits:3 (45 lectures)
Time : 3 Hrs

Unit-I

(July 2025)

Scientific Approach and Rational Thinking: Fundamentals of rational thinking, faith vs belief, the scientific method: observation, hypothesis, experimentation, and conclusion, origin of science through curiosity and inquiry, myth-busting discoveries in physics: 1) heliocentrism (Copernicus, Galileo), 2) gravity and motion (Newton), 3) theory of relativity (Einstein), 4) nature of lightning (Benjamin Franklin), 5) Vacuum and air pressure (Evangelista Torricelli, Otto von Guericke)

Unit-II

(August 2025)

Myths and Scientific Thinking: Science vs faith, science vs pseudoscience, definition, origin, and types of myths and beliefs, evolution of myths and misconceptions in explaining natural phenomena, influence of cultural and social beliefs on scientific progress, Darwin's theory as a case study in scientific thinking

Unit-III

(September 2025)

The Paradox of Science & Technology: Distinction between science and technology, understanding the science-technology acceptance paradox, case studies: 1) acceptance and rejection of new technologies, 2) rejection and resistance to scientific ideas, the future of Artificial Intelligence (AI) and its societal acceptance, potential problems in AI

Unit-IV

(Oct/November 2025)

Challenges in Promoting Rational Thinking: Barriers to rational thinking, role of education and media in promoting or hindering rationality, scientific temper, and constitutional duty: relevance in Indian context (Article 51A(h)), case studies: superstition and blind beliefs (e.g., astrology, miracle claims), science communication: importance of clear communication of science to the public

8/10/25

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