

Govt. College, Barota, Sonipat
Session 2026-27 Semester III (Odd)
Lesson Plan for B.Sc Physical Sciences

Name of Assistant Professor: Dr. Mukesh Sheoran

Name of Program: UG Multidisciplinary Program in Physics

Name of Course: Discipline Specific Course/ Major Course (DSC)

Nomenclature of Course: OPTICS

Course Code: 25PHYM403DS01

Credits (L+T+P): 2+0+2 = 4

Marks: 35

MONTH	WEEK	SYLLABUS
August 2026	3 rd Week	INTERFERENCE: Interference by Division of Wave front: Young's double slit experiment, Coherence, Conditions of interference.
	4 th Week	Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet, phase change on reflection.
	5 th week	Interference by Division of Amplitude: Plane parallel thin film, production of colours in thin films.
	6 th Week	Classification of fringes in films, Interference due to transmitted light and reflected light.
September 2026	1 st week	Wedge shaped film, Newton's rings. Test of Unit-1.
	2 nd week	DIFFRACTION Fresnel's diffraction: Huygens-Fresnel's theory, Fresnel's assumptions, rectilinear propagation of light.
	3 rd week	Diffraction at a straight edge, rectangular slit.
	4 th week	Diffraction at Circular Aperture, Fraunhofer diffraction: Single slit diffraction.
	5 th week	Double slit diffraction, plane transmission grating spectrum, dispersive power of grating.
October 2026	1 st week	Limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating. Test of Unit-2.
	2 nd week	POLARIZATION: Polarisation by reflection, refraction and scattering, Malus Law, Phenomenon of double refraction.
	3 rd week	Huygens's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light. Nicol prism, Quarter wave plate and half wave plate.
	4 th week	Production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light.
	5 th week	Optical activity, Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz).Test of Unit-3.

November 2026	2 nd week	LASERS: Basic concept of absorption and emission of radiations, amplification and population inversion; Main components of lasers: (i) Active Medium (ii) Pumping (iii) Optical Resonator.
	3 rd week	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.
	4 th week	FIBRE OPTICS: Optical fibres and their properties, Principal of light propagation through a optical fibre, Acceptance angle and numerical aperture.
	5 th week	Types of optical fibres: Single mode and multimode fibres, Advantages and Disadvantages of optical fibres. Test of Unit 4.

Sign of Concerned Teacher

Sign of Principal

Govt. College, Barota, Sonipat
Session 2026-27 Semester I(Odd)
Lesson Plan for B.Sc Physical Sciences

Name of Assistant Professor: Dr. Sunil Dhankhar

Name of Program : UG Multidisciplinary Program in Physics

Name of Course : Discipline Specific Course/ Major Course (DSC)

Nomenclature of Course : Mechanics and Theory of Relativity

Course Code : 24PHYM401DS01

Credits (L+T+P) : 2+0+2 = 4

Marks: 35

MONTH	WEEK	SYLLABUS
August 2026	3 rd week	Mechanics of single and system of particles.
	4 th week	Conservation of laws of linear momentum.
	5 th week	Angular momentum and mechanical energy.
	6 th week	Centre of mass and equation of motion, Work-Energy theorem.
September 2026	1 st week	Conservative & Non Conservative forces, Potential Energy, Energy diagram, Stable & Unstable Equilibrium.
	2 nd week	Elastic P.E. Force as gradient of P.E, Work done by conservative forces. Law of conservation of energy, Degree of freedom Generalised coordinates. Test of Unit -1.
	3 rd week	Transformation Equations, Generalised displacement, velocity, acceleration.
	4 th week	Momentum, force and potential. Components of Velocity & Acceleration in cylindrical & Spherical coordinate systems.
	5 th week	Hamilton's variational principle, Lagrange's equation of motion from Hamilton's Principle.
October 2026	1 st week	Linear Harmonic oscillator, simple pendulum, Atwood's machine. Test of Unit-2
	2 nd week	Rotation of Rigid body, moment of inertia, torque, angular momentum, kinetic energy of rotation.
	3 rd week	Theorems of perpendicular and parallel axes with proof.
	4 th week	Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section.

	5 th week	Acceleration of a body rolling down on an inclined plane, K.E of Rotation, Motion involving both Translation and rotation. Test of Unit -3.
November 2026	2 nd week	Non –inertial frames & fictitious forces ,Uniformly Rotating Frame , Law of Physics in rotating coordinate systems ,Centrifugal force ,Coriolis force & its applications.
	3 rd week	Michelson-Morley Experiment & its outcome. Postulates of Special Theory of Relativity. L-T Transformations, Simultaneity & order of events,
	4 th week	Lorentz Contraction, Time dilation, Relativistic transformation of velocity frequency & wave no. Relativistic addition of velocities.
	5 th week	Variation of mass with velocities, Massless Particle, Mass energy equivalence, Relativistic Doppler effect, Relativistic kinematics. Transformation of energy & momentum, Energy momentum Four Vector. Test of Unit -4.

Sign of Concerned Teacher

Sign of Principal

Govt. College, Barota, Sonipat
Session 2026-27 Semester III (Odd)
Lesson Plan for B.Sc Physical Sciences

Name of Assistant Professor: Dr. Mukesh Sheoran

Name of Program: UG Multidisciplinary Program in Physics

Name of Course: Discipline Specific Course/ Major Course (DSC)

Nomenclature of Course: Quantum Mechanics and Nuclear Physics

Course Code: 26PHYM405DS01

Credits (L+T+P): 2+0+2 = 4

Marks: 35

MONTH	WEEK	SYLLABUS
August 2026	3 rd week	Failure of Classical E.M. Theory, quantum theory of radiation (old quantum theory).
	4 th week	Photon, photoelectric effect and Einstein's photoelectric equation.
	5 th week	Compton effect (theory and result). Franck-Hertz experiment, Inadequacy of old quantum theory.
	6 th week	De-Broglie hypothesis. Davisson and Germer experiment. Phase velocity group velocity.
September 2026	1 st week	Heisenberg's uncertainty principle, Time-energy and angular momentum, position uncertainty. Uncertainty principle from de-Broglie wave, (wave-particle duality).
	2 nd week	Gamma Ray Microscope, Basic postulates and formalism: properties of Wave Function, Interpretation of Wave Function, Condition for physical acceptability of Wave Functions. Test of Unit -1.
	3 rd week	Eigen values and Eigen functions, Probability current density, Expectation values of position and linear momentum.
	4 th week	Time dependent and time independent Schrodinger equation, Mathematical consideration of Schrodinger equation: Normalization, Orthogonality, Observables.
	5 th week	Application of Schrodinger equation in the solution of the following one-dimensional problems: (i) Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and anti- nodes, zero-point energy). Test of Unit-2

October 2026	1 st week	Nuclear mass and binding energy, systematics nuclear binding energy, nuclear stability, nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape concept).
	2 nd week	Determination of charge by Mosley law Determination of size of nuclei by Rutherford Back Scattering.
	3 rd week	Interaction of heavy charged particles (Alpha particles), alpha disintegration and its theory Energy loss of heavy charged particle (idea of Bethe formula, no derivation).
	4 th week	Energetics of alpha -decay, Range and straggling of alpha particles, Geiger-Nuttal law, Introduction of light charged particle (Beta-particle). Test of Unit 3
	5 th week	Origin of continuous beta- spectrum (neutrino hypothesis).Types of beta decay and energetics of beta decay, Energy loss of beta-particles (ionization), Range of electrons, absorption of beta-particles.
November 2026	2 nd week	Interaction of Gamma Ray, Nature of gamma rays, Energetics of gamma rays, passage of Gamma radiations through matter (photoelectric, Compton and pair production effect) electron position annihilation.
	3 rd week	Absorption of Gamma rays (Mass attenuation coefficient) and its application. Nuclear Reactors General aspects of Reactor design. Nuclear fission and fusion reactors (Principles, construction, working and use).
	4 th week	Ionization chamber, Proportional counter, G.M. counters detailed study.
	5 th week	Revision and Test of Unit -4.

Sign of Concerned Teacher

Sign of Principal