ACADEMIC PLANNER & UNITIZATION OF SYLLABUS
ACADEMIC YEAR 2022-23.
DEPARTMENT : Physics CLASS : I Sem, NEP
Paper I-Phy-DSCT1:

Week,Month	CLASS	Portions Planned for 1 hour	Teacher
Sept 3rd week	1	Units and measurements: System of units (CGS and SI), measurement of length, mass and time,	KSS
	2	Laws of motion: Newton's Laws of motion.	PA
	3	Elasticity: Hooke's law, Stress-strain diagram	KCR
	4	Surface tension: Definition of surface, molecular theory	ASG
Sept 4th week	1	dimensions of physical quantities, dimensional formulae,	KSS
	2	Dynamics of single particle and system of particles,	PA
	3	elastic moduli	KCR
	4	angle of contact	ASG
Oct 1st week	1	errors, Mean deviation	KSS
	2	Centre of mass	PA
	3	Poisson's ratio, relation between elastic constants, expression for Poisson's ratio in terms of elastic constant	KCR
	4	surface energy, relation between surface tension and surface energy,	ASG
Oct 2nd week	1	Problems	KSS
	2	problems	PA
	3	problems	KCR
	4	problems	ASG
Oct 3rd week	1	Momentum and Energy: Work and energy,	KSS
	2	Dynamics of Rigid bodies: Rotational motion about an axis	PA
	3	Work done in stretching	KCR
	4	pressure difference across a curved surface (with example)	ASG
Oct 4th week	1	Conservation of linear momentum,	KSS
	2	Relation between torque and angular momentum,	PA
	3	work done in twisting a wire, twisting couple on a cylinder	KCR
	4	excess pressure inside a spherical liquid drop	ASG
Nov 1st week	1	Conservation of energy with examples,	KSS
	2	Rotational energy, Moment of inertia	PA
	3	Beams (Neutral layer, neutral axis), bending of beams, expression for bending moment	KCR
	4	problems	ASG
Nov 2nd week	1	Motion of rockets	KSS
	2	Laws of MI,	PA
	3	theory of single cantilever	KCR
	4	Assignment discussion	ASG
Nov 3rd week	1	problems	KSS

	2	MI of a rectangular lamina and solid cylinder,	PA
	3	problems	KCR
	4	Viscosity-	ASG
Nov 4th week	1	Special Theory of Relativity: Review of Galilean relativity.	KSS
	2	Flywheel	PA
	3	Torsional pendulum, expression for time-period of torsional oscillations	KCR
	4	Streamline flow, turbulent flow,	ASG
Dec 1st week	1	Constancy of speed of light, Postulates of the Special Theory of Relativity.	KSS
	2	problems	PA
	3	problems	KCR
	4	equation of continuity,	ASG
Dec 2nd week	1	Length contraction and Time dilation.	KSS
	2	Gravitation: Law of Gravitation, Motion of a particle in a central force field Satellite in a circular orbit	PA
	3	determination of rigidity modulus and moment of inertia	KCR
	4	determination of coefficient of viscosity by Poiseuille's method,	ASG
Dec 3rd week	1	Test	KSS
	2	Test	PA
	3	Test	KCR
	4	Test	ASG
Dec 4th week	1	Relativistic addition of velocities	KSS
	2	(motion in a plane, conservation of angular momentum, constancy of areal velocity is constant).	PA
	3	Kepler's laws (statements).	KCR
	4	Stoke's method	ASG
Jan 1st week	1	problems	KSS
	2	Discussion of self- study topics	PA
	3	determination of q, η and σ by Searle's double bar with necessary theory	KCR
	4	problems	ASG
Jan 2nd week	1	Discussion of self- study topics	KSS
	2	Discussion of self- study topics	PA
	3	Discussion of self- study topics	KCR
	4	Discussion of self- study topics	ASG

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS
ACADEMIC YEAR 2022-30.
DEPARTMENT : Physics NEP CLASS : III Sem
Paper III-Phy-DSCT 3:
Wave motion and optics

Week/Month	CLASS	Portions Planned for 1 hour	Teacher
Nov 1st week	1	Waves: Plane and Spherical Waves. Longitudinal and Transverse Waves.	KCR
	2	Standing Waves: introduction	ASG
	3	Nature of light: Corpuscular theory, The Wave model, Huygens' wave theory, , Maxwell's electromagnetic waves,	PA
	4	Fraunhofer diffraction: Introduction- Fraunhofer diffraction-	KSS
Nov 2nd week	1	Characteristics of wave motion, Plane Progressive (Travelling) Wave and its equation (derivation),	KCR
	2	Velocity of transverse waves along a stretched string (derivation)	ASG
	3	Dual nature of light, concept of wave packet. Group velocity and wave velocity-relation between them.	PA
	4	Theory of single slit diffraction, Two slit diffraction pattern (qualitative),	KSS
Nov 3rd week	1	Wave Equation – Differential form (derivation). Particle and Wave Velocities - Relation between them,	KCR
	2	Standing (Stationary) Waves in a String - Fixed and Free Ends (qualitative).	ASG
	3	Interference of light by division of wave front: Coherent source-Interference of light waves by division of wave-front,	PA
	4	Theory of diffraction Grating - oblique incidence – experimental determination of wavelength.	KSS
Nov 4th week	1	Energy Transport – Expression for intensity of progressive wave, Newton's Formula for Velocity of Sound. Laplace's Correction (Derivation)	KCR
	2	Theory of Normal modes of vibration in a stretched string,	ASG
	3	Young's double slit interference- theory and experiment,	PA
	4	Resolving power – Rayleigh criterion, Expression for resolving power of grating and telescope.	KSS
Dec 1st week	1	Brief account of Ripple and Gravity Waves., Problems	KCR
	2	Normal Modes of vibrations in Open and Closed Pipes – Analytical treatment	ASG
	3	Fresnel Biprism- theory	PA
	4	Problems	KSS
Dec 2nd week	1	Superposition of Harmonic Waves: Linearity and superposition Principle.	KCR
	2	Problems	ASG
	3	Problems	PA
	4	Fresnel Diffraction- Concept of Fresnel half period zones (mention of equations),	KSS
Dec 3rd week	1	Test	KCR
	2	Test	ASG
	3	Test	PA

	4	Test	KSS
Dec 4th week	1	Revision	KCR
	2	Velocity of Longitudinal Waves in gases (derivation).	ASG
	3	Fresnel Biprism- experiment (determination of wavelength)	PA
	4	Qualitative discussion on diffraction by a circular aperture and diffraction by an opaque disc,	KSS
Jan 1st week	1	Superposition of two collinear oscillations having (1) equal frequencies	KCR
	2	Energy density and energy transport of a transverse wave along a stretched string.	ASG
	3	Interference of light by division of amplitude: at thin films - reflected light	PA
	4	Zone plate (mention of equation for focal length) Comparison of Zone plate with lens,	KSS
Jan 2nd week	1	Superposition- (2) different frequencies (Beats) – Analytical treatment. Beats	KCR
	2	Vibrations in rods – longitudinal and transverse modes (qualitative).	ASG
	3	Interference of light by division of amplitude: at thin films – transmitted light	PA
	4	Theory of diffraction at a straight edge.	KSS
Jan 3rd week	1	Superposition of two perpendicular harmonic oscillations:	KCR
	2	Concept of Resonance, Theory of Helmholtz resonator.	ASG
	3	Colours of thin films; Problems	PA
	4	Polarisation: Production of polarized light, Malus' law,	KSS
Jan 4th week	1	Lissajous Figures with equal frequency- Analytical treatment.	KCR
	2	Acoustics: Absorption coefficient, Reverberation time	ASG
	3	Theory of air wedge;	PA
	4	Phenomenon of double refraction in crystals, Huygen's theory of double refraction (qualitative),	KSS
Feb 1st week	1	Lissajous Figures with unequal frequency- Analytical treatment.	KCR
	2	Sabine's Reverberation formula (derivation),	ASG
	3	Theory of Newton's rings (Reflection)	PA
	4	Quarter wave plate and half wave plate,	KSS
Feb 2nd week	1	Uses of Lissajous' figures.	KCR
	2	Factors affecting acoustics in buildings, Requisites for good acoustics.	ASG
	3	Determination of Refractive index of a liquid.	PA
	4	Optical activity, Laurent's half shade polarimeter.	KSS
Feb 3rd week	1	Problems	KCR
	2	Acoustic measurements – intensity and pressure levels.	ASG
	3	Michelson Interferometer (qualitative)	PA
	4	Problems	KSS
Feb 4th week	1	Revision	KCR
	2	Problems and revision	ASG
	3	Problems and revision	PA
	4	Revision	KSS

Name of the Department	**Physics**	**Subject Title: Quantum mechanics, Solidstate physics and Electronics**	
Semester	**V**	**Paper:501**	**Teacher**
Week/Month	**Class**	**Portions Planned for 1 hour**	
Nov 1st week	1	**Failures of classical physics:** Black body radiation spectrum- atomic spectra- photoelectric effect.	KCR
	2	**Free electron theory of metals:** Electrical conductivity- classical theory (Drude-Lorentz model);	ASG
	3	Basics of transistors and their operation, transistor amplifier (CE mode only),	PA
Nov 2ndweek 1	1	de-Broglie's hypothesis and de-Broglie's wavelength; Davisson-Germer experiment	KCR
	2	Thermal conductivity; Wiedemann - Franz's law;	ASG
	3	feedback concepts, transistor oscillators,Problems	PA
Nov 3rd week	1	Problems, Heisenberg's uncertainty principle; y-ray microscope experiment; Problems	KCR
	2	Density of states for free electrons; Fermi-Dirac distribution function and Fermi energy, Problems	ASG
	3	Operational amplifiers; Ideal characteristics; The basic op-amps circuits; Inverting amplifier), Problems	PA
Nov 4th Week	1	wave function and its interpretation; Schrodinger's time dependent equation,wave function and its interpretation;	KCR
	2	Expression for Fermi energy and Kinetic energy at absolute zero and above absolute zero (no derivation)	ASG
	3	Non-inverting amplifier; Problems	PA
Dec 1st week	1	Problems	KCR
	2	Problems	ASG
	3	Applications of op-amp-summer, Problems	PA
Dec 2nd week	1	Schrodinger's time dependent equation,	KCR
	2	**Band theory of solids:** Elementary ideas regarding formation of energy bands; Bloch equations;	ASG
	3	Integrator and differentiator, voltage follower. Problems.	PA
Dec 3rd week	1	Test	KCR
	2	Test	ASG
	3	Test	PA
Dec 4th week	1	Physical conditions on wave functions, Operators and Eigen values-Eigen functions Problems	KCR
	2	One dimensional Kronig-Penney model	ASG
	3	**Basic logic concepts:** Logic states; Voltage range of high and low logic states; Number codes;	PA
Jan 1st week	1	Expectation values of position, momentum and kinetic energy operators, Problems	KCR
	2	Density of states; Effective mass; Energy gap	ASG
	3	**Basic logic concepts:** Logic states; Voltage range of high and low logic states; Number codes;	PA
Jan 2nd week	1	Eigen values and eigen functions of a particle in one dimension box Problems	KCR
	2	**X ray diffraction:** Bragg's law; Types of crystals; Miller indices; the structure of NaCl and KCI crystals;	ASG
	3	Hexadecimal representation; BCD; Logic gates and truth tables;	PA

Jan 3rd week	1	Applications: Eigen values and eigen functions of a particle in three dimensional box ,Problems	KCR
	2	Continuous and characteristic X-ray spectra; Mosley's law	ASG
	3	OR gate, AND gate; Inverter (the NOT function);	PA
Jan 4th week	1	Simple harmonic oscillator, Problems	KCR
	2	Problems	ASG
	3	NAND and NOR exclusive OR; exclusive NOR.Truth tables	PA
Feb 1st week	1	Revision	KCR
	2	Revision	ASG
	3	Revision	PA

Name of the Department	**Physics**	**Subject Title: Statistical, Atomic, Molecular and Nuclear physics**	
Semester	**V**	**Paper:503**	
Week/Month	**Class**	**Portions Planned for 1 hour**	**Teacher**
Nov 1st week	1	Classical and quantum particles, identical particles	ASG
	2	**Atomic Physics:** A brief account of the Sommerfeld atomic model (qualitative).	PA
	3	**Alpha decay:** Gamow's theory of alpha decay.	KCR
Nov 2ndweek	1	Wave functions of identical particles, pauli's Exclusion Principle	ASG
	2	Electron spin, Stern- Gerlach experiment.	PA
	3	Q-value of alpha decay, Exact energy of alpha particle emitted.	KCR
Nov 3rd week	1	Bose-Einstein and Fermi- Dirac Distributions	ASG
	2	Space quantization, the vector model of the atom.	PA
	3	Characteristics of alpha spectrum, Geiger- Nuttal law.	KCR
Nov 4th Week	1	Maxwell-Boltzmann distribution and problems.	ASG
	2	spin -orbit interaction, Fine structure of spectral lines	PA
	3	Beta decay: Types of beta decay (electron, positron decay.	KCR
Dec 1st week	1	Applications of BE Statistics - Specific heat and pressure of a BE gas.	ASG
	2	The Pauli's exclusion principle and the electronic configuration of atoms	PA
	3	Electron capture, Characteristics of beta spectrum and Pauli's neutrino hypothesis.	KCR
Dec 2nd week	1	Black Body Radiation.	ASG
	2	The Normal Zeeman Effect (Quantum Theory)	PA
	3	**Detectors:** Variation of ionization current with applied voltage in a gas counter.	KCR
Dec 3rd week	1	Test	
	2	Test	
	3	Test	
Dec 4th week	1	Einstein's Theory of Specific heat,.	ASG
	2	**Molecular spectra:** Pure rotational Spectrum and selection rules,	PA
	3	GM Counter and problems.	KCR

Jan 1st week	1	Bose Einstein Condensation and problems.	ASG
	2	Vibrational spectrum and selection rules.	PA
	3	**Particle accelerator:** Cyclotron.	KCR
Jan 2nd week	1	Applications of FD Statistics	ASG
	2	Rotational vibrational spectrum and problems.	PA
	3	Tandem Van-de-Graff. **Nuclear reactions:** Types of Nuclear reactions.	KCR
Jan 3rd week	1	The pressure and specific heat of an FD gas,	ASG
	2	Scattering of light- Tyndall, Rayleigh and Raman's scattering	PA
	3	Conservation laws.	KCR
Jan 4th week	1	Super conductivity and super fluidity (qualitative)	ASG
	2	Experimental study of Raman Effect, Quantum theory of Raman effect.	PA
	3	Expression for Q value of a nuclear reaction, Endoergic and Exoergic reactions, threshold energy	KCR
Feb 1st week	1	Revision	ASG
	2	Applications of Raman effect and problems.	PA
	3	Threshold energy and problems.	KCR