**LESSON PLAN**

COLLEGE NAME:- GOVERNMENT COLLEGE SATNALI (MAHENDERGARH)

ACADEMIC SESSION:- 2023-24

SEMESTER:- B.Sc. NON MEDICAL 3RD SEM

TEACHER NAME:- MR. ANIL KUMAR

SUBJECT:- CPT

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| **21 JULY – 31 AUGUST**  **UNIT 1:-**  Computer Programming : Computer organisation, Binary representation, Algorithm development, flow charts and their interpretation. Fortran Preliminaries; |

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| **01 SEPTEMBER – 31 OCTOBER**  **UNIT 1:-**  Integer and floating point arithmetic expression, built in functions executable and non-executable statements, input and output statements, Formats, I.F. DO and GO TO statements, Dimesion arrays statement function and function subprogram. |

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| **01 NOVEMBER- 30 NOVEMBER**  UNIT 2:- Thermodynamics-I : Second law of thermodynamics, Carnot theorem, Absolute scale of temperature, Absolute Zero, Entropy, show that dQ/T=O, T-S diagram Nernst heat law, Joule’s free expansion, Joule Thomson (Porous plug) experiment. Joule - Thomson effect. Liquefication of gases. Air pollution due to internal combustion Engine.  Thermodynamics-II : Derivation of Clausius - Claperyron latent heat equation. |

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| **01 DECEMBER - 15 DECEMBER**  UNIT 3:- Phase diagram and triple point of a substance. Development of Maxwell thermodynamical relations. Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables. Thermodynamic functions : Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them. |

**LESSON PLAN**

COLLEGE NAME:- GOVERNMENT COLLEGE SATNALI (MAHENDERGARH)

ACADEMIC SESSION:- 2023-24

SEMESTER:- B.Sc. NON MEDICAL 3RD SEM

TEACHER NAME:- MR. ANIL KUMAR

SUBJECT:- OPTICS-1

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| **21 JULY- 31 AUGUST**  **UNIT 1:-**  Fourier Analysis and Fourier Transforms : Speed of transverse waves on a uniform string. Speed of longitudinal waves in a fluid, superposition of waves (physical idea) |

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| **01 SEPTEMBER- 31 OCTOBER**  **UNIT 1:-**  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-x2/2  (II) f(x) = [x] a |

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| **01 NOVEMBER- 30 NOVEMBER**  **UNIT 2:-** Geometrical Optics : Matrix methods in paraxial optics, effects of translation and refraction,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. |

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| **01 DECEMBER- 15 DECEMBER**  **UNIT 3:-**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 sheetLioyd’s mirror, phase change on reflection. |

COLLEGE NAME:- GOVERNMENT COLLEGE SATNALI (MAHENDERGARH)

ACADEMIC SESSION:- 2023-24

SEMESTER:- B.Sc. NON MEDICAL 5TH SEM

TEACHER NAME:- MR. ANIL KUMAR

SUBJECT:- QUANTUM MECHANICS

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| **21 JULY- 31 AUGUST**  **UNIT 1:-**  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. |

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| **01 SEPTEMBER- 31 OCTOBER**  **UNIT 1:-**  Davisson and Germer experiment. G.P. Thomson experiment. Phase velocity group velocity, Heisenberg's uncertainty principle. Time-energy and angular momentum, position uncertainty Uncertainity principle from de-Broglie wave, (wave-partice duality). Gamma Ray Microscope, Electron diffraction from a slit. |

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| **01 NOVEMBER- 30 NOVEMBER**  UNIT 2:- 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 harmonic oscillator  ground states and excited states. |

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| **01 DECEMBER - 15 DECEMBER**  UNIT 3:-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 barrier, E>V0 (Reflection and Transmission coefficient.  ii) One-dimensional potential barrier, E>V0 (Reflection Coefficient, penetration of leakage coefficient, penetration depth). |

**LESSON PLAN OF STATISTICAL MECHANICS**

COLLEGE NAME:- GOVERNMENT COLLEGE SATNALI (MAHENDERGARH)

ACADEMIC SESSION:- 2023-24

SEMESTER:- B.Sc. NON MEDICAL 4th SEM (SEC –B)

TEACHER NAME:- MR. ANIL KUMAR

SUBJECT:-STATISTICAL MECHANICS

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| **9 FEBRUARY – 15 FEBRUARY**  **UNIT -1 –** Probability, some probability considerations, combinations possessing maximum probability, combinations possessing minimum probability, distribution of molecules in two boxs. Case with weightage (general). |
| **16 FEBRUARY – 28 FEBRUARY**  **UNIT -1** Phase space, microstates and macrostates, statistical fluctuations constraints and accessible States Thermodynamical probability. |
| **1 MARCH- 10 MARCH**  **UNIT -2. –** Postulates of Statistical Physics. Division of Phase space into cells, Condition of equilibrium between two system in thermal contact. b-Parameter. Entropy and Probability. |
| **11 MARCH- 20 MARCH**  **UNIT -2.** Boltzman’s distribution law. Evaluation of A and b. Bose-Einstein statistics, Application of B.E. Statistics to Plancks’s radiation law, B.E. gas. |
| **21 MARCH - 05 APRIL**  **UNIT -3.** Fermi-Dirac statistics, M.B. Law as limiting case of B.E. Degeneracy and B.E., Condensation. |
| **06 APRIL- 21 APRIL**  **UNIT -3.** F.D. Gas, electron gas in metals. Zero point energy. Specific heat of metals and its solution. |

**LESSON PLAN OF OPTICS-II**

COLLEGE NAME:- GOVERNMENT COLLEGE SATNALI (MAHENDERGARH)

ACADEMIC SESSION:- 2023-24

SEMESTER:- B.Sc. NON MEDICAL 4th SEM (SEC –B)

TEACHER NAME:- MR. ANIL KUMAR

SUBJECT:- OPTICS-II

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| **9 FEBRUARY – 15 FEBRUARY**  **UNIT -1 –** Interference by division of Amplitude:- colour of thin films, wedge shaped films, Newton’s rings, Interferometers:- Michelson’s interferometer and its application to (1) standardisation of metre (2) determination of wavelength. |
| **16 FEBRUARY – 28 FEBRUARY**  **UNIT -1 –** Fresnel’s Diffraction:- Fresnel’ half period zones, zone plate, diffraction at a straight edge, rectangular slit |
| **1 MARCH- 10 MARCH**  **UNIT -1 –** Diffraction at a circular apperture  **UNIT -2. – Fraunhofer diffraction :-** One slit diffraction, two slit diffraction |
| **11 MARCH- 20 MARCH**  **UNIT -2. Fraunhofer diffraction :-** N-slit diffraction, Plane Transmission Grating Spectrum, Dispersive Power of a grating, Limit of resolution, Rayleigh’s criterion, Resolving power of telescope and a grating |
| **21 MARCH - 05 APRIL**  **UNIT -3.**  **Polarisation:-** Polarisation and Double refraction :- Polarisation by reflection, Polarisation by scattering, Malus law, Phenomenon of double refraction, Huygen’s wave theory of double refraction (Normal and Oblique incidence) |
| **06 APRIL- 21 APRIL**  **UNIT -3.**  Analysis of Polarised light: Nicol Prism, Quarter wave plate and half wave plate, Production and detection of (1) Plane polarised light (2) Circularly polarised light (3) Elliptically polarised light , Optical activity, Fresnel’s theory of rotation, specific rotation, Polarimeters (Half shade and Biquartz). |

**LESSON PLAN OF NUCLEAR PHYSICS**

COLLEGE NAME:- GOVERNMENT COLLEGE SATNALI (MAHENDERGARH)

ACADEMIC SESSION:- 2023-24

SEMESTER:- B.Sc. NON MEDICAL 6th SEM

TEACHER NAME:- MR. ANIL KUMAR

SUBJECT:- NUCLEAR PHYSICS

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| **9 FEBRUARY – 20 FEBRUARY**  **UNIT -1 –** Nuclear mass and Binding energy, systematic nuclear binding energy, Nuclear stability, Nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape moment), Determination of mass by Bain- Bridge mass spectrograph, Bain- Bridge and Jordan mass spectrograph, Determination of charge by Mosley law, Determination of size of nuclei by Rutherford back scattering |
| **21 FEBRUARY – 28 FEBRUARY**  **UNIT -2.** Introduction to heavy charged particle:- (Alpha particles), Alpha disintegration and its theory, Energy loss of heavy charged particle (idea of Bethe formula, no derivation), Energetics of alpha decay, Range and straggling of alpha particles, Geiger – Nuttal law |
| **1 MARCH- 15 MARCH**    **UNIT -2. –** Introduction to light charged particle:- (Beta particle), Origin of continuous beta- spectrum (neutrino hypothesis), Types of beta decay and energies of beta decay, Energy loss of beta- particles (ionization), Range of electrons, absorption of beta particles. |
| **16 MARCH- 31 MARCH**  **UNIT -2.** Interaction of Gamma ray:- Nature of gamma rays, Energies of Gamma rays, passage of gamma radiations through matter (Photoelectric, Compton and pair production effect), Electron- positron anhilation, Absorption of Gamma rays (mass attenuation coefficient) and its application. |
| **1 APRIL- 10 APRIL**  **UNIT -3.** Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, Photonuclear reaction, Radiactive capture, Direct reaction, heavy ions reaction and spallation reactions. Conservation laws, Q- value and reaction threshold. |
| **11 APRIL- 21 APRIL**  **UNIT -3.**  Nuclear reactor, General aspects of nuclear design, Nuclear fusion and fission reactors (Principle, construction, working and use)  Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators,  Ionization chamber, proportional counter, G.M. counter, Scintillation counter, semiconductor detector |