# GOVERNMENT COLLEGE FOR GIRLS ,UNHANI

## LESSON PLAN FOR ACADEMIC SESSION

**Name - Dinesh Kumar** **Department- Physics**

**Class-B.Sc. 1st year (1st Semester)** **Session: 2024-25 (22.07.2024 onwards)**

| Sr. No./Week | Day/ Month/Year | Topic to be covered |
|---|---|---|
| 1 | July 22-27,2024 | **Fundamentals of Dynamics:** Rigid body, Moment of Inertia, Radius of Gyration, Theorems of perpendicular and parallel axis (with proof). |
| 2 | July 29-August 3 | Moment of Inertia of rod, ring, Disc, Angular Disc, Solid cylinder, Solid sphere, Hollow sphere, rectangular plate, square plate, Solid cone, Triangular plate, Torque, Rotational Kinetic Energy, Angular momentum. |
| 3 | August 5-10 | Law of conservation of angular momentum, rolling motion, condition for pure rolling, acceleration of body rolling down an inclined plane, Fly wheel, Moment of Inertia of an irregular body. Written & Oral Test |
| 4 | August 12-17 | **Elasticity:** Deforming force, Elastic limit, stress, strain and their types, Hooke's law, Modulus of rigidity, Relation between shear angle and angle of twist, elastic energy stored/volume in an elastic body, Assignment-1 |
| 5 | August 19-24 | Elongation produced in heavy rod due to its own weight and elastic potential energy stored in it, Tension in rotating rod, Poisson"s ratio and its limiting value, Elastic Constants and their relations. Torque required for twisting cylinder. |
| 6 | August 26-31 | Hollow shaft is stiffer than solid one. Bending of beam, bending moment and its magnitude, Flexural rigidity, Geometrical moment of inertia for beam of rectangular cross-section and circular cross-section. |
| 7 | September 2-7 | Bending of cantilever (loaded by a weight W at its free end), weight of cantilever uniformly distributed over its entire length. Dispersion of a centrally loaded beam supported at its ends, determination of elastic constants for material of wire by Searle's method. Written & Oral Test |
| 8 | September 9-14 | **Special Theory of Relativity:** Michelson's Morley experiment and its outcomes, Postulates of special theory of relativity, Lorentz Transformations, Simultaneity and order of events, Lorentz contraction. |
| 9 | September 16-21 | Time dilation, Relativistic transformation of velocity, relativistic addition of velocities, variation of mass-energy equivalence. Written & Oral Test |
| 10 | September 23-28 | relativistic Doppler effect, relativistic kinematics, transformation of energy and momentum, transformation of force, Problems of relativistic dynamics. Written & Oral Test |
| 11 | Sept. 30-Oct. 5 | **Gravitation and central force motion:** Law of gravitation, Potential and field due to spherical shell and solid |

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| | | sphere. Motion of a particle under central force field. |
| 12 | October 7-12 | Two body problem and its reduction to one body problem and its solution, compound pendulum or physical pendulum in form of elliptical lamina and expression of time period, determination of g by means of bar pendulum, Normal coordinates and normal modes. |
| 13 | October 14-19 | Normal modes of vibration for given spring mass system, possible angular frequencies of oscillation of two identical simple pendulums of length (l) and small bob of mass m0 joined together with spring of spring constant (k). |
| 14 | October 21-26 | Revision of Fundamentals of Dynamics, Written & Oral Test |
| 15 | October 27-Nov.3 | **Diwali Vacation as per Academic Calendar (2024-2025) IGU Meerpur** |
| 16 | November 4-9 | Revision of Elasticity, Written & Oral Test |
| 17 | November 11-16 | Revision of Special Theory of Relativity , Written & Oral Test |
| 18 | November 18-23 | Revision of Gravitation and central force motion, Written & Oral Test |
| 19 | 25.11.2024 onwards… | Semester End examinations as per University Academic Calendar |

**References books as per University**


1. Mechanics "Berkeley Physics Course Vol.I", Charles Kittel, TataMcGraw-Hill
2. Mechanics, D.S. Mathur, S. Chand and Company Limited, 2000
3. Elements of Properties of Matter, D.S. Mathur, S. Chand & Com. Pt. Ltd., New Delhi
4. Physics, Resnick, Halliday &Walker, Wiley
5. Physics for scientists and Engineers with Modern Phys., J.W. Jewett, R.A. Serway, 2010, Cengage Learning
6. An introduction to mechanics, D. Kleppner, R.J. Kolenkow,1973, McGraw-Hill.
7. Properties of Matter, R. Murgeshan, S. Chand & Com. Pt. Ltd., New Delhi
8. Classical Mechanics, J.C. Upadhyaya, Himalaya Publishing House.
9. B.Sc. Practical Physics, C.L. Arora, S. Chand Publisher, New Delhi
10. Advanced Level Practical Physics, M. Nelkon and Ogborn, Henemann Education Books Ltd., New Delhi
11. Practical Physics, S.S. Srivastava and M.K. Gupta, Atma Ram &Sons, Delhi
12. Practical Physics, S.L. Gupta and V. Kumar, Pragati Prakashan Meerut
13. Modern Approach to Practical Physics, R.K. Singla, Modern Publishers, Jalandhar
14. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, Asia Publishing House.
15. B.Sc. Practical Physics, Geeta Sanon



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# GOVERNMENT COLLEGE FOR GIRLS ,UNHANI

## LESSON PLAN FOR ACADEMIC SESSION

**Name - Dinesh Kumar** **Department- Physics**

**Class-B.Sc. 2nd year (3rd Semester)** **Session: 2024-25 (22.07.2024 onwards)**

| Sr. No./Week | Day/ Month/Year | Topic to be covered |
|---|---|---|
| 1 | July 22-27.2024 | **Unit-I (Fourier Analysis and Transforms)** Speed of transverse waves on a uniform string, Speed of longitudinal waves in a fluid, superposition of waves (physical idea), Fourier Analysis of complex waves and its application for the solution of triangular and rectangular waves. |
| 2 | July 29-August 3 | The solution of half and full wave rectifier out puts, Fourier transforms and its properties. Application of Fourier transform to following function. (1) f(x) = e^-x2/2 (2) f(x)=1 [x] <a =0 [x] >a Written & Oral Test |
| 3 | August 5-10 | **Unit-II (Geometrical Optics)** Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae. |
| 4 | August 12-17 | unit plane, nodal planes, system of thin lenses, Chromatic, spherical coma, astigmatism and distortion aberrations and their remedies. Assignment-1 |
| 5 | August 19-24 | **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. |
| 6 | August 26-31 | Lioyd's mirror, phase change on reflection. Written & Oral Test |
| 7 | September 2-7 | **Unit-II (Thermodynamics-I)** Second law of thermodynamics, Carnot theorem, Absolute scale of temperature, Absolute Zero, Entropy, show that dQ/T=O, T-S diagram. |
| 8 | September 9-14 | 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. Written & Oral Test |
| 9 | September 16-21 | **Unit-III (Thermodynamics-II)** Derivation of Clausius - Claperyron latent heat equation. Phase diagram and triple point of a substance. Development of Maxwell thermodynamical relations. Written & Oral Test |
| 10 | September 23-28 | Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables. Written & Oral Test |
| 11 | Sept. 30-Oct. 5 | Thermodynamic functions: Internal energy (U), Helmholtz function (F), Enthalpy (H), Gibbs function (G) and the relations between them. |
| 12 | October 7-12 | **Unit-I (Computer Programming)** |

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| | | Computer organization, Binary representation, Algorithm development, flow charts and their interpretation. Written & Oral Test |
| 13 | October 14-19 | Fortran Preliminaries; Integer and floating point arithmetic expression, built in functions executable and non-executable statements, input and output statements, Formats, |
| 14 | October 21-26 | I.F. DO and GO TO statements, Dimension arrays statement function and function subprogram.<br>Written & Oral Test |
| 15 | October 27-Nov.3 | **Diwali Vacation as per Academic Calendar (2024-2025) IGU Meerpur** |
| 16 | November 4-9 | Revision of Optics, Written & Oral Test |
| 17 | November 11-16 | Revision of Thermodynamics, Written & Oral Test |
| 18 | November 18-23 | Revision of Computer, Written & Oral Test |
| 19 | 25.11.2024 onwards… | Semester End examinations as per University Academic Calendar |

**References books for Optics paper as per University**


1. Mathematical Physics by B.S. Rajput and Yog Prakash Pragati Prakashan.
2. Theory and Problems of Laplace Transforms by Murrari R. Spiegel, McGraw Hill Book Company.
3. Optics by Ajay Ghatak, Tata McGraw Hill 1977.
4. Introduction of Optics by Frank L. Pedrotti and Leno S. Pedrotti, Prentice Hall 1987.


**References books for Optics paper as per University**


1. 1.Rajaraman, Fortran Programming.
2. Schaum Series, Fortran 77.
3. Ram Kumar, Programming with Fortran - 77.
4. S. Lokanathan and R.S., Gambir, Statistical and Thermal Physics (An Introduction), Prentice Hall of India, Pvt., Ltd. (1991, New Delhi).
5. J.K. Sharma and K.K. Sarkar, Thermodynamics and statistical Physics, Himalaya Publishing House (1991, Bombay.)
6. M.W. Zemansky and R. Dittman, Heat and Thermodynamics, McGraw Hill, New York (1981).



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## LESSON PLAN FOR ACADEMIC SESSION

**Name - Dinesh Kumar** **Department- Physics**

**Class-B.Sc. 3rd year (5th Semester)** **Session: 2024-25(22.07.2024 onwards )**

| Sr. No./Week | Day/ Month/Year | Topic to be covered |
|---|---|---|
| 1 | July 22-27.2024 | **Unit-I (Solid State Physics)**<br>Crystalline and gallssy forms, Liquid crystals, Crystal translational, vectors and axes, Periodicity, Unit cell and primitive cell<br>Winger Seitz primitive Cell, symmetry operations for a two-dimensional crystal |
| 2 | July 29-August 3 | Point group, Bravais Lattices in two dimensions, Bravais Lattices in two dimensions, Bravais Lattices in three dimensions<br>Problems Discussion, Written & Oral Test |
| 3 | August 5-10 | **Unit-II (Solid State Physics)**<br>Crystal planes and Miller indices, Interplanar spacing, Packing fraction, Hexagonal closed pack structure, Diamond structure<br>NaCl structure, Test of 1st unit |
| 4 | August 12-17 | X-ray diffraction, Bragg's Law, Experimental x-ray diffraction methods- Laue method, Rotating crystal method, Powder method<br>Determination of crystal structure using Bragg's law, k-space<br>Problems Discussion, Assignment-1 |
| 5 | August 19-24 | **Unit-III (Solid State Physics)**<br>Reciprocal lattice and its physical significance, Reciprocal lattice, vectors for crystal axes, Construction of reciprocal lattice<br>Test of 2nd unit |
| 6 | August 26-31 | Properties of reciprocal lattice, Reciprocal lattice to a simple cubic lattice, B.C.C, Reciprocal lattice to a F.C.C. lattice, Specific heat of solids, Einstein's theory of specific heat, Written & Oral Test |
| 7 | September 2-7 | Debye model of specific heat of solids, Assignment presentation, Problems, Test of 3rd unit |
| 8 | September 9-14 | **Unit-I (Quantum Physics)**<br>Failure of (Classical) E.M. Theory, Quantum theory of radiation, Photoelectric effect, Compton effect, Written & Oral Test |
| 9 | September 16-21 | Dual nature of matter: De Broglie wavelength, Davisson and Germer experiment, G.P. Thomson experiment, Phase velocity, Group velocity, Relation b/w Group velocity and particle velocity<br>Heisenberg's uncertainty principle, Experimental verification of uncertainty principle, Written & Oral Test |
| 10 | September 23-28 | Example of time energy uncertainty, Application of uncertainty principle, Problems, Written & Oral Test |
| 11 | Sept. 30-Oct. 5 | **Unit-II (Quantum Physics)**<br>Derivation of time dependent Schrodinger wave equation<br>Eigen values, eigen functions<br>Wave functions and its significance. Normalization of wave function<br>Test 1st unit, Assignment presentation |

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| 12 | October 7-12 | Concept of observable and operator, Probability current density: Particle flux, One dimensional linear harmonic oscillator<br>Written & Oral Test |
| 13 | October 14-19 | **Unit-III (Quantum Physics)**<br>Free particle in one dimensional box<br>Potential step (E >Vo), Potential step or single step barrier (E <Vo)<br>Written & Oral Test |
| 14 | October 21-26 | One dimensional potential barrier, Assignment presentation<br>Problems unit 3rd |
| 15 | October 27-Nov.3 | Diwali Vacation as per Academic Calendar (2024-2025) IGU Meerpur |
| 16 | November 4-9 | Revision of Solid-State Physics, Written & Oral Test |
| 17 | November 11-16 | Revision of Quantum Mechanics, Written & Oral Test |
| 18 | November 18-23 | Revision, Written & Oral Test |
| 19 | 25.11.2024 onwards… | Semester End examinations as per University Academic Calendar |

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