

# GOVERNMENT COLLEGE FOR GIRLS , UNHANI

## LESSON PLAN FOR ACADEMIC SESSION

Name - Dinesh Kumar

Department- Physics

Class-B.Sc. 1<sup>st</sup> year (1<sup>st</sup> Semester)


Session: 2024-25 (22.07.2024 onwards)

| Sr. No./Week | Day/ Month/Year  | Topic to be covered   |
|--------------|------------------|---|
| 1            | July 22-27,2024  | <b>Fundamentals of Dynamics:</b><br>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     | <b>Elasticity:</b><br>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   | <b>Special Theory of Relativity:</b><br>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  | <b>Gravitation and central force motion:</b><br>Law of gravitation, Potential and field due to spherical shell and solid  |

|    |                          |   |
|----|--------------------------|---|
|    |                          | 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 $m_0$ joined together with spring of spring constant ( $k$ ).                     |
| 14 | October 21-26            | Revision of Fundamentals of Dynamics, Written & Oral Test   |
| 15 | October 27-<br>Nov.3     | <b>Diwali Vacation as per Academic Calendar (2024-2025) IGU Meerpur</b>   |
| 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<br>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

  
 Dinesh Kumar  
 Assistant Professor  
 Department of Physics