S.S.D. Girls' College, Bathinda
Multidisciplinary course Based on NEP-2020
B.Sc./B.Sc. (Honours)
Session 2025-2026
B.Sc. (Non-Medical) Part-1, Sem-1
Mechanics
Paper Code: BNM101
(Major Theory)

Max. Marks: 70 **Total Teaching Hrs.: 3 Hrs Per Week**
Theory Paper:50 **Credits: 03**
Internal Evaluation: 20 marks **Pass Marks: 35%**

INSTRUCTIONS FOR PAPER SETTER

The question paper will consist of three sections A, B and C. Section A and B will have four questions each from the respective sections of the syllabus out of which the student will be required to attempt two questions from each Section. Each question will carry 8 marks. Section C will be compulsory with 9 short-answer type questions of 02 marks each which will cover the entire Syllabus.

Instructions for Students

Students have to attempt four questions in all from Section A and B by selecting 2 questions from each Section. Section C will be compulsory. Use of scientific calculator is allowed.

SECTION-A

Cartesian and spherical polar co-ordinate systems, area, volume, displacement, velocity and acceleration in these systems, Solid angle, Various forces in Nature (brief introduction), Centre of mass, Equivalent one body problem, Central forces, Equation of motion under central force, Equation of orbit in inverse square, Force field and turning points, Kepler laws and their derivations.

Inertial frame of reference, Galilean transformation and invariance, Non-inertial frames of reference, Centrifugal force and its effect on acceleration due to gravity, Coriolis force and its applications, Variation of acceleration due to gravity with latitude.

SECTION-B

Elastic collision in Laboratory and C.M. system, velocities, angles and energies, Cross section of elastic scattering, Rutherford scattering (qualitative).

Concept of stationary universal frame of reference and ether, Michelson-Morley experiment and its result, Postulates of special theory of relativity, Lorentz transformations, Observer and viewer in relativity, relativity of simultaneity, Length, Time, Relativistic addition theorem of velocities, Relativistic Doppler effect, Variation of mass with velocity, mass-energy equivalence, rest mass in an inelastic collision, Relativistic momentum and energy, their transformation, concepts of Minkowski space, four vector formulation.

Course Outcomes

1. To impart knowledge about various coordinate systems and their applications in different physical systems.
2. To understand various frame of reference and transformations.
3. To differentiate between laboratory and centre of mass systems and various scattering phenomenon.

4. To understand various concepts of special theory of relativity.

Text Books:

1. Mechanics: Berkeley Physics Course, Vol. I by C. Kittel, W.D. Knight, M. Alvin and A. Ruderman, Tata McGraw Hill Publication, 1981.
2. Mechanics: H.S. Hans and S.P. Puri, Tata McGraw Hill, 2003, New Delhi.
3. Introduction to Classical Mechanics by R.G. Takwale and P.S. Puranik, Tata McGraw Hill, 2000.

S.S.D. GIRL's COLLEGE, BATHINDA
Multidisciplinary course Based on NEP-2020
B.Sc. / B.Sc. (Honours)
Session 2025-2026
B.Sc. (Non-Medical) Part-1, Sem-I
Physics Laboratory
Paper Code: BNM101P
(Major Practical)

Max. Marks: 30 **Total Teaching hours: 2 hours/week**
End-Semester exam: 20 marks **Total time Allowed: 03 hours**
Internal Evaluation: 10 marks **Pass Marks: 35 %**
Credits: 01

General Guidelines for End-Semester Practical Examination:
1. The student will be allotted one experiment out of the experiments mentioned in syllabus and asked to perform

Instructions for Students
Students have to perform at least nine experiments.

List of the Experiments:
1. Analysis of experimental data by:
i) Fitting of given data to a straight line.
ii) Calculation of probable error.
2. To establish relationship between torque and angular acceleration using flywheel and hence find moment of inertia of flywheel.
3. To find the Young's modulus of material of a rectangular bar by bending.
4. To determine modulus of rigidity of material of wire using Maxwell's needle.
5. To study the dependence of moment of inertia on distribution of mass (by recording time periods of oscillations) using objects of various geometrical shapes but of same mass.
6. To study one-dimensional collision using two hanging spheres.
7. To find relationship between longitudinal strain and lateral strain in case of rubber tube and hence find Poison's ratio for rubber.
8. To study the variation of time period with distance between centre of suspension and centre of gravity for a bar pendulum and hence determine:
9. (i) Radius of gyration of bar pendulum about an axis through its centre of gravity and perpendicular to its length.
(ii) Value of acceleration due to gravity, g.
10. To find the value of acceleration due to gravity using Kater's pendulum.
11. To measure the logarithmic decrement, co-efficient of damping, relaxation time and quality factor of a damped simple pendulum.

Text Books:
1. B.Sc. Practical Physics, C.L. Arora, S. Chand & Company Ltd. 2020.