



**Subject Code: 02PY0101**

**Subject Name: Physics-I**

**B.Sc. Year – I (Sem-I)**

**Objective:** This course aims to make students familiar with fundamental laws of Physics and their applications.

**Credits Earned: 4 Credits**

**Course Outcomes:** After completion of this course, student will be able to

- Apply the concepts of vector analysis in physical laws
- Apply the knowledge of laws of motion in kinematics and dynamics
- Utilize the concepts of rotational motion in industries
- Apply knowledge of physics in other branches of science to solve scientific problems

### Teaching and Examination Scheme

| Teaching Scheme (Hours) |          |           | Credits | Theory Marks |             |              | Tutorial/ Practical Marks |                | Total Marks |
|-------------------------|----------|-----------|---------|--------------|-------------|--------------|---------------------------|----------------|-------------|
| Theory                  | Tutorial | Practical |         | ESE (E)      | Mid Sem (M) | Internal (I) | Viva (V)                  | Term Work (TW) |             |
| 3                       | -        | 2         | 4       | 50           | 30          | 20           | 25                        | 25             | 150         |



**Contents:**

| Unit | Topics   | Contact Hours |
|------|--|---------------|
| 1    | <b>Vector analysis and kinematics:</b><br>Concept of scalar and vector, Adding Vectors Geometrically, Components of vectors, Unit vectors, Adding Vectors by Components, Vectors and the laws of physics, Multiplying Vectors. Position and displacement, Average Velocity and Instantaneous Velocity, Average Acceleration and Instantaneous Acceleration. Projectile motion, Relative motion in one and two dimension. | 15            |
| 2    | <b>Newton's Laws of Motion and Forces :</b><br>Newtonian Mechanics, Newton's First Law of Motion, Force, Mass, Newton's Second of Motion, Some Particular Forces, Newton's Third Law of Motion, Applying Newton's third law. Friction, Properties of Friction, The drag force and terminal speed. Centripetal force.   | 15            |
| 3    | <b>Rotational Motion :</b><br>The Rotational variables, Relating the linear and Angular variables, Kinetic energy of Rotation, Angular momentum, Calculating rotational Inertia, Torque, Newton's Second law for Rotation, Conservation of Angular Momentum, Precession of a Gyroscope, Rolling as Translational and Rotation Combined.  | 15            |
|      | <b>Total</b>   | <b>45</b>     |

**Reference Books :**

1. Fundamentals of Physics – Halliday , Resnick and Walker. Wiley Publication. 10<sup>th</sup> edition (2013)
2. University Physics with Modern Physics by Sears and Zemansky's. Addison-Wesley; 13th edition (2011)
3. The Feynman Lecture on Physics (Vol. 1, 2, 3) by Feynman, Pearson Publication (2006)



**Suggested Theory distribution:**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

| Distribution of Theory for course delivery and evaluation |            |       |         |          |        |
|---|------------|-------|---------|----------|--------|
| Remember  | Understand | Apply | Analyze | Evaluate | Create |
| 20%   | 20%        | 30%   | 15%     | 10%      | 5%     |

**Suggested List of Experiments:**

1. The measurement of acceleration due to gravity using Kater's pendulum.
2. Young's modulus by Koenig method.
3. To study Newton's law of cooling.
4. To measure moment of inertia of given disc with help of torisional pendulum.
5. To find out Average error, R.M.S error and probable error in observation.  
(Using Vernier Callipers and Micrometer Screw)
6. Calibration of travelling microscope and measurement of surface tension.
7. V-I characteristics of Solar cell.
8. To find coefficient of friction for different surfaces and for different loads.

**Instructional Method:**

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory