# Lecture Plan

**Name of the college: Government College of Arts, Science and Commerce, Sanquelim – Goa.**

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| **Name of Faculty:** Ms. Anushka Panjikar | **Subject:** Physics | |
| **Paper code: PHY 204 Classical Mechanics - I** | **Program:** SY BSc | **Division: -** |
| **Academic year: 2025- 2026** | **Semester: IV** | **Total Lectures: 45L + 30P** |

**Course Objectives: This course provides a foundation for understanding classical mechanics and the motion of particles and rigid bodies in different scenarios. They emphasize both theoretical knowledge and problem-solving skills, preparing students for various applications in physics and engineering.**

**Expected Course Outcome: Student will be able to 1. Understand the basic principles of kinematics and dynamics for motion in one and two dimensions. 2. Demonstrate a thorough understanding of projectile motion concepts. 3. Understand the concept of central forces and their implications on the motion of particles. 4. Comprehend the concept of a moving coordinate system and its advantages in problem-solving. 5. Understand the principles of rotational motion and dynamics of rigid bodies.**

**Student Learning Outcome: Students will gain a comprehensive understanding of the dynamics of particles and rigid bodies, including the principles governing their motion in one, and two dimensions under various forces and coordinate systems, enabling them to analyze complex physical systems and apply fundamental mechanics concepts to real-world scenarios**

| Month | Lecture From | Lecture To | No. of lectures allotted | Topic, Subtopic to be covered | Exercise/ Assignment | ICT Tools | Reference books |
|---|---|---|---|---|---|---|---|
| December | 1-12-25 | 6-12-25 | 3L+2P | Introduction to Physics<br><br>**Practicals** : Introduction to Physics Laboratory | Group discussion | Powerpoint presentation<br><br>Google classroom | K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |
| December | 8/12/25 | 13/12/25 | 3L+2P | 1. Dependence of force in general on position, velocity and time. The equation of motion of particle along straight line.<br>2. Motion under a constant force with illustrations - Atwood's machine, free fall near the surface of the earth | | | K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |

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| | | | | 3. Motion on inclined plane, problems.<br><br>**Practical 1** | | | |
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| December | 15/12/25 | 23/12/25 | 2L+ 2P | 1. Motion under a force which depends on time-general approach to the solution. Illustration using force of the type F =Fosin(ωt + φ)<br>2. Motion of a particle subjected to a resistive force: Resistive force | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |

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| | | | | proportional to first power of velocity<br><br>**Practical 2** | | | |
| December | 24/12/25 | 1/01/26 | 0 | **Christmas vacation** | | | |
| January | 2/01/26 | 3/01/26 | 1L | 1. Motion of a particle falling under gravity near the surface of the earth | Powerpoint presentation | Powerpoint presentation | K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |

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| January | 5/01/26 | 10/01/26 | 2L + 2P | 1. Projectile Motion Momentum and energy theorem<br>2. Projectile motion in non-resistive and resistive medium (force proportional to first power of velocity, no derivation).<br><br>**Practical 3** | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | A.V. Namjoshi, J. A. Rao, Classical Mechanics Thermal and Statistical Physics<br><br>K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |
| January | 12/01/26 | 17/01/26 | 3L + 2P | 1. Motion under a central force Central Force, motion in terms of eccentricity (nature of orbits) **ISA 1**<br>2. equivalent one body problem<br>3. General features of motion in an arbitrary potential field.<br><br>**Practical 4** | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | A.V. Namjoshi, J. A. Rao, Classical Mechanics Thermal and Statistical Physics<br><br>K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |

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| Jan | 19/01/26 | 24/01/26 | 3L + 2P | 1. Motion in an inverse –square law force field. Equation of the orbit.<br>2. Kepler's Laws of planetary motion, elliptical orbits<br>3. Moving coordinate system Inertial and non- inertial coordinate frames, rotating coordinate systems<br><br>**Practical 5** | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | A.V. Namjoshi, J. A. Rao, Classical Mechanics Thermal and Statistical Physics<br><br>K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |
| Jan | 26/01/26 | 31/01/26 | 2L + 2P | 1. laws of motion on the rotating earth, Coriolis force<br>2. Foucault's pendulum (no derivation), and Larmor's theorem<br><br>**Practical 6** | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | A.V. Namjoshi, J. A. Rao, Classical Mechanics Thermal and Statistical Physics<br><br>K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |

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| February | 2/02/26 | 7/02/26 | 3L + 2P | 1. Rigid bodies Translation and Rotational motion of a rigid body<br>2. Compound pendulum, Location of center of mass relative to the two different origins<br>3. theorems to locate the center of mass, Parallel axis and Perpendicular axis theorems.<br><br>**Practical 7** | MCQ Quiz<br><br>Written Test | Powerpoint presentation<br><br>Google classroom | A.V. Namjoshi, J. A. Rao, Classical Mechanics Thermal and Statistical Physics<br><br>K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |
| Feb | 9/02/26 | 14/02/26 | 3L + 2P | 1. **ISA 2 – written test**<br>2. Rotation of a rigid body about an axis, Expression for angular momentum of a rigid body<br>3. moment of inertia tensor<br><br>**Practical 8** | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | A.V. Namjoshi, J. A. Rao, Classical Mechanics Thermal and Statistical Physics<br><br>K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |

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| Feb | 16/02/26 | 21/02/26 | 3L + 2P | 1. Euler's equations of motion of a rigid body<br>2. Euler's equation for torque free motion.<br>3. Problem solving<br><br>**Practical Revision** | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | |
| Feb | 23/02/26 | 28/02/26 | 3L + 2P | 1. Problem solving<br>2. Problem solving<br>3. Problem solving<br><br>**Practical Revision** | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | A.V. Namjoshi, J. A. Rao, Classical Mechanics Thermal and Statistical Physics<br><br>K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics |
| March | 2/03/26 | 7/03/26 | 3L + 2P | 1. Revision<br>2. Revision<br>3. Revision<br><br>**Practicals :** Revision | MCQ Quiz | Powerpoint presentation<br><br>Google classroom | |

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| March | 9/03/26 | 14/03/26 | 3L + 2P | 1. **ISA 3 – written test**<br>2. Revision<br>3. Revision<br><br>**Practicals:** Revision | MCQ Quiz Test | Powerpoint presentation<br><br>Google classroom | K. R. Symon, Mechanics, 3rd edition, Pearson (2016).<br><br>R. G. Takawale and P. S. Puranik, Introduction to Classical Mechanics, |
| March | 16/03/26<br>23/03/26 | 21/03/26<br>31/03/26 | 8L | Revision<br>**Practical Exam** | Test | | |

**Assessment Rubrics**

| Component | Max Marks |
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| ISA 1 Assignment | 7.5 |
| ISA 2 Written Test | 7.5 |
| ISA 3 Presentation | 7.5 |
| Practical | 25 |
| Semester End Exam | 60 |