

**Syllabus**  
**B.Sc. (Physics)**  
**(Sem.- I)**

**Name of the Course: F.Y.B.Sc. SEM-I - Paper I – Introduction to Mechanics**

| Sr.No. | Heading                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Particulars                                                                                                                           |
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| 1      | <b>Description the course :<br/>Including but Not limited to:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Introduction, relevance, Usefulness, Application, interest, connection with other courses, demand in the industry, job prospects etc. |
| 2      | <b>Vertical :</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Major/Minor/Open Elective /Skill Enhancement / Ability Enhancement/Indian Knowledge System                                            |
| 3      | <b>Type :</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Theory</b> / Practical                                                                                                             |
| 4      | <b>Credits :</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2 credits ( 1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester )                                              |
| 5      | <b>Hours Allotted :</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30 Hours                                                                                                                              |
| 6      | <b>Marks Allotted:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50 Marks                                                                                                                              |
| 7      | <b>Course Objectives (CO):</b><br><br>After successful completion of this course students will be able to:<br><br>CO 1. Explain Newton's laws of motion, friction, work, energy and able to solve problems using them.<br><br>CO 2. Learn the mechanics of multi-particle system using concepts of center of mass and conservation laws.<br><br>CO 3. Study the mechanics of undamped (simple harmonic motion, uniform circular motion) and damped oscillations (Forced oscillations, two body oscillation)<br><br>CO 4. Describe qualitatively how undamped and damped oscillations are implemented in physical problems such as torsional, compound, and simple pendulums.<br><br>CO 5. Demonstrate quantitative problem solving skills in all the topics covered in the syllabus. |                                                                                                                                       |
| 8      | <b>Course Outcomes (OC):</b><br><br>After successful completion of this course the learner will be able to:<br><br>OC 1. Understand Newton's laws of motion, friction, work, energy and able to solve problems using them.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                       |

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|   | <p>OC 2. Comprehend Work and Energy equivalence and its applications through suitable numerical.</p> <p>OC 3. Understand mechanics of multi-particle system using concepts of center of mass and conservation laws.</p> <p>OC 4. Understand mechanics of undamped/ (simple harmonic motion, uniform circular motion) and damped oscillations</p> <p>OC 5. Understand how undamped and damped oscillations are implemented in physical problems</p> <p>OC 6. Demonstrate quantitative problem solving skills in all the topics covered</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 9 | <p><b>Modules:-Paper 1 – Introduction to Mechanics (30 Hrs)</b></p> <p style="text-align: center;"><b>UNIT- I (15 Hrs)</b></p> <p><b>1. Newton’s Laws of Motion:</b> Newton’s first, second and third laws of motion, interpretation and applications, pseudo forces, inertial and non-inertial frames of reference Worked out examples (with friction present). <b>(HCV: 5.1 to 5.5)</b></p> <p><b>2. Friction:</b> Advantages &amp; disadvantages of friction in daily life, Friction as the component of Contact force, Kinetic Friction, Static friction, laws of friction, Understanding friction at atomic level. <b>(HCV: 6.1 to 6.5)</b></p> <p><b>3. Work and Energy:</b> Kinetic Energy, Work and Work-energy theorem, Potential Energy, Conservative and Non-Conservative Forces, Different forms of Energy: Mass Energy Equivalence Worked out Examples. <b>(HCV: 8.1, 8.2, 8.5, 8.6, 8.11)</b></p> <p style="text-align: center;"><b>UNIT- II (15 Hrs)</b></p> <p><b>1.Many Particles System,</b> Centre of Mass of solid objects, Conservation of momentum in a system of particle, Angular momentum of a particle and system of particle, conservation of angular momentum. <b>(RH: 7.3, 7.4, 7.5, 10.1, 10.2, 10.4)</b></p> <p><b>Oscillations:</b> The Simple Harmonic Oscillator, Relation between Simple Harmonic Motion and Uniform Circular Motion, Damped Harmonic Motion, Forced Oscillations and Resonance, Two Body Oscillations.</p> <p>RH:17.2, 17.6, 17.7, 17.8, 17.9</p> <p>Examples of Simple Harmonic oscillations: Simple Pendulum,</p> <p>Simple Pendulum, Torsional Pendulum and Compound pendulum (Qualitative study)</p> <p>HP: 9.1.1(1,3,4)</p> |

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| 10 | Text Books                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                              |  |
| 11 | Reference Books<br><br>1. <b>HCV:</b> H.C. Verma, Concepts of Physics-Part I (Second Reprint of 2020) Bharati Bhavan Publishers and Distributers<br><br>2. <b>RH:</b> Resnick and Halliday: Physics – I , 5 <sup>th</sup> Edition.<br><br>3. <b>Mechanics</b> – H. S. Hans and S. P. Puri, Tata McGraw Hill (2nd ED.). |                                                                                                                                                                              |  |
| 12 | Internal Continuous Assessment: 40% (20Marks)                                                                                                                                                                                                                                                                          | Semester End Examination: 60% (30 Marks)                                                                                                                                     |  |
| 13 | Continuous Evaluation through:<br><br>Quizzes, Class Tests, presentation, project, role play, creative writing, assignment etc.( at least 3 )                                                                                                                                                                          |                                                                                                                                                                              |  |
| 14 | Format of Question Paper: 30 Marks Duration: One Hour                                                                                                                                                                                                                                                                  |                                                                                                                                                                              |  |
|    | Unit -I<br>(15Marks)                                                                                                                                                                                                                                                                                                   | Q:1 A) Attempt any <b>Two</b> 10Marks<br><br>i) Theory<br>ii) Theory<br>iii) Theory<br>iv) Theory<br><br>B) Attempt any <b>One</b> 05 Marks<br><br>i) Problem<br>ii) Problrm |  |
|    | Unit -II<br>(15Marks)                                                                                                                                                                                                                                                                                                  | Q:2 A) Attempt any <b>Two</b> 10Marks<br><br>i) Theory<br>ii) Theory<br>iii) Theory<br>iv) Theory<br><br>B) Attempt any <b>One</b> 05 Marks<br><br>i) Problem<br>ii) Problrm |  |