

Course Code	Course Name	Credits
26PH653	ADVANCED PHYSICS LAB	02

Objective

The objective of this laboratory course is to enable students to understand and verify fundamental principles of advanced physics through experimental methods. Students will develop practical skills in conducting experiments, taking accurate measurements, analyzing data, and interpreting results.

1. Python – Arrays
2. Python – Matrices
3. Python – Numerical methods
4. Python – Simple physics calculations (Velocity, Acceleration)
5. Matrix multiplication by using NumPy array operation
6. Lagrange interpolation and extrapolation
7. Newton Forward & Backward interpolation
8. Numerical Integration using Trapezoidal Rule
9. Trapezoidal vs Simpson accuracy
10. Write full Python program for RK4
11. Use SciPy to solve large matrix eigenvalues
12. Computational experiment: Binding energy calculation for different mass numbers
13. Computational experiment: Two body central force problem
14. Implement symmetry operations and representations using Python.
15. Curve fitting – Least square fitting
16. Computational experiment: Solving Schrodinger equation for hydrogen / LHO
17. Character Table (C_{2v} / C_{3v})
18. Computational experiment: Linear Harmonic Oscillator problem using Hamilton's equation
19. Computational experiment: Solution of Poisson's equation
20. Computational experiment: 2-D Electrostatic Calculation

Students are required to perform and record at least ten experiments in the laboratory manual as part of the course requirements.