

Department of Physics, IIT Kanpur
PHY617: Computational Physics
2025-2026 Semester II

Instructor:

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Schedule

Lectures: Tue, Wed 12.00-12.15 pm

Laboratory: Thu 14:00 - 17:00

Contents

Introduction to computers and programming, programming in Python; Interpolation and extrapolation, Roots of Equations, Solution of linear systems of equations, least squares fitting, numerical differentiation and integration, numerical solution of ordinary differential equations and partial differential equations, matrix eigenvalue problems, Fourier transforms, Monte Carlo techniques, examples from Physics. (the order may be different)

Suggested Textbooks and References

1. Computational Physics: Problem Solving with Python – Bordineau, Paez and Lan
2. Afternotes on Numerical Analysis - Stewart
3. Numerical Methods – Kincaid and Cheney
4. Any reference book or primer for Python.
5. Lecture notes will be made available wherever necessary.

Topic-wise references for further study will be suggested during the course if needed.

Evaluation

Component	Marks
Mid-Semester Examination (Theory)	30
End-Semester Examination (Theory)	30
Laboratory Reports	20
Two Quizzes	20
Total	100

Course policies:

- Attendance is mandatory.
- Taking End-Sem examination is mandatory.
- DOAA guidelines on use of unfair means and academic misconduct will be strictly followed.