

# Learning Introductory Numerical Computation

An add-on course offered for UG students to learn & understand basics of computer programming

By

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Course Coordinator

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## Salient Features

- Course duration : 32 hours
- Eligibility: All UG students from the faculty of Science
  - Course Registration Fee: Rs.50/-
  - Prerequisite: Knowledge of basic Mathematics of 10+2 level
- Teaching Mode: Hybrid mode of teaching

## Curriculum & Outline of the Course

- Recapitulation of 10+2 level calculus; plotting & optimization of functions.
- Solution to ODE, PDE of 1<sup>st</sup> & 2<sup>nd</sup> order, series expansion
- Binary & decimal arithmetic, floating point numbers, error estimations.
- Introduction to basic 2D & 3D graph plotting using GNU & Matplotlib.
- Fitting of curves: Least square & Linear fitting.
- Introductory ideas and basic architectures of writing programmes in LINUX/UNIX OS.
- Understanding the logical & conditional statements, for loop, nested compound statements; learning multi-dimensional arrays.
- Basic algebraic operations, search algorithms, matrix as 2D arrays, solution to the equations, differentiation, integration.

## Outcome of the Course

- Learn numerical computation of solutions to mathematical and applied problems
- Apply numerical techniques to compute physically observable quantities
- Communicate advantages and disadvantages of various numerical techniques and select appropriate numerical methods for specific problems.