1.	Title of the course	Computational Physics
2.	Course number	PH504M
3.	Structure of credits	2-0-3-4
4.	Offered to	PG
5.	New course/modification to	Modification To PH5210/10
6.	To be offered by	Department of Physics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To equip students with essential tools of numerical analysis for solving various physics problems and to implement some of these in the laboratory to gain practical knowledge.	
10.	**Course Content:** Programming essentials; Approximations, error analysis; Linear algebraic equations and matrix manipulations; Regression and curve fitting: broadening of lines, decay profile; Fast Fourier transforms; Numerical integration: trapezoidal method, Simpson's method and Gauss quadrature; Numerical solution of ordinary differential equation: Euler, Crank-Nicolson and Runge-Kutta methods; Partial differential equations with finite difference methods; Monte-Carlo methods; Applications: 1-D Schrodinger equation, Poisson equation, Maxwell equations, and Ising model.	
11.	**Textbook(s):** 1. Landau R H, Paez M J and Bordeianu C C, *Computational Physics: Problem Solving with Computers*, Wiley VCH (2007). 2. Pang T, *An Introduction to Computational Physics*, Cambridge University Press (2006).	
12.	**Reference(s):** 1. Chapra S C and Canale R P, *Numerical Methods for Engineers*, McGraw-Hill (2014). 2. Sastry S S, *Introductory Methods of Numerical Analysis*, Prentice Hall of India (1983). 3. Thijssen J M, *Computational Physics* , Cambridge University Press (1999).	