1.	Title of the course	Partial Differential Equations
2.	Course number	MA612L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To MA6024/7
6.	To be offered by	Department of Mathematics and Statistics
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To introduce PDEs such as Laplace, heat and wave equations. To learn classifications of second-order PDEs. To introduce various methods to solve first order, second order, linear, quasi-linear and non-linear PDEs.	
10.	**Course Content:** First order PDE: Linear, quasi-linear and non-linear PDE InitialValue Problem, Homogenous and nonhomogeneous problem, Fundamental solution, Green's Function, Energy methods, mean value formula, Transport, Laplace, heat and wave equations. D'Alembert's solution, Fourier method, Poisson integral formula, PDE problems in Cartesian and polar coordinates on rectangular, circular and annular regions. Non-linear PDE: Complete Integrals, Envelopes, Characteristic ODE, Hamilton-Jacobi equation, conservation laws, weak solution, uniqueness, Riemann problem. Second Order PDE: Classifications– elliptic, parabolic, hyperbolic, canonical forms of equations in two independent variables, Lax-Milgram theorem, maximum-minimum principles, regularity. Applications: Diffusion and wave equations in higher dimensions and a few industry and engineering applications.	
11.	**Textbook(s):** 1. McOwen R C, Partial Differential Equations: Methods and Applications, Pearson (2002). 2. Folland G B, *Introduction to Partial Differential Equations*, Princeton University Press (1996).	
12.	**Reference(s):** 1. John F, *Partial Differential Equations*, Springer (1991). 2. Evans L C,Partial Differential Equations, American Mathematical Society (2010). 3. Stavroulakis I P, and Tersian S A, *Partial Differential Equations-An Introduction with Mathematica and Maple*, World-Scientific, Singapore (1999). 4. Cooper J, *Introduction to Partial Differential Equations with Matlab*, Birkhauser (1988).	