1.	Title of the course	Advanced Differential Equations
2.	Course number	MA705L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To MA7101/10
6.	To be offered by	Department of Mathematics and Statistics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To discuss the well-posedness of first order ordinary differential equations. To describe the stability analysis of the solutions of autonomous systems. To introduce different methods to solve first order partial differential equations (PDEs) and classification of second order PDEs.	
10.	**Course Content:** Ordinary differential equations, review of existence and uniqueness of solutions of initial value problems for system of first order differential equations; Existence and uniqueness theorem for a linear system; homogeneous and nonhomogeneous linear systems; linear equations with constant coefficients; Fundamental matrix, linear differential equations with periodic coefficients; Floquet theory; Stability for linear systems, principle of linearised stability; Stability for autonomous systems, Liapunov functions, plane autonomous systems, periodic solutions of plane autonomous systems; Partial differential equations, review of method of characteristics for first order partial differential equations and classification of second order partial differential equations, nonlinear first order partial differential equations.	
11.	**Textbook(s):** 1. Evans L C, *Partial Differential Equations*, American Mathematical Society (1991). 2. Grimshaw R, *Nonlinear ordinary differential equations*, Blackwell Scientific publications (1990).	
12.	**Reference(s):** 1. Betounes D, *Differential equations: Theory and applications*, Springer (2010). 2. Coleman M P, *An introduction to partial differential equations with Matlab*, CRC Press (2005). 3. Perko L, *Differential equations and dynamical systems*, Springer (2001). 4. Salsa S, *Partial differential equations in action: From modelling to theory*, Springer (2008).	