1.	Title of the Course	Ordinary Differential Equations
2.	Course Number	MA5204
3.	Status of the Course	Core
4.	Structure of Credits	3-1-0-4
5.	Offered To	PG
6.	New Course/Modification to	Modification To MA5204
7.	To be Offered by	Department of Mathematics
8.	To take effect from	July 2019
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	**Course Objective:** To introduce the ordinary differential equations (ODE) and their solvability. To explain the long term behavior, stability and nature of a well-defined model system at an unknown location at a future time using ODE.	
12.	**Course Content:** Existence and uniqueness, geometric interpretation of exact solutions of first order, orthogonal trajectories, Picard's theorem, iteration, Lipschitz condition, existence and uniqueness of initial value problem, non-local existence of solutions; Second order, general solution of homogeneous, non-homogeneous equations, Wronskian, variation of parameters, Sturm comparison and separation theorem, boundary value problem, Green's functions, Sturm-Liouville problems, Euler-Cauchy equations, ordinary points, Frobenius series solutions, regular singular points, Legendre equation and polynomials, Bessel functions; System of ODE, properties of solutions of linear systems, eigenvalue, eigenvector, fundamental matrix solutions, matrix exponential; Applications, string vibration, Newton's law, motion of charged particle, satellite orbiting a planet, Euler-Lagrange equations.	
13.	**Text book(s):** 1. Coddington E A, *An Introduction to Ordinary Differential Equations*, Dover Publications (1989). 2. Ross S L, *Introduction to Ordinary Differential Equations*, Wiley (1980).	
14.	**Reference(s):** 1. Chicone C, *Ordinary Differential Equations with Application*, Springer (2006). 2. Collins P J, *Differential and Integral Equations*, Oxford University Press (2006). 3. Kreyszig E, *Advanced Engineering Mathematics*, Wiley (2011). 4. Simmons G F, *Differential Equations with Applications and Historical Notes*, McGraw-Hill Higher Education (2016).	