1.	Title of the course	Differential Equations and Matrices
2.	Course number	MA102L
3.	Structure of credits	3-1-0-4
4.	Offered to	UG
5.	New course/modification to	Modification To MA1202/4
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 introduce the elementary row operations and column operations of matrices. Using the elementary row operations, to find out the inverse of square matrices and to solve the system of linear equations. Further, to learn the sufficient and necessary conditions for a square matrix to be similar to a diagonal matrix. To introduce the notion of Fourier series expansion of functions, Laplace transform of functions and its applications to differential equations. To learn the method of power series and the method of Frobenius to solve the differential equations.	
10.	**Course Content:** Matrices: Matrix operations, existence- uniqueness of solutions of a linear system, Gaussian elimination, Gauss-Jordan elimination, special types of matrices, elementary operations, inverse of a matrix , matrices as linear transformations, linear independence, rank of a matrix, nullity of a matrix, orthogonalization, determinant. Eigenvalues, eigenvectors, eigenvalues of special types of matrices, similarity of matrices, diagonalization of matrices. Ordinary Differential Equations: Separable equations, Exact equations, structure of linear differential equations with constant coefficients, Power series method, Legendre's equation, Bessel equation, Fourier series, Laplace transform, Sturm-Liouville Problems.	
11.	**Textbook(s):** 1. E. Kreyszig, *Advanced Engineering Mathematics*, John Willey & Sons (2010).	
12.	**Reference(s):** 1. Piskunov N, Differential and Integral Calculus Vol. 1-2, Mir Publishers (1974). 2. Hoffman K and Kunze R, *Linear Algebra*, Prentice-Hall Inc (2005). 3. Strang H, Linear Algebra and Its Applications, Brooks / Cole (2006).	