SEMESTER- III
MJC-04: Ordinary Differential Equations

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Understand the concept of ordinary differential equation.
CO2: Solve first order linear and non-linear differential equation and linear differential equations of higher order using various techniques.
CO3: Apply these techniques to solve and analyze various mathematical models.

MJC-04: Ordinary Differential Equations (4 credits) Full Marks-100		
Unit	**Topics to be covered**	**No. of Lectures**
1	Formulation of Differential equations and its order and degree, General, Particular and Singular solutions of differential equations, variables separable, Equations reducible to variables separable, Homogeneous differential equations, Equations reducible to homogeneous form, Exact differential equations and equations reducible to the exact form, Linear differential equations and equations reducible to linear form, Bernoulli equation.	10
2	Differential equations of first order but not of first degree, Singular solutions, Clairaut's form, Orthogonal Trajectories of family of curves,Wronskian and its properties, Linear differential equation of order greater than one with constant coefficients, Cauchy- Euler Equation, Legendre's Linear Equation.	10
3	Second order linear differential equations with variable coefficients: Use of a known solution to find another, normal form, method of undetermined coefficient, variation of parameters, Total differential equation in three variables, Simultaneous differential equations.	10
4	Definition of Laplace transform, Existence Theorem, Formulas and Properties of Laplace transform, Laplace transform of special functions viz: Dirac's delta, Unit step, Periodic, Bessel, Error functions, Inverse Laplace transform, Formulas and Properties of inverse Laplace transform, Convolution theorem, Solution of ordinary differential equation using Laplace transform.	10
	TOTAL	40

Book References:

1. Simmons, George F. (2016). Differential Equations with Applications and Historical Notes. Tata–McGraw Hill Publishing Company Limited, New Delhi.
2. Raisinghania, M.D. (2020). Ordinary and Partial Differential Equations (20th ed.). S. Chand Publication.
3. Bronson, R. &Coasta, Gabriel B. (2021). Schaum's Outline of Differential Equations (5th ed.). McGraw Hill.
4. Prasad, Lalji. (2019). Differential Equations. Paramount Publication.