Course Outcomes: This paper provides detailed knowledge of differential equations and their solutions. This course is useful for the students to solve not only mathematical problems in daily life but also helps to understand typical problems of physics and other related areas.

Credits: 6	**Compulsory**
Max. Marks: 25+75	Minimum Passing Marks: ….

Total No. of Hours = 70-75

Unit	**Contents**	**Number of Hours**
Unit I	Order and Degree of Differential Equations, Complete primitive (general solution, particular solution and singular solutions), Existence and uniqueness of the solution dy/dx= f(x,y). Differential equations of first order and first degree, Separation of variables, Homogeneous Equations, Linear Differential Equations, Exact Differential Equations, Integrating Factor, Equation of First order but not of first degree, variation of parameters, Clairaut's form, Singular solutions, Trajectory, Orthogonal Trajectory, Self-Orthogonal family of Curves.	10-15
Unit II	**Linear Differential Equations:** Linear equations with constant coefficients, Complementary function, Particular integral, Working rule for finding solution, Homogeneous linear equations. **Miscellaneous Equations:** Simultaneous differential equations, Differential equations of the form dx/P= dy/Q= dz/R where P, Q, R are functions of x, y and z, Exact differential equations, Total differential equations, Series solutions of differential equations, Linear differential equations of second order with variable coefficients.	12-15
Unit III	**Partial Differential Equations**: Partial differential equations of first order, Charpit's method, Linear partial differential equations with constant coefficients. First-order linear, quasi-linear and non-linear partial differential equations using the method of characteristics: explicit solutions. **Partial differential equations of second order:** Classification of second order linear equations in two independent variables: hyperbolic, parabolic and elliptic types (with examples).	10-15
Unit IV	Laplace Transformation, Inverse Laplace Transformation, Applications to solve Differential equations	10-15
Unit V	Fourier Transformation, Inverse Fourier Transformation, Applications to solve Differential equations	12-15

Books Recommended:

1. G. F. Simmons: *Differential Equations with Application and Historical Notes*, McGraw Hill Edition, 2002