

Semester III

GE- 3 DIFFERENTIAL EQUATIONS

Five Lectures per week + Tutorial as per University rules

Max. Marks 100 (including internal assessment)

Examination 3 hrs.

UNIT-I

First order ordinary differential equations: Basic concepts and ideas, Exact differential equations, Integrating factors, Bernoulli equations, Orthogonal trajectories of curves, Existence and uniqueness of solutions, Second order differential equations: Homogenous linear equations of second order, Second order homogenous equations with constant coefficients, Differential operator, Euler-Cauchy equation.

UNIT-II

Existence and uniqueness theory, Wronskian, Nonhomogenous ordinary differential equations, Solution by undetermined coefficients, Solution by variation of parameters, Higher order homogenous equations with constant coefficients, System of differential equations, Conversion of n^{th} order ODEs to a system, Basic concepts and ideas, Homogenous system with constant coefficients.

UNIT-III

Power series method: Theory of power series methods, Legendre's equation, Legendre polynomial, Partial differential equations: Basic Concepts and definitions, Mathematical problems, First order equations: Classification, Construction, Geometrical interpretation, Method of characteristics, General solutions of first order partial differential equations, Canonical forms and method of separation of variables for first order partial differential equations, Classification of second order partial differential equations, Reduction to canonical forms, Second order partial differential equations with constant coefficients, General solutions.

REFERENCES:

[1] Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., 9/e, (2006)

[2] TynMyint-U and LokenathDebnath; Linear Partial Differential Equations for Scientists and Engineers, Springer, Indian Reprint (2009)