

Syllabus for Integrated B.Sc-M.Sc (Mathematics) II Semester

CourseCode:	Couse Title	L-T-P	Credits
TMAT30006T	Ordinary Differential Equations with Applications	3-0-2	4

Objective: The aim of this course is to teach the students C-programming.

CO 01	Understand the fundamentals of formulation of differential equation
CO 02	Learn the first order and higher degree differential equations various operators.
CO 03	Understanding of higher order differential equation and its real world applications
CO 04	Learn various other methods of finding solution of higher order differential equations
CO 05	Solve second order linear differential equations using power series methods

CourseContents

Afterpursuingthiscourse,thestudentshallbeableto:

UNIT-I

Definitions, Geometrical meaning of a differential equations of the first order and first degree, formation of a differential equation, variable separable form, homogenous equations, equation reducible to homogenous form, linear differential equations, equation reducible to linear form, exact differential equations, equations reducible to exact differential forms. Applications of first order linear differential equation.

UNIT-II

First order higher degree equations solvable for x , y , p . Clairaut's form and singular solutions. Orthogonal trajectories. Linear differential equations with constant coefficients; Applications of differential equations of first order.

UNIT-III

Linear differential equations of higher order, Operator D , Rules to find the complementary solutions of the differential equations, Rules to find the particular solutions of the differential equations. Applications of higher order linear differential equation.

UNIT-IV

Method of Variation of Parameters technique, Cauchy's Homogenous linear equations, Method of variation of parameters. Ordinary simultaneous differential equations. Series solutions of differential equations: Series solution of second order linear differential equations, Power series method, and regular singular point of the differential equations

UNIT-V

Methods of Frobenius to solve differential equations, Legendre's and Bessel differential equation, solution of Legendre's and Bessel equations and their properties: Convergence, recurrence, and generating relations, Orthogonality of functions.

Recommended Books:

1. Shepley L. Ross, Wiley, Differential Equations Differential Equations, 2007
2. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, Inc., 9th edition, 2011.
3. Simons, George, Differential Equations with Applications and Historical Notes, 2017
4. N.P.Bali, Manish Goyal, A Text Book of Engineering Mathematics, PLI

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