

INTEGRAL EQUATIONS

Course No: **MM24208DCE**

Total Credits: **02**

Semester: **M.A/M.Sc 2nd Semester**

Total Marks: **50**

Continuous Assessment: **Marks 10, Theory Marks: 40** Time Duration: **1½ Hrs Course**

Course objectives: To acquaint the student with tackling integral equations that include energy transfer, heat equation, oscillation of a string etc., that may enable them to solve different type of differential equations.

Course Outcomes: Course outcomes for an Integral Equations course typically focus on developing students' understanding of integral equations, their solutions, and their applications in various fields.

UNIT -I

Linear integral equations of the first and second kinds, Volterra and Fredholm integral equations, relations between differential and integral equations, solution of Volterra and Fredholm integral equations by the methods of successive substitutions and successive approximations, iterated and resolvent kernels, Neumann series, reciprocal functions, Volterra's solutions of Fredholm equations.

UNIT -II

Fredholm theorems, Fredholm associated equation, solution of integral equations using Fredholm's determinant and minor, homogeneous integral equations, integral equations with separable kernels, the Fredholm alternatives, symmetric kernels, Hilbert Schmidt theory for symmetric kernels, applications of integral equations to differential equations, initial value problem, boundary value problem, Dirac-Delta function, Green's function approach.

Books Recommended:

1. R. P. Kanwal, Linear Integral Equations (Theory and Technique), Academic Press Birkhauser-1997.
2. W. V. Lovitt, Linear Integral Equations, Dover Publications, Inc. New York, 1950.
3. K. F. Riley, M.P. Hobson and S.T. Bence, Mathematical Methods for Physics and Engineering Cambridge University Press, U.K., 1997.
4. M. D. Raisinghania, Integral Equations and Boundary Value Problems, S.C. Chand India, 2007.
5. Shanti Swarup, Integral Equations (&Boundary Value Problems), Krishna Prakashan Media (P) Ltd. Meerut, India, 2014.