

Course Contents:

Linear Differential Equations; Homogeneous Linear Equations of Second Order; Second-Order Homogeneous Equations with Constant Coefficients; Case of Complex Roots, Complex Exponential Function; Non-homogeneous Equations; Solution by Undetermined Coefficients; Solution by Variation of Parameters; Fourier Integrals; Fourier Cosine and Sine Transforms; Fourier Transform and Properties; Dirac Delta Function; Convolution Theorem; Parseval's Theorem; Fourier integral to Laplace transforms; Partial Differential Equations; Basic Concepts; Modelling: Vibrating String, Wave Equation; Separation of Variables, Use of Fourier Series; Modelling: Membrane, Two-Dimensional Wave Equation; Rectangular Membrane, Use of Double Fourier Series; Linear Algebra; Rank of a Matrix, Linear Independence, Vector Space; Solutions of Linear Systems: Existence, Uniqueness, General Form; Vector Spaces, Inner Product Spaces, Linear Transformations; Eigenvalues, Eigenvectors; Similarity of Matrices, Basis of Eigenvectors, Diagonalization.