SYLLABUS :-

Linear vector spaces: real and complex vector spaces; metric spaces; linear Operators; algebra of linear operators; eigenvalues and eigenvectors; orthogonalisation theorem; N-dimensional vector space; tensors and tensor calculus; invariant subspaces, Function spaces, orthogonal polynomials , Fourier transform: space of continuous functions; metric properties of the space of continuous functions; Lebesgue integral; the Riesz-Fischer theorem; expansions in orthogonal functions; Hilbert space; Weierstrass theorem; orthogonal polynomials-Rodriguez formula; recurrence relations; differential equations satisfied by classical polynomials; Fourier series and Fourier transform, delta function. Complex analysis: Cauchy-Riemann conditions; Cauchy s theorem; Taylor series and Laurent series; zeros and isolated singularities of analytic functions; Calculus of residues; Multivalued functions and Riemann surfaces; analytic,continuation;meromorphicfunctions. Ordinary differential equations, Green s functions, special functions : second order differential equations; the Sturm-Liouville problem; Hypergeometric functions; functions related to them; confluent Hypergeometric functions; functions related to them; Error and Bessel functions.