

SUBJECT NO-MA11004, SUBJECT NAME- LINEAR ALGEBRA, NUMERICAL AND COMPLEX  
ANALYSIS

LTP- 3-1-0,CRD- 4

SYLLABUS :-

Linear Algebra, Numerical and Complex Analysis(Math-II) [L-T-P: 3-1-0 Credit: 4] MA11004 Prerequisite: None Category: Old(Modified) 1.Linear Algebra: Vector spaces over real/complex field, subspaces, linear combination, spanning set.2.2 Lectures] Linear dependence and independence of vectors, echelon form of matrices, basis and dimension of vector spaces 3.3 Lectures] Rank of a matrix, Linear transformation, rank-nullity theorem, matrix representation of a linear transformation. [3 Lectures] Solution of system of linear homogeneous and non-homogeneous equations using rank concept and Gauss elimination method. [3 Lectures] Eigenvalues and Eigenvectors of matrices and their properties (Hermitian, Skew-Hermitian, Unitary matrices), diagonalization, Cayley-Hamilton Theorem (statement only). [3 Lectures] Inner product, Norms of vectors, orthogonal vectors, Cauchy Schwarz Inequality (statement only). [3 Lectures] 2.Numerical Analysis: Iterative method for solution of system of linear equations Jacobi and Gauss Seidel method. [3 Lectures] Solution for transcendental equations: Bisection, Regular Falsi methods, Fixed point iteration, Newton-Raphson methods. [3 Lectures] Finite differences, Interpolation, error in interpolation Polynomial, Newtons forward and backward interpolation formula, Lagranges interpolation formula. [3 Lectures] Trapezoidal and Simpsons 13 rules for numerical integration. [2 Lectures] 3. Complex Analysis: Limit, continuity, differentiability and analyticity of functions, Cauchy-Riemann equations, harmonic conjugates. [3 Lectures] Line integrals in complex plane, Path independence. [2 Lectures] Cauchy s integral formula, derivatives of analytic functions, Cauchy s integral theorem [2 Lectures] Singularities, Taylor s series, Laurent series [3 Lectures] Residue theorem, evaluation of real integrals [2 Lectures] References: 1. Advanced Engineering Mathematics, by Erwin Kreyszig, 10th edition, John wiley and Sons, 2017. 2. Introduction to Linear Algebra, by Gilbert Strang, 5 th edition, Wellesley-Cambridge Press, 2016