

Syllabus for Mid Term Examination

MS 105: Mathematics II

Rank of a matrix, determinants, Cramer's Rule. Linear systems of equations, Direct methods: Gauss elimination, Gauss-Jordan elimination and LU factorization. Vector spaces – Linear dependence of vectors, basis, linear transformations, range and kernel of a linear map, rank and nullity, rank-nullity theorem. Matrix associated with a linear map. Eigenvalues and eigenvectors, Cayley-Hamilton Theorem.

Finite differences, relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

Solution of polynomial and transcendental equations – Bisection method, Newton-Raphson Method, Secant method and Regula-Falsi method.

MS 103: Mathematics II

Linear Algebra: Vector spaces Linear dependence of vectors, basis, linear transformations, rank and inverse of a matrix, solution of algebraic equations consistency conditions. Eigenvalues and eigenvectors, Hermitian and skew Hermitian matrices.

Numerical Analysis: Finite differences, Newtons forward and backward interpolation formulae, Central difference interpolation. Solution of polynomial and transcendental equations bisection method, Newton Raphson method and Regula-Falsi method.