MA102 Mathematics II (3-1-0-8)

Prerequisite: Nil

Linear Algebra: Systems of linear equations, matrices, Gaussian elimination, echelon form, column space, null space, rank of a matrix, inverse and determinant; Vector spaces (over the field of real and complex numbers), subspaces, spanning set, linear independence, basis and dimension; Linear transformations, rank-nullity theorem, matrix of a linear trans-formation, change of basis and similarity; Eigenvalues and eigenvectors, algebraic and geometric multiplicity, diagonalization by similarity; Inner product spaces, Gram-Schmidt process, orthonormal basis; Orthogonal, Hermitian and symmetric matrices, spectral theorem for real symmetric matrices.

Ordinary Differential Equations: First order differential equations exact differential equations, integrating factors, Bernoulli equations, existence and uniqueness theorem, applications; Higher-order linear differential equations solutions of homogeneous and nonhomogeneous equations, method of variation of parameters, operator method; Series solutions of linear differential equations, Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kinds; Systems of first-order equations, phase plane, critical points, stability.

Texts:
[1] D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
[2] S. L. Ross, Differential Equations, 3rd Edition, Wiley India, 1984.

References:
[1] G. Strang, Linear Algebra and Its Applications, 4th Edition, Brooks/Cole India, 2006.
[2] K. Hoffman and R. Kunze, Linear Algebra, 2nd Edition, Prentice Hall India, 2004.
[3] E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
[4] E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.