

Department of Mathematics, IIT Madras

MA1102 Series and Matrices

Jan- Apr 2019 –Syllabus

: Syllabus for Series and Matrices:

Series: Sequences of real numbers, Series, ratio and root test, improper integral, integral test, alternating series, absolute and conditional convergence, power series, radius and interval of convergence of power series, term by term differentiation and integration of power series, Taylors formulas, Taylor series, periodic functions and Fourier series, convergence of Fourier series, functions of any period, even and odd functions, half-range expansions.

Matrices: Matrix operations, special types of matrices, matrices as linear transformations, linear independence, basis and dimension, rank of a matrix, nullity of a matrix, elementary operations, inverse of a matrix, orthogonalization, determinant, existence- uniqueness of solutions of a linear system, Gaussian elimination, Gauss-Jordan elimination, Eigenvalues, eigenvectors, eigenvalues of special types of matrices, similarity of matrices, basis of eigenvectors, diagonalization.

: Texts:

- (1) G.B. Thomas Jr., M.D. Weir and J.R. Hass, Thomas Calculus, Pearson Education, 2009.
- (2) E. Kreyszig, Advanced Engineering Mathematics, 10th Ed., John Willey & Sons, 2010.

: References:

- J. Hefferon, Linear Algebra, <http://joshua.smcvt.edu/linearalgebra>, 2014.
- S. Lang, Introduction to Linear Algebra, 2nd Ed., Springer-Verlag, 1986.
- M.T. Nair, Calculus of One Variable, Ane Books, 2014.
- N. Piskunov, Differential and Integral Calculus Vol. 1-2, Mir Publishers, 1974.
- G. Strang, Linear Algebra and its Applications, Cengage Learning, 4th Ed., 2006.