

MAE113T-Matrix and Calculus

Semester: I	Course Title: Matrix and Calculus	Credit: 2
Course No.: 113T	Minor -1 (T)	Hours: 2/week

COs with Cognitive Abilities

COs	COGNITIVE ABILITIES	COURSE OUTCOMES
CO1	REMEMBERING	Memorize the basics of various matrices of real and complex numbers
CO2	UNDERSTANDING	Familiarize with basics of Rank of matrix and Application of Matrix in solving linear equations
CO3	APPLYING	Employ Taylor's and McLaurin's series to find power series in one variable
CO4	ANALYSING	Define successive derivatives of nth order

CO-PO Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	1	2	1		
CO 2	1	1	1		
CO 3	1	2	1		
CO 4		1	2		

Unit	Detailed Syllabus	No. of Hours of Teaching
I	Different Matrices and Rank of Matrix. Introduction to matrices, different types of matrices, operations on matrices, Theorems on matrices, Elementary operations on matrices and types of matrices, Symmetric and skew-symmetric matrices, Hermitian and skew-Hermitian matrices. Linear dependence and independence of row and column matrices. Row rank, column rank and rank of a matrix. Row Reduced Echelon (RRE) form of a matrix and matrix inversion using it.	15
II	Successive derivatives and power series. a) Successive Derivatives, standard results for n^{th} derivative, Leibniz's Theorem. b) Definition of limit of a sequence, Convergence and divergence of an infinite series, Alternating Series (without proof). Comparison test, Ratio test and Root test, Power series.	15

Suggested Reference Books:

1. Calculus and Analytic Geometry – G. B. Thomas and R. L. Finney. Pearson Education. Indian Reprint.
2. Calculus – James Stewart, Sixth edition,(E-Book).
3. Calculus – T. M. Apostol. Volumel.

4. Differential Calculus – Shanti Narayan, P.K. Mittal, S. Chand and Co.
5. Differential Calculus – Harikishan, Atlantic Publishers.
6. Calculus – M. Spivak.
7. An Introduction to Linear Algebra – I. K. Rana, Ane Books Pvt. Ltd.
8. Linear Algebra Theory and Applications – Ward Cheney, David Kincaid. Jones and Bartlett India Pvt. Ltd.
9. Introduction to Linear Algebra – Serge Lang. Springer (India).
10. Matrix and Linear Algebra – K. B. Dutta, Prentice Hall.
11. A Textbook of Matrices – Shanti Narayan, P K Mittal, S. Chand Group.
12. Introduction to Linear Algebra – V. Krishnamurthy, Affiliated East-west Press Pvt Ltd.