

6TH SEMESTER
DISCIPLINE SPECIFIC ELECTIVES (DSEs)
OPTION -I

MM616DA: MATHEMATICS: LINEAR ALGEBRA

CREDITS: 6

Unit-I

Types and properties of matrices, Inverse of a square matrix, matrix polynomials, characteristic equation, Cayley-Hamilton Theorem, Eigen values and eigenvectors of matrices and their determination, rank of a matrix, invariance of rank matrix under elementary transformations. Reduction of matrix to normal form, elementary matrices.

Unit-II

Linear dependence and linear independence of row(column) vectors, conditions for columns of a matrix to be linearly dependent, matrix A has rank r iff it has r linearly independent columns, analogous results for rows. Linear homogeneous and non-homogeneous equations, Linear product of two vectors, orthogonal and unitary matrices, determination of orthogonal matrices.

Unit-III

Vector spaces, examples, subspaces, algebra of subspaces, quotient spaces, linear dependence, independence and linear span of vectors, basis and dimensions of vector spaces.

Unit-IV

Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, algebra of linear transformations, dual space and dual basis, homomorphism and isomorphism, isomorphism theorems.

Text Books Recommended:

1. A. Aziz, N. A. Rather and B. A. Zargar, A Text Book of Matrices, KBD.
2. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, PHI.
3. S. Lang, Introduction to Linear Algebra, Springer.
4. Shanti Narayan, A Text Book of Matrices.
5. Gilbert Strang, Linear Algebra and its Applications, Thomson (2007)

6TH SEMESTER
DISCIPLINE SPECIFIC ELECTIVES (DSEs)
OPTION -II

MM616DB: MATHEMATICS: THEORY OF PROBABILITY

CREDITS: 6

UNIT-I

The probability set functions, its properties, probability density function, the distribution function and its properties, mathematical expectations, some special mathematical expectations, inequalities of Markov, Chebyshev and Jensen.

Unit -II

Conditional probability, independent events, Baye's theorem, distribution of two and more random variables, marginal and conditional distributions, conditional means and variances, correlation coefficient, stochastic independence and its various criteria.

Unit-III

Some Special Distributions, Bernoulli, Binomial, trinomial, multinomial, negative binomial, Poisson, gamma, chi-square, beta, Cauchy, exponential, geometric, normal and bivariate normal distributions.

Unit-IV

Distribution of functions of random variables, distribution function method, change of variables method, moment generating function method, t and F distributions, distribution of order statistics, distribution of \bar{X} and nS^2/σ^2 · Limiting distributions, different modes of convergence, central limit theorem.

Recommended Books:

1. Hogg and Craig, An Introduction to Mathematical Statistics.
2. Mood and Grayball; An Introduction to Mathematical Statistics. References
3. C. R. Rao, Linear Statistical Inference and its Applications.
4. V. K. Rohatgi, An Introduction to Probability and Statistics.