MA 301: MATHEMATICS-III (Common to all Branches)
Theory-100 marks.; Sessional- 50 marks.
Time- 3 Hrs.

Unit-I: Linear Algebra: 40 Marks.: Some Special types of matrices such as symmetric and skew-symmetric, hermitian and skew-hermitian, idempotent, nilpotent, involuntary, orthogonal, unitary and their properties; Triangular and echelon form, pivot elements; Trace, Differentiation and integration of matrices; Inverse of a matrix, Theorems on inverse, elementary operations and elementary matrices, equivalent matrices, computation of inverse by elementary transformations, reduction of matrices to triangular from and normal from; partitioning, inverse by partitioning, rank of a matrix, evaluation of rank, Theorems on rank.; Vector spaces and subspaces, linear independence, basis and dimension, row space, column space, null space, row rank, column rank, equality of row rank, column rank and rank of a matrix. ; Solution of a system of non-homogeneous linear equations, solution of a system of homogeneous linear equations, Consistency of a system of linear equations.; Orthogonally: Inner product, orthogonal vectors, orthogonal metrics and Gram-Schmidt orthogonalization.; Eigen values and Eigen vectors and their properties, Cayler-Hamilton's theorem, Reduction of a matrix to diagonal from, necessary and sufficient condition for diagonalization.

Unit-II: Statistics: 40 Marks: Probability, probability distributions and characteristics: Dispersion skewness and kurtosis, random experiments and sample space, definitions of probability, Laws of probability, Baye's theorem, random variable, Probability distribution of a discrete random variable, Mean and Variance of a discrete random variable, Probability distribution of a continuous random variable, Expectation and moments, Binomial distribution, Poisson distribution, Normal distribution.

Elementary sampling theory: Sampling with and without replacement, Sampling distribution of mean, proportion, sum and difference. Central limit theorem and its significance.

Statistical estimation theory: Biased and un-biased estimates, efficient estimate, point & interval estimate. Confidence limits for the estimates of mean, proportion, difference and sum.

Statistical decision theory: Statistical hypothesis, Null hypothesis, Test of significance involving normal distribution.

Unit-III: Laplace transformation: 20 Marks : Laplace transformation of elementary functions, inverse Laplace transform, Linearity, Laplace transforms of derivatives and integrals, shifting Theorems, Laplace transform of unit step function,

Direc-delta function, Differentiation and integration of transforms, convolution, Application to differential equations.

Text/Reference:

1. Advanced Engineering Mathematics. : Peter V O' Neil. : Wiley Eastern Ltd.
2. Advanced Engineering Mathematics. : Jain & Iyenger. : Narosa.
3. Higher Engineering Mathematics. : B. S. Grewal. : Laxmi Publication.
4. Linear Algebra & its applications. : Gilbert Strang. : Thomson Books.
5. Probability & Statistics. : Murray R. Spiegel.: Schaum's outline series, Mc Graw Hill.