

Cluster University, Srinagar

Syllabus for B.A./B.Sc. 6th Semester

Subject: Mathematics
Course Title: Linear Algebra
Course Code: MA17601[DSC]
Total Credits: 06

Distribution of Marks
End-Term Examination: 56 Attendance: 04
Internal Assessment: 28 Attendance: 02

Unit I

Inverse of a square matrix, necessary and sufficient condition for a matrix to possess an inverse, uniqueness of inverse, reversal law for the inverse of product of matrices and its generalization, inverting and transposing are commutative operations, inverse of a symmetric matrix is symmetric, rank of a matrix, elementary transformations, elementary transformations (row and column) do not alter the rank of a matrix, employment of only row(column) transformation, rank of the product of two matrices cannot exceed the rank of either matrix, reduction of a matrix to normal form, elementary matrices

Unit II

Homogeneous and non-homogeneous equations, the equation $AX=O$ has a non-zero solution iff $\text{rank}(A)$ is less than the number of its columns, the number of linearly independent solutions of homogeneous equation $AX=O$ is $n-r$, where r is the rank of A of order $m \times n$, the equation $AX=B$ is consistent iff the matrices A and $[A:B]$ are of the same rank, linear dependence and linear independence of column (row) vectors, the columns of a matrix A of order $m \times n$ are linearly dependent iff there exists a vector $X \neq O$ such that $AX=O$, the columns of a matrix A of order $m \times n$ are linearly dependent iff its rank is less than the number of its columns

Unit III

Matrix polynomials, minimal and characteristic equations, Cayley-Hamilton theorem, Eigen values and eigen vectors of a square matrix and their determination, inner product of two vectors, length of a vector, normal vectors, orthogonal and unitary matrices, a matrix is orthogonal (unitary) iff its columns are normal and orthogonal in pairs, determination of orthogonal matrices.

Unit IV

Vector spaces, examples, subspaces, criteria for a non-empty subset to be a subspace, algebra of subspaces, quotient spaces, linear span of vectors, bases and dimensions of vector spaces

Recommended Texts:

1. A Book of Matrices by Shanti Narayan et al.
 2. Linear Algebra by Belkacem Said-Houari (Birkhauser)
 3. A Textbook of Matrices by Aziz et al.
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