

**Syllabus for the First Degree Programme in Mathematics
of the University of Kerala**

**Semester VI
Linear Algebra**

CODE: MM 1642

Instructional hours per week: 4
No. of Credits: 3

Module 1 A review of algebra of matrices is followed by some applications of matrices to conic sections, systems of linear equations, equilibrium-seeking systems and difference equations.

Systems of linear equations: elementary matrices, the process of Gaussian elimination, Hermite or row-reduced echelon matrices. Linear independence of columns, Row equivalent matrices, Rank of a matrix, Column rank, Normal form, Consistent systems of equations.

Module 2 Invertible matrix: Left and right inverse of a matrix, Orthogonal matrix, Vector spaces, Subspaces, Linear combination of vectors, Spanning set, Linear independence, Basis.

Linear mappings: Linear transformations, Kernel and range, Rank and Nullity, Linear isomorphism.

Module 3 Matrix connection: Ordered basis, Matrix of f relative to a fixed ordered basis, Transition matrix from a basis to another, Nilpotent and index of nilpotency.

Determinants: Determinantal if multilinear, alternating and 1-preserving, Transposition, Signum of a permutation, Laplace expansion along the i^{th} row, Adjoint.

Eigen values and eigen vectors: Characteristic equation, Algebraic multiplicities, Eigen space, Geometric multiplicities, Eigen vector, diagonalisation, Tridiagonal matrix.

TEXT: T S Blyth and E F Robertson: Linear Algebra, Springer, Second Ed.

References:

1. R Bronson and G B Costa: *Linear Algebra*, Academic Press, Seond Ed.
2. David C Lay: *Linear Algebra*, Pearson
3. K Hoffman and R Kunze: *Linear Algebra*, PHI

DISTRIBUTION OF INSTRUCTIONAL HOURS:

Module 1: 24 hours; Module 2: 24 hours; Module 3: 24 hours