

SEMESTER-II		
Course code	Course Name	Credit Hour
NS-104	Linear Algebra (Mathematics-II)	3 (3-0)

Course Objectives:

To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines

Course Outline:

Systems of Linear Equations

- Introduction to Systems of Linear Equations
- Gaussian Elimination and Gauss-Jordan Elimination
- Applications of Systems of Linear Equations

Matrices

- Operations with Matrices
- Properties of Matrix Operations
- The Inverse of a Matrix
- Elementary Matrices

Determinants

- The Determinant of a Matrix
- Determinants and Elementary Operations
- Properties of Determinants

Vector Spaces

- Vectors in R^n
- Vector Spaces
- Subspaces of Vector Spaces
- Spanning Sets and Linear Independence
- Basis and Dimension
- Rank of a Matrix and Systems of Linear Equations
- Coordinates and Change of Basis

Inner Product Spaces

- Length and Dot Product in R^n
- Inner Product Spaces
- Orthonormal Bases: Gram-Schmidt Process

Eigenvalues and Eigenvectors

- Eigenvalues and Eigenvectors
- Diagonalization
- Symmetric Matrices and Orthogonal Diagonalization

Recommended Books:

- Bndl: Elementary Linear Algebra. (2013). Brooks Cole.
- Leon, S.J. (1998). *Linear Algebra with Applications*.

SEMESTER-III		
Course code	Course Name	Credit Hour
ES-204	Environmental Chemistry	3 (2-1)