



SEMESTER – II

BRANCH	Subject Title	Subject Code
B.Sc. (Mathematic – Minor/GE)	ALGEBRA, VECTOR ANALYSIS AND GEOMETRY	MAM2/MA-121

Learning outcomes:-

The course will enable the students to:

1. Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix, using the rank of matrix.
2. To find the Eigen values and corresponding Eigen vectors for a square matrix.
3. Using the knowledge of vector calculus in geometry
4. Enhance the knowledge of three dimensional geometrical figures (eg, cone and cylinder).

Unit - 1

Historical background:

- 1.1.1 Development of Indian Mathematics: Later Classical Period (500-1250)
- 1.1.2 A brief biography of Varahamihira and Aryabhata
- 1.2 Rank of a Matrix
- 1.3 Echelon and Normal form of a matrix
- 1.4 Characteristic equations of a matrix
 - 1.4.1 Eigen-values
 - 1.4.2 Eigen-vectors

Unit - 2

- 2.1 Cayley Hamilton theorem



2.2 Application of Cayley Hamilton theorem to find the inverse of a matrix.

2:3 Application of matrix to solve a system of linear equations

2.4 Theorems on consistency and inconsistency of a system of linear equations

2.5 Solving linear equations up to three unknowns

Unit - 3

3.1 Scalar and Vector products of three and four vectors

3.2 Reciprocal vectors

3.3 Vector differentiation

3.3.1 Rules of differentiation

3.3.2 Derivatives of Triple Products

3.4 Gradient, Divergence and Curl

3.5 Directional derivatives

3.6 Vector Identities.

3.7 Vector Equations

Unit - 4

4.1 Vector Integration

4.2 Gauss theorem (without proof) and problems based on it

4.3 Green theorem (without proof) and problems based on it

4.4 Stoke theorem (without proof) and problems based on it

Unit -5

5.1 General equation of second degree



5.2 Tracing of conics

5.3 System of conics

5.4. Cone

5.4.1 Equation of cone with given base

5.4.2 Generators of cone

5.4.3 Condition for three mutually perpendicular generators

5.4.4 Right circular cone

5.5 Cylinder

5.5.1 Equation of cylinder and its properties

5.5.2 Right Circular Cylinder

5.5.3 Enveloping Cylinder