Lecture Plan

Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa

Name of Faculty: Samrudhi Uday Vaigankar	**Subject:** Mathematics	
Paper code: MAT -211 Matrix Algebra	**Program:** B.Sc.	**Division: -**
Academic year: 2025-26	**Semester:** III	**Total Lectures:** 37

Course Objectives:

1. To introduce and familiarize the learner with the System of Equations, Matrices and Matrix Operations, Gauss Elimination method, Diagonalisation and Quadratic forms.

Expected Course Outcome:

1) Display familiarity and knowledge of System of Equations, Matrices and Matrix Operations.
2) Demonstrate proofs of Matrix Algebra.
3) Choose the appropriate procedures and modify them, if needed, to solve method-based problems on the concepts in the syllabus.
4) Analyze and solve unseen problems in Matrix Algebra and invent mathematically precise arguments to justify their solutions.

Student Learning Outcome: Student will be able to

1) Have the skill of proving theorems specifically in Matrix algebra.
2) Apply concepts and techniques of Matrix Algebra to solve problems in mathematics and related fields.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
July	11/07/2025	11/07/2025	1	Operations with vectors in R^3 and generalization to R^n		Chalkboard	Hari Kishan : A textbook of matrices; Keith Nicholson: Linear Algebra with Applications
	15/07/2025	18/07/2025	3	Linear combinations; Linear dependence and independence; Basis and Dimension. Introduction to matrices; operations with matrices		Chalk board	Hari Kishan : A textbook of matrices; Keith Nicholson: Linear Algebra with Applications
	22/07/2025	25/07/2025	3	Transpose of a matrix, Types of matrices, Special matrices: Symmetric, Skew- Symmetric matrices - definition, examples, properties/ results		Chalkboard	Hari Kishan : A textbook of matrices
July August	29/07/2025	01/08/2025	3	Conjugate of a matrix, Hermitian matrix, Nilpotent and Idempotent matrices – definition, examples, properties/results		Chalkboard	Hari Kishan : A textbook of matrices
August	05/08/2025	08/08/2025	3	Elementary matrices; Effects of multiplying by these on a matrix; Equivalence of matrices: Row/column equivalence		Chalkboard	Hari Kishan : A textbook of matrices
	12/08/2025	15/08/2025	2 IndependenceDay	Echelon forms; Normal form		Chalkboard	Hari Kishan : A textbook of matrices

	19/08/2025	22/08/2025	3	Definition of rank of a matrix using minors; Finding rank of a matrix using definition (upto 3x3 only)		Chalkboard	Hari Kishan : A textbook of matrices
	26/08/2025	29/08/2025	0 Chaturthi Break 26/08/25 To 01/09/25				
September	02/09/2025	05/09/2025	2 Milad un-Nabi	Theorem: Elementary operations do not change the rank of a matrix; Finding the rank using echelon forms; Linear Independence of Row and Column Matrices		Chalkboard	Hari Kishan : A textbook of matrices
	09/09/2025	12/09/2025	3	Definition of rank of a matrix using independence of Row or column vectors; Equivalence of two definitions of Rank		Chalkboard	Hari Kishan : A textbook of matrices; Keith Nicholson: Linear Algebra with Applications
	16/09/2025	19/09/2025	3	Existence of solutions of a system of linear equations using Rank method and their solution using Gauss Elimination, Gauss – Jacobi and Gauss – Siedel method		Chalkboard	Hari Kishan : A textbook of matrices; Keith Nicholson: Linear Algebra with Applications
	23/09/2025	26/09/2025	3	Characteristic Values of a Matrix; Caley – Hamilton Theorem; Diagonalisation of a matrix		Chalkboard	Hari Kishan : A textbook of matrices
September October	30/09/2025	03/10/2025	2 Gandhi Jayanti /	Quadratic form as a matrix product; Diagonal reduction of a symmetric matrix		Chalkboard	Hari Kishan : A textbook of matrices

			Dussehra				
October	07/10/2025	10/10/2025	3	Reduction of quadratic form into sum of squares form.		Chalkboard	Hari Kishan : A textbook of matrices
	14/10/2025	17/10/2025	3	Revision.			

*** Assessment Rubrics**

Component	Max Marks
ISA 1	7.5
ISA 2	7.5
Practical	25
Project	Nil
Semester End Exam	60