PROGRAMME NAME: BSc Mathematics
COURSE NAME: Linear Algebra
SEMESTER DURATION :July to December

WEEK	TOPIC(S)	TEACHING METHODOLOGY ADOPTED/ CONTINUOUS INTERNAL EVALUATION
1	Fundamental operation with vectors in Euclidean space n , Linear combination of vectors, dot product and their properties, Cauchy-Schwarz inequality, Triangle inequality, Projection vectors	Lectures
2	Some elementary results on vectors in R^n ; Matrices: Gauss–Jordan row reduction, Reduced row echelon form, Row equivalence, Rank	Demonstrations
3	Linear combination of vectors, Row space, Eigenvalues, Eigenvectors, Eigenspace, Characteristic polynomials, Diagonalization of matrices	Discussions
4	Definition and examples of vector space, Some elementary properties of vector spaces.	Tutorials
5	Subspace, Span of a set, a spanning set for an eigenspace, Linear independence and dependence	Self –Instruction
6	Basis and dimension of a vector space, Maximal linearly independent sets, Minimal spanning sets	Presentation
7	Application of rank: Homogenous and non-homogenous systems of linear equations; Coordinates of a vector in ordered basis, Transition matrix Linear transformations: Definition and examples, Elementary properties.	Case Study
8	Linear transformations: Definition and examples, Elementary properties.	Assignment
9	The matrix of a linear transformation, Linear operator and similarity	Lectures
10	Application: Computer graphics, Fundamental movements in a plane, Homogenous coordinates, Composition of movements.	Self –Instruction
11	Kernel and range of a linear transformation, Statement of the dimension theorem and examples	Assignment
12	One to one and onto linear transformations, Invertible linear transformations, isomorphism, isomorphic vector spaces (to R^n)	Discussion
13	Orthogonal and orthonormal vectors, orthogonal and orthonormal bases,	Tutorials

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	orthogonal complement, statement of the projection theorem and examples. Orthogonal projection onto a subspace	
14	Application: Least square solutions for inconsistent systems, non-unique least square solutions	Case Study

Course Objectives: The objective of the course is to introduce the concept of vectors in n . The concepts of linear independence and dependence, rank and linear transformations has been explained through matrices. Various applications of vectors in computer graphics and movements in a plane has also been introduced.

Course Learning Outcomes : This course will enable the students to:

i) Visualize the space n in terms of vectors and the interrelation of vectors with matrices, and their application to computer graphics.
ii) Learn about vector spaces, linear transformations, transition matrix and similarity.
iii) Find approximate solution of inconsistent system of linear equations.