ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

Dr. Utpal Kumar Samanta

Department of Mathematics
Bankura Christian College
ACADEMIC YEAR 2023-24

3rd Semester (July to December)

Ring Theory and Linear Algebra-I (Core T6)

Course Objectives: The course will enable the students to

i) employ the concept of basis of a vector space.

(ii) acquire the knowledge of IPS and properties of operators on an IPS.

Course Specific Outcomes: The student acquires the knowledge of

i) properties of vector spaces and linear transformations.

ii) inner product spaces and orthonormal sets, and how one can transform a set to an orthonormal set.

Unit 3

Vector spaces, subspaces, algebra of subspaces, quotient spaces, linear combination of vectors, linear span, linear independence, basis and dimension, dimension of subspaces.

Unit 4

Linear transformations, null space, range, rank and nullity of a linear transformation, matrix representation of a linear transformation, change of coordinate matrix. Algebra of linear transformations. Isomorphisms. Isomorphism theorems, invertibility and isomorphisms. Inner product spaces, matrix of an inner product, Cauchy-Schwarz inequality. orthogonal/orthonormal set, Orthonormal basis, Gram-Schmidt orthogonalisation process. Matrix of a linear operator on finite dimensional inner product spaces with respect to orthogonal (orthonormal) basis, Inner product space isomorphism and related theorems.

MONTH/YEAR	WEEK	PORTIONS
August 2023	3	Vector spaces, subspaces.
	4	Algebra of subspaces, quotient spaces, linear combination of vectors.
	5	Linear span, linear independence, basis and dimension, dimension of subspaces.

MONTH/YEAR	WEEK	PORTIONS
September 2022	1	Linear transformations, null space, range
	2	Rank and nullity of a linear transformation.
	3	Matrix representation of a linear transformation, change of coordinate matrix.
	4	Revision / Class Test

MONTH/YEAR	WEEK	PORTIONS
October 2022	1	Algebra of linear transformations, Isomorphisms. Isomorphism theorems.
	2	Inner product spaces, matrix of an inner product, Cauchy-Schwarz inequality.
	3	Revision / Class Test

MONTH/YEAR	WEEK	PORTIONS
November 2022	1	Orthogonal/orthonormal set, Orthonormal basis
	2	Gram-Schmidt orthogonalisation process
	3	Matrix of a linear operator on finite dimensional inner product spaces with respect to orthogonal (orthonormal) basis,
	4	Matrix of a linear operator on finite dimensional inner product spaces with respect to orthogonal (orthonormal) basis
	5	Revision

MONTH/YEAR	WEEK	PORTIONS
December 2022	1	Inner product space isomorphism and related theorems
	2	Revision /Tutorial/Unit Test
	3	Study Leave