Women's College, Tinsukia

TEACHING PLAN

Name of the teacher : SANGEETA GOHAIN BORUAH
Subject : Mathematics
Session : Even Semester, 2023

4th Sem

Allotted Paper Code/Title	Method to be applied	Teaching material	Unit	Topic	Period required Class + test
C10 Ring Theory and Linear Algebra I	Discussion on the topic, solving examples & problems, after completion a class test on that topic	Text book, reference book, black board, e-learning	Full Paper	Unit-1 Definition and examples of rings Properties of rings Subrings Integral domains and fields Characteristic of a ring. Ideal, ideal generated by a subset of a ring Factor rings, operations on ideals, prime and maximal ideals. Unit-2 Homomorphisms, properties of ring homomorphisms Isomorphism theorems I, II and III Field of quotients. Unit-3 Vector spaces Subspaces, algebra of subspaces Quotient spaces Linear combination of vectors, linear span	 1 1 2 + 1 2 + 1 3 + 1 2 + 1 2 + 1 2 + 1 2 + 1 2 + 1 1 2 + 1 2 + 1 1 + 1 1 + 1

				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, algebra of linear transformations. Isomorphisms, Isomorphism theorems Invertibility and isomorphisms, change of coordinate matrix.	3 + 1 5 + 1 5 + 1 5 + 1 5 + 1

Women's College, Tinsukia

TEACHING PLAN

Name of the teacher : SANGEETA GOHAIN BORUAH
Subject : Mathematics
Session : Even Semester, 2023

6th Sem

Allotted Paper Code/Title	Method to be applied	Teaching material	Unit	Topic	Period required Class + test
C10 Ring Theory and Linear Algebra II	Discussion on the topic, solving examples & problems, after completion a class test on that topic	Text book, reference book, black board, e-learning	Full Paper	Unit-1	
				Polynomial rings over commutative rings	3+1
				Division algorithm and consequences	3+1
				Principal ideal domains, factorization of polynomials	3 + 1
				Reducibility tests, Irreducibility tests	3 + 1
				Eisenstein criterion, unique factorization in Z[x]. Divisibility in integral domains	3 + 1
				Irreducibles, primes, unique factorization domains, Euclidean domains.	4+ 1
				Unit-2	
				Dual spaces, dual basis, Double dual	3 + 1
				Transpose of a linear transformation and its matrix in the dual basis	3 + 1
				Annihilators, Eigen spaces of a linear operator, Diagonalizability, invariant subspaces and Cayley-Hamilton theorem	4 + 1
				The minimal polynomial for a linear operator.	2 + 1
				Unit-3	
				Inner product spaces and norms,	2 + 1

				Gram-Schmidt orthogonalisation process, orthogonal complements	3 + 1
				Bessel's inequality, the adjoint of a linear operator, Least Squares	3 + 1
				Approximation, minimal solutions to systems of linear equations	3 + 1
				Normal and self-adjoint operators,	3 + 1
				Orthogonal projections and Spectral theorem.	3+1