MAMDC124T: Linear Algebra and Abstract Algebra

Semester: II	Course Title: Linear Algebra and Abstract Algebra 124	Credit: 2
Course No.: 124T	MDC-2 (T)	Hours: 2/week

COs with Cognitive Abilities

COs	COGNITIVE ABILITIES	COURSE OUTCOMES
CO1	REMEMBERING	Memorize the vector space and its properties.
CO2	UNDERSTANDING	Discuss linear dependence and linear independence with its properties.
CO3	APPLYING	Apply the fundamental concepts of groups and their elementary properties.
CO4	ANALYSING	Analyse and Identify subgroups, normalizers, and centralizers within groups.
CO5	EVALUATING	Explain principles of Lagrange's Theorem to analyse the order of groups and elements effectively.

CO-PO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	1	2	1		
CO 2	1	1	1		
CO 3	1	2	1		
CO 4		1	2		
CO 5	1	1	2		

Unit	Detailed Syllabus	No. of Hours of Teaching
I	**Introduction to Linear Algebra.** Vector space: Definition, Examples, Properties, Subspaces, Necessary and Sufficient Condition to be a Subspace, Span of a Set, Examples of Subspaces, Intersection, Addition and Direct Sum of Subspaces., Linear Variety. Finite Linear Combination, Linear Dependence/Independence and their properties (with proof), Examples regarding Linear Dependence/ Independence. Dimension and Basis of a vector space, Dimension Theorem.	15
II	**Introduction to Abstract Algebra.** Definition and Examples of Groups, Elementary properties of Group, Equivalent Definitions of a Group, Finite Groups and their tables, Commutative and non-commutative groups. subgroups: Definition and Examples, normalizer and centralizers, order of an element, order of a group, cyclic subgroup generated by an element, Lattice diagrams of finite groups, cosets and its properties, Lagrange's Theorem.	15

Suggested Reference books
1. An Introduction to Linear Algebra – V. Krishnamurthy & others. (Affiliated East-West press, New Delhi)
2. Linear Algebra a Geometric Approach - S. Kumaresan, PHI.

3. Linear Algebra with Applications – Otto Bretscher– 3rd ed. –Pearson Education.
4. An Introduction to Linear Algebra – I. K. Rana ,Ane Books Pvt. Ltd., New Delhi.
5. Theory and Problems of Linear Algebra – R. D. Sharma, I K Int. Publishing House Pvt. Ltd.
6. Matrix and Linear Algebra – K. B. Datta, Prentice Hall, New Delhi.
7. Abstract Algebra - I. H. Sheth, PHI, New Delhi, Second edition-2009.
8. Topics in Algebra - I. N. Herstein, Vikas Publishing, New Delhi.
9. A First Course in Abstract Algebra – J. B. Fraleigh, Narosa Publishing, New Delhi.
10. Basic Abstract Algebra – P.B. Bhattacharya, S.K. Jain and S. R. Nagpal, Foundation Books, New Dehli.
11. Abstract Algebra - Dipak Chatterajee, PHI LearingPvt. Ltd, New Delhi.