

New College

LINEAR ALGEBRA

B.A./B.Sc. III
Semester-VI

JEEVANSONS PUBLICATIONS

SYLLABUS

K.U. Kurukshetra, C.D.L.U. Sirsa, CRSU Jind and G.J.U. Hissar

B.A. / B. Sc. 3rd Year

SIXTH SEMESTER

LINEAR ALGEBRA

Time Allowed : 3 hours

Maximum Marks { B.Sc. : 40
B.A. : 26

Note. *The examiner is requested to set **nine questions** in all, selecting two questions from each section and **one compulsory question** consisting of five or six parts distributed over all the four sections. Candidates are required to attempt **five questions in all**, selecting **at least one question** from each section and the compulsory question.*

Section - I

Vector spaces, subspaces, Sum and Direct sum of subspaces, Linear span, Linearly Independent and dependent subsets of a vector space. Finitely generated vector space, Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces, Invariance of the number of elements of basis sets, Dimensions, Quotient space and its dimension.

Section - II

Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces, Vector space of all the linear transformations. Dual Spaces, Bidual spaces, annihilator of subspaces of finite dimensional vector spaces. Null space, Range space of a linear transformation, Rank and Nullity Theorem.

Section - III

Algebra of Linear Transformation, Minimal Polynomial of a linear transformation, Singular and non-singular linear transformations, Matrix of a linear transformation, Change of basis, Eigen values and Eigen vectors of linear transformations.

Section - IV

Inner product spaces, Cauchy-Schwarz inequality, Orthogonal vectors, Orthogonal complements, Orthogonal sets and Basis, Bessel's inequality for finite dimensional vector spaces, Gram-Schmidt Orthogonalization process, Adjoint of a linear transformation and its properties, Unitary linear transformations.

SYLLABUS

M.D.U. Rohtak, C.B.L.U. Bhiwani and I.G.U. Meerpur (Rewari)

B.A. / B. Sc. 3rd Year

SIXTH SEMESTER

LINEAR ALGEBRA

Time Allowed : 3 hours

Maximum Marks { B.Sc. : 40
B.A. : 27

Note. *The question paper will consist of **five** sections. Each of the first four sections will contain two questions and the students shall be asked to attempt **one** question from each section. **Section-V** will contain **six** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory**.*

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CONTENTS

<i>Chapter</i>	<i>Pages</i>
1. <i>Vector Spaces and Subspaces</i>	--- 1.1 — 1.42
2. <i>Basis And Dimension</i>	--- 2.1 — 2.62
3. <i>Quotient Space</i>	--- 3.1 — 3.8
4. <i>Linear Transformations</i>	--- 4.1 — 4.28
5. <i>Rank and Nullity</i>	--- 5.1 — 5.16
6. <i>Algebra of Linear Transformations</i>	--- 6.1 — 6.20
7. <i>Matrix of a Linear Transformation</i>	--- 7.1 — 7.32
8. <i>Dual Space</i>	--- 8.1 — 8.24
9. <i>Eigen Values and Eigen Vectors</i>	--- 9.1 — 9.30
10. <i>Inner Product Spaces</i>	--- 10.1 — 10.50
11. <i>Linear Operators on Inner Product Spaces</i>	--- 11.1 — 11.22
• <i>Short Answer Questions</i>	--- (i) — (iv)
• <i>Question Papers</i>	--- (i) — (xx)