



# Indraprastha College for Women

## University of Delhi

Course Name:	B.A.(P)
Paper Title:	Elementary Linear Algebra
Unique Paper Code:	
Semester:	II
Faculty(s):	Ms. Ritika Gulati
Year:	2024

<b>Work Plan</b>			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
1	The objective of the course is to introduce the concept of vectors in $\mathbb{R}^n$ and Understanding the nature of solution of system of linear equations.	1	Fundamental operations with vectors in Euclidean space $\mathbb{R}^n$ , Linear combinations of vectors, Dot product and their properties,
		2	Fundamental operations with vectors in Euclidean space $\mathbb{R}^n$ , Linear combinations of vectors, Dot product and their properties,
		3	Fundamental operations with vectors in Euclidean space $\mathbb{R}^n$ , Linear combinations of vectors, Dot product and their properties,
		4	Fundamental operations with vectors in Euclidean space $\mathbb{R}^n$ , Linear combinations of vectors, Dot product and their properties,
		5	Cauchy-Schwarz inequality, Triangle inequality, Solving system of linear equations using Gaussian elimination,
		6	Cauchy-Schwarz inequality, Triangle inequality, Solving system of linear equations using Gaussian elimination,
		7	Cauchy-Schwarz inequality, Triangle inequality, Solving

			system of linear equations using Gaussian elimination,
		8	Cauchy-Schwarz inequality, Triangle inequality, Solving system of linear equations using Gaussian elimination,
		9	Application: Curve Fitting, Gauss Jordan row reduction, Reduced row echelon form, A
		10	Application: Curve Fitting, Gauss Jordan row reduction, Reduced row echelon form, A
		11	Solving several systems simultaneously, Equivalent systems, Rank and row space of a matrix,
		12	Solving several systems simultaneously, Equivalent systems, Rank and row space of a matrix,
		13	Solving several systems simultaneously, Equivalent systems, Rank and row space of a matrix,
		14	Eigenvalues, Eigenvectors, Eigenspace, Diagonalization, Characteristic polynomial of a matrix.
		15	Eigenvalues, Eigenvectors, Eigenspace, Diagonalization, Characteristic polynomial of a matrix.
		16	Eigenvalues, Eigenvectors, Eigenspace, Diagonalization, Characteristic polynomial of a matrix.
		17	Eigenvalues, Eigenvectors, Eigenspace, Diagonalization, Characteristic polynomial of a matrix.
		18	Eigenvalues, Eigenvectors, Eigenspace, Diagonalization, Characteristic polynomial of a matrix.
3	To view the $m \times n$ matrices as a linear function from $RRnn$ to $RRmm$ and vice versa.	19	Linear transformations: Definition, Examples and elementary properties, The matrix of a linear transformation,
		20	Linear transformations: Definition, Examples and elementary properties, The

			matrix of a linear transformation,
		21	Linear transformations: Definition, Examples and elementary properties, The matrix of a linear transformation,
		22	Linear transformations: Definition, Examples and elementary properties, The matrix of a linear transformation,
		23	Kernel and range of a linear transformation, The dimension theorem, one-to-one and onto linear transformations
		24	Kernel and range of a linear transformation, The dimension theorem, one-to-one and onto linear transformations
		25	Kernel and range of a linear transformation, The dimension theorem, one-to-one and onto linear transformations
		26	Kernel and range of a linear transformation, The dimension theorem, one-to-one and onto linear transformations
		27	Invertible linear transformations, Isomorphic vector spaces.
		28	Invertible linear transformations, Isomorphic vector spaces.
		29	Invertible linear transformations, Isomorphic vector spaces.
		30	Invertible linear transformations, Isomorphic vector spaces.
		31	Invertible linear transformations, Isomorphic vector spaces.
		32	Invertible linear transformations, Isomorphic vector spaces.
		33	Invertible linear transformations, Isomorphic vector spaces.

<b>Syllabus</b>		
<b>Unit</b>	<b>Contents</b>	<b>Contact Hours</b>
I	Fundamental operations with vectors in Euclidean space $\mathbb{R}^n$ , Linear combinations of vectors, Dot product and their properties, Cauchy-Schwarz inequality, Triangle inequality, Solving system of linear equations using Gaussian elimination, Application: Curve Fitting, Gauss Jordan row reduction, Reduced row echelon form, Application: Solving several systems simultaneously, Equivalent systems, Rank and row space of a matrix, Eigenvalues, Eigenvectors, Eigenspace, Diagonalization, Characteristic polynomial of a matrix.	18
II	Sharing with other faculty	
III	Linear transformations: Definition, Examples and elementary properties, The matrix of a linear transformation, Kernel and range of a linear transformation, The dimension theorem, one-to-one and onto linear transformations, Invertible linear transformations, Isomorphic vector spaces.	15
IV		
	<b>Total</b>	<b>33</b>
<b>Text Books/Suggested Readings:</b>		
<b>S. No.</b>	<b>Name of Authors/Books/Publishers</b>	<b>Year of Publication/ Reprint</b>
1.	Andrilli, S., & Hecker, D. (2016). Elementary Linear Algebra (5th ed.). Elsevier India.	2016
2.		
3.		
4.		

<b>Paper Components</b>			
<b>Credits</b>	<b>Lecture (L)</b>	<b>Tutorial (T)</b>	<b>Practical (P)</b>
<b>4</b>	<b>3</b>		<b>1</b>
<b>Assessment Scheme</b>			
<b>S.No.</b>	<b>Component</b>	<b>Marking Scheme</b>	<b>Total Marks</b>
1	Internal Assessment <ul style="list-style-type: none"> <li>• Assignment/Quiz/Project/Presentation</li> <li>• Class Test</li> <li>• Attendance</li> </ul>	<b>12</b> 12 6 	<b>30</b>
2.	Continuous Assessment ( <b>Tutorial</b> ) <ul style="list-style-type: none"> <li>• Activity 1</li> <li>• Activity 2</li> <li>• Attendance</li> </ul>		
3.	Practical <ul style="list-style-type: none"> <li>• Continuous Assessment</li> <li>• End Term Written/Practical Exam</li> <li>• Viva</li> </ul>	10 20 10 	<b>40</b>
4.	End Semester Examination	90	