Course Title	**Linear Algebra** (Mandatory)		
Course Code	**CSI-335**		
Credit Hours	3 (3,0)		
Category	Interdisciplinary / Allied Courses (Mandatory)		
Prerequisite	None		
Co-Requisite	None		
Follow Up	CSE-322 Machine Learning, CSE-421 Computer Vision		
Course Introduction	This course introduces fundamental concepts of linear algebra, including matrices, vectors, systems of equations, and vector spaces. Students develop analytical and computational skills to solve mathematical problems using techniques such as Gaussian elimination and eigenanalysis. The course also emphasizes applications of linear algebra in computer science, including data representation, algorithms, and modeling.		
Course Learning Outcomes (CLOs)	At the end of the course, the students will be able to:	**BT**	**PLO**
	CLO1: Understand and perform operations on matrices and vectors, including addition, multiplication, and inverse calculations.	C2 (Understand)	1,2,3
	CLO2: Solve systems of linear equations using matrix methods such as Gaussian elimination and matrix inversion.	C3 (Apply)	2,3
	CLO3: Analyze vector spaces, subspaces, basis, and dimension to understand the structure of linear systems.	C4 (Analyze)	2,3
	CLO4: Apply eigenvalues and eigenvectors in solving problems related to transformations and stability analysis.	C3 (Apply)	2,3,4
	CLO5: Utilize linear algebra concepts to model and solve practical problems in computer science, such as algorithms and data representations.	C6 (Create)	2,3,4
Text Book(s)	1. Howard Anton and Chris Rorres, J., Elementary Linear Algebra. Applications Version, 11th Edition, Wiley & Sons, NJ, 2014, ISBN: 978-1-118-43441-3. 2. David C. Lay, Steven R. Lay, Judi J. McDonald, Linear Algebra and Its Applications, 5th Edition, Pearson, 2015, ISBN-13: 978-0321982384, ISBN-10: 032198238X. 3. Gilbert Strang, Introduction to Linear Algebra, 5th Edition, Wellesley-Cambridge Press, 2016, ISBN-13: 978-0980232776, ISBN-10: 0980232775. 4. Howard Anton, Elementary Linear Algebra, 11th Edition, Wiley, 2013, ISBN-13: 978-0470458211, ISBN-10: 0470458216.		
Reference Material	1. Philip N. Klein, Coding the Matrix: Linear Algebra through Applications to Computer Science, 1st Edition, Newtonian Press, 2013, ISBN-13: 978-0615880990, ISBN-10: 0615880991. 2. 2. David Hill, David Zitarelli, Linear Algebra Labs with MATLAB, 3rd Edition, Pearson, 2003, ISBN-13: 978-0131432741, ISBN-10: 0131432745		

Weekly Lesson Plan		
Week No.	**Course Content**	**Assignments/Readings**
Week 1	Systems of linear equations	Anton: 1.1, 1.2
Week 2	Matrix Arithmetic	Anton: 1.2 Quiz 1
Week 3	Matrix Inverse	Anton: 1.4 – 1.6
Week 4	Diagonal and Triangular Matrices	Anton: 1.7 Quiz 2
Week 5	Matrix Transformations	Anton: 1.8
Week 6	Polynomial Interpolation	Anton: 1.9 Quiz 3
Week 7	Determinants - I	Anton: 2.1
Week 8	Determinants - II	Anton: 2.2 – 2.3 Quiz 4
Week 9	Vector Spaces - I	Anton: 3.1 – 3.2
Week 10	Vector Spaces - II	Anton: 3.3 – 3.5 Quiz 5
Week 11	General Vector Spaces - I	Anton: 4.1 – 4.3
Week 12	General Vector Spaces - II	Anton: 4.4 – 4.6 Quiz 6
Week 13	Basis	Anton: 4.7 – 4.10
Week 14	Eigenvalues and Eigenvectors	Anton: 5.1, 5.2 Quiz 7
Week 15	Inner Product Spaces	Anton: 6.1, 6.2
Week 16	Gram-Schmidt Process & Least Squares Fitting	Anton: 6.3, 6.4 Quiz 8