Guidelines
B.Sc. (H) Computer Science
DSC-03 (Mathematics for Computing)

S.No	Topic	Reference	
		Table of Content	**Book**
1	**Unit 1-** Introduction to Matrix Algebra: Echelon form of a Matrix, Rank of a Matrix, Determinant and Inverse of a matrix, Solution of System of Homogeneous & Non-Homogeneous Equations: Gauss elimination and Gauss Jordan Method.	7.1	[2]
		7.3	
		7.4 Pg.282-285	
		7.5	
		7.7 Pg 293-295	
		7.8 Pg 301-304	
2	**Unit 2 -** Vector Space and Linear Transformation: Vector Space, Sub-spaces, Linear Combinations, Linear Span, Convex Sets (Follow any Book) , Linear Independence/Dependence, Basis & Dimension, Linear transformation on finite dimensional vector spaces, Inner Product Space, Schwarz Inequality, Orthonormal Basis, Gram-Schmidt Orthogonalization Process	4.1 – 4.5 (Except Page no. 208 -212)	[3]
		5.1 – 5.4	
		7.5	
3	**Unit 3 -** EigenValue and EigenVector: Characteristic Polynomial, Cayley Hamilton Theorem (Only in numericals), Eigen Value And eigen vector of a matrix, eigenspaces, Diagonalization, Positive Definite Matrices, Applications to Markov Matrices	6.1 Introduction to eigen value (*Refer 4.2 for applications)	[1]
		6.2 Diagonalization	
		6.4 Symmetric Matrices	
		Cayley Hamilton Theorem Page no. 384	[3]
		6.5 Positive Definite Matrices	[1]
		8.3 Applications of Markov Matrix	[1]
4	**Unit 4 -** Vector Calculus: Vector Algebra,Laws of Vector Algebra, Dot Product, Cross Product,Vector and Scalar Fields, Ordinary Derivative of Vectors, Space Curves, Partial Derivatives, Del Operator, Gradient of a Scalar Field, Directional Derivative, Gradient of Matrices, Divergence of a Vector Field, Laplacian Operator, Curl of a Vector Field.	9.1 Vectors in 2-Space and 3-Space	[2]
		9.2 Inner Product (Dot Product)	
		9.3 Vector Product (Cross Product)	
		9.4 Vector and Scalar Functions and Their Fields. Vector Calculus: Derivatives	
		9.7 Gradient of a Scalar Field. Directional Derivative	
		9.8 Divergence of a Vector Field	
		9.9 Curl of a Vector Field	

Reference:

1. Strang Gilbert, “Introduction to Linear Algebra”, 5th Edition, Wellesley-Cambridge Press, 2021.
2. Kreyszig Erwin, “Advanced Engineering Mathematics”, 10th Edition, Wiley, 2015.
3. Stephen Andrilli and David Hecker, “Elementary Linear Algebra”, Fourth Edition, Academic Press, 2010, ISBN: 978-0-12-374751-8

* Deisenroth, Marc Peter, Faisal A. Aldo and Ong Chengsoonm “Mathematics for Machine Learning, 1st Edition, Cambridge University Press, 2020.