SILVER OAK UNIVERSITY

College of Technology
Bachelor of Technology
Information Technology
Course Name: Applied Mathematics – I
Course Code: 1010273103
Semester: 1st

Prerequisite:

Algebra, Geometry and Calculus

Course Objectives:

1. To develop proficiency in solving systems of linear equations using elementary row operations, row echelon forms.
2. To gain a detailed understanding of vector spaces, including concepts such as subspaces, linear independence, and basis, and apply these concepts to real-world problems.
3. To achieve competence in linear transformations, their matrix representations, and the use of eigenvalues and eigenvectors for various applications.

Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
3	2	0	5	5

Contents:

Unit	Topics	Teaching Hours	Weightage %
1	**System of Linear Equations:** Elementary row operations in matrix, Row echelon and Row Reduced Echelon Form, Rank of a matrix by Row echelon Form, Inverse of matrix by Gauss Jordan Method, Application in Cryptography. Solution of Homogenous and Non-Homogenous equation using Gauss Jordan Method and Gauss Elimination Method.	9	20
2	**Vector Space:** Introduction to Vectors (Geometric), Norm of Vector, Real Vector Space, Subspace, Linear Combinations, Linear Independence and Dependence, Basis and Dimension, Row space Column space and Null space, Rank - Nullity Theorem. Application in Computer Graphics.	12	20
3	**Linear Transformations:** Definition of Linear Transformation, Types of Linear Transformation (Rotation, Reflection, Projection), Matrix Representation of Linear Transformations. Application in Image Processing.	8	20
4	**Eigen Values and Eigen Vectors:** Eigen Values, Eigen Vectors, Properties of Eigen Values and Eigen vectors, Diagonalization, Cayley Hamilton theorem and its applications	6	15
5	**Sequences and Series:**	10	25

	Infinite sequence and its convergence, Infinite series, Partial sum of infinite series, Geometric series, Test for convergence: P-series, Limit Comparison, D'Alembert's Ratio, Cauchy's Root Test		

Course Outcomes:

Sr. No.	CO Statement	Unit
CO-1	To perform matrix computation and to solve system of linear equations using matrices in a comprehensive manner.	1
CO-2	To analyze various concepts of vectors using Linear Algebra.	2
CO-3	To develop an understanding of matrices using Linear Transformations.	3
CO-4	To evaluate eigen values and eigen vectors of Matrix Algebra.	4
CO-5	To apply the various tests of convergence to sequence and series.	5

Teaching & Learning Methodology:

Problem - based Learning
Cooperative-based Learning
Competency-based Learning

List of Experiments: Total Hours: 28

Unit wise/Topic wise Tutorials/Teacher Guided Problem Solving Sets are to be given for Practice and better understanding of Concepts and applications

Books Recommended:

1. Anton and Rorres, "Elementary Linear Algebra", Applications version, Wiley India Edition.
2. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons.
4. James Stewart, "Calculus: Early Transcendentals with Course Mate", Cengagae.
5. Stephen H. Friedberg, Arnold J. Insel and Lawrence E. Spence, "Linear Algebra", Pearson Education.
6. Strang, Gilbert, "Linear algebra and its applications". Belmont, CA: Thomson, Brooks/Cole.

List of Open-Source Software/learning website:

1. https://www.scilab.org/software/scilab/numerical-analysis
2. https://ocw.mit.edu/courses/res-18-010-a-2020-vision-of-linear-algebra-spring-2020/
3. https://ocw.mit.edu/courses/18-338j-infinite-random-matrix-theory-fall-2004/

CO-PO-PSO Matrix:

Co. No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO 2
CO-1	2	2	1	1					1			3	1	1
CO-2	1	2	1						1			1	1	1
CO-3	2	3	2						1			2	2	1
CO-4	2	2	2						1			3	1	1
CO-5	2	3	1						1			2	1	1