Course: VSC
Mathematics Practical using Scilab and Maxima

Semester: II	Credits: 2	Subject Code: BSVSCCSM22301	Lectures: 60

Course Outcomes:

At the end of this course, the learner will be able to:

- CO1: Explore commands on matrices, plotting functions and writing small programs using functions in Scilab.
- CO2: Learn commands on matrices, drawing graph and operations on graph in Maxima.
- CO3: Plot various kinds of graphs and explore its properties in Maxima.
- CO4: Learn solving system of linear equations, matrix diagonalization, defining vectors and related properties in Scilab.

Unit 1:Scilab and Maxima **30**

- Introduction to Scilab-Introduction to Mathematical softwares – Scilab, Basic arithmetic operations, matrices and Matrices related operations, special Matrices
- Plotting in Scilab-Polynomials, define function, Plot 2D and 3D graph, sub plotting.
- Functions in Scilab-Writing small programs using functions in Scilab, find even number /odd number, Fibonacci Sequence, generate table of any number
- Introduction to Maxima-Introduction to Maxima and Basic commands,Basic commands to plot graph, define Matrices and matrix operations
- Basics of Graph Theory using Maxima-Find number of vertices, degree of each vertex, minimum and maximum degree vertex in the given undirected graph, generating different types of graphs and representing their adjacency matrix
- Operations in Graph Theory using Maxima-Isomorphism of Graphs Operations on Graphs, to check whether the graph is connected or not, commands on path, connected component, edge and vertex connectivity.

Unit 2:Scilab and Maxima **30**

- Tree using Maxima-Generate a random tree, check whether the graph is a tree or not, find vertex eccentricity, radius, diameter, and centre of a tree.
- Weighted graphs using Maxima-Generate a weighted graph and find the shortest path from a vertex in this graph to every other vertex using Dijkstra's algorithm., find Hamilton path and Hamilton Cycle in the given graph.
- Directed graphs using Maxima-Find the shortest spanning tree for the given graph using Kruskal's Algorithm and Prim's algorithm,draw a directed graph,find in-degree and out-degree of each vertex in the digraph
- Linear Algebra in Scilab-I-Define matrix, coefficient matrix and solve system, solving system of linear equations using Scilab
- Linear Algebra in Scilab-II-Finding Rank, nullity, Row space, Column Space of a Matrix, diagonalizable matrix
- Linear Algebra in Scilab-III-Define vectors, addition, subtraction, multiplication, and division of two vectors, cross product of two vectors,find norm of vector, projection of vector, orthogonalization

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Chairperson (HoD)	B.Sc. Computer Science	Gitanjali Phadnis	G.M.Phadnis 02/06/2023

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