STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN (November 2024 – April 2025)

Department : Mathematics

Name/s of the Faculty : Dr. Dhanalakshmi V(3 hours) and Dr. Sindiya Therese S (2 hours)

Course Title : MATHEMATICAL PYTHON

Course Code : 23MT/PE/MP15

Shift : I

COURSE OUTCOMES (COs)

COs		Description					
CO1	recall th	recall the knowledge of essential Python programming syntax					
CO2	demonst	trate a comprehensive understanding of the	core Python progr	amming fun	damentals		K2
СО3	differen	apply advanced mathematical problem-solving techniques, such as optimization, curve fitting, solving differential equations, and mathematical modeling, using Python, demonstrating their ability to transfer and adapt their knowledge to solve complex real-world problems					К3
CO4		critically assess and analyse data visualizations, demonstrating the ability to create meaningful and effective visual representations of mathematical data and functions using Matplotlib					
CO5	evaluate	evaluate the solutions in diverse mathematical contexts					
Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning	Assessment Methods

						Methodology	
Nov 18 – 25, 2024 (Day Order 1-6)	1	Unit 1: Python Fundamentals 1.1 Introduction to Python 1.2 Overview of Python and its Significance in Mathematics 1.3 Setting up Python Environment 1.4 Basic Python syntax, Variables, and Data Types	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Slip Test
Nov 26- Dec 3, 2024 (Day Order 1 to 6)	1	Unit 1: Python Fundamentals 1.5 Input/Output and Basic Arithmetic Operations 1.6 Conditional Statements (if, elif, else) 1.7 Loops (forand while) 1.8 Functions, Parameters, and return Statements. 1.9 Scope and Namespaces	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Quiz
Dec 4-11, 2024 (Day Order 1 to 6)	1 & 2	Unit 1: Python Fundamentals 1.10 Data Structures in Python: Lists Tuples, and Dictionaries 1.11 Iterating through Data Structures 1.12 List Comprehensions and Generator Expressions Unit 2: File Handling and Modules 2.1 Reading and Writing Files	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Quiz
Dec 12-19, 2024 (Day Order 1 to 6)	2	Unit 2: File Handling and Modules 2.2 Working with CSV and JSON Data 2.3 Introduction to Modules and Libraries 2.4 Creating and using Custom Modules	K1- K5	3+2	CO1-5	Lecturing and Hands on Training	Slip Test

						Case Studies	
Dec 20, 2024 (Day Order 1)	2	Unit 2: File Handling and Modules 2.5 Exception Handling and Debugging: Understanding Exceptions and Errors	K1- K5	1+0	CO1-5	Lecturing and Hands on Training Case Studies	Quiz
Jan 3 – 7, 2025 (Day Order 3 to 6)	2	Unit 2: File Handling and Modules 2.5 Exception Handling and Debugging: Understanding Exceptions and Errors 2.6 Using try-exceptBlocks for Error Handling	K1- K5	2+2	CO1-5	Lecturing and Hands on Training Case Studies	Quiz
Jan 8 – 17, 2024 (Day Order 1 to 6)	2 & 3	Unit 2: File Handling and Modules 2.7 Debugging Techniques and Tool Unit 3: Mathematical Problem Solving with Python 3.1 Numerical Computations: Working with NumPy for Numerical Computing	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Slip Test
Jan 18 - 23, 2025	C.A. Test – I (Unit 1 & 2)						
Jan 24 -31, 2025 (Day Order 1 to 6)	3	Unit 3: Mathematical Problem Solving with Python 3.2 NumPy Arrays, Operations and Functions 3.3 Solving Mathematical Equations using NumPy 3.4 Symbolic Mathematics with SymPy: Introduction to Symbolic Mathematics	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Slip Test

Feb 3-8, 2025 (Day Order 1 to 6)	3	Unit 3: Mathematical Problem Solving with Python 3.5 Using SymPy for Algebraic Manipulation 3.6 Solving Equations Symbolically and Symbol Manipulation	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Slip Test
Feb 10– 18, 2025 (Day Order 1 to 4)	4	Unit 4: Graph Theory with Python (NetworkX package) 4.1 Construction of Graphs 4.2 Degree and Distance Related Parameters 4.3 In-built Functions for Different Graph Classes	K1- K5	3+0	CO1-5	Lecturing and Hands on Training Case Studies	Quiz
Feb 19- 26, 2025 (Day Order 1-6)	4	Unit 4: Graph Theory with Python (NetworkX package) 4.4 Computation of Graph Parameters using inbuilt Functions 4.5 Graph Operations and Graph Connectivity 4.6 Customization of Graphs 4.7 Digraphs 4.8 Matrices and Algorithms of Graphs 4.9 Graph as Models	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Quiz
Feb 27- Mar 6, 2025 (Day Order 1 to 6)	4	Unit 4: Graph Theory with Python (NetworkX package) Data Visualization with Matplotlib 4.10 Creating Various Types of Plots (line, scatter, bar, etc.) 4.11 Customizing Plot Appearance 4.12 Visualizing Mathematical Functions and Data	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Third Component Seminar for 20 marks (Unit 4)

Mar 7 – 11, 2025 (Day Order 1 to 3)	5	Unit 5: Advanced Mathematical Problem Solving 5.1 Optimization Techniques (gradient descent)	K1- K5	2+0	CO1-5	Lecturing and Hands on Training Case Studies	Third Component - Project for 30 marks (Full Syllabus)
Mar 12 –17, 2025		C.A. Test	t – II (Unit	3 & 4)			
Mar 18 – 20, 2025 (Day 4 to 6)	5	Unit 5: Advanced Mathematical Problem Solving 5.2 Curve Fitting and Regression Analysis 5.3 Solving Differential Equations using Python	K1- K5	1+2	CO1-5	Lecturing and Hands on Training Case Studies	Slip Test
Mar 21 - 28, 2025 (Day Order 1 to 6)	5	Unit 5: Advanced Mathematical Problem Solving 5.4 Simulation of Mathematical Models	K1- K5	3+2	CO1-5	Lecturing and Hands on Training Case Studies	Slip Test
Mar 29- April 2, 2025 (Day Order 1 to 3)		R	EVISION				

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