



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

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

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

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

