



Objective:
To develop proficiency in object-oriented programming, data handling, and visualization techniques using Python.
Pre-requisites:
Basic understanding of programming concepts and logical reasoning.
Learning Outcome:

Mapping of CO and PO:

Content:

Unit	Content	Hrs.
1	Introduction to Object-Oriented Programming (OOP Basics): Need for Object-Oriented Programming, Comparison between Procedural and Object-Oriented Paradigms, Defining Classes and Creating Objects, The _init_() Constructor, Instance Variables and Methods, Class Variables and Static Methods, Method Overloading using Default Arguments, Access Modifiers, Understanding the self Keyword and Object Reference	06
2	OOP Features and Exception Handling: Inheritance Types, Method Overriding and use of super() Keyword, Basics of Polymorphism, Concept of Encapsulation and Data Hiding, Abstraction using Classes and Methods, Exception Handling Concepts, Difference between Syntax and Runtime Errors, Creating User-defined Exception Classes	06

3	NumPy – Numerical Computing: Introduction to NumPy Arrays – Creation and Types, Array Indexing, Slicing, and Reshaping, Arithmetic and Statistical Operations, Broadcasting and Aggregation Techniques, Performance Comparison between NumPy Arrays and Python Lists	06
4	Pandas – Data Handling: Introduction to Pandas Series and DataFrame, Data Import and Export using CSV and Excel Files, Data Cleaning and Handling Missing Values, Data Sorting, Filtering, and Grouping, Merging and Joining DataFrames	06

5	Threat Detection and Security Automation with Python: Log File Analysis, Suspicious Activity Detection, Pattern Matching using Regular Expressions, Basic Network Scanning, Ping and Port Scan Automation, Running Security Commands via Python Scripts, Generating Alerts and Reports	06
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Practical Content:

List of programs specify by subject teacher based on above mention topics.

Reference Books:

1	Introduction to Computation and Programming Using Python by John V. Guttag (3rd Edition) MIT Press
2	Python for Data Analysis by Wes McKinney (2nd Edition), O'Reilly Media
3	Data Structures and Algorithmic Thinking with Python by Narasimha Karumanchi (1st Edition) CareerMonk Publications

Web Reference:

1	https://www.w3schools.com/python/
2	https://www.tpointtech.com/python-tutorial
3	https://www.geeksforgeeks.org/python/python-programming-language-tutorial/

MOOC/Certificate Course:

1	https://www.coursera.org/learn/object-oriented-python
2	https://nptel.ac.in/courses/106106145
3	https://www.udemy.com/course/object-oriented-python-programming/?srsltid=AfmBOorYT_c9GMnLjhHhHmdIIWDqs_Y5SCIOXeWV8XggzvbYgdjAP1O

Question Paper Scheme:

	End Semester Examination Duration: (2 Hours Theory Examination) Note for Examiner: - Q-1 Any Five out of Seven (25 Marks) Q-2 Any Two out of Three (06 Marks) Q-3 Mandatory question (05 Marks) Q-4 Any Two out of Three (08 Marks) Q-5 Any Two out of Three (06 Marks) *The question paper must comprehensively address all Course Outcomes (COs), align with Bloom's Taxonomy levels, and ensure complete syllabus coverage.
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