Mastering Python

Module 1: Introduction to Python

- Introduction to Python
- Overview Python Based Applications
- Environment Setup
- Data Types
- Variables and its Scope
- Data Structure
- Operations on Data Structure
- Input and Output Operation
- Writing a Python Module

Module 2: Functions

- Define and use custom functions within a Python program.
- Types of function
- Types of Arguments.
- Map Function.
- Filter Function
- Reduce Function
- Naming conventions
- Using Imports
- Documentation
- Executing Modules as Scripts
- Extended Keyword Arguments (*args, **kwargs)
- Lambda Functions
- Decorators

Module 3: Iterables and Conditional Statement

- Definitions
- Sequences
- Unpacking Sequences
- Dictionaries
- The len() function
- Sets
- Conditional Statements
- Loops in Python
- break and continue
- The enumerate() Function
- Generators
- List Comprehensions
- Advanced List Comprhensions
- Collections Module
- Mapping and Filtering

- Mutable and Immutable Buitilin Objects
- Sorting
- Unpacking Sequences in Function Calls

Module 4: Modules

- What are modules
- General Format
- Importing Modules
- Executing functions from other modules
- The __name__ variable

Module 5: Python Strings

- Quotation Marks and Special Characters
- String Indexing
- Slicing Strings
- Concatenation and Repetition
- Common String Methods
- String Formatting
- Namespaces
- Formatted String Literals (f-strings and .format() method)
- Built-in String Functions

Module 6: Python Dates and Times

- Understanding Time
- The Time Module
- The datetime Module

Module 7: Math

- Airthmetic Operators
- Assignment Operators
- Built-in Math Functions
- The math Module
- The random Module

Module 8: File Processing

- Opening Files
- The os and os.path modules
- Reading files
- Writing into a file
- Appending data into a file

Module 9: Exception Handling

- Except Clauses
- The else clause
- The finally clause
- Using Exceptions For Flow Control

- Raising your own exceptions
- Exception Hierarchy

Module 10: OOPS in Python

- Introduction to Object-Oriented Python
- Creating Classes, Methods, and Objects
- Using Constructor and Attributes
- Using Class Attributes and Static Methods
- Understanding Object Encapsulation
- Private Attributes and Methods
- Controlling Attribute Access
- Creating and Accessing Properties

Module 11: Playing with Data

- Relational Databases
- CSV
- Getting Data from the Web
- JSON
- Overview of Data Serialization
- Importance of Data Interchange Formats
- Understanding JSON syntax and structure
- Encoding Python Data to JSON - Serialization
- Decoding JSON to Python Data – Deserialization
- Introduction to XML
- Parsing XML with xml.etree.ElementTree
- Best Practices in XML Processing
- Introduction to CSV Format
- Reading CSV data
- Writing Data into CSV files
- Best Practices for CSV Processing
- Integrating JSON, XML and CSV using advanced python library Pandas

Module 12: NumPy

- Introduction to NumPy
- Installation
- NumPy Arrays (numpy.array)
- Array Indexing and Slicing
- Array Shape and Reshaping
- Array Operations (Sum, Mean, etc.)
- numpy.arange and numpy.linspace
- Array Stacking and Splitting
- Data Type Promotion
- Formation of 1D, 2D and 3D arrays
- Exploring dimension type, shape and size of array
- Exploring dimension type, shape and size of array
- Indexing of NumPy Arrays

- Slicing of NumPy Arrays
- One's Matrix and Zero's Matrix
- Identity Matrix
- min() and argmin()
- max() and argmax()
- np.sort()
- np.argsort()
- Addition of matrices
- Multiplication of matrices

Module 13: Pandas

- Introduction to Pandas
- Series
- DataFrames
- Missing Data
- Merging Joining and Concatenating
- Operations
- Data Input and Output
- Groupby()
- Pivoting
- VLookup

Module 14: Tkinter

- Introduction to GUI Development
- Introduction to Tkinter
- First Step to creating Tkinter Applications
- Geometry Manager
- Grid Layout
- Develop an app based on Tkinter
- Project exercise on Tkinter

Module 15: Project

- Use Python to develop a bill generator for a shopping mall
- Pizza Ordering Kiosk using Tkinter

Module 16: Testing and Debugging

- Testing for Performance
- The Unittest Module