

## Python Programming

**Duration: 5 days**

**Day 1:**

### 1: Python Introduction

- what's Python?
- Why do people use Python?
- Some quotable quotes
- A Python history lesson
- Advocacy News
- What's Python good for?
- What's Python not good for?
- The features list
- Python portability
- Summary

### 2. Using the Interpreter

- Python's Interactive Prompt
- Scripting
- Program Execution Model
- Program Architecture: modules
- How to run Python programs
- The IDLE interface
- Other python IDEs

### 3. Python Scripting

- Python Scripts in Linux/Unix & Windows
- Whitespace Significance
- Line Termination
- Comments in Python
- Basic Output Generation
- Simple User Input
- Python Modules
- Module Search Paths
- Determining the System Search Path
- `input()`
- `raw_input()`

### 4. Working with Variables in Python

- Python Variables
- Naming Conventions & Rules
- Types as Objects
- Variable References & Garbage Collection
- Sequence Types
- Membership Statements
- List Iteration
- Sequence Assignments
- Mutable vs Immutable Objects
- Multi Target Assignments

## **5. Numeric Operations in Python**

- More About Python's Numeric Types
- Numeric Tools
- The Decimal Module
- Operator
- Arithmetic
- Logical
- Relational
- Bitwise
- Special Operators
- Operator Precedence

## **6. Python Compound Statements**

- Python Nesting Recap
- Comparison Operations
- The if Statement
- The if Ternary Expression
- The while Loop
- The for Loop
- Traversing Parallel Sets

## **7. Python String Types**

- Generating Strings in Python
- Immutable
- Common String Methods
- Type Conversion in Python
- Formatting String Output
- Format Specifier
- Variable Substitution
- String Indexing
- String Slicing

- String Iteration

## **8. -NA-**

## **9. Python's Tuples**

- Immutable
- Common Tuples Methods
- Tuples Operations
- Tuples Indexing
- Tuples Slicing
- Tuples Iteration
- Multi-Dimensional Tuples (Matrices)

## **10. Python's Lists**

- Common List Methods
- The range() Function
- List Operations
- String Indexing
- String Slicing
- String Iteration
- Multi-Dimensional Lists (Matrices)

## **11. Python List Comprehension**

- Basic List Comprehensions
- Compound List Comprehensions

## **12. Python Dictionaries**

- Python Dictionaries
- Assigning Values to Dictionaries
- Dictionary Methods
- Dictionaries vs Lists & Tuples
- Dictionary Indexing
- Dictionary Iteration

## **Day 2:**

## **13. Basic Input/Output with Files**

- Opening Files
- Working with Files
- Controlling Output Location

#### **14. Handling Compound Data Structure**

- Nested Structure
- Parsing and Loading into Data Structure
- Retrieval of data from the Data Structure

#### **15. Regular Expression in Python**

- Meta Characters
- re module
- Search
- Match
- Split
- Translation

#### **16. Creating Python Functions**

- Function Basics
- Defining Functions
- Function Polymorphism
- Argument Defaults
- Lambdas
- Local Variables
- Understanding \_\_builtin\_\_
- Preventing Variable Modifications
- Argument Matching Methods
- Keyword Argument Methods

#### **17. Modules & Packages**

- Module Basics
- Packages
- Using \_\_all\_\_ and \_ Variables
- Using \_\_name\_\_
- Using third party modules

#### **18. Classes and Objects**

- Introduction to OOP using python
- Classes and class attributes
- Instances and instance attributes
- Binding and method invocation
- Composition, Subclassing and Derivation
- Inheritance
- Built-in functions for classes, instances and other objects
- Privacy and Delegation

- An overview of built-in python classes and modules
- Object Oriented Python & Object Orientation:
- Individual Objects
- Static And Non-static Instances,
- Designing Objects,
- Constructors & Destructors,
- Base classes and subclasses,
- Abstract classes,
- Polymorphism,
- Inheritance and Inheritance structure,
- Multiple Inheritance.

### **Day 3:**

## **19. Exceptions**

- About Exceptions
- Python's Default Exception Handler
- Using Try/Except/Else/Finally Exceptions
- Generating User Defined Exceptions
- More on Exceptions
- Exception Examples
- Using Asserts
- Exception Classes

## **20. Standard Python modules**

- Using the sys module
  - sys.argv, sys.path, sys.version
- An overview on `__builtin__` and `__future__` modules
- Using the os module
  - Filesystem/directory functions
  - Basic process management functions
  - Recursive directory iteration using `os.walk`
- Using the os.path module
  - Determining basename, dirname, path manipulation
  - File type/size/timestamp and other stat determination
- Using the time and datetime modules
- Using random, shutil, pprint, hashlib, md5

## **21. Process management and process automation**

- Using `os.system`, `os.popen`, `os.fork`, `os.exec` functions
- Using the commands module
- Using the subprocess module

- Managing processes using various functions  
in os module

#### **Day 4:**

### **22. Working with Spreadsheets**

- Introduction to openpyxl, win32client
- creating and saving new excel workbooks
- Extracting objects from excel
- Plotting in excel

### **23. Working with pandas and numpy**

- Introduction to Numpy
- An overview of Pandas
- Data analysis using pandas
- Plotting using pandas

### **24. Python with Databases**

- Connection to a database server MySQL and other databases,
- the basic principles of databases Using SQLite from Python.
- ORM Concepts using SQL Alchemy

#### **Day 5:**

### **25. Pandas**

- Slicing, Merging, Concatenating Data Frames
- Applying aggregation, grouping and categorising
- Using apply and lambda functions
- Cleansing and preparing data for data analysis
- time series analysis
- Solving linear regression using numpy

### **26. Web development with python**

- Django Framework
- Flask Framework
- CRUD Apps