

# Python Programming

## Introduction to Python

*Day 1*

- What is Python?
- Why should we learn Python?
- Installing Python
- Installation & walkthrough of Visual Studio Code Editor for Python Programming
- Different ways of execution of Python scripts
- Understanding Python Syntax, Indentation, Code Execution, Comments
- Memory management while running Python Scripts

## Variables and Data types

*Day 1*

- Python Variables
- Python Strings
- Python Lists
- Python Tuples
- Python Dictionaries
- Python Sets
- Python Arrays
- Python Operators

## Conditional Statements and Loops in Python

*Day 1*

- Python If...Else, If Elif else Loop
- Python While else Loops
- Python For else Loops
- Global vs Local variable in Python

## Control Statements in Python

*Day 1*

- Return Statement
- Continue Statement
- Break statement
- Pass statement

## Functions

*Day 1*

- Functions Concept in Python
- Creating a function
- Calling a python function
- Arguments in function – Formal and Actual Arguments
- Types of Actual Arguments – Positional, Keyword, Default, Variable length, Keyword variable length
- Built-in functions – Filter, Map, Reduce
- Function Recursion
- Decorators
- Generators in Python
- Iterators in Python

## Modules and Packages

*Day 1*

- Importing Modules
- Creating Module
- Use a Module using pip commands.
- Understanding PyPI repository
- Modularizing your project with modules
- Built-in Modules
- Special Variable `__name__`
- Multithreading in Python

## Classes and Objects

*Day 1*

- Understanding Class and Object - Conceptual
- `__init__` - Understanding role of constructor
- Types of variables and methods in Class
- What is an Inner Class in Python?
- Class Inheritance – Single level, Multi-level and Multiple
- Method Resolution Order
- Abstraction in Python
- Polymorphism – Duck Typing, Method Overloading, Method Overriding, Operator Overloading
- Encapsulation in Python

## File and Exception Handling

*Day 2*

- File handling\Read files
- Write\Create files
- Delete files
- Try...except...finally statement

## Python Libraries

*Day 2*

- Essential Python Libraries
- Anaconda Installation & Setup
- Jupyter Lab\Notebook Overview (Anaconda Distribution)

## Numpy Arrays

*Day 2*

- Create multi-dimensional arrays
- Numpy Data Types
- Array attributes
- Indexing and Slicing
- Manipulate array shapes

## Introduction to Pandas

*Day 2*

- Introduction to Python Pandas
- Basics of Pandas Dataframe and Series
- Multiple ways of creating Pandas Dataframe
- Read/Write Static files (Excel / CSV)
- Handling missing data using fillna / dropna / interpolate methods
- Handle missing data using Pandas replace method
- Perform Split-Apply-Combine operation using Pandas GroupBy method
- Concatenate Dataframes
- Merge Dataframes
- Perform Pivot operation using Pivot table
- Reshape Dataframe using melt operation
- Perform Stack-Unstack operations on multiple Dataframes
- Crosstab operation on Pandas Dataframes
- Read-write data from database using read\_sql , to\_sql methods

## Introduction to Data Visualizations

*Day 2*

- What is Data Visualization
- Some Theoretical Principles Behind Data Visualization
- Histograms-Visualize the Distribution of Continuous Numerical Variables
- Boxplots-Visualize the Distribution of Continuous Numerical Variables
- Scatter Plot-Visualize the Relationship Between 2 Continuous Variables
- Create Barplot
- Create Pie Chart
- Create Line Chart

## Python Regular Expressions

*Day 2*

- Match function
- Search function
- Match vs String function
- Search and Replace
- Extended Regular Expression
- Wildcards

## Connecting to Database (MySQL)

*Day 2*

- Download and Install MySQL on Windows 10
- Database Connectivity
- Create Database
- Create Table
- Inserting Data into Table
- Inserting Multiple Records
- Extracting Data from Table
- Update Table Records
- Delete Record from Table
- Import Excel in MySQL DB using Python