

# Python (Core and Advance)

## 1. Introduction to python

- History of Python
- Why to learn python
- How is Python Different from other programming languages
- Installing Python and path setting
- How to run python programs

## 2. Basics of Python

- Variable
- Identifier
- Keywords
- Statements & Comments
- Indentation
- Data types(number,string,list,tuple,set,dictionary)
- Static Typing vs Dynamic Typing
- Input and output

## 3. Operators

- Arithmetic operator
- Relational Operator
- Assignment Operator
- Logical operator
- Bitwise operator
- Membership Operator
- Identity Operator

## 4. Control Flow

- If statement
- If - else
- If – elif -else
- Nested if – else
- While loop
- for – in loop
- Nested loop
- Loop with else
- Pass statement
- Break and continue

## 5. Functions

- Function Basics
- Defining function
- Function call
- Return statement
- Function parameters
- Call by value or call by reference
- Local and global variable
- Recursion
- Anonymous (lambda) function

## 6. Modules

- Defining module
- How to create module
- Importing module
- Dir ()
- Module search path
- Reloading a module
- Sys module

- Os module
- Namespace

## **7. Packages**

- Defining package
- How to create package
- Importing package
- Installing third party packages

## **8. Numeric Types**

- Numeric type basics
- Numbers
- Hexadecimal, Octal and Binary Notation
- Complex Numbers
- Type casting
- Numeric Functions
- Random number generation

## **9. String**

- Defining a string
- Different ways to create string
- Accessing elements of string
- Escape sequence
- Raw string
- String methods
- String formatting Expressions

## **10. List**

- Defining a list
- Creating list
- Accessing list elements of list
- Deleting list
- List methods
- Functions used with list
- List comprehension
- Implementation of stack and queue using list
- Use of Zip ()
- Matrix operations using list

## **11. Tuple**

- Defining a tuple
- Creating a tuple
- Accessing elements of tuple
- Immutability
- List vs tuples
- Tuple Methods
- Functions used with tuple
- Advantage of Tuple

## **12. Dictionary**

- Defining a dictionary
- Creating a dictionary
- Accessing elements of dictionary
- Deleting a dictionary
- Dictionary methods
- Dictionary Comprehension

## **13. Set**

- Defining a set
- Creating set
- Set operations

- Set methods
- Set comprehension

## **14. File Handling**

- Defining a file
- Types of file
- File operations
- Opening a File
- Closing file
- File modes
- File attributes
- Writing to file
- Reading from file
- Appending to file
- File positions
- Binary file
- Pickle module

## **15. Exception Handling**

- Defining an exception?
- Default exception handler
- Exception handling techniques
- Detecting Exception (try)
- Catching exceptions (catch)
- Catching multiple exceptions
- Raising exception (raise)
- Finally block
- User defined exceptions

## **16. Object Oriented Programming**

- Oop concepts
- Defining a class
- Creating object
- Method vs function
- Calling methods
- Instance attribute vs class attribute
- Instance method vs class method
- Private attribute and method
- Static method
- Method Overloading
- Constructor
- List of objects
- Inheritance
- Method overriding
- Operator overloading
- Abstract method
- Abstract class

## **17. Multithreading**

- Process based multi-tasking
- Thread based multi-tasking
- Creating a Thread without using class
- Creating thread using class
- Sleep () method
- Join () method
- Getting and setting name of Thread
- Logging module
- Synchronization

- Lock concept
- Inter thread communication
- Is\_Alive () method
- Active\_count () method
- Enumerate () method
- Current\_thread () method
- Daemon Thread

## **18. GUI Programming with Tkinter**

- Introduction to tkinter
- Creating a window
- Tkinter widgets
  - Label
  - Button
  - Entry
  - Message box
  - List
  - Radio Button
  - Check Button
- Creating Frame
- Creating Menu
- Assignments on tkinter

## **19. Event Handling**

- Defining an event
- Bind () method
- Mouse events
- Keyboard events

## **20. Database Programming**

- Introduction to SQLite module
- Connecting to database by using sqlite3
- Creating table by sqlite3
- Performing SQL operations
- Introduction to MySQL
- Installing MySQL
- Creating database using MySQL
- Connecting MySQL database from python
- Creating table
- Performing SQL operations

## **21. Networking**

- Introduction to Network programming
- Ip address
- Port Number
- Socket module
- Server socket
- Client socket
- Socket methods
- TCP socket
- UDP socket

## **22. Converting Python script to Executable file**

- Defining an executable file
- Installing cx\_Freeze module
- Importing setup and Executable
- Deploying the application

## 23. Introduction to Machine learning using Python

- What is machine learning?
- Difference between Machine learning and AI
- Types of Machine learning
- Supervised learning
- Unsupervised learning
- Examples
- Applications of Machine learning
- Popular Python packages for machine learning
  - Numpy
  - Scipy
  - sklearn
  - matplotlib
  - Pandas