

Course Title: Python Programming
Course Type: DSE

Course Credits: 3+1

Objectives:

The objective of this course is to introduce the students to python programming, its applications, and to provide understanding of basic datatypes, advanced datatypes, control structures, object-oriented concepts, file handling, exception handling, data manipulation and visualization using python programming.

Learning Outcomes:

At the end of this course, students will be able to:

1. Demonstrate proficiency in Python Programming including variables, datatypes, functions, and control structures.
2. Manipulate and visualize data effectively using numpy, Pandas and Matplotlib.
3. Develop Python programs using Object-oriented concepts.

Unit I

Introduction to Python : History, Usage, Features of Python as programming language, Advantages of Python, Components of a Python Program: Indentation ,Identifiers, Keywords, data types, variables, operators Control flow statements ,numeric types, Methods: definition, calling, parameters, argument passing, return type, scope, Modules .List the tools used for programming in Python such as IDLE, Anaconda, PyCharm etc.

Unit II

Creating and Manipulating Strings, List, Tuple, Dictionary, Set. File Handling: Types of Files, Creating Files, Opening and Closing files, Reading and Writing Operations on files. **Exception Handling:** Introduction to errors and exceptions, try, except, finally blocks.

Connecting to Database with Python: Performing basic CRUD operations on database, Handling database errors.

Unit III

Creating Class and Object, Adding Attributes and Methods to Class, self argument, init() method, del() method, other special methods, Static methods, public and private data members, private methods, calling a class method from another class method, built-in class attributes, Method Overloading, Operator Overloading, Parameterized, and Non-parameterized Constructor.

Inheritance: Inheriting classes in python, Subclass accessing attributes of Parent class, Types of inheritance: Single, Multi-Level, Multiple and Hierarchical Inheritance, Super (), Method Overriding, Abstract Classes, Interfaces, Composition, Object Class.

Unit IV

Python Numpy: Introduction, one-dimensional and N-dimensional arrays, indexing and slicing, Basic array operations, matrix operations, Introduction to **Pandas**, Series and DataFrames, basic Series functions, reading and writing data from csv files, basic dataframe operations, dataframe slicing, selecting, extracting, grouping, and sorting, Pandas built-in functions for basic operations, working with text data.**Data Visualization with Matplotlib and Seaborn:** Introduction to data visualization , creating basic plots with Matplotlib, Enhancing visualizations with seaborn.

Recommended Books

- 1) Learning Python, Mark Lutz, O'Reilly Publishers
- 2) Python-The complete reference, Martin Brown-Mc graw hill Publishing
- 3) Python in easy steps, MikeMcgraw-Mc graw hill Publishing

Course Name : **Lab on Programming Through Python**

- Python program to print "Hello Python"
- Python program to do arithmetical operations
- Python program to find the area of a triangle
- Python program to convert Celsius to Fahrenheit
- Python program to display calendar
- Python Program to Check if a Number is Positive, Negative or Zero
- Python Program to Check if a Number is Odd or Even
- Python Program to Check Leap Year
- Python Program to Check Prime Number
- Python Program to Print the Fibonacci sequence
- Python Program to Check Armstrong Number
- Python Program to Find Armstrong Number in an Interval
- Python Program to Find the Sum of Natural Numbers
- Python program to copy all elements of one array into another array
- Python program to find the frequency of each element in the array
- Python program to left rotate the elements of an array
- Python program to print the duplicate elements of an array
- Python program to print the elements of an array
- Python program to print the elements of an array in reverse order
- Python program to print the elements of an array present on even position
- Python program to print the elements of an array present on odd position
- Python program to print the largest element in an array
- Python program to print the smallest element in an array
- Python program to print the number of elements present in an array
- Python Program to Sort Words in Alphabetic Order
- Python Program to Remove Punctuation from a String
- Python Program to reverse a string
- Python Program to convert list to string
- Python Program to create a dictionary
- Python Program to convert list to dictionary
- Python Program for Check if all digits of a number divide it
- Check whether a number has consecutive 0's in the given base or not
- Python Program for Number of solutions to Modular Equations
- Python Program for Legendre's Conjecture
- Machine Learning examples (From basic to Advanced)