Course Category : **Major Core**

Course Name : Python Programming

Course Code : **UCS2003**

L-T-P : **3-0-2**

Semester : **2nd**

Batch : **2024-28**

Syllabus

Prerequisite:

There is no pre-requisite for this course.

Course Outcomes:

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

CO1	Understand the numbers, Math functions, Strings, List, Tuples, and Dictionaries in Python
CO2	Use different Decision-Making statements and Functions
CO3	Implement Functions and Strings in Python
CO4	Apply File-handling operations and Object-Oriented concepts using Python
CO5	Applying Python Packages for data exploration.

Unit No	Topics	CO No.	No. of Lecture
1	**Introduction:** The Programming Cycle for Python, Python IDE, Interacting with Python Programs, Elements of Python, Type Conversion. Basics: Expressions, Assignment Statement, Arithmetic Operators, Operator Precedence, Boolean Expression. Python Data Structure: Tuples, Unpacking Sequences, Lists, Mutable Sequences, Sets, Dictionaries.	**1**	**8**
2	**Conditionals:** Conditional statement in Python (if-else statement, its working, and execution), Nested-if statement and Elif statement in Python, Expression Evaluation & Float Representation. **Loops**: Purpose and working of loops, while loop, For Loop, Nested Loops, Break and Continue.	**2**	**8**
3	**Function:** Parts of a Function, Execution of a Function, Keyword and Default Arguments, Scope Rules, Lambda Function.	**3**	**8**

Unit No	Topics	CO No.	No. of Lecture
	Strings: Length of the string and perform Concatenation and Repeat operations. Indexing and Slicing of Strings, inbuilt functions for strings.		
4	**File Handling:** File input and output operations in Python Programming, Reading, and writing text files, Appending to Files – (for text files and CSV files) **Basics of Classes and Objects** – Creating Class and Object, Constructors in Python – Parameterized and Non-parameterized, Inheritance in Python, Inbuilt class methods and attributes, Multi-Level and Multiple Inheritance, Method Overriding and Data Abstraction, Encapsulation and Polymorphism	**4**	**8**
5	**NumPy**-Introduction, creating arrays, using arrays and Scalars, Indexing Arrays, Array Transposition, Universal Array Function, Array Processing, Array Input and Output. **Pandas:** Introduction, uses of Panda, Series in pandas, Index objects, Reindex, Drop Entry. **Plotting and Visualization in Python:** Plotting using Matplotlib library (Histogram, Box Plot, Scatter Plot, Bar Graphs, Line Graph, etc.)	**5**	**8**

Text Book:

1. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

2. Let Us Python - 4th edition (5 December 2021); BPB PUBLICATION

Reference Book:

1. Python: The Complete Reference, by Martin C. Brown, McGraw Hill Education; Forth edition (20 March 2018)

0. Guido van Rossum and Fred L. Drake Jr, ―An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011

List of Programs

Lab Course Outcomes:

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

CO1	Understand the numbers, Math functions, Strings, List, Tuples, and Dictionaries in Python
CO2	Use different Decision-Making statements and Functions
CO3	Implement Functions and Strings in Python
CO4	Apply File-handling operations and Object-Oriented concepts using Python
CO5	Applying Python Packages for data exploration.

S. No.	**Programs**	**CO No.**
1	Write a Python program to print the documents (syntax, description, etc.) of Python built-in Functions.	1
2	To write a Python program find the square root of a number.	1
3	To write a Python program exponentiation (power of a number).	1
4	Write a Python program to calculate the length of a string	2
5	To write a Python program find the maximum of a list of numbers.	3
6	To write a Python program to find the most frequent words in a text read from a file	4
7	To write a Python program to find the most frequent words in a text file.	4
8	Write a Python program to demonstrate various ways of accessing the string- By using Indexing (Both Positive and Negative)	3
9	Create a dictionary and apply the following Methods: 1) Print the dictionary items 2) access items 3) use get() 4)change values 5) use len()	1
10	Write a Python program to find the smallest number in a list, and to find largest number in a list	1

11	(i) Write a Python program to open and write “hello world” into a file? (ii) Write a Python program to write the content “hi python programming” for the existing file.	4
12	Write a program to double a given number and to write a python program add two numbers using lambda ()?	3
13	(i) Write a Python program to display welcome to MRCET by using classes and objects. (ii) Write a Python program to call data members and function using classes and objects. (iii) Write a program to find the sum of two numbers using class and methods. (iv) Write a program to read 3 subject marks and display pass or failed using class and object.	4
14	Implement single and Multiple inheritance concepts using Python.	4
15	Write a Python program for addition of two matrix using NumPy library and find transpose of a matrix.	5
16	Using a NumPy module create an array and check the following: 1. Type of array 2. Axes of array 3. Shape of array 4. Type of elements in an array	5
17	Write a Python program using panda library to add new column admission no. to a data frame. Initially, there are 3 columns respectively name, and marks, and have some dummy data for each column.	5
18	Use Matplotlib to write a python program to draw a graph of two lines intersecting each other while points for line1 at x axis- (1,2,3) and at y-axis at (2,4,1) and for line2 points are- (1,2,3) at x axis and (4,1,3) at y-axis.	5