22CS1T1: PROGRAMMING AND PROBLEM SOLVING USING PYTHON

Course Name	Programming and Problem Solving Using Python		L	T	P	C	CIA	SEE	TM
Course Code	22CS1T1		4	0	0	4	30	70	100
Year of Introduction: 2020	Year of Offering: 2022	Year of Revision: 2022			Percentage of Revision: 10				
L-Lecture, T-Tutorial, **P**-Practical, **C**-Credits, **CIA**-Internal Marks, **SEE**-External Marks, **TM**-Total Marks									

Course Description and Purpose: Python Programming is a course that illustrates basic concepts of Python programming, Decision Control Statements, Functions and Modules, Python Strings Revisited, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, File Handling, Numpy, Matplotlib.

Course Objectives:
This course will help enable the students to understand, learn and develop a various Decision Control Statements, Functions & Modules, Strings, Data Structures, Classes and Objects, Inheritance, Operator Overloading, Pandas, Error and Exception Handling, Handling Files, Databases.

Specific objectives include:
- ✓ To understand basics of *Python Programming*.
- ✓ To gain knowledge on *Decision Control Statements* and *Functions & Modules and Python Strings* and *Data Structures*.
- ✓ To gain knowledge on *Classes & Objects, Ingeritance.*
- ✓ To apply *Operator Overloading, Error and Exception Handling* and Pandas.
- ✓ To gain knowledge on File Handling, Database Connection, basics of Numpy and matplotlib.

Course Learning Outcomes:
Upon successful completion of the course, the student will be able to:
CO1: Understand basics of Python Programming.
CO2: Gain knowledge on *Decision Control Statements* and *Functions & Modules* and *Python Strings* and *Data Structures*.
CO3: Gain knowledge on *Classes & Objects & Inheritance.*
CO4: Apply Operator Overloading, Error and Exception Handling and Pandas.
CO5: Gain Knowledge on File Handling, Database Connection and basics of Numpy and matplotlib

UNIT I (12 Hours)

Basics of Python Programming: Features of Python, History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.
Decision Control Statements: Conditional Branching Statements, Basic Loop Structures, Nested Loops, The Break Statement, The Continue Statement, The Pass Statement, The Else Statement used with Loops.

UNIT II (12 Hours)

Functions and Modules: Function Definition, Function Call, Variable Scope and Lifetime, The Return Statement, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Standard Library Modules.
Python Strings Revisited: Concatenating, Appending and Multiplying Strings, String Formatting Operator, Built in String Methods and Functions, Comparing Strings, Regular Expressions.
Data Structures: Sequence, Lists, Functional Programming, Tuple, Sets, Dictionaries.

UNIT III (12 Hours)

Classes and Objects: Classes and Objects, Class Method and self Argument, Class Variables and Object Variables, Public and Private Data Members, Private Methods, Calling a Class Method from Another Class Method, Built in Class Attributes, Class Methods, Static Methods.

Inheritance: Inheriting Classes in Python, Types of Inheritance, Abstract Classes and Interfaces.

UNIT IV (12 Hours)

Operator Overloading: Concept of Operator Overloading, Advantage of Operator Overloading, Implementing Operator Overloading.

Pandas: Introduction, Getting Started, Series, Data Frame**,** Read CSV, Read JSON **-**Analyzing Data Frames, Cleaning Data, Cleaning Empty Cell, Cleaning Wrong Format, Cleaning Wrong Data, Removing Duplicates, Correlations, Plotting.

Error and Exception Handling: Introduction to Errors and Exceptions, Handling Exceptions, Raising Exceptions, Built in and User defined Exceptions.

UNIT V (12 Hours)

File Handling: File Path, Types of Files, Opening and Closing Files, Reading and Writing Files.

Databases: Database Table Creation, Select Operation, Insert Operation, Delete Operation, Update Operation, Drop Table.

Numpy: Basic Functions of Numpy.

Matplotlib: Basic Functions of Matplotlib.

Reference Text Books:

1. Reema Thareja, Python Programming Using Problem Solving Approach, Oxford University Press, June 2017.
2. Vamsi Kurama, Python Programming, A Modern Approach, Pearson, 2017.
3. Wesley Chun, Core Python Programming, Prentice Hall, December 2000.

e-resources: https://www.w3schools.com/python/pandas/

PARVATHANENI BRAHMAYYA SIDDHARTHA COLLEGE OF ARTS & SCIENCE

(An Autonomous College in the jurisdiction of Krishna University)

M.Sc.(Computer Science), First Semester

Course Name: PROBLEM SOLVING USING PYTHON PROGRAMMING

Course Code: 22CS1T1

(w.e.f admitted batch 2022-23)

Time: 3 Hours **Max Marks: 70**

SECTION-A

Answer ALL questions **(5×4 = 20 Marks)**

1. a) Explain *Future of Python* (CO1,L2)

(or)

b) Explain different *Data Types* in *Python* (CO1,L2)

2. a) What is *Recursive Function*? Explain with *example*.(CO2,L1)

(or)

b) List out and explain any *4 Built in String Method*?(CO2,L1)

3.a) Whit is the *Differences between Class Variable and Object Variable*?(CO3,L1)

(or)

b) List out *Built in Class Attributes*? (CO3,L1)

4.a) Explain *Advantages of Operator Overloading*? (CO4,L2)

(or)

b) Explain *Exception Hierarchy*? (CO4,L2)

5.a) Explain *Types of Plots in Matplotlib*? (CO5,L2)

(or)

b) Explain different *ways of creating Arrays* using *Numpy*. (CO5,L2)

SECTION-B

Answer Five Questions Choosing One Question from Each Unit.

All Questions Carry Equal Marks. **(5×10 = 50 Marks)**

6. a) Explain the *features of Python Programming Language.*(CO1,L2)

(or)

b) Explain *Different Loops* in Python with example. (CO1,L2)

7. a) Apply Modules Concept in Python with examples. (CO2.L3)

(or)

b) Build the List *Data Structure and their built in functions* with examples. (CO2, L3)

8. a) What are Classes and Objects? Write a program in Python to illustrate an instance variable.(CO3,L1)

(or)

b)What is *Inheritance*? Explain *different types of Inheritance.* (CO3,L1)

9. a) Explain how to *Implement Operator Overloading* in Python. (CO4,L2)

(or)

b) Explain *process of Analyzing Data Frames*. (CO4,L2)

10. a) Explain *process of Writing and Reading data from file with example*. (CO5,L5)

(or)

b) Explain process of *Update Data* into *Database* with *relevant examples*. (CO5,L5)