Sri Sathya Sai College for Women, Bhopal

(An Autonomous College affiliated to Barkatullah University, Bhopal)

(NAAC Accredited 'A' Grade)

SYLLABUS

SESSION: 2023-24

Course Type: Certificate Course

Course Title : Python Programming

Additional Credit Course for I, II and III Year [N.E.P.]
Certificate Course for P.G. / B.Ed. [Non N.E.P. Course]

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Syllabus

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Course Title	**Python Programming**
Course Details	**Additional Credit Course for I, II and III Year [N.E.P.]** **Certificate Course for P.G. / B.Ed. [Non N.E.P. Course]**
Credit Value	**2 Credits**
Max.Marks: 70 [Th], 30 [Pr]	**Min. Marks: 24 [Th], 11 [Pr]**

Course Learning Outcomes(CLO) : **After completing the course, student will be able to –**

- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- Express proficiency in the handling of strings, functions and file handling.
- Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python with class, modules and packages .
- Identify the commonly used operations involving database connectivity and use of tkinter for GUI programming.

Content of the Course	
Module	**Topics**
I	**Python Basics :** Python interpreter, Python idle, dynamically typed and strongly typed features, basic data types, variables, expressions, statements, operators, flow of execution. Input and Output statements, Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration: while, for, break, continue, pass, implementing 'for' through range(), 'in' and 'not in' operators for sequence traversal. Creating and executing .py scripts.
II	**Data Structures:** Lists- append, extend, insert, index, remove, pop, count, sort, reverse,

	slicing, list comprehension, Copying a list: deep copy, shallow copy. Tuples- index, count, usage, use of tuples as a swap function. Dictionaries-keys, values, tuples, nested dictionaries, dictionary comprehension. Strings- Single line and multi-line strings, formatter, isdigit, isalpha, isalnum, islower, istitle, isspace, title, lower, upper, strip, split, splitlines, join etc. Sets – union, intersection, subset, superset, difference, symmetric difference, copy, add, remove, discard etc.
III	**Functions & File Handling:** Inbuilt Functions- id, len, chr, ord etc., defining and calling a function, arguments, global versus local variables, defining and using lambda functions, the map(), filter(), reduce() functions. Working with files : read, write and append modes: r, w, a, r+, w+, a+, reading-read(), readline(), readlines(), writing-write(), writelines(), seek(), tell(). Word count, copy file scripts through file handling concepts.
IV	**Classes, modules and exceptional handling:** Classes: Introduction, Member variables and defining methods, constructor, destructor, data encapsulation, inheritance, multiple inheritance, diamond problem solving technique of python. Modules: inbuilt modules- sys, random, time etc. import, from..import, from..import *. Constructing packages, role of __init__.py Exceptional Handling: The **try-except-else-finally** block, the **raise** statement, the hierarchy of exceptions, adding exceptions.
V	**Database & GUI Programming**: importing sqlite, connecting to database, creating table, insert, select, update, delete, drop tables, accessing and modifying tables through python. Graphical user interfaces; event-driven programming paradigm; tkinter module, creating simple GUI; buttons, labels, entry fields, dialogs; widget attributes - sizes, fonts, colors layouts, nested frames.

Suggestive List of Practicals	
	1. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500? 2. Print the first 2 and last 3 characters in a given string. Use the string slicing. 3. Write a program that eliminates duplicates in a list. 4. Implement shallow copy and deep copy of a list. 5. Find the largest of n numbers, using a user defined function largest() 6. Write a function that capitalizes all vowels in a string. 7. Read a line containing digits and letters. Write a program to give the count of digits and letters. 8. Write a function myReverse() which receives a string as an input and returns the reverse of the string. 9. Use the list comprehension methodology in python, to generate the squares of all odd numbers in a given list. 10. Generate a dictionary and print the same. The keys of the dictionary should be integers between 1 and 10 (both inclusive). The values should be the cubes of the corresponding keys. 11. Create a nested dictionary. The roll number of a student maps to a dictionary. This inner dictionary will have name, age, and place as keys. Read details of at least three students. 12. Enter a word. Create a dictionary with the letters of this word as keys, and the corresponding ASCII values as values. 13. Define a class with three methods: readString(), printString(), writeString(). The first method should read the contents of a file. The second method should print the contents to the console. The third method should write the contents to a new file.

	14. Create a class account which has constructor to input account_no, name, balance from user, print_account() to display the account details, and deposit(), withdraw() which inputs amount and add/subtract them from the total amount of individual object. 15. Create a database table in sqlite and show the table data in python. 16. Implement DML commands in SQLite from python interface. 17. Implement tkinter methods in a python script.
Learning Resources	
Textbooks, Reference Books, Other Resources	
Suggested Readings: • Taneja Sheetal & Kumar Naveen , "Python Programming: A modular approach", Pearson • Zed A. Shaw , "Learn Python the Hard Way", Zed Shaw's Hard Way Series • Liang Y. Daniel, "Introduction to Programming Using Python", Pearson • Charles Dierbach, "Introduction to Computer Science using Python", Wiley • Michael T. Goodrich, "Data Structures and Algorithms in Python", Wiley