



SANT HIRDARAM GIRLS COLLEGE, BHOPAL

Department of Computer Science

Session 2020-21

Certificate Course on “Python Programming Capsule Training for School Students”

❖ Course Objectives:

- To understand why Python is a useful scripting language for developers.
- To learn how to design and program Python applications.
- To learn how to use lists, tuples, and dictionaries in Python programs.
- To learn how to identify Python object types.
- To learn how to use indexing and slicing to access data in Python programs.
- To define the structure and components of a Python program.
- To learn how to write loops and decision statements in Python.
- To learn how to write functions and pass arguments in Python.
- To learn how to build and package Python modules for reusability.
- To learn how to read and write files in Python.
- To learn how to design object-oriented programs with Python classes.

❖ Course Outcomes

- 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 and functions.
- Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
- Identify the commonly used operations involving file systems and regular expressions.
- Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.

❖ Module of the Course

✓ **Getting Started:** Introduction to Python - an integrated high level language, interactive mode and script mode, Data types.

✓ **Mutable and Immutable Variables**

✓ **Variables, Expressions and Statements:** Values, Variables and keywords; Operators and Operands in Python, operator precedence, Expressions and Statements Taking input (using raw input () and input ()) and displaying output (print statement); Putting Comments.

✓ **Functions:** Importing Modules, invoking built in functions, using random() and randint() functions of random module to generate random numbers.

- ✓ **Defining functions**, invoking functions, passing parameters (default parameter values, keyword arguments), scope of variables, void functions and functions returning values, flow of execution
- ✓ **Conditional constructs and looping:** if else statement while, for (range function), break, continue, else, pass, nested if, nested loops, use of compound expression in conditional and looping construct.

❖ Programming with Python

- ✓ **Strings:** Creating, initialising and accessing the elements; string operators: +, *, in, not in, range slice [n:m]; comparing strings using relational operators; String functions & methods
- ✓ **Lists:** creating, initializing and accessing the elements, traversing, appending, updating and deleting elements, composition, lists as arguments, **List functions and methods**
- ✓ **Dictionaries: Dictionary Functions and methods, Tuple & Functions**

❖ Introduction to files

- ✓ Types of files (Text file, Binary file, CSV file), relative and absolute paths
- ✓ **Text File:** opening a text file, text file open modes (r, r+, w, w+, a, a+), closing a text file, opening a file using with clause, writing/appending data to a text file using write() and writelines(), reading from a text file using read(), readline() and readlines(), seek and tell methods, manipulation of data in a text file, : import csv module, open / close csv file, write into a csv file using csv.writerow() and read from a csv file using csv.reader()
- ✓ **File Python libraries:** creating python libraries
- ✓ **Recursion:** simple programs with recursion: sum of first n natural numbers, factorial, fibonacci series
- ✓ **Idea of efficiency:** number of comparisons in Best, Worst and Average case for linear search
- ✓ **Data Structure:** Stack, operations on stack (push & pop), implementation of stack using list. Introduction to queue, operations on queue (enqueue, dequeue, is empty, peek, is full), implementation of queue using list.