Annual Python Course

Course Name :	Python Intermediate level
Course Level :	Beginner
Course Duration :	10-12 Months
Lectures Per Month:	8 Lectures per month, 2 Lectures per week (72 Lectures)
Course Language:	English
About This Course:	Python is. Python is an object-oriented, high level language popular programming language. It was created by Guido van Rossum, and released in 1991. It is useful in following areas: Python has its own advantages: • Python works on different operating systems (Windows, Mac, Linux, Raspberry Pi, etc.). • Python is similar to the English language. • Python use interpreter to execute the coding. • Python programs are smaller compared to other programming languages. (Because of ready-made libraries) • Python can be treated in a procedural way, an object-oriented way or a functional way.
Learning objectives:	At the end of this course, the student will able to • To learn how to design and write a program in Python. • To learn the concepts of lists, tuples, and dictionaries in Python programs. • To identify Python object types. • To learn indexing and slicing to access data in Python programs. • To learn looping and decision statements in Python. • To learn how to write functions and pass arguments in Python.

	• To build packages in Python modules. • To read and write the data from files in Python. • To learn the concept of object- oriented programming in Python using class concept. • To learn exception handling in Python applications for error handling. • Work with data structure and collections • Create user defined modules and import them • Installing and uninstalling packages • Define user define class and objects • Work with inheritance and encapsulations • Work with date and time module • Create GUI interface using Tkinter module • Connect python with MYSQL • Design games using Pygame module
Software Requirement	You will need the following software's − • Windows xp/7/8/10 or Linux 7.1 operating system • Download python for free from the following website: https://www.python.org/ • Python IDE : 1. Spyder 2. Atom 3. Pycham There are many other IDE available online. • Online free python interpreter : https://www.online- python.com/
Target Audience:	Students from grade 8 onwards, Working professional
Curriculum:	Curriculum is given below in the table.

Topic 1 : Python Get Started**.....2 Hrs**

- What is Python
- Installation of Python
- Setting up the VS Code for Python
- Write the coding in Python to print “the Hello, Word!” program

Topic 2. Fundamentals**.....4 Hrs**

- Syntax
- Variables
- Strings
- Numbers
- Booleans
- Constants
- Comments
- Type conversion

Topic 3. Operators**.....1 Hr**

- Comparison operators
- Logical operators

Topic 4. Control flow**.....8 Hrs**

- if…else statement
- Ternary operator
- for loop with range()
- while statement
- break statement
- continue statement
- pass statement

Topic 5. Functions**.....2 Hrs**

- Python functions
- Lambda Expressions
- Default parameters
- Keyword arguments
- Recursive functions

Topic 5. Lists.....4 Hrs

- List
- Tuple
- Sort a list in place and Sort a List
- Slice a List
- Unpack a list .
- Iterate over a List
- Find the index of an element .
- Iterables
- Transform list elements with map()
- Filter list elements with filter()
- Reduce list elements into a value with reduce()
- List comprehensions

Topic 7. Dictionaries.....1 Hr

- Dictionary
- Dictionary comprehension

Topic 8. Sets.....2 Hrs

- Set
- Set comprehension
- Union of Sets
- Intersection of Sets
- Difference of sets
- Symmetric Difference of sets
- Subset
- Superset
- Disjoint sets .

Topic 9. Exception handling .....2 Hrs

- try…except
- try…except…finally
- try…except…else

Topic 10. More on Python Loops .....3 Hrs

- for…else
- while…else
- do…while

Topic 11. More on Python functions .....2 Hrs

- Unpacking tuples
- *args Parameters
- **kwargs Parameters
- Partial functions
- Type hints

Topic 12. Work with Modules & Packages.....2 Hrs

- Modules
- Module search path
- __name__variable
- Packages

Topic 13. File operations.....3 Hrs

- Read from a text file
- Write to a text file
- Create a new text file
- Check if a file exists
- Read from CSV files
- Write into CSV files

Topic 14 : Data Structures or Collections 3 Lectures

- Introduction of data structure
- Importance and applications of Data structures
- Types of Collections
    - Sequence
        - Strings, List, Tuple, range
    - Non sequence
        - Set, Frozen set, Dictionary

Topic 15 : Python Modules 3 Lectures

- Importance of modular programming
- What is module

- Types of Modules – Pre defined, User defined.
- Create User defined modules
- Functions based modules
- Class based modules
- Import module
- Use of **From … import** command
- Create module alias / Renaming name

Topic 16 : Packages *2 Lectures*

- Organizing python project into packages
- Types of packages – pre defined, user defined.
- Importing package
- Introduction to PIP command and installing PIP
- Installing and uninstalling Python packages

Topic 17 : OOPs *6 Lectures*

- Differences between Procedural v/s Object oriented programming
- Principles of OOP – Encapsulation, Abstraction (Data Hiding)
- Concepts of Classes and Objects
- Define a new class in python
- Types of variables – instance variables, class variables.
- Types of methods – instance methods, class method, static method
- Importance to initialization of an Object
- Concept of ‘self’ reference variable
- ‘cls’ reference variable
- Access modifiers – private(__) , protected(_), public
    - Creating object properties using setaltr, getaltr functions
- Encapsulation(Data Binding)
- What is polymorphism?
- Overriding and Overloading – Method and constructor
- Operator Overloading
- Inheritance and types of Inheritance
- Constructors in inheritance
- Create Object
- Use of super() method
- Runtime polymorphism

- Method overriding
- Method overriding in Multiple inheritance and Hybrid Inheritance
- Concrete Methods in Abstract Base Classes
- Difference between Abstraction & Encapsulation
- Inner classes

Topic 18 : Date & Time module *2 Lectures*

- Use of Date & Time class
- Use of Time Delta object
- Formatting Date and Time
- Calendar module
- Text calendar
- HTML calendar

Topic 19 : Tkinter & Turtle *5 Lectures*

- Introduction to GUI programming
- Tkinter module
- Tk class
- Different Components / Widgets
- Label, Entry, Button, Combo, Radio
- Types of Layouts
- Handling events
- Widgets properties

Topic 20 : Pygame Module *5 Lectures*

- Installing Pygame in Pycharm
- Introduction to Pygame
- Installing pygame
- A "hello world" program in Pygame
- Game loop and Game state
- Knowledge about display window: Pixel coordinates
- Using Colors in Pygame
- Rect Object
- Adding an image to Game window
- Pygame Blit
- Drawing geometrical shapes

- Adding text to Game window
- Animation
- Playing sounds

Topic 21 : MySQL *4 Lectures*

- Python MySQL
- Connect MySQL database using MySQL-Connector Python
- Create Database
- Create Table
- Insert record into Table
- Select Query
- Where Clause
- Order By Clause
- Delete Query
- Drop Table
- Update Query
- Limit Clause
- Python MySQL – Join

Topic 22 : Project *6 Lectures*

Total Hours : 72 Hours