CYBORG
ROBOTICS ACADEMY PVT. LTD.

PYTHON

TEACHER: CERTIFIED TRAINER	DURATION: 16 CLASSES(x6 LEVELS) (1 HOUR PER CLASS)	MODE: ONLINE AND OFFLINE

Python is a programming language that lets you work quickly and integrate systems more effectively. It is a general purpose and a high-level programming language, allow you to focus on core functionality of the application by taking care of common programming tasks. You can use Python for developing desktop GUI applications, websites and web applications

COURSE CURRICULUM

Level 1: Introduction to Python Basics

This level introduces students to the foundations of Python programming and Turtle graphics.

- Introduction to Python:
  - Overview of Python language and syntax.
  - Variables, data types, and operators.
  - Print statements and input/output (I/O).
- Control Structures:
  - Conditional statements: if, else, elif.
  - Loops: for and while.

    - Lists and tuples for storing data.
- Functions and Modules:
    - Defining functions, understanding scope, and using modules.
    - Turtle Graphics Exploration:
        - Create basic shapes and patterns using Turtle commands (forward, right, circle).
- Project - Simple Calculator:
    - Build a calculator for basic arithmetic operations using functions.

Level 2: Intermediate Python

This level dives deeper into data structures, file handling, and object-oriented programming.

- Advanced Data Structures - Lists and Dictionaries:
    - List slicing and comprehensions.
    - Working with dictionaries for key-value operations.
- File Handling and Exception Handling:
    - Read/write operations with files.
    - Handling exceptions to prevent runtime errors.
- Object-Oriented Programming (OOP):
    - Classes, objects, inheritance, and methods.
    - Turtle Racing Game:
        - Use Turtle to create a simple racing game with multiple turtles competing based on random movement.
- Project - To-Do List Application:
    - Build a to-do list manager using OOP principles and file handling.

Level 3: Advanced Python

Students are introduced to more advanced programming concepts, including regular expressions and functional programming.

- Advanced Functions and Lambdas:
    - Work with lambda functions, closures, and decorators.
- Regular Expressions and String Manipulation:
    - Use regex for pattern matching in strings.
- Project - Text Analyzer:
    - Build a text analyzer that extracts data from user input using regular expressions.

Level 4: Game Development with Turtle Graphics

This level focuses exclusively on **developing games using Turtle graphics**, giving students hands-on experience with interactive Python programming.

- Game 1 - Ball Game:
    - Create a bouncing ball game where points are earned by keeping the ball in play.
- Game 2 - Space Invader:
    - Build a space-themed shooting game, where the player shoots down invading enemies.
- Game 3 - Brick Breaker:

    - Design a brick breaker game using a paddle and ball to destroy bricks.
- Game 4 - Maze Game:
    - Create a maze where the player guides the Turtle to a goal through obstacles.
- Game 5 - Pacman Clone:
    - Develop a Pacman-style game, with a player navigating a maze while avoiding enemies.
- Game 6 - Jump and Run Game:
    - Implement a side-scrolling game where the player jumps over obstacles to score points.
- Game 7 - Flappy Turtle:
    - Build a game inspired by Flappy Bird, where the Turtle flies between obstacles to score points.
- Game 8 - Turtle Racing Game:
    - Advanced Turtle race with custom speed and path visualization.
- Game 9 - Shooting Game:
    - Design a shooting game with moving targets and a scoring system.

Level 5: Python Libraries and Advanced Applications

This level introduces important Python libraries, web frameworks, and machine learning concepts.

- Working with NumPy and Pandas:
    - Data manipulation and statistical operations using these libraries.
- Data Visualization with Matplotlib and Seaborn:
    - Create visual representations of data through graphs and plots.
- Web Scraping and APIs:
    - Scrape web content with BeautifulSoup and interact with APIs to gather data.
- Project - Data Analysis and Visualization**:**
    - Analyze a dataset and present insights through graphs.

Level 6: Advanced Python Applications

The final level focuses on advanced topics like web development, databases, and machine learning.

- Django or Flask Web Frameworks:
    - Build basic web applications using Django or Flask.
- SQL Integration:
    - Perform SQL queries and integrate them with Python applications using SQLite.
- Machine Learning Basics:
    - Implement regression and classification models using Scikit-Learn.
- Project - Simple ML Application:
    - Build a basic machine learning application for a real-world classification or regression task.