Python for Kids and Teens - Course Syllabus

Overview

Python is a widely used text-based programming language for web development, game creation, and app building. This course introduces kids and teens to fundamental coding concepts while enhancing problem-solving and analytical skills. The curriculum includes hands-on projects, interactive lessons, and engaging game-building exercises.

Course Structure

7 Modules | 44 Lessons | 100+ Activities & Projects | 44 Quizzes

Module 1: Python Basics

- Introduction to Python programming
- Overview of programming languages
- History of Python
- Algorithms, flowcharts, and repl.it platform
- Getting started with programming
- Print statements, identifiers, keywords, and variables
- Data types in Python
- Typecasting, user input, and string operations
- Python Operators I (Basic arithmetic and logical operations)
- Application of basic operators in Python
- Conditional Statements (If-else statements and decision-making concepts)
- Python Operators II (Logical operators and elif statements)
- Python Operators III (Identity, membership, and bitwise operators)
- Python Challenge: Solve coding exercises using all concepts learned

Project: Personalized Digital Diary - Develop a program where students can write and save their thoughts.

Module 2: Loops in Python

- Nested conditional statements
- Loops and their types
- While loop implementation
- Nested loops and their syntax
- Pattern creation using nested loops
- Introduction to Turtle graphics in Python

Project: Animated Name Art with Turtle - Create a colorful animation of names using loops and Turtle graphics.

Module 3: Python Functions and Modules

- Introduction to functions in Python
- Function arguments and recursion
- Keywords: return, continue, break, pass
- Exception handling and error-handling techniques
- Using the Random and Math module
- Date, Time, and Calendar modules

Project: Magic 8-Ball Game - Build a program that gives random responses when users ask a yes/no question.

Module 4: Data Structures in Python

- Introduction to Lists and list operations
- Working with Tuples
- Dictionary operations and iterations
- Understanding Sets and Arrays
- Advanced Python functions (map, zip, list comprehension, etc.)

Project: Virtual Pet Simulator - Create a simple game where a virtual pet responds to feeding, playing, and sleeping commands.

Module 5: Object-Oriented Programming (OOP)

- Introduction to Object-Oriented Programming
- Understanding Classes and Objects
- Implementing Inheritance in Python
- Encapsulation and Special Functions
- Abstraction and Polymorphism
- Challenges and Operator Overloading in OOP

Project: Superhero Profile Generator - Develop a program that generates superhero names, powers, and weaknesses using OOP concepts.

Module 6: Game Development with Pygame

- Introduction to Pygame for game building
- Basic game-building concepts and key detection
- Adding sprites to the game

- Enhancing game interactivity with sound, effects, and collisions

Project: Dodge the Falling Objects - Design a game where a character moves left and right to avoid falling obstacles.

Module 7: GUI Development with Tkinter

- Basics of Tkinter and widgets
- Tkinter Geometry Managers
- Event handling and message boxes

Projects: Color Mixer App, Pocket Money Tracker, and Music Player.