

Advanced concepts in Python: Level II

Suitable for: G10 - G12

Prerequisite: Introduction to Python: Level I

Duration: 20 Weeks

Classes per Week: 1 class (45 minutes each)

Course Overview:

This course expands on foundational Python programming by introducing more advanced concepts such as lists, dictionaries, and functions. Students will learn to apply these concepts in real-world applications, developing problem-solving skills through hands-on projects and practice exercises. By the end of the course, students will be able to create more sophisticated programs and explore applications in basic data handling and interactive projects.

Covered Topics

Unit 1: Advanced Data Structures

- Exploring lists and their functions
- Using lists for managing multiple pieces of data
- Advanced list operations and applications

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Unit 2: Problem Solving with Loops and Operators

- Applying loops in complex scenarios
- Understanding operators and their advanced usage
- Practicing through hands-on exercises and puzzles

Unit 3: Project-Based Learning

- Developing projects such as a "Small Bank" application
- Applying logic and data structures in interactive projects
- Practicing problem-solving with real-life applications

Unit 4: Introduction to Dictionaries and Interactive Applications

- Working with dictionaries to organize data
- Creating applications like a login system
- Building a basic chatbot using conditionals and dictionaries

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Unit 5: Functions and Final Projects

- Writing and using functions for modular code
- Developing a final project integrating lists, dictionaries, and functions
- Demonstrating advanced problem-solving through comprehensive projects

Materials Needed:

- Access to a computer or tablet
- Internet connection
- Chrome browser

Assessment

At the end of each lesson, learners will be assessed on their ability to apply advanced Python concepts, including lists, dictionaries, and functions, in meaningful ways. Assessments will focus on students' skills in building interactive and practical Python programs.

Certification

A certificate of completion will be awarded to students who successfully complete the course, recognizing their advanced proficiency in Python programming.