

# Introduction:

Python is a widely-used programming language that is easy to learn due to its simple syntax. It is used for web development, software development, data analysis, artificial intelligence, and automation. The main advantage of Python is its readability and vast library support.

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## Objective:

This course aims to provide a comprehensive understanding of the fundamentals of Python programming. It covers both basic and intermediate concepts that will help students develop coding skills in Python.

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## Detailed Content:

### 1. Introduction to Python 3.X

- Python 3.X is the latest version of the Python programming language.
  - It provides improved syntax, library functions, and better performance compared to Python 2.X.
  - Applications of Python include Web Development, Machine Learning, Data Analysis, and Automation.
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### 2. Getting Started with Python

- Installation of Python software from the official website (<https://python.org>).
  - Setting up the Python environment for running Python programs.
  - Introduction to IDEs like PyCharm, Jupyter Notebook, and Visual Studio Code.
  - Writing the first Python program using the print() function.
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### 3. Print and String Operations

- The print() function is used to display output on the screen.
  - String is a sequence of characters enclosed in quotes.
  - String Operations include:
    - Concatenation
    - Slicing
    - String Formatting
    - String Functions like len(), upper(), lower(), etc.
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## 4. Mathematical Operations

- Python supports arithmetic operators:
    - Addition (+), Subtraction (-), Multiplication (\*), Division (/), Modulus (%).
  - Math library functions for advanced operations like square root, power, etc.
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## 5. Variables, Loops, and Conditional Statements

### Variables

- Used to store data values.
- No need for explicit declaration of data types in Python.

### Loops

- While Loop: Repeats a block of code as long as a condition is true.
- For Loop: Iterates over a sequence (list, tuple, string).

### Conditional Statements

- if Statement: Executes code if a condition is true.
  - if-else Statement: Executes one block if the condition is true, else another block.
  - if-elif-else Statement: Checks multiple conditions.
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## 6. Functions and Variables

### Functions

- A function is a block of reusable code.
- Defined using the `def` keyword.

### Function Parameters

- Functions can accept parameters and return values.

### Local and Global Variables

- Local Variables: Defined inside a function.
  - Global Variables: Declared outside functions and accessible throughout the program.
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## 7. Error Detection

### Syntax Errors

- Errors in the structure of code (missing colon, wrong indentation).

### **Runtime Errors**

- Errors occurring during program execution (division by zero).

### **Logical Errors**

- Errors in the logic of code leading to incorrect output.
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## **8. File Handling and Classes**

### **File Handling**

- Writing to a file using `write()` function.
- Appending data using `append()` function.
- Reading content from a file using `read()` function.

### **Classes and Objects**

- Class is a blueprint for creating objects.
  - Object is an instance of a class.
  - Supports Object-Oriented Programming principles like:
    - Encapsulation
    - Inheritance
    - Polymorphism
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## **9. Intermediate Python Concepts**

### **User Input**

- Accepting input from the user using `input()` function.

### **Importing Modules**

- Importing built-in and custom modules for reusing code.

### **Lists and Tuples**

- List: Mutable sequence of items.
- Tuple: Immutable sequence of items.

### **Dictionary**

- Stores data in key-value pairs.

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## 10. Final Project

### Problem Statement

- A real-world problem is given to students to solve using Python.

### Solution

- Develop a Python program using all the learned concepts:
  - Functions
  - Loops
  - File Handling
  - Error Detection
  - Classes & Objects

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## Conclusion:

This Free Python Course helped me gain strong knowledge of basic and intermediate Python programming. I learned about variables, loops, functions, file handling, object-oriented programming, and error handling. These concepts will help me in developing real-world projects and improving my coding skills.

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## References:

- Course Link: <https://simpli-web.app.link/e/MkYDGEqHJLb>
- Python Official Documentation: <https://docs.python.org/3/>