55284A: Introduction to Python

Duration: 32 Hours (4 Days)

Overview

The 55284A: Introduction to Python course is a comprehensive training program designed to introduce learners to the world of Python programming. Covering a breadth of topics from the very basics of running Python and writing simple scripts to more advanced concepts like handling exceptions, working with dates and times, and running Python scripts from the command line, this course is structured to provide a strong foundation in Python.Throughout the modules, learners engage in lessons that include practical lab exercises, reinforcing their understanding of concepts like variables, functions, modules, and file processing. They will gain proficiency in flow control with conditional statements and loops, understand how to manipulate strings and work with iterables like sequences, dictionaries, and sets, and learn to utilize virtual environments for project isolation.By the end of the course, participants will have a solid grasp of Python that will serve as a platform for further learning and development in the language. Whether it's for data analysis, web development, automation, or scientific computing, this course equips learners with the necessary skills to start creating their own Python programs and scripts effectively.

Audience Profile

Course 55284A: Introduction to Python is designed for beginners seeking to gain fundamental skills in Python programming. Ideal for those entering the field of software development.

- Target Audience for Course 55284A:
- Aspiring Programmers with little to no prior programming experience
- Students interested in learning programming and considering a career in IT
- Professionals seeking to transition into tech roles requiring scripting knowledge
- Data Analysts looking to add Python skills for data manipulation and analysis
- IT Professionals who need to automate tasks or processes with Python scripts
- Hobbyists and DIY enthusiasts interested in learning Python for personal projects
- System Administrators seeking to write or understand Python scripts for automation
- Entrepreneurs who want to understand the technical aspects of their tech projects
- Academic Researchers requiring programming skills for data processing and analysis
- Educators and Teachers aiming to incorporate Python programming into their curriculum

Course Syllabus

Module 1: Python Basics

- Python, which first appeared in 1991, is one of the most popular programming languages in use. Python is
- a high-level programming language, meaning that it uses a syntax that is relatively human readable, which
- gets translated by a Python Interpreter into a language your computer can understand. Examples of other
- popular high-level programming languages are C#, Objective-C, Java, PHP, and JavaScript. Interestingly,
- all of these other languages, unlike Python, share a C-like syntax. If you use one or more of those

- languages, you may find Python's syntax a little strange. But give it a little time. You'll find it's quite
- programmer friendly.

Lessons

- Running Python
- Hello, World!
- Literals
- Python Comments
- Variables
- WRiting a Python Module
- print() Function
- Collecting User Input
- Getting Help

Lab: Exercises in this Lesson

- Hello, World
- Exploring Types
- A Simple Python Script
- After completing this module, students will be able to:
- Understand how Python works.
- Understand Python's place in the world of programming languages.
- Understand the difference between Python 3.x and Python 2.x.
- Understand variables and Python's data types.
- Create simple modules.
- Get help on Python

Module 2: Functions and Modules

- This module explains how to work with functions and modules.

Lessons

- Defining Functions
- Variable Scope
- Global Variables
- Function Parameters
- Returning Values
- Importing Modules

Lab : Exercises in this Lesson

- A Function with Parameters
- Parameters with Default Values
- After completing this module, students will be able to:
- Define and call functions.
- Define parameters in the pass arguments to functions.
- Set default values for parameters.
- Understand variable scope.
- Return values from functions.
- Create and import modules.

Module 3: Math

- Python includes some built-in math functions and some additional built-in libraries that provide extended
- math (and related) functionality. In this lesson, we'll cover the built-in functions and the math and random
- libraries.

Lessons

- Arithmetic Operators
- Assignment Operators
- Built-in Math Functions
- The math Module
- The randon Module

Lab: Exercises in this Lesson

- Floor and Modulus
- How Many Pizzas Do We Need
- After completing this module, students will be able to:
- Do basic math in Python.
- Use the math module for additional math operations.
- Use the random module to generate random numbers.

Module 4: Python Strings

- Python includes some built-in math functions and some additional built-in libraries that provide extended
- math (and related) functionality. In this lesson, we'll cover the built-in functions and the math and random
- libraries.

Lessons

- Quotation Marks and Special Characters
- String Indexing
- Slicing Strings
- Concatentaion and Repetition
- Common String Methods
- String Formatting
- Formatted String Literals (f-strings)
- Built-in String Functions

Lab: Exercises in this Lesson

- Indexing Strings
- Slicing Strings
- Repetition
- Playing with Formatting
- Getting Acquainted with f-strings
- Outputting Tab-delimited Text
- After completing this module, students will be able to:
- Work with strings.

- Escape special characters
- Work with multi-line strings.
- Index and slice strings.
- Use common string operators and methods.
- Format strings.
- Use built-in string functions

Module 5: Iterables: Sequences, Dictionaries, and Sets

- Iterables are objects that can return their members one at a time. The iterables we will cover in this lesson
- are lists, tuples, ranges, dictionaries, and sets.

Lessons

- Definitions
- Sequences
- Unpacking Sequences
- Dictionaries
- The len() Function
- Sets*args and **kwargs

Lab: Exercises in this Lesson

- Remove and Return Random Element
- Simple Rock, Paper, Scissors Game
- Slicing Sequences
- Creating a Dictionary from User Input
- After completing this module, students will be able to:
- Understand the different types of iterables available in Python
- Create, modify, and work with lists.
- Create and work with typles.
- Create ranges.
- Create, modify, and work with dictionaries
- Create sets and to use sets to remove duplicates in lists
- Understand the *args and **kwargs parameters.

Module 6: Flow Control

- Generally, a program flows line by line in sequential order. We have seen already that we can change this
- flow by calling functions. The flow can also be changed using conditional statements and loops.

Lessons

- Conditional Statements
- Loops in Python
- break and continue
- The enumerate() Function
- Generators
- List Comprehensions

Lab: Exercises in this Lesson

- All True and Any True
- Word Guessing Game
- Find the Needle
- Rolling Dice
- After completing this module, students will be able to:
- Work with if conditions in Python.
- Work with loops in Python.
- Create generator functions
- Work with list comprehensions

Module 7: Virtual Environments

- A virtual environment is a container for a Python development platform on your computer. Packages can
- be installed in the virtual environment that are separate from your standard, or non-virtual environment.

Lessons

- Virtual Environment

Lab: Exercises in this Lesson

- Working with a Virtual Environment
- After completing this module, students will be able to:
- Understand what a virtual environment is.
- Create a virtual environment.
- Activate and deactivate a virtual environment.
- Delete a virtual environment.

Module 8: Regular Expressions

- Regular expressions are used to do pattern matching in many programming languages, including, Java,
- PHP, JavaScript, C, C++, and Perl. We will provide a brief introduction to regular expressions and then
- we'll show you how to work with them in Python.

Lessons

- Regular Expression Syntax
- Python's Handling of Regular Expressions
- After completing this module, students will be able to:
- Create regular expressions for pattern matching.
- Use regular expressions within Python.

Module 9: Unicode and Encoding

- This module explains how to work with Unicode and encoding.

Lessons

- Bits and Bytes
- Hexadecimal Numbers
- Encoding

Lab: Exercises in this Lesson

- Converting Numbers between Number Systems
- Finding Confusables
- After completing this module, students will be able to:
- Understand binary and hexadecimal numbers.
- Convert numbers between number systems.

Module 10: File Processing

- Python allows you to access and modify files and directories on the operating system. Among other things,
- you can: 1. Open new or existing files and store them in file object variables. 2. Read file contents, all at
- once or line by line. 3. Append to file contents. 4. Overwrite file contents. 5. List directory contents. 6.
- Rename files and directories.

Lessons

- Opening Files
- The os and os.path Modules

Lab: Exercises in this Lesson

- Finding Text in a File
- Writing to FilesList CreatorAfter completing this module, students will be able to:Read files on the operating
- system.
- Create and write to files on the operating system.
- Access and work with directories on the operating system.
- Work with the os and os.path modules.