

Section 1: Welcome!

About the instructor – 10 minutes:

In this section, you will learn about the instructor of the course and their experience in Python programming.

About this course 10 minutes:

This section provides an overview of the course objectives and goals, as well as the topics that will be covered.

Course structure and projects – 10 minutes:

This section outlines the structure of the course, including the different sections and projects that you will work on.

What you need to enroll in this course – 10 minutes:

In this section, you will find out what you need to have to enroll in this course, such as a computer and a code editor.

Section 2: Python Programming Fundamentals - Part 1

Your first "Hello World" – 15 minutes:

This section teaches you how to write your first Python program that prints "Hello World" on the screen.

A brief introduction to Python – 25 minutes:

In this section, you will learn about the history of Python and its applications.

- History of Python.
- Why Python?
- Python Application.
- Installation.
- Running Python code.

Python Syntax – 30 minutes:

This section introduces you to the basic syntax of Python, including how to use indentation, keywords, and operators.

- Lines.
- Names and Tokens.
- Blocks and Indentation.
- Doc Strings.

Python Comments – 15 minutes:

In this section, you will learn how to add comments to your Python code to make it more readable and understandable.

- What are comments?
- Why to use comments?
- How to write comments?

- Where to write comments?

Python Variables – 25 minutes:

This section teaches you how to create and use variables in Python.

- How to declare variable?
- Local and Global variable.
- Constant variable.

Values and Variables – 10 minutes:

In this section, you will learn about the difference between values and variables in Python.

- Difference between Value and Variable.

Python Datatypes – 15 minutes:

This section covers the different data types in Python, such as strings, numbers, and Booleans.

Python Numbers – 30 minutes:

In this section, you will learn about numbers in Python, including integers, floats, and complex numbers.

- Plain Integers.
- Long Integers.
- Floats.
- Complex Numbers.

Python User Inputs – 20 minutes:

This section teaches you how to get user input in Python using the input() function.

- Introduction to user input.
- The input() function.
- Handling user input.
- Converting user input.
- Using user input in programs.

Homework:

- Write a program that asks the user for his name and age and then prints out a message with his name and age.
 - Store the user's name and age in separate variables.
 - The expected output is "Hello Nader, your age is 24".

Section 3: Python Programming Fundamentals - Part 2

Python Strings – 30 minutes:

In this section, you will learn about strings in Python, including how to create and manipulate them.

- Introduction to strings.
- Creating string.

- String concatenation.
- String indexing and slicing
- String methods.
- String formatting.
- String operations.

Python Casting – 20 minutes:

This section teaches you how to convert one data type to another in Python.

- Introduction to casting.
- Casting between data types.
- Implicit vs explicit casting.

Python Booleans – 20 minutes:

This section covers Booleans in Python, including their values and operators.

- Introduction to Booleans.
- Boolean values.

Python Operators – 30 minutes:

In this section, you will learn about the different operators in Python, such as arithmetic, assignment, and comparison operators.

- Introduction to operators.
- Arithmetic operators.
- Comparison operators.
- Assignment operators.
- Logical operators.
- Membership operators.
- Identity operators.

Python Lists – 30 minutes:

This section introduces you to lists in Python, including how to create and manipulate them.

- Introduction to lists.
- Creating lists.
- Accessing list elements (indexing and slicing).
- Modifying list elements.
- List methods.
- List comprehension.
- Nested lists.

Python Tuples – 15 minutes:

In this section, you will learn about tuples in Python, including their properties and methods.

- Introduction to tuples.
- Creating tuples.
- Accessing tuple elements.
- Tuple methods.

- Immutable nature of tuples.
- Tuple packing and unpacking.

Python Sets – 15 minutes:

This section covers sets in Python, including how to create and manipulate them.

- Introduction to sets.
- Creating sets.
- Accessing set elements.
- Modifying sets.
- Set methods.
- Set operations.
- Set comprehension.
- Frozen sets.

Python Dictionaries – 30 minutes:

In this section, you will learn about dictionaries in Python, including how to create and manipulate them.

- Introduction to dictionaries.
- Creating dictionaries.
- Accessing dictionary elements.
- Modifying dictionaries.
- Dictionary methods.
- Dictionary comprehension.
- Nested dictionaries.

Python If...Else – 40 minutes:

This section teaches you how to use if and else statements in Python to control the flow of your code.

- Introduction to conditional statements.
- The if statement.
- The else statement.
- The elif statement.
- Nested if statements.
- Comparison operators.
- Logical operators.
- Ternary operator.

Python While Loops – 25 minutes:

In this section, you'll learn how to use while loops in Python to repeat a block of code until a condition is met.

- Introduction to loops.
- The while loops.
- Loop control statements.
- Infinite loops.
- Nested loops.

- Loop else statement.

Python For Loops – 30 minutes:

This section teaches you how to use for loops in Python to iterate over a sequence of values.

- Introduction to for loops.
- The range() function.
- The for-loop syntax.
- Loop control statements.
- Nested loops.
- Loop else statement.
- Iterating over sequences.
- Iterating over dictionaries.

Projects – 60 minutes:

- A simple E-commerce Platform.

Homework:

- Develop a guessing game that generates three random numbers and asks the user to guess them.
 - Define a list with three random number values.
 - Create three Boolean variables to check if the three numbers have been guessed or not.
 - Create an infinite loop that asks the user to enter a number until they have correctly guessed all three numbers.
 - Print out to the user a message every time he guessed a number, entered a wrong number, guessed the three numbers.

Section 4: Advanced Python Programming - Part 1

Python Functions – 40 minutes:

In this section, you will learn how to create and use functions in Python.

- Introduction to functions.
- Function syntax.
- Function arguments.
- Variable scope.
- Return values.
- Built-in functions.

Python Lambda – 30 minutes:

This section covers lambda functions in Python, which are a shorthand way of writing functions.

- Introduction to lambda functions.
- Lambda function syntax.

- Anonymous functions.
- Single-expression functions.
- Using lambda functions with built-in functions.
- Sorting with lambda functions.
- Higher-order functions.
- Limitations of lambda functions.

Python Try...Except – 30 minutes:

This section covers error handling in Python using try and except statements.

- Introduction to error handling.
- The try...except block.
- Handling specific exceptions.
- The else block.
- The finally block.
- Raising exceptions.

Debugging Techniques – 30 minutes:

In this section, you will learn how to identify and fix common errors in Python code.

- Introduction to debugging.
- Debugging tools.
- Debugging strategies.
- Reading error messages.
- Basic debugging techniques.
- Advanced debugging techniques.

Projects – 60 minutes:

- Develop a simple warehouse management system.
 - Store our products.
 - List all products.
 - Get a specific product.
 - Add new product.
 - Update existing product.
 - Delete product.

Homework:

- Develop a program that simulates a simple game of Rock, Paper, Scissors.
 - Create a function to randomly select the computer's choice of Rock, Paper, or Scissors.
 - Create a function to prompt the user for their choice of Rock, Paper, or Scissors and validate their input using a try...except block.
 - Create a function to determine the winner of the game based on the rules of Rock, Paper, Scissors.
 - Create a function to determine the winner of the game based on the rules of Rock, Paper, Scissors.

- Use the debugging techniques to identify and fix any errors in your code. For example, you can print out the intermediate values of your variables to see where the code is going wrong.

Section 5: Advanced Python Programming - Part 2 (OOP)

What is Object Oriented Programming? – 30 minutes.

Python Classes and Objects – 60 minutes:

In this section, you will learn about object-oriented programming in Python and how to create classes and objects.

- Introduction to classes.
- Class syntax
- Instance attributes and methods.
- The `init()` method.
- Class attributes and methods.
- Introduction to objects.
- Creating objects.
- Object attributes.
- Object methods.
- Object initialization.

Python Constructors – 30 minutes:

In this section, you will learn about constructors in Python classes, which are special methods that are called when an object is created.

- Constructor overloading.
- Chaining constructors.
- Initialization order.
- Object cloning.

Python Encapsulation – 50 minutes:

This section covers encapsulation in Python, which is the practice of hiding data and methods within a class.

- Introduction to encapsulation.
- Access modifiers.
- Public attributes and methods.
- Private attributes and methods.
- Protected attributes and methods.
- Property decorators.

Python Inheritance – 40 minutes:

In this section, you will learn about inheritance in Python, which is the process of creating new classes based on existing classes.

- Introduction to inheritance.
- Parent and child classes.

- Inheritance syntax.
- Overriding methods.
- Multiple inheritance.
- Method resolution order (MRO).

Python Polymorphism – 45 minutes:

This section teaches you about polymorphism in Python, which is the ability of objects to take on different forms or behaviors.

- Introduction to polymorphism.
- Polymorphic functions.
- Polymorphic methods.
- Duck typing.
- Operator overloading.

Projects – 60 minutes:

- Develop a program that converts Geographic Coordinates from Degree, Minute, Second to Decimal Degree.

Homework:

- Develop a program that converts Geographic Coordinates from Decimal Degree to DMS.
 - Define a class called “DDConverter” with the following instance attributes:
 - Latitude
 - Longitude
 - Check if both latitude and longitude are valid.
 - Print out the result to the user.

Section 6: Advanced Python Programming – Part 3 (File Handling)

Python File Handling – 90 minutes:

In this section, you will learn how to handle files in Python, including how to read from and write to files.

- Introduction to file handling.
- Opening and closing files.
- Reading from files.
- Writing to files.
- Appending to files.
- CSV file handling.
- Introduction to Pandas.
- Error handling.

Projects – 60 minutes:

- Develop a program that convert the geographic coordinates from DMS to Decimal Degree from CSV file and print the result on the CMD.

Homework:

- Develop a program that convert the geographic coordinates from DMS to Decimal Degree from CSV file and write the result to a new CSV file.