



## Python 7-9 Syllabus

### Course Goals

#### 1 Learn Basic Programming

Students learn basic programming concepts such as variables, loops, functions, dictionaries, and classes using the intuitive and beginner-friendly language Python.

#### 2 Develop Problem Solving Skills

Students learn to use programming as a tool to solve problems that would be difficult otherwise.

#### 3 Prepare for More Advanced Programming

Students practice basic concepts of programming that they can go on to apply to other programming languages and environments, giving them a head start in future courses.

### Course Topics

#### 1 Introduction to Programming

Students learn about how programming works and are introduced to the Python programming language. Students learn about basic components of Python syntax, such as key words and indentation.

#### 2 Hello World

Students are introduced with a general explanation both for how computers process information as well as how students should model it.

#### 3 Variables

Students learn to use variables, the core building blocks of code, to their advantage.

#### 4 If Statements

Students learn how to model their code through if-statements, which provide the framework for the logic intrinsic in software.

#### 5 Loops

Students practice the use of both for loops and while loops, the slightly more involved cousin of if statements when it comes to logically laying out an idea.

#### 6 Functions

Students practice the use of functions, which are used to keep code neat and to organize a coder's thoughts.

#### 7 Lists

Students learn to write lists, which store values together in a logical and meaningful way, and to iterate through the contents of lists.

#### 8 Dictionaries

Students practice the use of dictionaries, which are similar to lists except dictionaries can use anything rather than just numbers to access an element. Students also learn how to iterate through dictionaries.

#### 9 Classes

Students practice the use of classes, a type of object with both variables and methods, as well as writing the methods within

classes and subclasses.

## Course Schedule

### Day 1

#### Icebreaker and Introduction Lesson: What is Code

Students complete an icebreaker to get to know each other and the instructor.

#### Intro to Programming, Hello World, and Variables

Students begin with a basic introduction to programming.

#### Mad-Libs Activity

Students complete a Mad-Libs activity to better understand the concept of variables.

#### Data Types Overview

Students explore the different types of variables that exist in Python.

#### Variable Practice

Students practice what they have learned about variables.

### Day 2

#### If Statements: If, Else, and Elif

Students learn about the various if statements in Python.

#### Flow Blocks

Students explore how flow blocks work with if statements using boolean logic.

#### If Statements: Rock, Paper, Scissors

Students create a simulator of Rock, Paper, Scissors using if statements.

#### Loops in Programming

Students are introduced to for loops and while loops.

### Day 3

#### For Loops

Students strengthen their understanding of how for loops are used in programming.

#### Loop Practice

Students practice what they have learned regarding loops.

#### Lists

Students explore lists and arrays in Python.

#### Putting it Together

Students combine everything they have learned to accomplish various tasks.

### Day 4

#### Putting it Together

Students combine everything they have learned to accomplish various tasks.

## **String Manipulation and Concatenation**

Students learn how to use and modify string variables in Python.

## **Basic String Operations**

Students learn functions that help them utilize strings more effectively when programming.

## **Day 5**

### **Dictionaries**

Students understand what dictionaries in Python are and how they can be used.

### **Hangman**

Students use their knowledge of dictionaries to program a Hangman game.

### **Functions**

Students learn what functions are and how they are coded.

### **Making Simple Functions**

Students create functions that accomplish a variety of goals.

## **Day 6**

### **File I/O**

Students learn how to input and output files in Python.

### **Practicing File I/O**

Students use file I/O to sort through files.

## **Day 7**

### **Regular Expressions**

Students learn about expressions within Python.

### **Regex with File I/O**

Students apply Regex to the File input/output activity with the dictionary.

## **Day 8**

### **Classes in Programming**

Students understand what classes are and how they are used in programming.

### **Using Classes**

Students explore how classes work in Python specifically.

### **Shapes Class Activity**

Students practice what they have learned about classes in an activity about shape classification.

## **Day 9**

### **Modules**

Students discover basic modules in Python.

## **Revisiting Rock Paper Scissors**

Students go back to the Rock, Paper, Scissors game they made earlier and improve it with their new knowledge.

## **Day 10**

### **Final Project**

Students create a Tic-Tac-Toe game as their final project for the course.

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