

## **45Day Python Training Plan (AquaSub)**

### **WEEK 1 – Python Fundamentals & Execution**

- 1 Python Overview, History, Features, Applications
- 2 CPython, Jython, PyPy, Writing your First Program
- 3 Interactive vs Script Mode, Program Structure
- 4 Python 2.7 vs 3.x, Installation (Windows/Linux), IDLE, PyCharm
- 5 Running via Shell, Script, IDE – Demo Exercises

### **WEEK 2 – Data Types, Memory, Syntax**

- 6 Memory Management, Garbage Collection, Object Lifecycle
- 7 Data Types – int, float, str, bool, conversion
- 8 List, Tuple, Set, Dictionary – with examples
- 9 Operators: Arithmetic, Assignment, Logical, Membership
- 10 IfElse Conditions, Syntax, Indentation, Nested Conditions

### **WEEK 3 – Loops, Functions, File Handling**

- 11 For Loop, While Loop, Break, Continue, Pass
- 12 List Comprehension, Nested Loops, Loop Practice
- 13 File Handling: Open, Read, Write, Append
- 14 Userdefined Functions, Return, Parameters
- 15 Lambda, args, kwargs, Variable Scope, Closures

### **WEEK 4 – OOP, Modules, Exception Handling**

- 16 ObjectOriented Concepts – Class, Object, Attributes
- 17 Inheritance, Composition, Method Overriding
- 18 Static Method, Class Method, Operator Overloading
- 19 Creating & Using Modules, Packages, Search Path
- 20 Exception Handling – Try, Except, Finally, Multiple Exceptions

### **WEEK 5 – Libraries: NumPy, Pandas, OS, sys**

- 21 Builtin Libraries: OS, Sys, Datetime, Math
- 22 NumPy Arrays – Creation, Indexing, Operations
- 23 NumPy Continued – Slicing, File Operations
- 24 Pandas: Series, DataFrame, Indexing, Filter
- 25 Pandas: Read/Write Excel & CSV – Analysis Practice

## WEEK 6 – PDF Scraping + GUI Programming

- 26 PDF Introduction: `PyPDF2`, `pdfplumber`
- 27 Extract Specific Words, Tables from PDF
- 28 GUI: `ipywidgets` – Numeric, Boolean, String Widgets
- 29 GUI Continued: Color Picker, Containers, Events
- 30 Mini Project: GUIbased PDF Word Search Tool

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- 1 Xyz 20 CBE
- 2 Abc 22 CBE
- 3 Def 52 CBE
- 4 Gef 56 CBE
- 5 Ade 26 CBE

## WEEK 7 – Flask, CherryPy, REST APIs

- 31 Flask Framework: Intro, Routing, Jinja2 Templates
- 32 Flask REST API – Create & Call Endpoints
- 33 CherryPy Basics – Server Setup, REST Routing
- 34 CherryPy Hosting, Configuration Files
- 35 Mini Project: REST API App with Flask or CherryPy

## WEEK 8 – Database, Networking, Multithreading

- 36 Intro to MongoDB – NoSQL vs SQL
- 37 MongoDB CRUD using PyMongo
- 38 Socket Programming: TCP/UDP Basics
- 39 Multithreading Concepts & Practice
- 40 Mini Project

## WEEK 9 – Prisma, GraphQL, Machine Integration

- 41 GraphQL Overview, Schema Design
- 42 Prisma ORM: Setup, Schema, Migrations
- 43 Machine Integration: Serial Communication with `pyserial`
- 44 RealTime Pump Data Handling from Serial Input
- 45 Final Project Presentation, Demo, Q&A, Feedback, Certification

AquaSub Additions:

Day 26–27: PDF scraping with targeted search (custom requirement)

Day 43–44: Machine integration using `pyserial` (custom requirement)

Day 30, 35, 40, 45: Miniproject checkpoints and final project

