Python Workshop Outline for AI Preparation

This workshop is prepared by *Hussein El Amouri*, Assistant Professor and AI Researcher at University of Sciences and Arts in Lebanon – *USAL*. He also collaborates in research with LAU University in Lebanon and AgroParisTech in France.

Workshop Sections:

- Python installation and basics
- Advanced Python fundamentals and libraries (NumPy, Pandas, Matplotlib)
- Hands-on AI examples (Scikit-Learn, KNN)
- Extra advanced Python topics

Outline

1. Python Installation and Basics

01. Introduction to Python

- What is Python? (History, Features, Popularity in AI/ML)
- Differences between Python and Java (syntax, typing, ecosystem)
- Why Python is the language of choice for AI

02. Setting up Python

- Installing Python (latest stable release)
- Installing and setting up VS Code as Python IDE (GoogleColab and Jupyter NoteBook)
- Introduction to interactive coding
- Running Python code: scripts vs notebooks

03. Python Basic Syntax

- Statements, Lines and Indentation
- Printing and Comments
- Variables and data types

04. Collections and Operators

- Python collections: lists, tuples, sets, dictionaries
- Operators: addition, subtruction, division, module, etc

05. Control Flow, Functions and Modules

- Control flow: if statements, loops
- Functions: Defining, Calling and Wrapping
- Modules: Importing, Saving and Installing

2. Advanced Fundamentals and Libraries

01. Downloading Packages

- Intorduction to package installation, managing and importing

02. Introduction to Pandas and Numpy Packages

- Introduction to Python libraries for AI and Data Science: NumPy, Pandas
- Working with arrays and dataframes

03. Data Visualization with Matplotlib

- Line, Scatter, Bar plots and more.

04. Hands on

- Combining what we learned so far.

3. Hands-On AI Examples

01. Scikit-Learn: Intro to AI

- Introduction to the Scikit-Learn package
- Using a simple machine learning model to predict Iris classes
- Using linear regression for prediction
- Applying concepts learned in previous sections

02. Predicting Iris using KNN

- Introduction to the K-Nearest Neighbors (KNN) algorithm in Scikit-Learn
- Predicting Iris classes using KNN
- Comparing KNN with linear regression
- Hands-on implementation and evaluation

03. Final Example

4. Extra

- Extra reads and hands-on for Advanced Python

Inspired by:

- Python-Course by SergiF
- The official Python website
- The official Jupyter website