Outline: Day 1

* Introduction to Python and Setting Up the Environment
* Introduction to Python and its uses.
* Hands-On:
  + Installing Python and setting up the environment.
  + Writing and running a simple Python script.
  + Using the interactive mode (Shell).
* Python Basics and Data Types
* Lecture: Overview of Python syntax and primary data types.
* Hands-On:
  + Writing scripts using int, float, complex, str, list, tuple, dict, and set.
  + Demonstrating size of int, float using `sys.getsizeof()`.
  + Type casting examples.
* Variables and Operator
* Lecture: Variables, arithmetic operators, and assignment
* Hands-On:
  + Writing expressions using arithmetic, comparison, and logical operators.
  + Demonstrating operator precedence.
  + Creating examples to show identity and membership operators.
* Conditional Statements
* Lecture: if, elif, else statement
* Hands-On:
  + Writing scripts with various conditional structures.
  + Examples of membership (`in`, `not in`) and identity (`is`, `is not`) operators.
* Loops
* Lecture: Introduction to loops: while and for.
* Hands-On:
  + Writing scripts using `while` and `for` loops.
  + Converting a for loop into a while loop using iterables.
* Functions
* Lecture: Defining and calling functions.
* Hands-On:
  + Writing functions with positional, keyword, default, and variable arguments.
  + Demonstrating lambda functions.
  + Creating nested functions and using decorators.
* Input/Output Operations
* Lecture: Printing and reading from terminal.
* Hands-On:
  + Writing scripts to read user input and produce formatted output.
  + Reading and writing data from terminal.
* Data Structures – String
* Lecture: String operations and methods.
* Hands-On:
  + Writing scripts to manipulate strings using slicing, splitting, joining, and other methods.
  + String formatting examples.

Outline: Day 2

* Data Structures - Lists
* Lecture: List operations and methods.
* -Hands-On:
  + Creating and manipulating lists.
  + Demonstrating list slicing, appending, extending, and other list methods.
  + Using map, filter, and reduce functions.
* Data Structures - Tuples
* Lecture: Tuple operations and immutability.
* Hands-On:
  + Creating and accessing tuples.
  + Demonstrating immutability with examples.
  + Writing scripts with nested tuples.
* Data Structures - Dictionaries
* Lecture: Dictionary operations and methods.
* Hands-On:
  + Creating and manipulating dictionaries.
  + Demonstrating key-value pairs, iteration over keys and values.
  + Examples to check for keys and values using `in`.
* Data Structures - Sets
* Lecture: Set operations and methods.
* Hands-On:
  + Creating and manipulating sets.
  + Writing scripts to demonstrate set operations like union, intersection, difference.
  + Assignment: Build a probability-based sentiment analyzer using sets.
* Bytes, Byte Arrays, and Range
* Lecture: Bytes, byte arrays, and range objects.
* Hands-On:
  + Writing scripts to create and manipulate byte sequences and byte arrays.
  + Demonstrating usage of `range` in loops.
* Modular Programming
* Lecture: Modules and packages.
* Hands-On:
  + Writing scripts to import and use modules.
  + Creating custom modules.
  + Brief introduction to Numpy and Scikit-learn.
* Object-Oriented Programming
* Lecture: Classes and objects in Python.
* Hands-On:
  + Creating classes and objects.
  + Demonstrating inheritance, polymorphism, and encapsulation with examples.
* Exception Handling
* Lecture: Handling exceptions in Python.
* Hands-On:
  + Writing scripts to handle exceptions using try-except blocks.
  + Raising custom exceptions.
* Advanced Data Structures with Numpy
* Lecture: Introduction to Numpy.
* Hands-On:
  + Creating and manipulating Numpy arrays.
  + Demonstrating mathematical operations on arrays.
* Data Processing with Pandas
* Lecture: Introduction to Pandas.
* Hands-On:
  + Reading CSV files using Pandas.
  + Performing data processing and analysis with Pandas DataFrames.

Outline: Day 3

* File Handling
* Lecture: Reading from and writing to files.
* Hands-On:
  + Writing scripts to read from and write to files.
  + Demonstrating file handling with various modes.
* Jupyter Notebook and PyCharm IDE
* Lecture: Using Jupyter Notebook and PyCharm for Python development.
* Hands-On:
  + Creating and running notebooks in Jupyter.
  + Exploring features of PyCharm IDE.
  + Integrating and running code in both environments.
* Pickle for Persistence
* Lecture: Introduction to Pickle module.
* Hands-On:
  + Writing scripts to serialize and deserialize Python objects using Pickle.
* Understanding Asynchronous Programming
* Building a Synchronous Web Server

Outline: Day 4

* Programming Parents: Not as Easy as It Looks!
* Thought Experiment #1: The Synchronous Parent
* Thought Experiment #2: The Polling Parent
* Thought Experiment #3: The Threading Parent
* Using Python Async Features in Practice
* Synchronous Programming
* Simple Cooperative Concurrency
* Cooperative Concurrency With Blocking Calls
* Cooperative Concurrency With Non-Blocking Calls
* Synchronous (Blocking) HTTP Calls
* Asynchronous (Non-Blocking) HTTP Calls
* Recap and Comprehensive Coding Task
* Lecture: Recap of all topics covered.
* Lecture: Brief introduction to advanced topics based on interest.
* Hands-On:
  + Starting a small project or advanced task, such as a machine learning model using
* Scikit-learn or a data visualization task using Matplotlib.
* Q&A and Final Project Presentation
  + Lecture: Open floor for questions and clarifications.