Python Programming + AI Tools - Course Outline

Duration: 2 months (8 weeks) | **Classes:** 24

Course Objectives

- Build a genuine, ground-up understanding of Python.
- Develop strong fundamentals: variables, control flow, data structures, functions, and file handling.
- Learn to read error messages and debug code independently.
- Understand APIs, JSON, and build AI-powered tools using Python.
- Apply safe practices when handling API keys and data.

Week-wise Course Plan

Week 1: Python Basics

Class	Topics Covered	Assignment/Project
1: What is Programming?	Installing Python/VS Code, Variables, Data types	Name/Age greeting script
2: Numbers and Text	Arithmetic, String basics, input/print	Unit converter
3: Making Decisions	if/elif/else, operators	Number guessing game

Week 2: Loops & Collections

Class	Topics Covered	Assignment/Project
4: Repeating Things	while/for loops, break/continue	Times-table generator
5: Lists	Indexing, Adding/Removing items	Todo-list manager
6: Dictionaries	Key-value pairs, Nesting	Contact book

Week 3: Functions

Class	Topics Covered	Assignment/Project
7: Writing Functions	def, parameters, return values	Refactor todo-list
8: Functions in Practice	Local/global variables, Docstrings	Basic calculator

9: Practice Day	Combining concepts, Debugging	Quiz game

Week 4: Object-Oriented Programming (Intermediate)

Class	Topics Covered	Assignment/Project
10: Intro to Classes	Classes, Objects, Attributes, __init___	Student data display class
11: Encapsulation & Inheritance	Private attributes, Parent/Child classes	Library system
12: OOP Practice	Refactoring to objects	OOP Calculator

Week 5: Strings, Files & Errors

Class	Topics Covered	Assignment/Project
13: String Manipulation	Methods, searching, formatting	Text cleaner
14: Files	Reading/Writing .txt, CSV	CSV grade parser
15: Errors	try/except, validation	Error handling addition

Week 6: Libraries, APIs & JSON

Class	Topics Covered	Assignment/Project
16: External Libraries	pip, documentation	Requests web-fetcher
17: APIs & JSON	Request/response, JSON structure	Public API fetcher
18: API Project	Environment variables	Weather lookup

Week 7: Python Meets AI

Class	Topics Covered	Assignment/Project
19: OpenAI API	Setup, API calls	AI prompt response script
20: Prompt Construction	Dynamic prompts, System messages	Paragraph generator
21: Responsible AI	Validation, Token awareness	Input validation project

Week 8: Final Project

Class	Topics Covered	Assignment/Project

22: Planning	Problem selection	Project plan
23: Build Day	Guided development	Working tool
24: Presentation	Peer/Instructor feedback	Final presentation