Python Learning Roadmap

✅ Level 1: **Foundations** (1–2 weeks)

Goal: Build strong fundamentals.

Topics:

- Variables and data types
- Conditionals (if/else)
- Loops (for/while)
- Functions
- Basic I/O
- Lists, Tuples, Dictionaries, Sets

Resources:

- Python Docs – Beginner's Guide
- W3Schools Python
- Practice: HackerRank Python Basics

✅ Level 2: **Intermediate Concepts** (2–4 weeks)

Goal: Write structured, modular, and efficient code.

Topics:

- File handling
- Exception handling
- Modules and Packages
- List comprehensions
- Lambda, map, filter, reduce
- Working with dates and times

Resources:

- Real Python
- YouTube: Tech With Tim
- Practice: Exercism.io

✅ Level 3: **Object-Oriented Programming (OOP)** (2 weeks)

Goal: Understand how Python supports classes and objects.

Topics:

- Classes and objects
- Constructors, attributes, methods
- Inheritance, Polymorphism
- Encapsulation, Abstraction
- Magic methods (`__init__` , `__str__` , etc.)

Resources:

- Book: *Python Crash Course* by Eric Matthes (Ch. 9+)
- Practice: Create a mini-project like a bank account manager or RPG character builder

✅ Level 4: **Popular Libraries & Tools** (2–3 weeks)

Goal: Use Python for real-world tasks.

Topics:

- `requests` (APIs)
- `pandas` , `matplotlib` (Data)
- `sqlite3` or `SQLAlchemy` (Databases)
- `venv` , `pip` (Environment + packages)

Projects:

- Weather App (using API)
- CSV data analysis with Pandas
- Mini-database app

✅ Level 5: **Build Projects** (Ongoing)

Goal: Learn by doing. Pick a few projects to apply what you've learned.

Ideas:

- To-Do List CLI
- Expense Tracker
- Web scraper
- Flask/Django Blog App
- Simple Game with Pygame
- Automation scripts (rename files, sort folders)

✅ Bonus Level: **Specialize (choose a path)**

Once you're confident in Python basics:

- **Web Dev**: Flask, Django, FastAPI
- **Data Science**: NumPy, Pandas, Matplotlib, Scikit-learn
- **Machine Learning**: TensorFlow, PyTorch, Scikit-learn
- **Automation/Scripting**: Selenium, BeautifulSoup, OS module
- **APIs & Backend**: FastAPI, Postman, Docker

🗓️ Sample Weekly Schedule (6 hrs/week)

- 🧠 2 hrs → Learn theory (videos, articles)
- ✍️ 2 hrs → Practice (exercises, small problems)
- 🚀 2 hrs → Build mini projects