**Python Learning Roadmap (Beginner to Advanced)**

**1. Introduction to Python**

* What is Python?
* Installing Python & Setting Up Environment
* Running Python Scripts & Using the REPL
* Python IDEs (VS Code, PyCharm, Jupyter)

**2. Python Basics**

* Variables & Data Types
* Operators (Arithmetic, Logical, Comparison, Bitwise)
* Input & Output in Python
* Type Conversion & Type Hinting

**3. Control Flow Statements**

* Conditional Statements (if, elif, else)
* Loops (for, while)
* Loop Control Statements (break, continue, pass)
* List & Dictionary Comprehensions

**4. Functions & Modules**

* Defining Functions & Function Arguments
* Return Values & Scope (Local vs. Global)
* Lambda Functions & Higher-Order Functions
* Importing & Using Modules (Standard & Custom)

**5. Data Structures in Python**

* Lists, Tuples, Sets, Dictionaries
* Stack, Queue, Heap, Linked List (Using Python Collections)
* Iterators & Generators
* NamedTuples & DefaultDict

**6. Object-Oriented Programming (OOP)**

* Classes & Objects
* Constructors (\_\_init\_\_) & Magic Methods
* Inheritance & Polymorphism
* Encapsulation & Abstraction
* Dataclasses

**7. Exception Handling**

* Handling Exceptions (try, except, finally)
* Raising Custom Exceptions
* Using assert Statements

**8. File Handling & OS Module**

* Reading & Writing Files (open(), read(), write())
* Working with JSON & CSV
* Working with OS & Shutil Modules (File Operations)

**9. Advanced Python Concepts**

* Decorators & Property Methods
* Context Managers (with Statement)
* Multithreading & Multiprocessing
* Asyncio (Asynchronous Programming)
* Memory Management & Garbage Collection

**10. Working with Databases**

* Using SQLite & PostgreSQL with Python
* Working with ORM (SQLAlchemy)
* Connecting to MSSQL in Python

**11. Web Development with Python**

* Introduction to FastAPI & Flask
* Building REST APIs
* Handling Requests & Responses
* JWT Authentication & Middleware

**12. Working with External APIs & Web Scraping**

* Making API Calls with requests Module
* BeautifulSoup & Scrapy for Web Scraping

**13. Data Science & Machine Learning with Python**

* NumPy & Pandas for Data Analysis
* Matplotlib & Seaborn for Data Visualization
* Scikit-Learn for Machine Learning
* Building & Evaluating ML Models

**14. AI & Deep Learning with Python**

* TensorFlow & PyTorch Basics
* Building Neural Networks
* Training & Evaluating Models

**15. Automation & Scripting**

* Automating Tasks with Python
* Working with Selenium for Web Automation
* Automating Emails & File Handling

**16. Cybersecurity & Ethical Hacking with Python**

* Working with Hashing & Encryption
* Building Simple Security Tools
* Penetration Testing with Python

**17. Building Python Projects**

* Creating a CLI Tool
* Building a Chat Application with MQTT
* Developing an AI-Based Application
* Deploying Python Applications

This is a complete roadmap. Let me know if you want to start from the basics or jump into an advanced topic. 🚀