🐍 Python Course Roadmap

📘 Beginner Level

1. **Introduction to Python**
   - What is Python?
   - Why Python?
   - Installing Python & IDE (VS Code, PyCharm, or Jupyter)
   - Writing your first Python program: `print("Hello, World!")`
2. **Basic Syntax and Variables**
   - Comments
   - Data Types: `int`, `float`, `str`, `bool`
   - Variables and Naming Conventions
   - Type Casting
3. **Operators**
   - Arithmetic, Assignment, Comparison, Logical, Bitwise, Membership
4. **Control Flow**
   - `if`, `elif`, `else`
   - `while` loops
   - `for` loops
   - `break`, `continue`, `pass`
5. **Data Structures**
   - `list`, `tuple`, `set`, `dict`
   - Built-in methods and operations
6. **Functions**
   - Defining and calling functions
   - Parameters and return values
   - `*args`, `**kwargs`
   - Lambda functions
7. **Input and Output**
   - Taking user input
   - Reading/writing to files

📘 Intermediate Level

1. **Object-Oriented Programming (OOP)**
   - Classes and Objects
   - `__init__` constructor
   - Instance and class variables
   - Inheritance
   - Polymorphism and Encapsulation
2. **Exception Handling**
   - `try`, `except`, `else`, `finally`
   - Custom exceptions
3. **Modules and Packages**

- Importing modules
- Creating your own module
- `pip` and installing external packages

4. **Working with Files and JSON**
   - Reading/Writing `.txt`, `.csv`
   - JSON encoding/decoding
5. **Comprehensions**
   - List, Dict, Set comprehensions
6. **Decorators & Generators**
   - `@decorator` syntax
   - `yield` and generator functions

📘 Advanced Level

1. **Working with APIs**
   - `requests` module
   - Consuming JSON APIs
2. **Multithreading & Multiprocessing**
   - Thread vs Process
   - Using `threading` and `multiprocessing` modules
3. **Regular Expressions**
   - `re` module basics and applications
4. **Database Interaction**
   - Using SQLite3 or MySQL with Python
5. **Web Scraping**
   - `requests`, `BeautifulSoup`, `lxml`, `selenium`
6. **GUI Development**
   - Using `Tkinter` or `PyQt`
7. **Unit Testing**
   - `unittest`, `pytest`
8. **Python for Data Science / AI / Web Dev (Optional Tracks)**
   - NumPy, Pandas, Matplotlib
   - Flask / Django for web apps
   - Intro to Machine Learning with `scikit-learn`

📝 Final Project Ideas:

- To-do App
- Weather App using API
- Blog Website using Flask
- Web Scraper that saves to Excel
- Data Analysis on a real dataset