**🔹 Python Syllabus**

**1️ Introduction to Python**

* History and Features of Python
* Installing Python & Setting up Environment
* Running Python Programs (Interactive & Script Mode)
* Python IDEs: VS Code, PyCharm, Jupyter Notebook

**2️ Python Basics**

* Variables and Data Types (int, float, string, bool, etc.)
* Type Casting & Type Conversion
* Operators: Arithmetic, Comparison, Logical, Bitwise, Identity, Membership
* Taking User Input & Printing Output
* Comments and Docstrings

**3️⃣ Control Flow Statements**

* Conditional Statements (if, elif, else)
* Looping Statements (for, while)
* Loop Control (break, continue, pass)

**4️⃣ Functions in Python**

* Defining & Calling Functions
* Function Arguments (Positional, Keyword, Default, Variable-length \*args, \*\*kwargs)
* Return Statement
* Lambda Functions

**5️⃣ Data Structures in Python**

* Lists (Indexing, Slicing, Methods, Comprehensions)
* Tuples (Immutability, Packing, Unpacking)
* Dictionaries (Key-Value Pairs, Methods, Iteration)
* Sets (Unique Elements, Set Operations)
* Strings (Methods, String Formatting, f-strings)

**6️⃣ Exception Handling**

* try, except, finally, else Blocks
* Handling Multiple Exceptions
* Raising Exceptions (raise)
* Custom Exceptions

**7️⃣ Object-Oriented Programming (OOPs)**

* Classes and Objects
* Constructors (\_\_init\_\_)
* Instance & Class Variables
* Inheritance (Single, Multiple, Multilevel, Hybrid)
* Method Overriding
* Encapsulation & Data Hiding
* Polymorphism

**8️⃣ File Handling**

* Reading & Writing Files (open, read, write, with)
* File Modes (r, w, a, r+)
* Handling CSV and JSON files

**9️⃣ Modules & Packages**

* Importing Modules (import, from ... import)
* Built-in Modules (math, random, os, sys)
* Creating Custom Modules
* Virtual Environments & Package Management (pip)

**🔟 Advanced Python Topics**

* **List Comprehensions & Generator Expressions**
* **Decorators & Closures**
* **Iterators & Generators (yield)**
* **Multithreading & Multiprocessing**
* **Regular Expressions (re module)**
* **Memory Management & Garbage Collection**

**1️⃣1️⃣ Python Libraries & Frameworks**

* **NumPy & Pandas** → Data Analysis
* **Matplotlib & Seaborn** → Data Visualization
* **Flask & Django** → Web Development
* **BeautifulSoup & Scrapy** → Web Scraping
* **OpenCV** → Image Processing
* **TensorFlow & Scikit-Learn** → Machine Learning

**1️⃣2️⃣ Database Connectivity**

* Connecting Python with MySQL, SQLite
* Performing CRUD Operations
* Using sqlite3 and MySQL Connector

**1️⃣3️⃣ Automation & Scripting**

* Automating Tasks with os, shutil, subprocess
* Working with APIs (requests module)
* Web Scraping with BeautifulSoup and Selenium

**📌 Python Roadmap**

✅ **Beginners** → Syntax, Variables, Loops, Functions  
✅ **Intermediate** → OOPs, Modules, File Handling  
✅ **Advanced** → Decorators, Multithreading, Frameworks