

# Python Learning Roadmap

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## Phase 1: Fundamentals (Weeks 1–3)

 **Goals: Build strong basics**

### Topics:

- What is Python & installation
  - Variables, Data Types
  - Operators
  - Conditional Statements (if/else)
  - Loops (for, while)
  - Functions & Scope
  - Basic Input/Output
  - Error Handling (try/except)
  - Coding practice (HackerRank / LeetCode)
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## Phase 2: Data Structures (Weeks 4–5)

 **Topics:**

- Lists (CRUD operations)
- Tuples

- Sets
  - Dictionaries
  - Strings (advanced operations)
  - List Comprehension
  - Lambda, Map, Filter, Reduce
  - Practice mini-projects (calculator, todo app, menu-driven program)
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## **Phase 3: Object-Oriented Programming (Weeks 6–7)**

### **Topics:**

- Classes & Objects
  - Constructor
  - Inheritance
  - Polymorphism
  - Encapsulation
  - Abstraction
  - Magic/Dunder Methods
  - OOP Mini Projects (Banking system, Student management)
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## **Phase 4: File Handling & Modules (Week 8)**

### **Topics:**

- Reading/Writing files
  - Working with CSV, TXT, JSON
  - Creating and importing modules
  - Virtual environments
  - pip package manager
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## Phase 5: Databases (Week 9)

### Topics:

- SQL basics
  - CRUD operations
  - MySQL / SQLite with Python
  - Database mini project
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## Phase 6: Python Libraries (Weeks 10–12)

### Libraries to Master:

- NumPy
- Pandas
- Matplotlib
- Seaborn
- Requests

- Regular Expressions
  - Python Automation (os, shutil, datetime)
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## **Phase 7: Web Development With Python (Weeks 13–15)**

### **Topics:**

- Flask basics
  - Django basics
  - Templating
  - API creation
  - Authentication
  - Mini Project → Blog App / Ecommerce Backend
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## **Phase 8: Data Science & Machine Learning (Weeks 16–20)**

### **Topics:**

- Data Cleaning
- Data Wrangling
- Visualisation
- Feature Engineering
- ML Algorithms (Scikit-learn)

- Train/Test Split
  - Model Evaluation
  - Real-world ML Projects
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## Phase 9: Automation & Scripting (Weeks 21–22)

### Topics:

- Automating files/folders
  - Web scraping (BeautifulSoup, Selenium)
  - Task automation scripts
  - Email automation
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## Phase 10: Advanced Python (Weeks 23–24)

### Topics:

- Generators
  - Decorators
  - Multi-threading
  - Async/Await
  - APIs & Microservices
  - Design Patterns
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## Phase 11: Portfolio + Projects (Weeks 25–28)

### Must Build Projects:

- Python automation tools
  - Web scraping pipeline
  - ML model deployment
  - Django/Flask full project
  - Data dashboard project
  - REST API project
  - Portfolio website + GitHub clean structure
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## Phase 12: Job Preparation (Ongoing)

### Requirements:

- 10+ projects
  - Strong GitHub profile
  - Resume targeting Python/ML roles
  - DSA practice (medium level)
  - Mock interviews
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## Python Job Roles & Salary (India)

Role	Salary (INR/year)
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Python Developer ₹4.5–12 LPA

Django/Flask Developer ₹5–15 LPA

Data Analyst ₹4–10 LPA

Data Scientist ₹8–25 LPA

ML Engineer ₹10–30 LPA

Automation Engineer ₹4–12 LPA

Backend Engineer ₹8–20 LPA