

# Python Engineer Roadmap



[Python](#) can be used in a lot of computer science fields. In this repository, we have collected resources for each field of computer science that are related to Python.

**Not sure which source to choose?** You can follow the resources marked with a ✓ symbol, they are highly recommended by the community.

## Contribution

Before you head over, read the [Contribution Guide](#) first. You are new to contribution process? For more information about the steps and guides, check out the [First Contribution Guide](#). ([Also available in Persian](#))

## Table of Contents

- [Prerequisites](#)
  - [Algorithms and Data Structures](#)
  - [System Design](#)
  - [Git](#)
  - [Operating System](#)
  - [Virtual Environment](#)
  - [Python](#)
- [Career Path](#)
  - [Backend](#)
    - [Django](#)
    - [FastAPI](#)
    - [Flask](#)
    - [Tornado](#)
    - [Web2Py](#)
    - [Sanic](#)
    - [AIOHTTP](#)
    - [Bottle](#)
    - [Dash](#)
  - [Data Science](#)
  - [Machine Learning](#)
  - [Deep Learning](#)
  - [Neural Networks](#)
  - [Image Processing](#)
  - [DevOps](#)
  - [Hacking](#)
  - [Algorithmic Trading](#)

- Bot
  - Web
  - Telegram
    - Telethon
    - Pyrogram
    - Python Telegram Bot
    - AIOGram
    - PyTelegramBotApi
  - Discord
- Advanced Topics
  - Databases
    - General
    - SQLite
    - PostgreSQL
    - MySQL
    - Oracle
    - MongoDB
    - Redis
    - MemCached
    - Apache Cassandra
  - Clean Code
  - Clean Architecture
  - Caching
  - Testing
    - Python `unittest` Package
    - `PyTest` Testing Package
    - DRF Test Framework
  - Container Platforms
    - Docker
    - Kubernetes
  - Programming Paradigms
    - Object-Oriented Programming
    - Functional Programming
  - Architectural Patterns
    - Microservice
    - Enterprise Applications
  - Design Principles
    - SOLID
    - KISS
    - DRY
  - Design Patterns
  - Message Brokers

- [RabbitMQ](#)
- [WSGI Servers](#)
  - [Gunicorn](#)
  - [uWSGI](#)
- [ASGI Servers](#)
  - [Uvicorn](#)
  - [Starlette](#)
- [Web Servers](#)
  - [Nginx](#)
  - [Apache](#)
- [Availability and Reliability](#)
- [Distributed Systems](#)
- [Reactive Systems](#)
- [Refactoring](#)
- [Security](#)
- [Monitoring](#)
- [Soft Skill](#)
- [Public Cloud](#)
- [Where to Go Next?](#)

## Prerequisites

---

- **Algorithms and Data Structures**

- **Book**

- [✓ Grokking Algorithms by Aditya Bhargava](#)
- [✓ Cracking the Coding Interview by Gayle Laakmann McDowell](#)
- [Data Structure and Algorithmic Thinking with Python: Data Structure and Algorithmic Puzzles by Narasimha Karumanchi](#)
- [Introduction to Algorithms \(CLRS\)](#)

- **Video**

- [Data Structures And Algorithms Course by Mosh Hamedani](#)

- **Platform**

- [✓ LeetCode](#)
- [HackerRank](#)
- [CodeWars](#)
- [TheAlgorithms](#)
- [Codeforces](#)

- **Repo**

- [✓ Coding University](#)

- **Cheat Sheet**

- [Data Structures Cheat Sheet](#)

- **System Design**

- **Book**

- [✓ System Design Interview by Alex Xu](#)
- [System Design Interview: Volume 2 by Alex Xu & Sahn Lam](#)

- **Course**

- [Educative - Grokking the System Design Interview](#)

- **Git**

- **Documentation**

- [Git Documentation](#)

- **Video**

- [✓ Git Course by Mosh Hamedani](#)
- [Git and GitHub tutorial for beginners by Amigoscode](#)
- [Git and GitHub crash course by freeCodeCamp](#)
- [Git For Professionals course by Trevor Miller](#)

- **Book**

- [Pro Git](#)
- [Git Notes for Professionals](#)

- **Website**

- [Git For Beginners by tutorialspoint](#)
- [Git For Intermediates and Professionals by W3schools](#)
- [Advanced Git Tips by atlassian](#)
- [Learn Git Branching](#)

- **Cheat Sheet**

- [Git cheat sheet](#)

- **Operating System**

- **Book**

- [✓ LPIC-1: Linux Professional Institute Certification Study Guide: Exams 101 and 102 by Roderick W. Smith](#)

- **Video**

- [Lpic-1 Course by Jadi](#)

- **Platform**

- [Linux Journey](#)

- **Community**

- [Discord Linux group](#)
- [Linux For Everyone Community](#)

- **Cheat Sheet**

- [Linux commands cheat sheet](#)

- **Virtual Environment**

- **VENV**

- **Documentation**
  - [VENV Documentation](#)

- **VirtualEnvWrapper**

- **Documentation**
  - [VirtualEnvWrapper Documentation](#)

- **PipEnv**

- **Documentation**
  - [PipEnv Documentation](#)

- **Conda**

- **Documentation**
  - [Conda Documentation](#)

- **Python-Poetry**

- **Documentation**
  - [Python-Poetry Documentation](#)

- **Python**

- **Documentation**

- [Python Documentation](#)

- **Beginner**

- **Book**

- ✓ [Python Crash Course by Eric Matthes](#)
- [Head First Python by Paul Barry](#)
- [Learn Python the Hard Way by Zed Shaw](#)
- [Essential Python Tools](#)

- **Video**

- [Python Beginner Tutorial by NeuralNine](#)
- [Python Programming Tutorials by Tech with Tim](#)

- **Platform**

- [W3schools](#)
- [Codecademy Python 2](#)
- [Codecademy Python 3](#)
- [Sololearn Python](#)

- **Intermediate**

- **Book**

- ✓ [Python Cookbook by David Beazley & Brian Jones](#)
- [Beyond the Basic Stuff with Python Best Practices for Writing Clean Code by Sweigart, Al](#)
- [Fluent Python by Luciano Ramalho 2nd Edition](#)
- [Effective Python by Brett Slatkin](#)
- [Python Concurrency with asyncio](#)

- **Video**

- [Python Intermediate Tutorial by NeuralNine](#)
- [Intermediate Python Tutorials by Tech with Tim](#)

- **Platform**

- [GeeksForGeeks](#)
- [Programiz](#)

- **Advanced**

- **Book**

- ✓ [Architecture Patterns with Python by Harry Percival & Bob Gregory](#)
- ✓ [Practices of the Python Pro by Dane Hillard](#)
- ✓ [Python Tricks by Dan Bader](#)
- [Python Testing with pytest by Brian Okken](#)
- [Python Concurrency with asyncio by Matthew Fowler](#)
- [Python for Programmers by Deitel Developer Series](#)

- [Serious Python by Julien Danjou](#)
- [Python Notes for Professionals](#)
- **Video**
  - [Python3: Deep Dive \(4 Parts\)](#)
- **Platform**
  - [✓ RealPython](#)
  - [Python-Course](#)
- **Community**
  - [Python Discord group](#)
  - [Python Telegram group](#)
- **Cheat Sheet**
  - [Beginners Python cheat sheet](#)
  - [Python cheat sheet](#)

## Career Path

---

- **Backend**

- **Django**
  - **Documentation**
    - [Django Documentation](#)
  - **Book**
    - [Django for Beginners by William S. Vincent](#)
    - [Django for APIs by William S. Vincent](#)
    - [Django for Professionals by William S. Vincent](#)
    - [Two Scoops of Django 3.x by Daniel Roy Greenfeld, Audrey Roy Greenfeld](#)
    - [Test-Driven Development with Python: Obey the Testing Goat: Using Django, Selenium, and JavaScript by Harry Percival](#)
    - [Test-Driven Development with Django by Kevin Harvey](#)
    - [Django3 by example by antonio mele](#)
  - **Video**
    - [Django Web Framework - Full Course for Beginners by Justin Mitchel](#)
    - [Build REST APIs with Django REST Framework and Python By Shubham Sarda](#)
    - [Django For Everybody - Full Course by Dr. Charles Severance](#)
    - [Django ORM Mastery - Very Academy](#)

- [Learn Django Class Base View - Very Academy](#)
- [Django Course by Mosh Hamedani](#)
- [Try Django 3.2 - Python Web Development Tutorial Series by Justin Mitchel](#)

- **Awesome Django**

- [Awesome Django](#)

- **Community**

- [Django Discord group](#)
  - [Django Telegram group](#)

- **Cheat Sheet**

- [Django Cheat Sheet](#)
  - [Django Models Cheat Sheet](#)
  - [Django Class Based Views Cheat Sheet](#)

- **FastAPI**

- **Video**

- [Python API Development - Comprehensive Course for Beginners by Sanjeev Thiyagarajan](#)
    - [FastAPI course by testdriven.io & talkpython.fm](#)

- **Documentation**

- [FastAPI documentation](#)
    - [FastAPI Utilities documentation](#)

- **Awesome FastAPI**

- [Awesome FastAPI](#)

- **Community**

- [FastApi Discord group](#)

- **Flask**

- **Book**

- [Flask Web Development: Developing Web Applications with Python](#)
    - [Flask Framework Cookbook](#)

- **Video**

- [Flask Tutorial by Tech With Tim](#)
    - [REST APIs with Flask and Python by Jose Salvatierra](#)

- **Documentation**



- [Flask Document](#)
- **Cheat Sheet**
  - [Flask Cheat Sheet and Quick Reference](#)
- **Tornado**
  - **Book**
    - [Introduction to Tornado by Michael Dory](#)
  - **Video**
    - [Tornado, Coroutines and Concurrency by Bek Brace](#)
    - [Tornado in Depth by Oscar Vilaplana](#)
    - [More than just a pretty web framework, the Tornado IOLoop by Gavin M.Roy](#)
  - **Documentation**
    - [Tornado Document](#)
- **Web2Py**
  - **Documentation**
    - [Web2Py Document](#)
  - **Book**
    - [Complete Reference Manual by Massimo Di Pierro](#)
    - [Killer Web Development by Marco Laspe](#)
- **Sanic**
  - **Documentation**
    - [Sanic Document](#)
    - [Sanic Guide](#)
  - **Article**
    - [Getting Started with Sanic for Python by Mukul Khanna](#)
  - **Video**
    - [Async Web Apps with Sanic by Dougal Matthews](#)
- **AIOHTTP**
- **Bottle**

- **Dash**
- [List Of All Python Backend Web Frameworks](#)

- **Data Science**

- **Machine Learning**

- **Video**
  - [Machine Learning Course by Andrew Ng](#)

- **Deep Learning**

- **Neural Networks**

- **Image Processing**

- **DevOps**

- **Community**
  - [DevOps, SRE, & Infrastructure](#)

- **Hacking**

- **Book**
  - [Black Hat Python, 2nd Edition: Python Programming for Hackers and Pentesters](#)

- **Algorithmic Trading**

- **Bot**

- **Web**
- **Telegram**
  - **Telethon**
    - **Documentation**
      - [Telethon official document](#)
      - [Telethon arabic document](#)
  - **Pyrogram**
    - **Documentation**
      - [Pyrogram document](#)
  - **Python Telegram Bot**

- **Documentation**
  - [python-telegram-bot document](#)
- **AIOGram**
  - **Documentation**
    - [aiogram document](#)
- **PyTelegramBotApi**
  - **Documentation**
    - [PyTelegramBotApi document](#)
- **Discord**

## Advanced Topics

---

△ The following topics don't have any order or priority of learning.

□ Choose topics that you are **interested in** or **suit your needs**.

- **Databases**

- **General**
  - **Book**
    - ✓ [Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and Maintainable Systems](#)
    - [Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement](#)
- **SQLite**
  - **Documentation**
    - [SQLite Documentation](#)
  - **Tutorials**
    - [SQLite Tutorial](#)
- **PostgreSQL**
  - **Documentation**
    - [PostgreSQL Documentation](#)
  - **Community**
    - [PostgreSQL Telegram group](#)

- **Cheat Sheet**

- [PostgreSQL Cheat Sheet By GoalKicker](#)
- [PostgreSQL CHEAT SHEET](#)
- [POSTGRESQL 8.3 PSQL CHEAT SHEET](#)

- **MySQL**

- **Documentation**

- [MySQL Documentation](#)

- **Tutorials**

- [MySQL Tutorial](#)

- **Cheat Sheet**

- [MySQL Cheat Sheet by GoalKicker](#)

- **Oracle**

- **Documentation**

- [Oracle Documentation](#)

- **Tutorials**

- [Oracle Tutorial](#)

- **Cheat Sheet**

- [Oracle Cheat Sheet by GoalKicker](#)

- **MongoDB**

- **Documentation**

- [MongoDB Documentation](#)

- **Tutorial**

- [Python MongoDB](#)

- **Cheat Sheet**

- [MongoDB Cheat Sheet by GoalKicker](#)

- **Redis**

- **Documentation**

- [Redis Documentation](#)

- **Article**

- [How to use redis with python by Brad Solomon](#)

- **Cheat Sheet**

- [Redis Cheat Sheet 1](#)
- [Redis Cheat Sheet 2](#)

- **MemCached**

- **Documentation**

- [MemCached Wiki](#)

- **Apache Cassandra**

- **Clean Code**

- **Book**

- ✓ [Clean Code in Python by Mariano Anaya](#)
- [Code Complete: A Practical Handbook of Software Construction, Second Edition by Steve McConnell](#)

- **Clean Architecture**

(In Progress)

- **Caching**

- **Article**

- [Caching in django with redis by Real Python](#)

- **Video**

- [Redis Course - In-Memory Database Tutorial](#)

- **Testing**

- **Python `unittest` package**

- **Documentation**

- [Testing in Python](#)
- [Getting Started With Testing in Python](#)

- **PyTest Testing Package**

- **Documentation**

- [Official PyTest Documentation](#)

- **DRF Test Framework**

- **Documentation**

- [Testing - Django REST framework](#)

- **Video**

- [Pytest Django and Django Rest Framework](#)

- **Container Platforms**

- **Docker**

- **Documentation**

- [Docker Documentation](#)

- **Book**

- [Docker in Action, Second Edition](#)
      - [Docker Deep Dive: Zero to Docker in a single book](#)

- **Video**

- [Docker Mastery With Django - very academy](#)
      - [Docker Course by Mosh Hamedani](#)
      - [Docker Swarm Step by Step](#)

- **Cheat Sheet**

- [Docker Cheat Sheet](#)

- **Kubernetes**

- **Documentation**

- [Kubernetes Documentation](#)

- **Video**

- ["Just me and Opensource" YouTube channel](#)

- **Book**

- [Kubernetes: Up and Running, 2nd Edition](#)
      - [Kubernetes in Action, Second Edition](#)

- **Community**

- [Kubernetes Discord group](#)

- **Programming Paradigms**

- **Object-Oriented Programming**
  - **Book**
    - [Python3 Object-Oriented Programming](#)
- **Functional Programming**
  - **Article**
    - [Functional Programming in Python](#)

## • **Architectural Patterns**

- **Microservice**
  - **Book**
    - [Microservice Architecture](#)
    - [Building Microservices, 2nd Edition](#)
- **Enterprise Applications**
  - **Book**
    - [Patterns of Enterprise Application Architecture](#)
    - [Enterprise Integration Patterns: Designing, Building, and Deploying Messaging Solutions](#)

## • **Design Principles**

- **SOLID**
  - **Article**
    - [SOLID Principles In Python by Philip Norton](#)
    - [Uncle Bob's SOLID principles made easy ☐ - in Python!](#)
- **KISS**
- **DRY**

## • **Design Patterns**

- **Book**
  - [Head First Design Patterns: Building Extensible and Maintainable Object-Oriented Software](#)
  - [Django Design Patterns and Best Practices \(by Arun Ravindran\)](#)
  - [Dive Into Design Patterns by Alexander Shvets](#)
- **Video**
  - [Design Patterns Course by Mosh Hamedani](#)

## • **Message Brokers**

- **RabbitMQ**
  - **Article**
    - [RabbitMQ Hello World](#)
    - [RabbitMQ Work Queues](#)
    - [RabbitMQ Publish/Subscribe](#)
    - [RabbitMQ Routing](#)
    - [RabbitMQ Topics](#)
    - [RabbitMQ Remote procedure call \(RPC\)](#)

- **WSGI Servers**

- **Gunicorn**
  - **Documentation**
    - [Gunicorn Documentation](#)
- **uWSGI**
  - **Documentation**
    - [uWSGI Documentation](#)

- **ASGI Servers**

- **Uvicorn**
  - **Documentation**
    - [Uvicorn Documentation](#)
- **Starlette**
  - **Documentation**
    - [Starlette Documentation](#)

- **Web Servers**

- **Nginx**
  - **Documentation**
    - [NGINX Documentation](#)
  - **Book**
    - [NGINX Cookbook](#)
  - **Cheat Sheet**
    - [NGINX CHEAT SHEET](#)



- **Apache**
  - **Documentation**
    - [Apache Documentation](#)
  - **Book**
    - [Apache Cookbook: Solutions and Examples for Apache Administrators](#)
- **Cheat Sheet**
  - [Apache Cheat Sheet](#)

- **Availability and Reliability**

(In Progress)

- **Distributed Systems**

(In Progress)

- **Reactive Systems**

(In Progress)

- **Refactoring**

(In Progress)

- **Security**

- **Book**
  - [The Web Application Hacker's Handbook](#)
  - [Application\\_Security\\_Program\\_Handbook](#) - a guide for software engineers
  - [Designing secure software](#) - a guide for developers
  - [Hacking APIs Breaking Web Application Programming Interfaces](#)
  - [Web Application Security Exploitation and Countermeasures for Modern Web Applications](#)
  - [Web Security for Developers: Real Threats, Practical Defense](#)
  - [Mastering Modern Web Penetration Testing](#)
- **WebSite**
  - [OWASP Top 10](#)
  - [OWASP Top 10 for Web with live training](#)
  - [SANS SWAT Checklist](#)

- **Monitoring**

(In Progress)

- **Soft Skill**

(In Progress)

- **Public Cloud**

(In Progress)

## **Where to Go Next?**

(In Progress)