

# 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](#)

## • 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**

- **Documentation**

- [venv](#)
- [virtualenvwrapper](#)
- [pipenv](#)
- [conda](#)
- [poetry-python](#)

- **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**
- **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](#)

## • 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)