Roadmap For Python for Data Analysis + REST APIs

60 Overall Goal:

- Learn Python for Data Analysis
- Master REST APIs with authentication techniques
- Work with real-world data (pull from APIs, analyze, and visualize)
- Build mini-projects for practice and portfolio

Chapter 1: Python Refresher (1 Week)

What to Learn:

- Data Types, Variables, Comments
- Operators, Conditional Statements
- Loops (for, while)
- Functions (with args/kwargs)
- List, Tuple, Dictionary, Set
- Basic Exception Handling

Resources:

- W3Schools Python Basics
- Python Programming (freeCodeCamp)

Chapter 2: Intermediate Python for Data (1.5 Weeks)

✓ What to Learn:

- List Comprehension
- Lambda Functions

- Map, Filter, Reduce
- Error Handling (try-except-else-finally)
- Working with Files (read, write CSV/JSON)
- Python Modules & Imports

Resources:

- Real Python Intermediate Python
- Python Docs File Handling

Chapter 3: NumPy and Pandas for Data Analysis (2 Weeks)

What to Learn:

- NumPy: Arrays, Indexing, Broadcasting, Vectorized Ops
- Pandas: DataFrame, Series
- Data Cleaning (missing values, duplicates)
- GroupBy, Merge, Concat, Apply
- Handling Dates/Time
- Basic Exploratory Data Analysis (EDA)

Resources:

- <u>freeCodeCamp: NumPy + Pandas Full Tutorial</u>
- Kaggle Pandas Course
- Book: Python for Data Analysis by Wes McKinney (Free PDF online)

Chapter 4: Data Visualization (1 Week)

What to Learn:

- Matplotlib & Seaborn (Line, Bar, Histogram, Heatmaps)
- Plotly (Interactive Dashboards)
- Styling and Customizing Graphs
- · Visualize insights from real data

Resources:

- Data Visualization with Python IBM (Coursera)
- Seaborn Gallery
- Plotly Python

Chapter 5: REST APIs & Requests (2 Weeks)

What to Learn:

- What is REST API?
- GET, POST, PUT, DELETE methods
- · JSON responses and parsing
- Python requests library
- Query Parameters, Headers

Resources:

- Real Python APIs with Requests
- Python Requests Docs

Chapter 6: API Authentication (2 Weeks)

What to Learn:

- Working with API Keys
- Bearer Token Authentication
- OAuth 2.0 Basics
- Client ID / Client Secret flow
- Refresh Tokens
- Use Postman to test APIs
- Hands-on with real APIs like:
 - OpenWeather
 - o CoinGecko
 - Spotify API (needs Auth)
 - Twitter/X API (OAuth)
 - RapidAPI or NewsAPI

Resources:

- Postman Beginner Guide
- YouTube: How to use APIs with Auth in Python
- OAuth 2.0 Simplified Guide

Chapter 7: Mini Projects (2 Weeks)

What to Build:

- 1. Weather Dashboard
 - Use OpenWeather API to pull weather data, visualize temp trends
- 2. Crypto Tracker

Use CoinGecko API to show top crypto prices, make plots

3. Spotify Playlist Analyzer

o Use Spotify API + Auth to get your playlists and analyze genre, popularity

4. News Dashboard

Use NewsAPI to show trending headlines by topic

5. Custom API Project

o Pick an API, pull data, clean with Pandas, and visualize it

Interpretation Tools:

- Python
- Pandas, Plotly/Seaborn
- Requests
- Streamlit (if you want to build a web UI)

Optional Add-ons (After the Roadmap)

- Learn Web Scraping (BeautifulSoup, Selenium)
- Build Flask API (your own API to expose data)
- Learn how to schedule Python scripts with cron or task scheduler