CodeDict

Python

Industry-Ready Python Developer – Complete Curriculum

Module 1: Python Setup & Programming Fundamentals

- Python Installation (Windows/Mac/Linux)
- VS Code / PyCharm Setup
- Running Python (Script vs Interactive)
- Variables & Data Types
- Operators & Expressions
- Type Casting & Input/Output
- String Basics & String Formatting (f-strings)
- Mini Practice: Simple Calculator (Add/Sub/Mul/Div)
- Mini Project: Student Marks Sheet Generator (Input → Total → Percentage → Grade)

Module 2: Control Flow & Logic Building

- if / elif / else
- Nested Conditions
- Loops: for, while
- break, continue, pass
- Range & Loop Patterns
- Practical Logic Problems (prime, factorial, palindrome)
- Mini Practice: Number Guessing Game
- Mini Project: ATM Console Program (PIN, Balance, Withdraw, Deposit)

Module 3: Data Structures in Python (Core)

- Lists (CRUD, slicing, methods)
- Tuples & unpacking
- Sets (unique, operations)
- Dictionaries (keys, values, nested dict)
- Comprehensions (list/dict/set)
- Mini Practice: Contact Book (list/dict based)
- Mini Project: Expense Tracker (Add/View/Delete + Total Monthly Summary)

Module 4: Functions & Modular Programming

- Defining Functions & Return Values
- Parameters (default, keyword, *args, **kwargs)
- Scope (local/global)
- Lambda Functions
- map, filter, reduce
- Creating Modules & Importing
- Mini Practice: Utility Functions Library (math/string utilities)
- Mini Project: Password Generator + Strength Checker

Module 5: File Handling & Data Storage

- Reading/Writing Text Files
- Append vs Write
- Working with CSV Files
- Working with JSON Files
- File/Folder Basics (os, pathlib)
- Exception-safe file operations

Module 6: Exception Handling & Debugging

- try / except / else / finally
- Raising Exceptions
- Custom Exceptions
- Common Python Errors (TypeError, ValueError, KeyError)
- Debugging with print & debugger
- Mini Practice: Robust Input Validator (no crash inputs)
- Mini Project: Banking System (with error handling + transaction logs)

Module 7: OOP in Python (Object-Oriented Programming)

- Class & Object
- init constructor
- Instance vs Class Variables
- Methods (instance/class/static)
- Inheritance & Overriding
- Encapsulation & Properties
- Polymorphism (basic)
- Mini Practice: Vehicle Class Hierarchy (Car/Bike)
- Mini Project: Library Management System (Books, Members, Issue/Return)

Module 8: Advanced Python Concepts (Interview + Real Use)

- Iterators & Generators (yield)
- Decorators (intro + use cases)
- Context Managers (with)
- Working with datetime
- Collections (Counter, defaultdict, deque)
- Mini Practice: Log Cleaner Script (remove duplicates, filter by date)
- Mini Project: Automation Script (Rename Files in Folder + Report)

Module 10: Database with Python (SQLite + MySQL Overview)

- SQLite CRUD using sqlite3
- Table Design Basics
- Parameterized Queries (avoid SQL injection)
- Joins basics (simple)
- MySQL connection overview (pymysql/mysql-connector)
- Mini Practice: Student DB (Add/View/Search)
- Mini Project: Mini CRM (Customers + Orders + Simple reports)

Module 11: Data Analysis Basics (Optional but Useful)

- Intro to NumPy (arrays, operations)
- Intro to Pandas (DataFrame, filtering)
- Reading CSV/Excel
- Basic Charts (matplotlib)
- Mini Practice: Sales Data Summary
- Mini Project: Monthly Business Report Generator (CSV → stats → chart → export)