BACKEND DEVELOPMENT ROADMAP (ZERO → HERO) MODULE-BASED | PHP + PYTHON | BACKEND → AI READY

RULE OF THIS ROADMAP: ❗ Do NOT move to the next module unless you can confidently do everything listed under "You must be able to". Each module = a new backend level unlocked.

MODULE 1 — LEVEL 1: PROGRAMMING FOUNDATIONS (BACKEND THINKING)

Goal: Build strong logic and programming discipline using Python (primary) and PHP (secondary).

You must be able to: - Write clean Python and PHP code without tutorials - Use variables, loops, conditionals, and functions confidently - Work with arrays, lists, dictionaries, and strings - Handle basic errors and edge cases

Core Topics: - Variables & data types - Conditionals & loops - Functions - Arrays / lists / dictionaries - Basic error handling

Practical Exercises (must complete ALL): 1. Build a CLI calculator in Python (add, subtract, divide, multiply) 2. Write a PHP script that processes form input and validates data 3. Write a Python script that reads user input and outputs formatted results

Projects (build at least 3): 1. Python CLI To-Do App 2. PHP Contact Form Processor 3. Python Number Guessing Game

Free Resources: - Python Full Course – freeCodeCamp (YouTube) - Corey Schafer Python Basics - PHP Manual (php.net)

MODULE 2 — LEVEL 2: DEVELOPER WORKFLOW & GIT

Goal: Work like a real backend developer using Git, GitHub, and the terminal.

You must be able to: - Use Git (commit, branch, merge) without fear - Push and manage repositories on GitHub - Use basic Linux terminal commands - Organize backend projects properly

Core Topics: - Git & GitHub - Linux terminal basics - Project structure

Projects (build at least 3): 1. Version-controlled PHP mini project 2. Python utility scripts repo 3. GitHub portfolio repository

Free Resources: - Git & GitHub – freeCodeCamp - Linux Command Line – freeCodeCamp

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MODULE 3 — LEVEL 3: BACKEND CORE CONCEPTS

Goal: Understand how the web actually works behind the scenes.

You must be able to: - Explain HTTP, requests, responses, and status codes - Build CRUD logic without frameworks - Work with JSON - Explain MVC architecture

Core Topics: - HTTP / HTTPS - REST APIs - CRUD operations - JSON - MVC

Projects (build at least 3): 1. PHP CRUD app (no framework) 2. Python REST-style API (no framework) 3. API that returns JSON responses

Free Resources: - HTTP Overview – MDN - REST APIs – freeCodeCamp

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MODULE 4 — LEVEL 4: DATABASES & DATA MANAGEMENT

Goal: Store, query, and manage data professionally.

You must be able to: - Write SQL queries confidently - Design relational databases - Connect backend code to databases - Use basic ORM concepts

Core Topics: - MySQL / PostgreSQL - SQL queries - Relationships & indexes - ORMs

Projects (build at least 3): 1. PHP User Management System (MySQL) 2. Python app with PostgreSQL 3. CRUD system with authentication-ready schema

Free Resources: - SQL Full Course – freeCodeCamp - PostgreSQL Tutorial – freeCodeCamp

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MODULE 5 — LEVEL 5: PYTHON BACKEND FRAMEWORKS

Goal: Build real, scalable backend applications using frameworks.

You must be able to: - Build APIs using Flask or Django - Handle routing, middleware, and errors - Structure backend projects professionally

Core Topics: - Flask - Django - Intro to FastAPI

Projects (build at least 3): 1. Flask REST API 2. Django CRUD web app 3. Backend API with pagination & validation

Free Resources: - Flask Mega-Tutorial – Miguel Grinberg - Django Official Tutorial

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MODULE 6 — LEVEL 6: AUTHENTICATION & SECURITY

Goal: Secure backend systems like a professional.

You must be able to: - Implement login systems - Hash and verify passwords - Use JWT or sessions correctly - Explain common backend security risks

Core Topics: - Authentication & authorization - JWT & sessions - OWASP Top 10

Projects (build at least 3): 1. PHP Login & Session System 2. Flask API with JWT authentication 3. Role-based access control system

Free Resources: - Flask Authentication – freeCodeCamp - Django Auth Docs - OWASP Top 10

MODULE 7 — LEVEL 7: TESTING, DEPLOYMENT & DEVOPS BASICS

Goal: Ship production-ready backend systems.

You must be able to: - Write unit tests - Debug backend code efficiently - Deploy backend apps - Understand Docker basics

Core Topics: - Testing (Pytest) - Deployment - Docker intro

Projects (build at least 3): 1. Tested Flask API 2. Deployed backend service 3. Dockerized backend app

Free Resources: - Pytest – freeCodeCamp - Docker for Beginners – freeCodeCamp

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MODULE 8 — LEVEL 8: SYSTEM DESIGN & SCALING

Goal: Think like a senior backend engineer.

You must be able to: - Design scalable APIs - Explain caching & background jobs - Understand async concepts

Core Topics: - System design - Caching - Background tasks - Async programming

Projects (build at least 3): 1. Cached API system 2. Background job processor 3. Scalable REST API design

Free Resources: - Backend System Design – freeCodeCamp - Python Async – Real Python

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MODULE 9 — LEVEL 9: BACKEND → AI TRANSITION

Goal: Prepare backend systems for AI integration.

You must be able to: - Work with NumPy & Pandas - Serve ML models via APIs - Use FastAPI for AI services

Core Topics: - NumPy - Pandas - FastAPI - ML APIs

Projects (build at least 3): 1. Data-processing backend service 2. FastAPI ML inference API 3. AI-powered backend feature

Free Resources: - Python for Data Science – freeCodeCamp - NumPy & Pandas – freeCodeCamp - FastAPI Docs

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FINAL RULE: If you cannot confidently build the projects in a module, you are NOT ready to move forward. Mastery over speed. Backend excellence is earned.

=============================== BACKEND → APPLIED AI ENGINEER TRANSITION ROADMAP (POST-BACKEND COMPLETION) TARGET: UAE APPLIED AI ENGINEER – SUMMER 2027 ===============================

AUTHOR: Personalized Career Plan TARGET SALARY: AED 35K–50K / month + housing DURATION: 6–8 months (intensive)

EXECUTIVE SUMMARY

Current Level: - Backend Engineer (AI-ready)

Target Role: - Applied AI Engineer (backend-heavy)

Success Criteria: - 4 production-grade AI systems - Live deployments + GitHub - Interview-ready for UAE sponsorship roles

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PHASE 1 — AI INFRASTRUCTURE FOUNDATIONS (WEEKS 1–4) Goal: Build your first production-ready AI backend using existing backend skills

WEEK 1 — OPENAI API + FASTAPI

Core Skills: - OpenAI API usage - Prompt handling - FastAPI production patterns

Free Resources: - OpenAI Docs: https://platform.openai.com/docs/quickstart - FastAPI Tutorial: https://fastapi.tiangolo.com/tutorial/ - YouTube: FastAPI Crash Course – freeCodeCamp

Project: AI Chat API - POST /chat → OpenAI response - Rate limiting & error handling - Deploy on Railway (free tier)

Repository: - github.com/yourname/ai-chat-api

WEEK 2–3 — RAG + VECTOR DATABASES

Core Skills: - Retrieval-Augmented Generation (RAG) - Embeddings & vector search - Chunking strategies

Free Resources: - Pinecone Quickstart: https://docs.pinecone.io/guides/get-started - LangChain Docs: https://python.langchain.com - YouTube: RAG Tutorial – James Briggs

Project: Document Q&A System - Upload PDF → chunk → embed → vector store - Query → retrieve → AI answer with sources - Optional React chat UI

Deployment: - yourname.ai/doc-qa

WEEK 4 — AUTHENTICATION + DOCKER

Core Skills: - Auth for AI systems - Multi-tenant architecture - Dockerized services

Free Resources: - Clerk.dev Docs: https://clerk.com/docs - Docker Curriculum: https://docker-curriculum.com

Milestone Project: - Auth-enabled AI backend - Dockerized FastAPI + PostgreSQL + Redis

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PHASE 2 — PRODUCTION AI SYSTEMS (WEEKS 5–10) Goal: Build AI systems companies actually pay for

WEEK 5–6 — AI CODING ASSISTANT

Free Resources: - GitHub API Docs - OpenAI Function Calling Docs

Project: Code Review Bot - Analyze GitHub repos - Detect code smells & security risks - PR review automation

Stack: - FastAPI + GitHub API + OpenAI + PostgreSQL

Live Demo: - yourname.ai/code-review

WEEK 7–8 — MULTI-AGENT AI DASHBOARD

Free Resources: - LangGraph Docs - Streamlit Docs

Project: Business Intelligence AI - Upload CSV/sales data - Agent 1: Data analysis - Agent 2: Business recommendations - Export PDF reports

Deployment: - Streamlit Cloud (free)

WEEK 9–10 — PAYMENTS + MONITORING

Free Resources: - Stripe Test Mode Docs - Sentry for FastAPI

Final Project: AI SaaS Platform - Auth + RAG + Agents + Payments - Multi-tenant workspaces - Usage analytics dashboard

Domain: - yourname.ai

PHASE 3 — UAE JOB PREPARATION (WEEKS 11–24) Goal: Turn projects into job offers

PORTFOLIO REQUIREMENTS: [ ] AI Chat API [ ] Document Q&A System [ ] Code Review Bot [ ] AI Business Dashboard

CERTIFICATIONS (OPTIONAL): - AWS Certified Developer Associate - Google Cloud ML Engineer

INTERVIEW PREP: - LeetCode 75 (NeetCode) - AI System Design - RAG system design (1M+ docs)

UAE APPLICATION STRATEGY: - LinkedIn: 500 UAE tech connections - Bayt / Naukrigulf: 15 apps/week - Startup portals (fast hiring)

WEEKLY STUDY TEMPLATE

Mon–Wed: Theory (2h/day) Thu–Fri: Coding (4h/day) Saturday: Deployment & polish (6h) Sunday: LeetCode + networking (2h)

SUCCESS MILESTONES

Month 1: First AI API live Month 3: 3 AI projects deployed Month 5: Portfolio + domain live Month 6: 50 UAE applications Month 7: Offer + visa processing Month 8: Relocation + first paycheck