AI Engineering Accelerator: 14-Day Intensive Bootcamp to Build and Deploy Production-Ready AI Systems

Course Overview

This hands-on, coding-focused accelerator program is designed for developers with prior programming experience who want to become proficient AI engineers. Over 14 intensive days (70+ hours of live training), you'll build and deploy 8+ real-world AI applications, master enterprise-grade tools, create autonomous agent systems, and develop a portfolio that positions you for AI engineering roles, freelancing, or launching your own AI ventures.

- **Target Audience**: Intermediate developers with coding experience (Python preferred); ready to dive into production AI engineering.

- **Prerequisites**: Solid Python basics; familiarity with Git and APIs is helpful.

- **Format**: Live sessions (4-6 hours/day) with expert instruction, pair programming, code reviews, and daily deployments.

- **Outcomes**: 8+ deployed AI projects, production experience with monitoring/security, AI agent workforce, and a job-ready portfolio. Certificate + GitHub repo template provided.

- **Resources**: Private Discord for support, code templates, datasets, and lifetime access to recordings. Bonus: Guest sessions on AI ethics and career strategies.

Sprint 0: Python Basecamp & Foundation Setup (Day 1)

What Will You Learn?

1. Optimize your Python environment for AI development (virtualenvs, Jupyter, debugging).
2. Master essential data structures, algorithms, and libraries for AI workflows.
3. Advanced NumPy/Pandas for efficient data manipulation and preprocessing.
4. Concurrency basics: Threading, multiprocessing, and async programming.
5. Ethical tip: Best practices for reproducible and fair AI code.

Tools

- Python, VS Code
- NumPy, Pandas
- Jupyter Lab, Poetry (for dependency management)

Estimated Time: 6 hours live + 4 hours assignments.

Assignments

1. **Set up your AI dev environment**:
   - Step 1: Install Python 3.12+, VS Code with extensions (Python, Jupyter, Pylance).
   - Step 2: Create a Poetry-managed project and add NumPy/Pandas.
   - Step 3: Test with a sample dataset (e.g., load CSV, perform operations).
   - Expected Outcome: GitHub repo with setup script. Share link in Discord.
   - Tips: Use GPU drivers if available for later sprints.

2. **Data manipulation challenges**:
   - Step 1: Complete 5 exercises (e.g., vectorized operations, groupby aggregations).
   - Step 2: Implement multiprocessing for a large dataset task.
   - Step 3: Profile performance and optimize.
   - Expected Outcome: Notebook with results and explanations.

Sprint 1: Building ChatGPT-Level Applications (Days 2-3)

What Will You Learn?

1. Build your own multi-provider ChatGPT clone with streaming responses.
2. Advanced prompt engineering (XML/JSON structuring, few-shot, chain-of-thought).
3. Multi-model interfaces with UI and local fallback.
4. Deploy local LLMs efficiently.
5. Real-world: Cost comparison across providers.

Tools

- OpenAI, Groq, Anthropic
- Hugging Face, Gradio
- Ollama, LM Studio (for local)

Estimated Time: 10 hours live + 8 hours assignments.

Assignments

1. **Deploy a multi-model chatbot**:
   - Step 1: Integrate OpenAI/Groq APIs with fallback to local Ollama model.
   - Step 2: Build Gradio UI with chat history and model switching.
   - Step 3: Add structured output parsing (JSON mode).
   - Expected Outcome: Deployed app (e.g., on Hugging Face Spaces). Share link.

2. **Prompt engineering optimization**:
   - Step 1: Test 10 advanced prompts on the same task.
   - Step 2: Measure accuracy/latency across models.
   - Expected Outcome: Report with best practices.

Sprint 2: AI-Powered Automation Systems (Days 4-5)

What Will You Learn?

1. Build end-to-end automation pipelines (e.g., job applications).
2. Generate personalized resumes/cover letters with AI.
3. Integrate video generation and modern UIs.
4. Orchestrate workflows with no/low-code tools.

Tools

- n8n (updated alternative to N8N)
- HeyGen API
- Lovable.dev, Bolt.new
- Streamlit (for UI)

Estimated Time: 10 hours live + 8 hours assignments.

Assignments

1. **Automated job application system**:
   - Step 1: Scrape job listings (ethically, via API).
   - Step 2: Generate tailored resume/cover letter using LLM.
   - Step 3: Integrate HeyGen for video resume.
   - Expected Outcome: Fully automated workflow demo (video recording).
2. **Deploy full-stack automation app**:
   - Step 1: Build UI with Streamlit/Bolt.
   - Step 2: Orchestrate in n8n.
   - Expected Outcome: Live deployed app.

Sprint 3: Custom AI with Your Data (RAG Systems) (Days 6-7)

What Will You Learn?

1. Advanced RAG pipelines for document understanding.
2. Build 'Atlas' – personal second brain with multi-source ingestion.
3. YouTube/video analysis and multi-modal querying.
4. Vector databases and hybrid search.

Tools

- LlamaIndex (top RAG framework 2025)
- LanceDB, Pinecone
- Google Gemini API, Whisper (for transcription)

Estimated Time: 10 hours live + 8 hours assignments.

Assignments

1. **Personal RAG second brain**:
   - Step 1: Ingest documents/YouTube transcripts.
   - Step 2: Build a query engine with citations.
   - Step 3: Add multi-modal (image/text) support.
   - Expected Outcome: Deployed 'Atlas' app.

2. **YouTube analyzer tool**:
   - Step 1: Transcribe and index videos.
   - Step 2: Generate assignments/quizzes.
   - Expected Outcome: Demo with sample video.

Sprint 4: Open Source AI & Production Deployment (Days 8-9)

What Will You Learn?

1. Multi-modal systems (vision/audio/text integration).
2. Cost optimization, tracing, and monitoring.
3. AI security (prompt injection, data leakage).
4. Production strategies (scaling, A/B testing).

Tools

- Anthropic Claude, Google Gemini
- Langfuse (observability)
- Stable Diffusion (Diffusers)
- Vercel/Hugging Face (deployment)

Estimated Time: 10 hours live + 8 hours assignments.

Assignments

1. **Deploy monitored multi-modal system**:
   ○ Step 1: Build vision+text app (e.g., image captioning + chat).
   ○ Step 2: Add Langfuse tracing and alerts.
   ○ Step 3: Implement security guards.
   ○ Expected Outcome: Production-deployed app with dashboard.

2. **Cost optimization exercise**:
   ○ Step 1: Benchmark providers/models.
   ○ Step 2: Implement caching/fallbacks.
   ○ Expected Outcome: Report with savings projections.

Sprint 5: AI Agents & Autonomous Systems (Days 10-11)

What Will You Learn?

1. Tool-calling agents with real-world actions.
2. Cost/performance monitoring in agent loops.
3. Sequential and reasoning workflows.
4. Human-in-the-loop integration.

Tools

- Claude/Anthropic
- LangChain
- Cursor.ai (AI coding)
- LangSmith, Composio (tools)

Estimated Time: 10 hours live + 8 hours assignments.

Assignments

1. **Code-generating agent**:
   ○ Step 1: Build agent that writes/tests/deploys code.
   ○ Step 2: Add tool integration (e.g., GitHub API).
   ○ Step 3: Monitor costs via LangSmith.
   ○ Expected Outcome: Autonomous coding demo.

Sprint 6: Multi-Agent AI Systems (Days 12-13)

What Will You Learn?

1. Collaborative multi-agent architectures.
2. 'Orion' – personal engineering agent team.
3. Discord/GitHub bots for project management.
4. Long-term memory and state management.

Tools

- LangGraph (top multi-agent 2025)
- CrewAI (role-based)
- LangChain/LangSmith
- OpenAI/Groq

Estimated Time: 10 hours live + 8 hours assignments.

Assignments

1. **Build 'Orion' multi-agent team**:
   ○ Step 1: Define roles (planner, coder, reviewer).
   ○ Step 2: Implement collaboration via LangGraph.
   ○ Step 3: Integrate Discord bot for PRs.
   ○ Expected Outcome: Live agent workforce demo.

2. **Memory-enabled system**:
   ○ Step 1: Add vector/long-term memory.
   ○ Step 2: Test complex task (e.g., full project from spec).
   ○ Expected Outcome: Video walkthrough.

Sprint 7: Capstone Hackathon (Days 13-14)

What Will You Learn?

1. Ideate and build an original AI product.
2. Full production deployment with monitoring/security.
3. Prepare a presentation and portfolio.

Estimated Time: 12 hours live + 10 hours independent work.

Assignments

1. **Capstone project**:
   - Step 1: Combine skills (e.g., multi-agent RAG app).
   - Step 2: Deploy to production (Vercel/HF).
   - Step 3: Add observability and docs.
   - Expected Outcome: Live product + presentation deck.
2. **Portfolio polish**:
   - Step 1: Document all 8+ projects.
   - Step 2: Peer reviews in group sessions.
   - Expected Outcome: Public GitHub portfolio.

What You'll Walk Away With

- 8+ fully deployed AI applications in your portfolio.
- Hands-on production experience (scaling, monitoring, security).
- Your own AI agent workforce for personal/productivity use.
- Enterprise toolkit mastery (LangGraph, LlamaIndex, etc.).
- Skills to land AI engineering jobs ($150K+ avg) or freelance/build AI startups.
- Network of peers and mentors for ongoing support.

This enhanced 14-day program builds on your original structure with updated 2025 tools (e.g., LangGraph over older agents, n8n, LM Studio), deeper assignments, ethical focus, and progressive projects leading to a stronger capstone. Copy-paste into Word for editing! If you'd like further extensions or specifics, let me know.