



# 50-Day Full-Stack Agentic AI Roadmap (3 Hours/Day)

**Goal:** Learn to build production-grade full-stack Agentic AI apps using open-source + cloud models (Mistral, LLaMA, Groq, OpenAI, etc.) with voice and full-stack deployment.

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## Week 1–2: LLM + Prompting Fundamentals (Days 1–10)

### Concepts:

- [What is Agentic AI?](#)
- [Transformers & tokenization](#)
- [LLM APIs: OpenAI, Groq, Mistral, Gemini](#)
- [Prompt Engineering](#)
- [Sampling, temperature, top-k](#)
- [Build your first chatbot \(OpenAI\)](#)

### Tools:

- Python, Jupyter, Colab
  - Hugging Face Transformers
  - OpenAI SDK / Groq HTTP API
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## Week 3–4: RAG (Retrieval-Augmented Generation) (Days 11–20)

### Concepts:

- [What is RAG?](#)
- [RAG Pipeline Explained \(NVIDIA\)](#)
- Embeddings, chunking, similarity search
- Vector DBs: ChromaDB, Pinecone

### Tools + Docs:

- [LlamaIndex Docs](#)
- [LangChain RAG Guide](#)
- [ChromaDB Docs](#)
- [Pinecone Docs](#)

## Projects:

- Build a PDF-based QA bot using LlamaIndex + Chroma
  - Convert user question → context chunks → LLM
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## Week 5–6: Agentic AI Core + MCP (Days 21–35)

### Concepts:

- [LangChain Agents](#)
- [LangGraph Multi-Agent Planning](#)
- [LangSmith \(Debugging & Tracing\)](#)
- [AutoGen \(Microsoft\)](#)
- [LiteLLM \(multi-LLM fallback\)](#)

### MCP Breakdown:

- [Memory Types](#)
- [Chains Overview](#)
- [Planner Agents](#)

### Projects:

- Build planner+executor agent to complete "organize my AI schedule"
  - Chain: topic → web search → summarize → quiz generator
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## Week 7: Full-Stack Build (FastAPI + React + Voice) (Days 36–45)

### Backend:

- [FastAPI Docs](#)
- [SQLModel Docs](#)
- [JWT Auth \(FastAPI Security\)](#)

### Frontend:

- [React Docs](#)
- [TailwindCSS Docs](#)
- [Connecting Frontend + Backend \(CORS\)](#)

### Voice:

- [Whisper \(STT\)](#)
- [Google STT](#)
- [Google TTS](#)

- [ElevenLabs TTS](#)

### Projects:

- Build UI → backend flow to convert audio → text → LLM → voice
  - Add Hindi/English switching based on input
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## Week 8: Deployment + Projects (Days 46–50)

### Deployment:

- [Docker Basics](#)
- [Render \(FastAPI deploy\)](#)
- [Vercel \(frontend hosting\)](#)
- [Hugging Face Spaces](#)

### Logging & Monitoring:

- [LangSmith Evaluation](#)
  - Environment management with `.env`, `uvicorn`, etc.
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## Final Projects (Choose 1+)

### 1. PDF RAG Assistant

- LlamaIndex + Chroma + LangChain
- FastAPI backend, React frontend

### 2. AI Tutor (MCP + STT/TTS)

- LangGraph + Whisper + ElevenLabs
- React + Tailwind frontend, FastAPI backend

### 3. Task Planner Agent

- LangChain tools + planner + executor agents
- LLM plans → tool calling → results

### 4. Multilingual Calling Agent

- Twilio + Whisper + Google TTS
- Voice flow for Hindi/English customer support

### 5. SaaS Starter with LangGraph

- [LangGraph SaaS Template](#)

- Next.js + LangGraph agents + Stripe

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Log your progress daily in README.md or Notion. Build your own repo for each mini project. Deploy each one (Render, Hugging Face Spaces, or Vercel).