

# AI Agents Complete Roadmap

Total Duration: ~9–10 Months

Goal: Build and Deploy Advanced AI Agents using LangChain, LangGraph, MCP, and Generative AI tools.

## 1. Python (1 Month)

- Goal: Master Python fundamentals, data structures, OOP, and modules.
- Study Material: TutorialsPoint – Python (<https://www.tutorialspoint.com/python/index.htm>)
- YouTube Playlist: Python Full Course (<https://youtu.be/fHKPQEVcX-s?si=XQSVyCY8SgwO0Zye>)
- Topics: Variables, Functions, OOP, File Handling, Libraries (NumPy, Pandas, Matplotlib).

## 2. Statistics & Linear Algebra (3 Weeks)

- Goal: Understand math fundamentals behind ML and DL.
- Statistics: <https://youtu.be/LZzq1zSL1bs?si=4XIXKCVitc8J59Du>
- Linear Algebra: <https://youtu.be/rSjt1E9WHaQ?si=AXcmwA0ssTfx8Q8s>
- Topics: Mean, Variance, Probability, Matrices, Vectors, Eigenvalues.

## 3. Machine Learning (8 Weeks)

- Goal: Learn ML algorithms and evaluation using scikit-learn.
- Course: <https://youtu.be/7uwa9aPbBRU?si=S6Kt7tE-GT6zanww>
- Scikit-learn Guide: [https://youtu.be/0B5eIE\\_1vpU?si=5eklqhiIAhJu4VAM](https://youtu.be/0B5eIE_1vpU?si=5eklqhiIAhJu4VAM)
- Topics: Regression, Classification, Clustering, PCA, Evaluation Metrics.

## 4. Deep Learning (12 Weeks)

- Goal: Understand neural networks, CNNs, and RNNs with TensorFlow.
- Course: [https://youtu.be/YFNKnUhm\\_-s?si=2VOD-bo-8HeKsp67](https://youtu.be/YFNKnUhm_-s?si=2VOD-bo-8HeKsp67)
- TensorFlow: [https://youtu.be/Mubj\\_fqiAv8?si=WuC8mJnsa1qTkkSI](https://youtu.be/Mubj_fqiAv8?si=WuC8mJnsa1qTkkSI)
- Topics: ANN, CNN, RNN, LSTM, Transfer Learning, Optimization.

## 5. NLP (2 Weeks)

- Goal: Learn text preprocessing, embeddings, and pipelines.
- NLP Course: <https://youtu.be/zlUpTlaxAKI?si=v-U655Uqjiw79SQR>
- Topics: Tokenization, Lemmatization, TF-IDF, Word2Vec, Sentiment Analysis.

## 6. Generative AI & Hugging Face + Ollama + Gemini + OpenAI (6 Weeks)

- Goal: Learn GenAI tools and model APIs.
- Part 1: [https://youtu.be/IG-tM\\_4iKOg?si=Q\\_KvRI2AIEDTh\\_Kd](https://youtu.be/IG-tM_4iKOg?si=Q_KvRI2AIEDTh_Kd)
- Part 2: [https://youtu.be/L9-47sX8PvI?si=\\_8O8uv91XpPbB-D\\_](https://youtu.be/L9-47sX8PvI?si=_8O8uv91XpPbB-D_)
- Topics: Transformers, Prompting, Ollama, Gemini, OpenAI, Fine-Tuning.

## 7. LangChain & LangGraph (8 Weeks)

- Goal: Build multi-agent systems and RAG chatbots.
- LangChain: <https://youtu.be/pSVk-5WemQ0?si=3D-IIGFjFI75eaf0>
- LangGraph: [https://www.youtube.com/watch?v=yC36gN-rqjo&list;=PLKnIA16\\_RmvYsvB8qkUQuJmJNuiCUJFPL](https://www.youtube.com/watch?v=yC36gN-rqjo&list;=PLKnIA16_RmvYsvB8qkUQuJmJNuiCUJFPL)
- Topics: LLM Chains, Agents, Memory, Vector Stores, Multi-Agent Graphs.

## 8. Advanced MCP (4 Weeks)

- Goal: Master the Model Context Protocol for AI orchestration.
- Playlist: [https://www.youtube.com/watch?v=3\\_TN1i3MTEU&list;=PLKnIA16\\_Rmva\\_oZ9F4ayUu9qcWgF7Fyc0](https://www.youtube.com/watch?v=3_TN1i3MTEU&list;=PLKnIA16_Rmva_oZ9F4ayUu9qcWgF7Fyc0)
- Topics: FastMCP, Context Sharing, Custom Tools, Real-time Agents.

## 9. Final Integration (2–3 Weeks)

- Build an AI Agent Platform using LangGraph + MCP + Hugging Face.
- Projects: Chatbot, Autonomous Agent System, Sketch2Code, Resume Screener, BuildPilot MVP Generator.