BOARD INFINITY

COURSE 3 OF 3 · AI AGENTS: FROM FOUNDATIONS TO APPLICATIONS

Advance Multi-Agent Systems & Production AI with LangSmith

Full course syllabus - every module, video lesson, reading and assignment, from tool calling to scaling in production.

Board Infinity
Instructor · Offered on Coursera

4	35	16	2 weeks
Modules	Video lessons	Assignments	At 10 hours a week

INSIDE THE COURSE

01	Tool-Calling and Function Execution Patterns	4 hours to complete
02	Multi-Agent Architectures and Coordination	4 hours to complete
03	Model Context Protocol (MCP) and Tool Integration	4 hours to complete
04	Production, Evaluation, and Scaling	4 hours to complete

Enroll on Coursera

https://www.coursera.org/learn/advanced-multi-agent-systems-and-production-ai-with-langsmith

01 ABOUT THE COURSE

From one agent to a production system.

The course takes you past the single agent, in the order the problems appear: make tools reliable with API contracts, schema validation and safe execution; make agents work together; standardize the tools with MCP; then ship it safely.

Along the way you use CrewAI, build an MCP server with FastAPI, and implement persistent memory on DynamoDB + ChromaDB, with guardrails, red-teaming, monitoring and scaling - 35 videos, 12 readings and 16 assignments in all.

WHO IT'S FOR

AI developers
Moving from single LLM apps to orchestrated agents.

AI engineers
Tool calling, coordination and production deployment.

Technical architects
Architecture, orchestration and scalability.

Workflow builders
Connecting agents with tools, APIs and MCP.

WHAT YOU'LL LEARN

01 **Tool calling** Module 1
Implement tool-calling mechanisms using LLM function interfaces

02 **Multi-agent coordination** Module 2
Construct multi-agent workflows with task delegation and communication

03 **MCP integration** Module 3
Explain the principles of MCP and its role in standardizing agent tools

04 **Production AI** Module 4
Deploy agent systems with memory persistence and safety guardrails

02 SYLLABUS

Four modules, tool calling to scale.

2 weeks to complete at 10 hours a week. Flexible schedule - learn at your own pace.

01 Tool-Calling and Function Execution Patterns

4 hours

API contracts, schema validation, safe execution, traces and chaining

9 videos

BY THE END OF THIS MODULE YOU CAN

- Implement tool calling using LLM function interfaces
- Validate tool schemas and wrap calls in a safe execution wrapper
- Debug agent execution loops with traces, and chain tools

CONTENTS: 9 videos (45 min) · 3 readings (90 min) · 4 assignments (105 min)

PLUGIN: Quick Course Check-In (5 min)

TOPICS: Understanding Tool-Calling · Designing Reliable Tool Interfaces · Integrating External APIs

You'll leave with: reliable tool calls through contracts, validation and safe wrappers.

02 Multi-Agent Architectures and Coordination

4 hours

Chained agents, retries and guardrails, coordination and CrewAI

9 videos

BY THE END OF THIS MODULE YOU CAN

- Construct multi-agent workflows with delegation and communication
- Handle failure in chained agents with retries and guardrails
- Build a multi-agent research summarization workflow with CrewAI

CONTENTS: 9 videos (40 min) · 3 readings (90 min) · 4 assignments (105 min)

TOPICS: Agent Roles and Responsibilities · Coordination and Messaging · Collaborative Problem Solving

You'll leave with: specialized agents that delegate, communicate and collaborate.

03 Model Context Protocol (MCP) and Tool Integration

4 hours

Schemas, endpoints, an MCP server in FastAPI, clients and chaining

9 videos

BY THE END OF THIS MODULE YOU CAN

- Explain MCP and its role in standardizing agent tools
- Create an MCP server with FastAPI; register, discover and test tools
- Integrate MCP clients with agents and chain MCP tools

CONTENTS: 9 videos (36 min) · 3 readings (90 min) · 4 assignments (105 min)

TOPICS: Introduction to MCP | Building MCP Servers | Consuming MCP Tools

You'll leave with: standardized tools served over MCP and used by your agents.

04 Production, Evaluation, and Scaling

4 hours

AWS deployment, persistent memory, guardrails, monitoring and scaling

8 videos

BY THE END OF THIS MODULE YOU CAN

- Deploy agents with persistent memory on DynamoDB + ChromaDB
- Build guardrails with prompt filters and red-teaming
- Monitor in production and choose a scaling architecture

CONTENTS: 8 videos (51 min) · 3 readings (90 min) · 4 assignments (105 min)

TOPICS: Deployment and Persistence | Evaluation and Safety Guardrails | Scaling and Monitoring in Production

You'll leave with: the production picture - memory, safety, monitoring and scale.

03 TOOLS & SKILLS

The tools you work with, module by module.

Tool schemas & JSON Module 1

Tools as API contracts, validated before execution.

In this course: A safe execution wrapper, traces and tool chaining.

CrewAI Module 2

A framework for teams of collaborating agents.

In this course: A minimal example and a research summarization demo.

MCP & FastAPI Module 3

A standard way for agents to discover and use tools.

In this course: An MCP server in FastAPI, and MCP clients in agents.

AWS, DynamoDB & ChromaDB Module 4

Production infrastructure and persistent memory.

In this course: Deployment, persistence, monitoring and scaling.

SKILLS YOU LEAVE WITH

Agents & tools

- Generative AI Agents
- Agentic systems
- Tool Calling
- AI Integrations

Production

- Debugging
- System Monitoring
- Scalability
- Context Management

LLM foundations

- LLM Application
- Retrieval-Augmented Generation
- Large Language Modeling
- Embeddings

04 CERTIFICATE & CAREER

Finish with a shareable certificate.

Add it to LinkedIn

Add this credential to your LinkedIn profile, resume, or CV.

Print it

Saved to your Coursera Accomplishments page, where you can print it.

Earned, not attended

Awarded on a graded quiz in each of the four modules.

Course 3 of 3

Completes AI Agents: From Foundations to Applications.

ROLE AREAS THESE SKILLS RELATE TO

- AI Engineer
- Generative AI Developer
- AI Solutions Engineer
- LLM Application Developer
- AI Systems Engineer
- AI Architect

Board Infinity

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Intermediate level · English + 9 languages · Flexible schedule

Ready to build beyond the single agent?

Enrollment, lessons, grading and the certificate all happen on Coursera.

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Course page:
coursera.org/learn/advanced-multi-agent-systems-and-production-ai-with-langsmith

Want a coach alongside the course?

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