CERTIFICATION PROGRAM IN AGENTIC SYSTEMS AND DESIGN

FROM iHUB DIVYASAMPARK, IIT ROORKEE

About iHUB DivyaSampark, IIT Roorkee

- **iHUB DivyaSampark, IIT Roorkee:** A Section 8, not-for-profit Technology Innovation Hub at IIT Roorkee, established under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)by the Department of Science & Technology (DST), Government of India.
- **Strong Industry & Research Ecosystem:** With active collaborations, incubators, and innovation hubs, IIT Roorkee bridges academia and industry to drive real-world impact
- **Industry-Focused Learning:** IIT Roorkee maintains strong ties with industries across its campus locations, providing students with opportunities for internships, real-world projects, and networking with business leaders.

Why Choose This Course?

- **Prestigious Certification:** Receive a certificate of completion from iHUB DivyaSampark, IIT Roorkee, recognising your achievement.
- **Campus Immersion:** An optional 3 day campus immersion for direct interaction with industry experts and peers.
- **Future Proof Career Gateway:** Step into the rapidly evolving AI landscape by mastering Agentic AI, LangChain, and multi-agent systems with hands-on expertise guided by top IIM and IIT faculty.
- **Advanced Curriculum:** Access cutting-edge business analysis content, engaging simulations, and practical evaluations. Focus on real-time project implementation for hands-on mastery.
- **Practical-Based Learning:** Work on hands-on projects and real-world AI scenarios, applying LangChain and multi-agent frameworks to solve complex, industry-relevant problems.
- **World Class Faculty:** Learn directly from top-tier faculty and industry experts

What Will You Learn?

Drive your career forward by mastering Agentic AI. Learn to design, govern, and deploy autonomous agents that solve complex business challenges and fortify digital assets. Move beyond simple Generative AI to become a high-impact professional, ready to lead with strategic governance and build robust solutions using 15+ leading frameworks and tools.

Toolkit

python™   LangChain   crewai

PostgreSQL   n8n   mongoDB®   & more

Course Details

Course Duration
6 Months

Time Commitment
8-10 hours per week

Certification
iHUB DivyaSampark IIT Roorkee

Course Curriculum

Module 1: Agentic Foundations and Architecture

This module establishes the core concepts of Agentic Systems, distinguishing it from traditional Generative AI. You will learn the fundamental architecture of an intelligent agent and the shift from "prompting" to "planning".

You will learn:

- Defining Agentic Systems: Understanding the four core components - planning, reasoning, memory, and action - and how they create an autonomous system
- The Business Case for Agents: Identifying high-impact scenarios where agents (e.g., financial analysts, customer support bots, data wranglers) deliver massive value
- Understanding the LLM Layer: A non-technical overview of how Large Language Models (LLMs) serve as the brain for agents. This includes a conceptual introduction to leading models like Anthropic Claude and GPT models
- Introduction to Frameworks: A high-level look at the popular development tools like LangChain, CrewAI, and AutoGen and where they fit in the agent ecosystem

Pro-Tip for Non-Tech Learners: Focus on the capability of the agent, not the code. If an agent can plan a marketing campaign, write the content, and schedule the posts, your job is to define the goal and the constraints, not write the functions. Think of an agent as a new, highly effective virtual employee.

Module 2: Agent Components: Memory, Tools, and RAG

We dive deep into the specific mechanisms that allow an agent to perform complex tasks. This module explores how agents gain access to current knowledge and interact with the outside world, turning static AI into dynamic, goal-driven systems.

You will learn:

- Advanced Prompt Engineering for Agents: Techniques for crafting effective system prompts such as chain of thoughts, defining agent roles, and enabling self-correction and adaptive feedback loops
- The Role of Memory: Implementing different memory types (short-term and long-term) to maintain context across interactions
- Retrieval-Augmented Generation (RAG): Understanding how to ground agents in proprietary data, ensuring they use up-to-date and relevant information rather than relying only on their training data
- Tool Integration (Functions): Giving agents the ability to act by connecting them to external APIs, databases, and code to execute real-world tasks

Pro-Tip for Non-Tech Learners: The most important part of this module is data. An agent is only as good as the internal knowledge (RAG) and external tools you give it. When planning an agent project, prioritize identifying the data sources and APIs it will need to access to do its job.

Module 3: Hands-On Single-Agent Development and Use Cases

This is the hands-on building module. You will focus on a single, powerful framework (like LangChain) to develop, test, and refine your first functional intelligent agent. We will explore core use cases across major business functions.

You will learn:

- Setting up the Agent Environment: Practical steps for configuring and initializing a development environment for agent creation (using Python for examples, but focusing on framework logic)
- Building Your First Agent: Implementing planning, tool use, and RAG into a single-agent system. Case study examples include a data analysis agent or a smart document summarizer
- Testing and Iteration: Learning how to debug agent outputs, evaluate decision-making, and use adaptive feedback loops to improve performance
- Real-World Use Cases (Single-Agent): Detailed analysis of how one agent can streamline tasks in Finance (due diligence), HR (onboarding), and Content Creation

Pro-Tip for Non-Tech Learners: While you won't write the code, follow the logic closely. This is where you learn that an agent is just a series of decisions and actions. If you can map out a workflow (e.g., Check email → Search database → Draft response), you can define an agent. This workflow logic is a key deliverable for your technical team.

Module 4: Multi-Agent Collaboration and Deployment Strategy

The final strategic module focuses on scaling Agentic Systems from a single-task agent to complex, collaborative workflows using multi-agent frameworks (like CrewAI and AutoGen). We will also cover the critical aspects of professional deployment and governance.

You will learn:

- Designing Multi-Agent Workflows: Creating teams of specialized agents (e.g., a "Researcher," a "Writer," and an "Editor" agent) to tackle challenges that require diverse roles and sequential tasks
- Framework Deep Dive (CrewAI / AutoGen): Hands-on practice in defining roles, tasks, and hierarchical communication for collaboration between agents.
- Deployment and Monitoring: Strategizing for the deployment of agents, and implementing essential features like observability and logging to ensure performance, reliability, and auditability in production environments
- Governance and Ethical Scaling: Establishing protocols for ethical use, managing data privacy, and setting up the organizational structure needed to govern a fleet of autonomous agents
- No code agent builders: n8n, make.com, chatgpt agent

Pro-Tip for Non-Tech Learners: Multi-agent systems reflect real-world team structures. When designing a multi-agent solution, think like a project manager: define clear roles, clear hand-off points, and robust check-and-balance mechanisms. Your primary contribution here is ensuring the agent team structure accurately reflects the optimal human process.

Module 5: Capstone Project: Autonomous System Build

This culminating module requires you to apply the entire lifecycle of Agentic Systems. You will select a high-value business or technical challenge and design, prototype, and present a complete multi-agent solution.

You will learn:

- Full-Cycle Agent Design: From initial problem definition to identifying required tools, memory structure, and RAG sources
- Prototyping a Multi-Agent System: Utilizing a chosen framework (LangChain/CrewAI/AutoGen) to build a functional, collaborative agent system
- Strategic Pitch: Creating a comprehensive strategic plan and business case that details the project's ROI, ethical considerations, deployment strategy, and resource requirements

Pro-Tip for Non-Tech Learners: Partner with a technically inclined learner for this project. Focus your efforts entirely on the strategic and business aspects: problem framing, calculating ROI, defining the ethical guardrails, and presenting the final vision to secure stakeholder buy-in. Your role is to prove the project's worth and viability.

Due to the evolving nature of the industry expectations and partner institute feedback, some syllabus aspects may change. Any updates will be communicated during the Inauguration Session(s) or at the start of the relevant module

Our Instructors

Dr. Suman Banerjee
Assistant Professor in Computer Science & Engineering, IIT Jammu

Dr. Suman Banerjee is an Assistant Professor in the Discipline of Computer Science & Engineering at IIT Jammu. He completed his Ph.D. at IIT Kharagpur and has professional experience as a Post Doctoral Fellow at IIT Gandhinagar. His research interests include Social and Information Network Analysis, Algorithmic Data Management and Time Varying Graph Analysis. He also has teaching interests in Algorithms, Graph Theory and Databases.

Abhinandan S.P.
Assistant Professor in Data Science & Engineering, IIT Palakkad

Dr. Abhinandan S. P. is an Assistant Professor in the Mehta Family School of Data Science and Artificial Intelligence at the Indian Institute of Technology Palakkad. His research focuses on using mathematical and machine learning methods to solve system problems in emerging cloud networking technologies, such as IoT, Edge-Cloud continuum, Systems for AI/ML, and 6G. He has published numerous research papers in prominent journals and conferences and co-authored a book on Cloud Computing.

Anjali Mishra
Product Manager II, Microsoft

Anjali Mishra, Product Manager at Microsoft, drives innovation across Azure Migrate and Azure Arc. She brings expertise in discovery tooling, onboarding flows, and roadmap execution, with a focus on making cloud migration and hybrid infrastructure intuitive and seamless. Anjali's diverse background spans consulting, community-building, and an MBA from IIM Shillong.

Admission Process

Clear Qualifier Test
You must pass the exam to confirm your seat for the program.

Complete Counselling
Only shortlisted candidates go through the counselling process.

Start Learning
Learn from India's top educators and stand out from the crowd.

Fees Structure

Qualifier Test Fee (Non-Refundable)	₹99	

	Option 1	Option 2
	Upfront	**EMI** (Through Masai's NBFC Partners)
Secure Seat Fee (Non-Refundable)	₹4,000	₹4,000
Programme Fee (Non-Refundable)	₹46,000	₹5,878 x 9 months
Total	₹50,000*	₹56,902*

*GST at 18% extra, as applicable