

## Title

# Planning and Orchestration in Multi-Agent System – Seminar (B.Sc./M.Sc.)

## Background

Planning and orchestration in multi-agent LLM systems focuses on how multiple specialized LLM-based agents can collaboratively decompose complex tasks, coordinate actions, and share intermediate results under a global objective. It combines hierarchical or agent-oriented planning with an orchestration layer that decides which agent to invoke, when to call external tools, and how to manage memory, context, and conflict between agents.

## Task definition

Examine recent frameworks and algorithms that formalize planning and orchestration in multi-agent LLM systems, aiming for more reliable, efficient, and scalable agentic systems.

## Literature review:

1. Agent-Oriented Planning in Multi-Agent Systems (<https://arxiv.org/pdf/2410.02189.pdf>)
2. Enhancing LLM-Based Agents via Global Planning and Hierarchical Execution (<https://arxiv.org/abs/2504.16563>)

## Supervisor

Nikita Agrawal

Feel free to ask any questions anytime via Teams or e-mail (Nikita.Agrawal@uni-bayreuth.de)