



# ID2209 Distributed Artificial Intelligence and Intelligent Agents 7.5 credits

## Distribuerad AI och Intelligenta Agenter

---

Course syllabus for ID2209 valid from Autumn 08

This is a translation of the Swedish, legally binding, course syllabus.

**Grading scale:** A, B, C, D, E, FX, F

**Education cycle:** Second cycle

**Main field of study:** -

### Intended learning outcomes

The main goal of the course is to give students knowledge about basic methods and techniques of Distributed AI and agent technology which, in particular, can be applied to:

- solving problems with decentralized control
- providing solutions to inherently distributed problems
- providing solutions to problems where expertise is distributed

Students should learn from the course:

1. What an agent and multi-agent system are. This means that students should get a good understanding of intelligent agent properties and how agents are distinct from other software paradigms.
2. Have a good overview of important agent subjects:
  - 2.1. Agent Coordination, Agent Negotiation, and Agent Communication. This means that students should learn basic principles, protocols and languages related to these agent issues.
  - 2.2. Agent-Oriented Software Engineering. This means that students should learn methodologies related to developing agent-based systems and be able to apply them in building agent-based systems.
  - 2.3. Micro (intra-Agent) and Macro (agent systems) agent architectures. This means that students should learn principles of building architectures for agents and multi-agent systems
  - 2.4. Agent Intelligence Mechanisms. This means that students should learn foundations of agent theory and get understanding of BDI-architecture
3. Get valuable hands-on experience in developing agent systems. This means that students should be able to apply knowledge obtained during the course to design and implementation of an agent-based system

### Course main content

Introduction and basic concepts of DAI. Coordination methods: general models, common coordination techniques, organizational structures, meta-level information exchange, multi-agent planning, explicit analysis and synchronization. Negotiation methods: principles, protocols, production sequencing as negotiation, conventions for automated negotiation. Interoperability: approaches to software interoperation, speech acts, KQML, FIPA. Multi-agent architectures: low-level architecture support, DAI testbeds, agent-oriented software engineering. Agent theory: basics of modal logic, BDI-architecture. Agent architectures: deliberative, reactive and hybrid architectures. Mobile agents: requirements, implementation, security for mobile agents, environments for mobile agents. Agent typology and technology issues. Applications.

Practical part of the course includes exercises and a project involving implementation of a multi-agent system.

## Language of instruction

Language of instruction is specified in the course offering information in the course and programme directory.

## Eligibility

Computer Science courses 30 hp

Operating Systems courses 7,5 hp

Computer Programming courses 7,5 hp

English "level B" (from Swedish Gymnasium) or similar

## Literature

M. Wooldridge: An Introduction to Multi-Agent Systems. John Wiley and Sons (Chichester, England). ISBN 0 47149691X, 2002, 340 pp approx;

+ selected papers (an additional listing of literature will be provided in the course)

## Examination

- ANN1 - Assignment, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 4.5 credits, grading scale: A, B, C, D, E, FX, F

## Requirements for final grade

Written examination (TEN1 4.5 hp.), Grading: 3, 4, 5 Homework and project assignments (ANN1 3 hp.)