ID2209 Distributed Artificial Intelligence and Intelligent Agents 7.5 credits

Distribuerad AI och Intelligenta Agenter

Course syllabus for ID2209 valid from Autumn 15

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:  
   - Agent Coordination, Agent Negotiation, and Agent Communication. This means that students should learn basic principles, protocols and languages related to these agent issues.  
   - 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.  
   - 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.  
   - 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.
4. Understand ethical aspects and importance of sustainability in developing autonomous systems.
5. Get experience in reporting and discussing results of the course homework and project both in oral and written forms.

The course also includes a seminar as a part of the Software Engineering of Distributed Systems master program. The intention of the seminar is to put the course into the context of the autonomous systems research in general and into the context of the master program in particular.

### 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

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**

Textbook for the course:


Lecture notes

Recommended Reading (not in curriculum):

The following articles are recommended to obtain a deeper understanding of the subject. We have provided links to the articles wherever possible.

**Introduction, Overview and Terminology**


**Negotiation**


**Coordination**

Teamwork

- Tambe, M., Towards


Agent Communication


Mobile Agents


Agents Overview


Agent Theory


Agent-Oriented Software Engineering


Agent-Mediated Electronic Commerce


Additional articles in the curriculum may be added during 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

Written examination (TEN1 4.5 hp).