

Syllabus

Artificial Intelligence and Machine Learning, 6hp

Issued by the WASP graduate school management group **2024-01-09**.

Main field of study

AI/MLX, AI/math

Course level

PhD student course

Course offered for

PhD Students in the WASP graduate school

Entry requirements

The course requires solid programming experience in a high-level language; the programming assignments will use Python. No previous knowledge of Artificial Intelligence is required. The participants are assumed to have a background in mathematics and logic corresponding to the contents of the WASP-courses “Mathematics for ML” and “Introduction to logic for AI”.

Intended learning outcomes

Artificial Intelligence is a broad topic and today's AI is based on both learning and inference. In this course we will focus on the foundational topics within artificial intelligence.

This course is designed as the first graduate course, and it introduces the basic concepts by focusing on an intuitive understanding as well as an algorithmic and mathematical perspective.

On completion of the course the students should be able to

- explain and analyse foundational techniques in AI and machine learning
- propose, evaluate, and implement solutions to problems requiring AI and machine learning techniques
- gain an understanding in how and where AI and machine learning can be applied in solving problems

Course content

The course covers the following topics:

- Problem solving by search
- Intelligent agents
- Logic and inferences
- Automated planning
- Learning and reasoning
- Neurosymbolic AI
- The machine learning problem
- Supervised learning
- Support vector machines, regressions
- Kernel methods
- Probabilistic modeling
- Deep learning
- Conformal risk control
- Unsupervised learning

Teaching and working methods

We will have two modules involving lectures and time for solving exercises (non-mandatory and mandatory for examination).

Examination

Examination format: mandatory exercises.

Grades

Fail or Pass