

# 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
- The machine learning problem
- Supervised learning
- Support vector machines, regressions
- Kernel methods
- Probabilistic modeling, including the Gaussian process
- Deep learning
- Approximate methods, variational inference
- 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