

Artificial Intelligence 7.5 credits

Artificiell intelligens 7.5 hp

Second cycle

Main field: Computer Science and Engineering, Second cycle, has only first-cycle course/s as entry requirements (AIN)

Syllabus is adopted by the Research and Education Board (2024-03-20) and is valid for students admitted for the autumn semester 2024.

Placement in the Academic System

The course is included in the Computer Science and Engineering 300 credits, Master's Programme in Embedded and Intelligent Systems 120 credits and in the Master's Programme in Information Technology 120 credits. The course is also offered as a freestanding course.

Prerequisites and Conditions of Admission

Courses in computer science, computer engineering or electrical engineering of at least 90 credits. Courses in mathematics of at least 30 credits or courses including calculus, linear algebra and transform methods. English 6. Exemption of the requirement in Swedish is granted.

Course Objectives

The course aims at providing an overview of the field Artificial Intelligence, i.e. discipline that attempts to understand and emulate mechanisms underlying "intelligent behaviour." This is an introductory course, thus the focus will be mostly on presentation of basic principles and different paradigms, as well as on discussion of kinds of problems that are approached within AI.

Following successful completion of the course the student should be able to:

Knowledge and understanding

- describe various classes of problems that are approached in AI, with examples
- discuss different methods and algorithms that can be used to solve those problems, and present their pros and cons
- outline implementation of those algorithms as computer programs, pointing out arising challenges and ways to overcome them

Skills and ability

- be able to work within a group towards solving a common problem

Judgement and approach

- judge which, if any, AI methods are suitable for solving a particular problem
- compare suitability of different techniques based in different criteria and/or requirements

Primary Contents

Definition of AI. Overview of paradigms in AI; symbolic and non-symbolic methods (and comparison of these). An overview of search algorithms (e.g. BFS, DFS, IDS, GBFS, A* and genetic algorithms) and how they can be used to e.g. play computer games in an intelligent way. An overview of formal logical methods for reasoning. An introduction to Bayesian networks for reasoning under uncertainty. An introduction to machine learning, especially decision trees, neural networks and support vector machines.

Teaching Formats

The course is composed of a series of lectures which present Artificial Intelligence concepts and techniques. The lectures are followed up with supervised programming lab exercises, where students are given an opportunity to put this knowledge into practice.

The course also includes group project work, where students are provided with practice in solving an open-ended problem independently, using methods and techniques introduced during the course. Supervision and consultation is provided for project work.

Teaching is in English.

Examination

The overall grades of Fail, 3, 4 or 5 will be awarded for the course.

The theoretical part of the course is graded based on written and oral exam. The practical part of the course consists of project and laboratory work. Both the project and laboratory work is graded based on written reports.

The final grade is determined by combining the grades of the practical and theoretical part, where equal weight is assigned the two areas.

| Name of the test | | Grading |
|-------------------------------|-------------|---------|
| Practical Programming Project | 1,5 credits | U/3/4/5 |
| Examination, Oral and Written | 4,5 credits | U/3/4/5 |
| Exercises | 1,5 credits | U/G |

If there are special reasons, the examiner may make exceptions from the specified examination format and allow a student to be examined in another way. Special reasons can e.g. be a decision on learning support.

For elite sports students according to Riktlinjer för kombinationen studier och elitidrott vid Högskolan i Halmstad, DNR: L 2018/177, the examiner has the right to decide on an adapted examination component or let the student complete the examination in an alternative way.

Course Evaluation

Course evaluation is part of the course. This evaluation should offer guidance in the future development and planning of the course. Course evaluations should be documented and made available to the students.

Course Literature and Other Study Resources

Russel, S. & Norvig, P. Artificial Intelligence: A Modern Approach. 3:rd edition, Prentice Hall, 2010.

Lecture notes will be available in BlackBoard.