



COMPUTER SCIENCE AND ENGINEERING

DIT410 Artificial Intelligence, 7.5 higher education credits

Artificial Intelligence, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by The IT Faculty Board on 2009-10-15 and was last revised on 2014-10-24 by Department of Computer Science and Engineering to be valid from 2016-01-17, spring semester of 2016.

Field of education: Science 100%

Department: Computer Science and Engineering

Position in the educational system

The course is offered within the framework of several degree programmes. The course is also a single subject course at the University of Gothenburg.

The course can be part of the following programmes: 1) Computer Science, Master's Programme (N2COS), 2) Software Engineering Master's Programme (N2SOM), 3) Complex Adaptive Systems, Master's Programme (N2CAS), 4) Computer Science, Bachelor's Programme (N1COS) and 5) No translation available (NDATM)

Main field of studies

Computer Science-Algorithms and Logic

Computer Science-Interaction Design

Specialization

A1F, Second cycle, has second-cycle course/s as entry requirements

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Entry requirements

To be eligible for the course students should have successfully completed 90 hec of studies within the subject Computer Science, or equivalent. Furthermore, students should have successfully completed the following courses: Advanced programming (DIT950 or DIT260 or equivalent) and Data structures (DIT960 or equivalent).

Applicants must prove knowledge of English: English 6/English B or the equivalent level of an internationally recognized test, for example TOEFL, IELTS.

Learning outcomes

After completing the course the student is expected to be able to:

Knowledge and understanding

- exemplify and describe some chosen application areas that can benefit from using AI technologies and methodologies.
- state and describe the most important technologies and methodologies used in different subfields of AI, such as search, automatic reasoning and planning, natural language processing; including the fundamental AI algorithms in these areas and how they are used.
- define, explain and discuss the fundamental AI algorithms in at least one of the subareas of AI, gained by a supervised group project.
- design, program, document, and evaluate an AI-based software system so that it has acceptable performance.

Skills and abilities

- interpret and analyse research literature, and apply it for solving AI-related problems.
- apply the knowledge gained from this course to new problems in the AI domain.
- write scientific reports.

Judgement and approach

- judge what can be achieved by AI technology and what is not possible.
- judge when it is feasible to use AI technology, and when it is not useful.
- summarize and relate different ethical arguments in favour of or against AI.

Course content

Artificial Intelligence (AI) studies how computers can accomplish tasks that were traditionally thought to require human intelligence. The aim of this course is to give a deepened understanding of the possibilities and the limitations of AI methods.

The following topics will be treated in the course:

Overview of AI

- introduction to AI

- history, philosophical foundations and ethical issues of AI
- application areas where AI technologies are used, such as natural language processing, bioinformatics, robotics etc.

AI techniques and methodologies

- uninformed and informed search
- logic and deduction
- probabilistic reasoning
- automated planning

Sub-courses

1. **Written assignment** (*Skriftlig inlämningsuppgift*), 2.5 higher education credits
Grading scale: Pass (G) and Fail (U)
2. **AI Project** (*AI Projekt*), 5 higher education credits
Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

Form of teaching

The course is project-oriented and divided into two parts. The smaller part is theoretical and consists of lectures and exercises covering basic AI topics. The bigger part consists of supervised project work in groups to complete one programming project, to write one essay, and to read and comment upon the work made by other groups in the course. The students form project groups, and each group is assigned a programming project and an essay subject.

Language of instruction: English

Assessment

The course is examined by an individual written assignment (2.5 hec) and a AI project (5 hec) carried out in groups. The AI project consist of three parts: a programming project covering some of the AI techniques presented in the lectures, a written report on the programming project, and a written essay covering a historical, philosophical or ethical issue within AI whose content will be presented at the end of the course. The quality of the final program, the written material, the participation during supervision and the final presentation are important for the assessment of the project part. In addition, in order to pass the course the student needs to actively participate during supervision, as well as read and comment upon reports presented by other groups in the course.

A student who has failed two examinations on the same material has the right to request a change of examiner. Such a request must be submitted to the Department in writing

and shall be granted unless there are particular reasons not to do so.

In cases where a course has been discontinued or has undergone major changes, students must be guaranteed at least three examination opportunities (including the regular opportunity) based on the previous content of the course for a period of at least one year.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

To be awarded Pass (G) for a full course, the student must pass both the AI project and the written assignment with at least grade (G). The student must in addition have participated actively during the supervision.

To be awarded Pass with Distinction (VG) for a full course, the student must, in addition, Pass with Distinction (VG) on the AI project.

Course evaluation

The course is evaluated through meetings both during and after the course between teachers and student representatives. Further, an anonymous questionnaire is used to ensure written information. The outcome of the evaluations serves to improve the course by indicating which parts could be added, improved, changed or removed.

Additional information

The course is a joint course together with Chalmers.

It is helpful, but not mandatory, if the student has taken courses such as:

- Algorithms (e.g., DIT600)
- Automata theory (e.g., DIT321)
- Machine learning (e.g., DIT380)
- Programming language technology, (e.g., DIT231)