UNIVERSITY OF GOTHENBURG

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DIT728 Design of AI systems, 7.5 credits

Design av AI-system, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Computer Science and Engineering on 2020-01-21 to be valid from 2021-01-18, spring semester of 2021.

Field of education: Science 100%
Department: Department of Computer Science and Engineering

Position in the educational system

The course can be part of the following programmes: 1) Mathematical Sciences, Master's Programme (N2MAT), 2) Computer Science, Master's Programme (N2COS) and 3) Applied Data Science Master's Programme (N2ADS)

Main field of studies	*Specialization*
Data Science	A1F, Second cycle, has second-cycle course/s as entry requirements
Computer Science	A1F, Second cycle, has second-cycle course/s as entry requirements

Entry requirements

To be eligible for the course the student must have successfully completed courses in:

- 7,5 hec mathematical thinking (DIT025 or DIT856 or equivalent) or a course in basic mathematics (containing e.g. calculus, linear algebra, discrete mathematics),
- 7,5 hec mathematical statistics (e.g. MSG810 or DIT862 or similar),
- 7,5 hec programming in a general-purpose language (e.g. Python/Java/C or similar),
- An introductory course in Data Science and/or AI, for examle DIT852 or DIT405 or equivalent.

We strongly recommend to also take a course in Machine learning, for example DIT866 or similar, or that such a course is taken in parallel alongside this course.

Learning outcomes

On successful completion of the course the student will be able to:

Knowledge and understanding

- Provide an overview of different applications of AI and related areas.
- Describe how some different well-known AI-systems work and how they are used.
- Explain how AI approaches relate to other kinds of advanced information processing.

Competence and skills

- Identify problems that can be solved with AI and other advanced computational techniques.
- Design simpler Ai systems for different applications, including model choices and system design.
- Implement AI systems with programming in combination with different tools and programming libraries.

Judgement and approach

- Discuss advantages and disadvantages of different models and approaches in AI.
- Reflect over fundamental possibilities and limitations of current AI approaches.
- Critically analyze and discuss AI applications with respect to ethics, privacy and societal impact.
- Show a reflective attitude in all learning.

Course content

The course teaches design of AI systems in several different ways:

- Reading of papers and lectures describing different AI systems and their design (eg. AlphaZero, Watson, systems for self-driving cars,…)
- Opportunities to see and try out the implementation of different simpler AI systems.
- Own problem solving in the form of design and implementation of simpler AI systems.
- Discussions about possibilities and limitations of AI, ethics and societal impact.

Sub-courses

1. **Assignments** *(Inlämningsuppgifter),* 7.5 credits
   Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

Form of teaching

Lectures and modules with exercises and mini-projects – these are mainly done in groups of two persons.

Language of instruction: English

Assessment

Assignments and mini-projects.

If a student, who has failed the same examined element on two occasions, wishes to change examiner before the next examination session, such a request is to be submitted to the department in writing and granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In the event that a course has ceased or undergone major changes, students are to be guaranteed at least three examination sessions (including the ordinary examination session) over a period of at least one year, though at most two years after the course has ceased/been changed. The same applies to work experience and VFU, although this is restricted to just one additional examination session.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).
To pass the course, the assignments and mini-projects must pass. To get a higher grade than Pass, a higher weighted average from the grades of the assignments and mini-projects is required.

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.

The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.

Additional information

The course is a joint course together with Chalmers.

Course literature will be announced at the latest 8 weeks prior to the start of the course.