UNIVERSITY OF GOTHENBURG

DEPARTMENT OF APPLIED INFORMATION TECHNOLOGY

TIA410 AI and Human Thinking, 15 credits

AI och mänskligt tänkande, 15 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Applied Information Technology on 2023-06-01 to be valid from 2023-06-01, spring semester of 2023.

Field of education: Technology 100%
Department: Department of Applied Information Technology

Position in the educational system

The course is a compulsory course in the programme specified below.

The course can be part of the following programme: 1) Human-centered Artificial Intelligence Master's Programme (T2HAI)

Main field of studies	*Specialization*
Human-centered Artificial Intelligence	A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

To be eligible for the course the student must have a Bachelor's degree (180 credits), and the following courses courses or equivalent:

- Programming in a general programming language (at least 7.5 credits)
- Artificial intelligence or machine learning (at least 7.5 credits),

Applicants must prove their knowledge of English: English 6/English B from Swedish Upper Secondary School or the equivalent level of an internationally recognized test, for example, TOEFL, IELTS, or alternatively a bachelor's degree from education held in English.

Learning outcomes

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

Knowledge and understanding

- understand the intersection and interaction between AI systems and human cognition;
- analyze how AI can be used for modeling different aspects of human cognition;
- explain how models of psychology and neuroscience gave rise to different AI methods;
- show ability to identify current challenges in research, relevant to AI systems and human cognition;

Competence and skills

- demonstrate the ability to critically integrate knowledge relating to interdisciplinary topics in human cognition and AI systems;
- identify critical issues pertaining to psychological and computational modeling perspectives of AI;
- select and apply appropriate methods to research questions pertaining to psychological and computational modeling perspectives of AI;
- summarize, interpret, and communicate theoretical perspectives and empirical results from AI and cognitive science;

Judgement and approach

- critically evaluate the relationship between sustainability, AI, and cognition;
- critically evaluate assumptions, principles, strengths and weaknesses of central theories and frameworks in the interdisciplinary field of AI and cognitive science.

The course is sustainability-related, which means that at least one of the learning outcomes clearly shows that the course content meets at least one of the University of Gothenburg's confirmed sustainability criteria.

Course content

The course reviews the context and foundations of human-centered AI relating to cognitive science. This includes areas such as:

- how to understand and emulate human cognition and behavior,
- how to design AI applications that are adapted to human cognition.

The general focus of the course is on the intersection and interaction between human cognition and AI. Specific topics will include:

- foundations and current perspectives of cognitive science,
- cognitive aspects of AI systems,
- interaction with robots in social spaces,
- AI-systems for predicting human cognitive faculties such as human preferences, language use, and decision-making,
- concepts and methods in AI originating from psychology and neuroscience,
- concepts and applications of generative models,
- methods for studying cognition from quantitative and computational modeling perspectives.

Sub-courses

1. **Theories of AI and Human Thinking** *(Teorier inom AI och mänskligt tänkande),* 6 credits

   Grading scale: Pass (G) and Fail (U)
   This subcourse will introduce theoretical aspects of AI and human thinking. This will include theoretical perspectives about psychological and computational modeling, covering topics such as:

   - foundations and current perspectives of cognitive science,
   - cognitive aspects of AI systems,
   - AI systems for predicting human cognitive faculties such as human preferences, language use, and decision-making,
   - concepts in AI originating from psychology and neuroscience.

2. **Project in AI and Human Thinking** *(Projekt inom AI och mänskligt tänkande),* 6 credits

   Grading scale: Pass (G) and Fail (U)
   In this subcourse, the students are tasked to undertake a project relating to topics covered by the other two subcourses. Students are expected to plan, apply, and interpret appropriate methods and theoretical frameworks. The students will summarize and communicate their results in the form of a written report and an oral presentation.

3. **Methods in AI and Human Thinking** *(Metoder inom AI och mänskligt tänkande),* 3 credits

   Grading scale: Pass (G) and Fail (U)
   In this subcourse, the students will learn to design experiments, analyze data using statistical methods, and apply computational models.

Form of teaching

The course includes lectures, seminars, workshops and project work.

Language of instruction: English

Assessment

Theories in AI and Human Thinking

This module will be examined through a written exam.

Project in AI and Human Thinking

This module will be examined through a written collaborative report.

Methods in AI and Human Thinking

This module will be examined through a written exam.

Mandatory attendance at seminars will also be required during the course.

If a student who has twice received a failing grade for the same examination component wishes to change examiner ahead of the next examination session, such a request should be made to the department in writing and should be approved by the department unless there are special reasons to the contrary (Chapter 6 Section 22 of the Higher Education Ordinance).

If a student has received a recommendation from the University of Gothenburg for study support for students with disabilities, the examiner may, where it is compatible with the learning outcomes of the course and provided that no unreasonable resources are required, decide to allow the student to sit an adjusted exam or alternative form of assessment.

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, but no more than two years after the course has ceased/been changed. The same applies to internships and professional placements (VFU), although this is restricted to just one additional examination session.

Grades

The grading scale comprises: Pass (G) and Fail (U).
To get a Pass grade for the whole course, a student must get a Pass grade for all parts of the examination.

Course evaluation

After completion, the course will be evaluated by the students. The results of the evaluation are reported to the director of studies and discussed with the students. A summary of the evaluation results together with the suggestions for improvement is to be made available to students and teachers.

Additional information

The course meets the following sustainability criterion adopted by the University of Gothenburg:

2. Analysis from a globalisation perspective
How products, services, or activities in their own lives or in the future professional profession affect the natural environment, social conditions and the economy in a global perspective, both today and in the future.

5. Human rights and social equity
Distribution, discrimination, health and poverty issues and the mutual interaction between social inequality, poor health, the natural environment and people's opportunities for good living conditions.

6. Values, culture and ethics
How norms, culture, religion, ethics and social conditions can shape human behaviour toward the natural world.

9. Planning and design
How community planning and product and service design can influence human well-being and human impact on the natural environment.