

# Humans in Complex Systems

Single subject and programme course

9 credits

Människan i komplexa system

729G84

Valid from: 2020 Autumn semester

**Determined by**

Course and Programme Syllabus Board  
at the Faculty of Arts and Sciences

**Date determined**

2019-12-03

## Main field of study

Cognitive Science

## Course level

First cycle

## Advancement level

G2F

## Course offered for

- Bachelor's Programme in Cognitive Science
- Master Programme in Cognitive Science

## Entry requirements

General entry requirements for undergraduate studies  
and

English corresponding to the level of English in Swedish upper secondary  
education (Engelska B/6)

and

Social Studies corresponding to the level of Social Studies in Swedish upper  
secondary education

and

Mathematics corresponding to the level of Mathematics in Swedish upper  
secondary education

and

90 credits from semester 1 to 4 of the programme

and

9 ECTS credits passed in Cognitive Science Introductory Course

and

Passed at least one of the courses Information Technology and Programming 12  
ECTS credits, Research Methodology and Statistics 9 ECTS credits or Qualitative  
Research Methods 6 ECTS credits

(Exemption from Swedish)

## Intended learning outcomes

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

- Account for and contrast the context and historical development of central theories connected to the study of human behaviour in complex systems, such as cybernetics, systems science, human factors, cognitive systems engineering and naturalistic “cognition in the wild”-perspectives.
- Apply theories and methods from the field of human factors and cognitive systems engineering to analyse and evaluate human–machine systems and joint cognitive systems.
- Describe the role of central human factors concepts in the study of human–machine systems.
- Critically reflect on perspectives and theoretical foundations of system complexity, cognitive systems design, and control of cognitive systems.
- Analyse how a cognitive system can be delimited from a control perspective.
- Explain central concepts and perspectives on safety in human-machine systems.
- Describe common risk and accident analysis approaches and models in human–machine systems.

## Course content

The contents of the course are focused on human factors from a system perspective. This covers historical and current approaches to human-centred systems analyses such as cybernetics, human factors, and joint cognitive systems (JCS). The course primarily concerns complex, technical systems that include humans, technology and artefacts, and sociocultural factors, and how to design, analyse, and evaluate such systems from micro and macro perspectives. The following aspects are covered:

- An introduction to systems science, systems theory, cybernetics, cognitive systems engineering, and resilience engineering
- An elaboration on central, theoretical constructs from cognitive psychology and human factors and their function in the context of complex sociotechnical and cognitive systems.
- How to apply fundamental assessment and measurement methods of concepts central to human factors to study complex systems.
- How to analyse human-machine systems, complex systems, and joint cognitive systems from micro and macro perspectives.
- An overview of different risk and accident analysis methods.

## Teaching and working methods

This course includes lectures, seminars, practical exercises, and study visits. The student is expected to study independently, individually or in groups.

## Examination

The course is examined by:

- Assignments (individual and in groups), grading scale: UG
- Written examination, grading scale: EC

Final grades for the course are based on the written examination, assuming that the assignments have been passed.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it. If the coordinator has instead recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

## Grades

ECTS, EC

## Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is carried out in such a way that both men's and women's experience and knowledge is made visible and developed.

## Department

Institutionen för datavetenskap