

**SYLLABUS**

# **Human Interactions with Cyber-Physical Systems 7.5 credits D0022E**

**Människa-maskin-interaktion för cyber-fysikaliska system**

**Course syllabus admitted: Autumn 2017 Sp 1 - Present**

**DECISION DATE  
2017-02-15**

# Human Interactions with Cyber-Physical Systems 7.5 credits D0022E

## Människa-maskin-interaktion för cyber-fysikaliska system

### First cycle, D0022E

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Datateknik	Computer Technology

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language. and Courses of at least 60 credits at first cycle including the following knowledge/courses: Object oriented programming (D0010E), Basic knowledge in mathematics (M0031M), Boolean algebra (M0009M), General computer skills and ability to work in Unix environment, Experience of report writing Alternative: Alternative to completed courses can be corresponding knowledge acquired through work within the IT-sector. Good knowledge in English, equivalent to English 6.

## Selection

The selection is based on 1-165 credits.

## Examiner

Arash Mousavi

## Course Aim

This course particularly concerns with the appropriate way of interacting with computers as well as systems such as robots, datacenters etc., which comprise of a Cyber (data processing) sub-system as well as a Physical (actuators, real objects ...) sub-system. The aim of this course is to learn how Human and Computers should work together in order to achieve the best performance.

Upon successful completion of this course, student will be able to understand and demonstrate:

- Fundamental theories, concepts, tools and techniques in the field of Human Computer Interaction.
- User Interface design and evaluating the appropriateness of the designed UI.
- Methods for quality control and quality evaluation of the User Interfaces.
- The usefulness criteria of computer systems, and the role of HCI in increasing such system level usefulness.
- Systems and Manipulation: How the system is manipulated through its interface. Direct and indirect manipulation.
- How to use the gained knowledge in a real-world scenario, by designing and developing UIs for computer-based cyber-physical systems.

## Contents

Introduction to Human-Computer Interaction, theories and Paradigms

Fundamental of Design Process

Interaction design

HCI in software Process

Design Rules

Implementation Support

Evaluation Techniques

Models and Theories

Cognitive Model

Socio-organizational issues and stakeholder requirements

Communication and collaboration models

Task Analysis

Dialog notations and Design

Models of the system

Modeling rich interaction

Applications may include but not limited to the followings

Application in ubiquitous computing

Application in mobile computing

Multimedia Applications

Application in Robotics

Application in Industrial Automation

Applications in Building Automation Systems

Applications in Datacenters

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course consists of lectures, home assignment and labs. There are no optional educational moments in this course. The structure of the course makes it necessary for students that do not pass to retake the unsuccessful examination moment next time the course is given.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. Continuous examination with quizzes, homework assignments, labs, which give certain number of credits (see table "Items/Credits" below). The final score is calculated from the total number of credits collected by a student.

## Literature. Valid from Autumn 2015 Sp 1

Human-Computer Interaction  
Alan Dix,  
Third Edition , 2004

Paperback: 834 pages  
Publisher: Pearson Education; 3rd Edition  
Language: English

ISBN-13: 978-0-13-046109-4  
ISBN-10: 0-13-046109-1

## Course offered by

Department of Computer Science, Electrical and Space Engineering

## Items/credits

Number	Type	Credits	Grade
0002	Laboratory work	2	U G#
0007	Midterm test 1	1.5	G U 3 4 5
0008	Midterm test 2	1.5	G U 3 4 5
0009	Assignment report	2.5	G U 3 4 5

## Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

## Last revised

by Jonny Johansson, HUL SRT 2017-02-15

# Syllabus established

by Jonny Johansson, HUL SRT 2015-02-16