

Human Computer Interaction and Design 2018-2020

Major code: SCI3020

Entry points: Aalto, Royal Institute of Technology (KTH), University Paris-Sud (UPS), University of Twente (UT), Technical University of Madrid (UPM) and Polytechnic University of Milan (POLIMI).

Exit points with specializations:

Aalto: Computational Interaction

KTH: Mobile and ubiquitous interaction

UPS: Situated interaction

UT: Intelligent systems

UPM: Accessible and Adaptive Interaction

Technical University Berlin (TUB): Multi-modal interaction

University of Trento (UNITN): Cognitive Interaction

Professor in charge:	Marko Nieminen
Other professors of the major:	Perttu Hämäläinen
	Antti Oulasvirta
	Tapio Takala
Academic coordinator:	Mika P. Nieminen

Objectives of the programme

Human Computer Interaction and Design (HCID) focuses on the study, design, development and evaluation of novel user interfaces and interactive systems taking into account human aspects, at the cognitive and sensory-motor levels, technological aspects, as well as business aspects.

New ICT technologies are transforming our daily lives. Smart devices (mobile phones, PDAs, tablet computers), smart products (car, navigation) and smart environments (ambient intelligence) are enabling new services such as navigation, information providing, learning, making reservations or buying of goods are delivered.

Increasingly, the interaction with these devices is not through simple buttons or keystrokes but with more flexible and intuitive interaction methods such as multi-touch, speech, gestures, and with advanced display systems such as augmented and virtual reality. Smart devices and services are also able to show intelligent behaviour recognizing intentions of the user and anticipating the user's needs. These technologies are central in Human-Computer Interaction and Design.

The design of intuitive user interfaces, however, is not only a matter of the right technology but also a matter of good interaction design: study user's social and cognitive behaviour in relation to using technology, taking the user as a central driver for design, designing for the right user experience, and testing and evaluating the design within context, are keys to understanding and designing successful user experience.

Compulsory major courses (11 ECTS)

Code	Course name	Credits
SCI-E1010	Introduction course for Master's students: Academic skills	1 ECTS
CS-E4900	User-Centered Methods for Product and Service Design	5 ECTS
Select one of the following courses:		
CS-E5220	User Interface Construction	5 ECTS
ELEC-E7851	Computational User Interface Design	5 ECTS

Compulsory I&E Courses (16 ECTS)

Code	Course name	Credits
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CS-E5120	Introduction to Digital Business and Venturing	3 ECTS
CS-E5130	Digital Business Management	4 ECTS
TU-E4100	Startup Experience	9 ECTS

Elective major courses - Select at least 2 ECTS over the two semesters.

Autumn courses:

Code	Course name	Credits
CS-C3120	Human-Computer Interaction	5 ECTS
CS-E3210	Machine Learning: Basic Principles	5 ECTS
CS-C3100	Computer Graphics	5 ECTS
CS-E4400	Design of WWW services	4 ECTS
ELEC-E7890	User Research	5 ECTS
CS-E4450	Explorative Information Visualization	5 ECTS
CS-E50xx	Seminars and Special courses in Software and Service Engineering	5 ECTS

Compulsory major courses (23 ECTS)

Code	Course name	Credits
LC->xxxx	Language course: Compulsory degree requirement, both oral and written requirements	3 ECTS
CS-E5200	Design Project	10 ECTS
CS-E5210	Usability Evaluation	5 ECTS
CS-E4200	Emergent User Interfaces	5 ECTS

Compulsory I&E Courses (8 ECTS)

Code	Course name	Credits
CS-E5140	Global Business in the Digital Age	4 ECTS
CS-E5430	ICT Innovation Summer School	4 ECTS

Elective major courses - Select at least 2 ECTS over the two semesters.

Spring courses:

Code	Course name	Credits
CS-E4840	Information Visualization	5 ECTS
CS-E4800	Artificial Intelligence	5 ECTS

CS-E5520	Advanced Computer Graphics	5 ECTS
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CS-E50xx	Seminars and Special courses in Software and Service Engineering	5 ECTS
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Total for the whole year: 60 ECTS

Note for exit year at partner university: According to Finnish legislation, a master's thesis is a public document and its contents cannot be confidential. Therefore, the material of the thesis must be chosen so that it does not include any information that could be classified as a business secret of the financing company.

Aalto specialization – Computational Interaction

Aalto University offers a specialisation in Computational Interaction. Students learn to apply methods from computer science, engineering, and mathematics to inform understanding of human-computer interaction and to design and adapt human-computer interfaces. Such methods build on for instance machine learning, optimisation, statistical modelling, natural language processing, control theory, signal processing and computer vision, among others. Emerging application topics include computational and data-driven design, interactive AI, conversational agents, interactive visualisation, cognitive and behavioral modeling, and novel user interface technology.

The specialisation is offered by the Aalto University School of Science and the Aalto University School of Electrical Engineering and it builds on internationally recognized research and education in human-computer interaction, computational intelligence in games, and advanced machine learning methods.

Compulsory major courses (14 ECTS)

Code	Course name	Credits
SCI-E1010	Introduction course for Master's students: Career and working life skills	1 ECTS
LC-xxxx	Language course: Compulsory degree requirement, both oral and written requirements	3 ECTS
CS-E3210	Machine Learning: Basic Principles*	5 ECTS
ELEC-E7851	Computational User Interface Design	5 ECTS

Compulsory I&E Courses (6 ECTS)

Code	Course name	Credits
CS-E5425	I&E Study Project	6 ECTS

Elective major courses (10 ECTS)

Code	Course name	Credits
DOM-E5129	Intelligent Computational Media**	5 ECTS
CS-E4840	Information Visualization**	5 ECTS
ELEC-E7890	User Research	5 ECTS
ELEC-E7870	Advanced Topics in User Interfaces	3 ECTS
Only one course of the following can be included in the electives:		
CS-E4890	Deep Learning	5 ECTS
CS-E4600	Algorithmic Methods of Data Mining	5 ECTS

ELEC-E8125 Reinforcement learning

5 ECTS

* If machine learning basics have been studied at entry, select more electives on agreement with academic coordinator.

** Course currently offered during spring semester.

Total: 30 ECTS

Code	Course name	Credits
CS.thes	Master's Thesis	30 ECTS

Total for the whole year: 60 ECTS