TECHNISCHE HOCHSCHULE LÜBECK

Module: Human-Computer Interfaces

Level	Master	**Short Name**	HCI
Responsible Lecturers	Matthies, Denys, Prof. Dr.-Ing.		
Department, Facility	Electrical Engineering and Computer Science		
Course of Studies	Applied Information Technology, Master		
Compulsory/elective	Compulsory elective	**ECTS Credit Points**	5
Semester of Studies	2	**Semester Hours per Week**	4
Length (semesters)	1	**Workload (hours)**	150
Frequency	WiSe	**Presence Hours**	60
Teaching Language	English	**Self-Study Hours**	90

The following section is filled only if there is **exactly one** module-concluding exam.

Exam Type	Project Work	**Exam Language**	German/English
Exam Length (minutes)		**Exam Grading System**	One-third Grades
Learning Outcomes	The students get an overview of the interdisciplinary science of Human-Computer Interaction (HCI) and its central concepts, definitions, and research areas. They acquire knowledge regarding the History and Future Trends of HCI, Foundations of HCI (especially Psychology, Cognitive Sciences, Ergonomics), HCI Models and Interaction Concepts, Prototyping (Input & Feedback Interfaces), Human-Centered Machine Learning, Human Activity Recognition (HAR), Sensing Technologies for HAR, and typical Evaluation Methods in HCI. Participants learn that a User Interface (UI) goes beyond being a software interface, including physical interfaces, as they learn how to apply their acquired theoretical knowledge throughout the lectures to develop, analyze, and evaluate UIs. Students practice their fabrication skills by independently building a hardware-based UI on the scope of their self-chosen HCI project. Thereby the practical application of machine-learning is pronounced.		
Participation Prerequisites			

The previous section is filled only if there is **exactly one** module-concluding exam.

Consideration of Gender and Diversity Issues	✔ Use of gender-neutral language (THL standard) ✔ Target group specific adjustment of didactic methods ✔ Making subject diversity visible (female researchers, cultures etc.)
Applicability	The module can be used within the Master of Computer Science/Software Engineering for Distributed Systems
Remarks	The project work (examination) includes, e.g., the implementation of a self-chosen HCI project, a written report, and an oral presentation of the project.

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Module Course: Human-Computer Interfaces (Lecture)

(of Module: Human-Computer Interfaces)

Course Type	Lecture	**Form of Learning**	Presence
Mandatory Attendance	no	**ECTS Credit Points**	2
Participation Limit		**Semester Hours per Week**	2
Group Size		**Workload (hours)**	60
Teaching Language	English	**Presence Hours**	30
Study Achievements ("Studienleistung", SL)		**Self-Study Hours**	30
SL Length (minutes)		**SL Grading System**	

The following section is filled only if there is a course-specific exam.

Exam Type		**Exam Language**	
Exam Length (minutes)		**Exam Grading System**	
Learning Outcomes			
Participation Prerequisites			

The previous section is filled only if there is a course-specific exam.

Contents	**Introduction into HCI** Basic Terms, Interaction Paradigms, Ubiquitous Computing **History & Future** Computer & Networks, Future Computing **HCI Models & Interaction Concepts** HCI Models, Interaction Concepts, Reflexive Interaction **Foundations of HCI** Cognition, Perception **Prototyping** HCD Lifecycle, Prototyping, Rapid Prototyping **Human-Centered Machine Learning** Overview, Machine Learning, Human-in-the-Loop **Human Activity Recognition** Overview, Human Activity Recognition Chain, Examples **Electrical Sensing Technologies** Overview, Passive CapSense / EFS, Active CapSense **Inertial Sensing Technologies**

	Overview, Accelerometer, Gyroscope, Magnetometer **Acoustic Sensing Technologies** Overview, Doppler Effect, Technological Developments **Optical Sensing Technologies** Overview, Optical (Light) Sensors, Image (Camera) Sensors **Machine Learning Reloaded** ARC, Conventional ML, Deep Learning **Evaluation** Study Design, Data Acquisition, Standardized Questionnaires, Data Analysis
Literature	• Carroll, J. M. (2003). HCI Models, Theories and Frameworks: Toward a Multidisciplinary Science. San Francisco, Morgan K. • Norman, D. A. (1988). The Psychology of Everyday Things, New York, Basic Book. paperback as the Design of Everyday Things. • Shneiderman, B., Plaisant, C. (2010). Designing the user interface. Strategies for effective human-computer interaction. Addison-Wesley. Boston, 5th edition. • ISO 9241: Ergonomics of Human-Computer Interaction. International Organization for Standardization. • Preece, Rogers and Sharp (2002): Designing interactive products to support people in their everyday and working lives. • Jennifer Preece, Yvonne Rogers, Helen Sharp (2002): Interaction Design, ISBN: 0471492787. • O'Sullivan, D., & Igoe, T. (2004). Physical computing: sensing and controlling the physical world with computers. Course Technology Press. ISBN-13: 978-1592003464. • Dix, A., Finlay, J., Abowd, G., & Beale, R. (1993). Task analysis. Human-computer Interaction. • Bakker, S., Hausen, D., Selker, T. (2016). Peripheral Interaction: Challenges and Opportunities for HCI in the Periphery of Attention. Springer.
Remarks	(add. literature incl. current research papers presented in script)

Module Course: Human-Computer Interfaces (Practical Training)

(of Module: Human-Computer Interfaces)

Course Type	Practical Training	**Form of Learning**	Presence
Mandatory Attendance	yes	**ECTS Credit Points**	3
Participation Limit		**Semester Hours per Week**	2
Group Size	12	**Workload (hours)**	90
Teaching Language	English	**Presence Hours**	30
Study Achievements ("Studienleistung", SL)		**Self-Study Hours**	60
SL Length (minutes)		**SL Grading System**	Pass
The following section is filled only if there is a course-specific exam.			
Exam Type		**Exam Language**	
Exam Length (minutes)		**Exam Grading System**	
Learning Outcomes			
Participation Prerequisites			
The previous section is filled only if there is a course-specific exam.			
Contents	• Design and prototypical implementation of a hardware-based user input interface • Applying machine-learning techniques to build a model for user input classification		
Literature	See lecture		
Remarks			