NAME OF THE COURSE	Multimodal Interaction and linterfaces						
Code	PMIH50	Year of study	GU-1 UGU-3				
Course teacher	prof.dr. sc. Andrina Granić	Credits (ECTS)	5,0				
Associate teachers		Type of instruction (number of hours)	L	S	E	F	
			30		30		
Status of the course	elective	Percentage of application of e-learning	25				
COURSE DESCRIPTION							
Course objectives	Humans are using multimodality extensively to communicate with each other, either simultaneously in face-to-face conversations or alternatively using speech, writing, gestures, touch. The communication with computers has on the other hand traditionally employed few modalities: the user provides input with keyboard or mouse and the computer responds visually, in the form of text or icons. This course gives an introduction to new interfaces that can improve the experience or the efficiency of the interaction with computers such as voice control, sound interaction, gesture recognition, touch screens, haptic feedback, augmented reality.						
Course enrolment requirements and entry competences required for the course	It would be preferable if students have already acquired basic knowledge from the course Human-Computer Interaction: Fundamental Principles.						
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	After completing the course students should be able to: - describe the functionality of state-of-the-art multimodal or alternative HCI interfaces, - evaluate the strengths and weaknesses of multimodal interfaces, - implement human-computer interaction interfaces employing new interaction techniques for restricted tasks, - propose efficient designs for new interfaces employing different modalities. The aforementioned is important in order to be able to: - deepen knowledge about the interaction modalities of interest in advanced courses, - employ multimodality in applied project work, - choose suitable interfaces for a given task (from an HCI and technical perspective).						
Course content broken down in detail by weekly class schedule (syllabus)	The course will give the students theoretical and practical introductions to multimodal communication and different types of HCI interfaces. The course is focused around a group project to create, analyse and/or evaluate a multimodal or innovative interface for a given task. In order to prepare for the project, introductory lectures and laboratory exercises present different interface technologies, and home assignments are solved to provide an adequate background and planning. The main focus is on techniques for (i) user input, such as speech recognition, touch screens or eye and gesture tracking, and (ii) computer output, such as unconventional display devices, speech synthesis, sounding objects and haptic devices. In particular, the effects of combining different modalities are addressed. Lectures: 1. Introduction to multimodal interfaces 2. Mixed Reality						

	3. Tabletops, Tangibles and Tracking 4. Gesture-based interfaces 5. Sound in interaction 6. Speech interfaces 7. Multimodal conversational interfaces 8. Haptic interfaces 9. Individual home assignments – analysis and discussion 10. Seminars Exercises: 1. Eye tracking interfaces (Tobii) 2. Gesture interfaces (Kinect, Leap) 3. Haptic interfaces (Falcon) 4. Sound /speech interfaces 5. Tactile interfaces (Smart Phone with tactile feedback) 6. Group projects 7. Preliminary /final exams
Format of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☐ on line in entirety ☐ partial e-learning ☐ field work ☒ independent assignments ☐ multimedia ☒ laboratory ☒ work with mentor ☐ homework assignments
Student responsibilities	Active participation in all activities: lectures, consultations, searching the literature, individual home assignments, seminars and group work; preliminary (mid-term) /final exams

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*

Name	Ects	Name	Ects	Name	Ects
Class attendance	1	Research		Experimental work	1
Oral exam		Report		Homework assignments	1
Seminar essay	1	Essay			
Tests		Practical training			
Written exam	1	Project			

Grading and evaluating student work in class and at the final exam	Seminars (10%) Individual home assignments (10%) Group projects (30%) Preliminary /final exams (50%)

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Dumas, B., Lalanne, D., Oviatt, S. (2009). Multimodal Interfaces: A Survey of Principles, Models and Frameworks. In Denis Lalanne, Jürg Kohlas eds. Human	0	

	Machine Interaction, LNCS 5440, Springer-Verlag, Berlin/Heidelberg, pp. 3-26.		
	Oviatt S. (1999). Ten myths of multimodal interaction. Communications of the ACM, 42(11), pp. 74 - 81.	0	
	Reeves et al. (2004). Guidelines for multimodal user interface design. Communications of the ACM, 47 (1), pp. 57-59.	0	
	Olwal, A. (2009). An Introduction to Augmented Reality.	0	
	Schöning et al. (2008). Multi-Touch Surfaces: A Technical Guide. Technical Report TUMI0833.	0	
	Jacob, R. and Kam, K. (2003). Eye Tracking in Human-Computer Interaction and Usability Research: Ready to Deliver the Promises. In Hyona et al. (Eds.), The Mind's eye: Cognitive and Applied Aspects of Eye Movement Research (pp. 573-603).	0	
	Jacob, R. and Kam, K. (2003). Eye Tracking in Human-Computer Interaction and Usability Research: Ready to Deliver the Promises. In Hyona et al. (Eds.), The Mind's eye: Cognitive and Applied Aspects of Eye Movement Research (pp. 573-603).	0	
	Mitra, S. and Acharya, T. (2007). Gesture recognition: A Survey. IEEE Transactions On Systems, Man and Cybernetics - Part C, 37(3), 311-324.	0	
	Rocchesso, D., & Bresin, R. (2007). Emerging sounds for disappearing computers. In Streitz, N., Kameas, A., & Mavrommati, I. (Eds.), The Disappearing Computer (pp. 233-254). Berlin Heidelberg: Springer.	0	

	Mohamed Yacine Tsalamlal, Nizar Ouarti, Mehdi Ammi. (2013). Non-intrusive Haptic Interfaces: State-of-the Art Survey. In Haptic and Audio Interaction Design. LNCS Volume 7989, 2013, pp 1-9.	0	
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	student discussion, anonymous student evaluation questionnaire, student success rate, self-assessment		
Other (as the proposer wishes to add)			