VIDZEMES AUGSTSKOLA

FACULTY OF ENGINEERING
STUDY COURSE DESCRIPTION

Course Title:	**VR/AR Hardware and Physical Structure, Elements of IoT**					
Course code (LAIS):	**DatZ1017**					
Study programme:	**Virtual reality and smart technologies**					
Level of Study programme:	☐	1st level professional higher education				
	☐	Professional Bachelor				
	☒	Professional Master				
	☐	PhD level				
Type of Study programme:	☒	Compulsory course (Part A)				
	☐	Professional specialization courses (Part B, compulsory)				
	☐	Professional specialization optional courses (Part B, optional)				
	☐	Elective courses (Part C)				
Course Workload:	**Credits**	**ECTS**	**Academic hours**	**Contact hours**	**Independent work hours**	
	2	3	80	24	56	
Course Author/ Tutor:	**Arnis Cīrulis**					
	Assoc. Prof., Dr.sc.ing.					
	e-mail: arnis.cirulis@va.lv					
	Consultation: according to the schedule for each semester					
Course Form:	Full time					
Study year, semester:	1st year, 1st semester					
Language:	Latvian, English					
Prerequisites for the Course:	-					
Course Summary:	The aim of this course is to give practical and theoretical knowledge in virtual and augmented reality hardware and physical structure. In frames of this course students are introduced with concepts and definitions of virtual and augmented reality, and fundamental approach for immersion and interaction. During practical demonstrations students will get opportunity to experience and understand visual interfaces, fixed support and wearable interfaces, and interfaces for interaction, tracking sensors, controllers and motion simulators. As a result students investigate and prove their chosen hardware and software set for their project.					
Assessment:	Examination					
Requirements for Credits:	1. Session of practical solution presentation and demonstration. Uploaded documentation. Evaluation in 10 point system (50% weight of final score). 2. Online test. Evaluation in 10 point system (50% weight of final score).					
Abiding by the Academic Ethics	Students must abide by the academic and research ethics, Vidzeme University of Applied Sciences Ethics Regulations, incl.: – study papers must be independently developed; – the study work should reference all statements, ideas and data used that have been authored by someone else; – appropriate data acquisition methods should be used in the acquisition of data, the research ethics must be respected, empirical data must be collected independently and cannot be distorted or falsified; – the examination must be carried out by the student independently, without the use of supporting materials and/or consultations with other students, unless the lecturer states otherwise. In the event of non-compliance with the academic and research ethics, punishment is imposed in accordance with the ViA Ethics Regulations and the study course must be re-taken, unless the punishment is extramarital.					
Learning Outcomes; the	**Learning Outcomes**			**The evaluation methods and criteria**		

evaluation methods and criteria	**Knowledge**	
	Knowledge on concepts and definitions of virtual and augmented reality.	Seminar and workshops at VR/AR laboratory. Experiments and discussions. Online test.
	Knowledge on fundamental approach for immersion and interaction.	Seminar and workshops at VR/AR laboratory. Experiments and discussions. Online test.
	Knowledge on human senses, psychophysical characteristics of vision, cutaneous sensitivity and perception, vestibular system, articular and muscular proprioception.	Seminar and workshops at VR/AR laboratory. Experiments and discussions. Online test.
	Skills	
	Skills to describe visual interfaces, fixed support and wearable interfaces. .	Seminar and workshops at VR/AR laboratory. Experiments and discussions. Practical demonstrations.
	Skills to analyse and distinguish VR/AR headsets, design, ergonomics, specifications and future challenges. .	Seminar and workshops at VR/AR laboratory. Experiments and discussions. Practical demonstrations.
	Skills to explain field of view, eye tracking, conventional screen, see-through, interfaces for interaction, tracking sensors, controllers and motion simulators.	Seminar and workshops at VR/AR laboratory. Experiments and discussions. Practical demonstrations.
	Competency	
	Understand and use correct terminology related to functional and technical characteristics of VR/AR headsets, smartphone based headsets. .	Seminar and workshops at VR/AR laboratory. Experiments and discussions.
	Independently design drafts for VR/AR applications for all age groups and professional applications, behavioural experiments and use cases.	Seminar and workshops at VR/AR laboratory. Experiments and discussions.
	Solve challenges related to virtual and real environment participants. Evaluate the role and necessity of IoT potential. Implement technologies for IoT elements visualization	Seminar and workshops at VR/AR laboratory. Experiments and discussions.
Course Compulsory literature:	Philippe Fuchs, Virtual Reality Headsets - A Theoretical and Pragmatic Approach, 2017, 214 p.	
Course additional literature:	Murray Ramirez, Virtual Reality for Beginners!: How to Understand, Use & Create with VR, 2016.	
Course confirmation date:	13.06.2018	
Date of course description update:		

Study Course Plan:

Date	Theme	Academic hours		Study Form
		Contact hours	Independent work hours	
	Concepts and definitions of virtual and augmented reality. Fundamental approach for immersion and interaction.	4	8	Seminar and practical workshops. Experiments and discussions.
	Visual interfaces, fixed support and wearable interfaces. VR/AR headsets, design, ergonomics, specifications and future challenges.	4	8	Seminar and practical workshops. Experiments and discussions.
	Field of view, eye tracking, conventional screen, see-through and other approaches. Interfaces for interaction, tracking sensors, controllers and motion simulators.	4	8	Seminar and practical workshops. Experiments and discussions.
	Functional and technical characteristics of VR/AR headsets. Smartphone based headsets. Comfort and health. Recommendations and solutions.	4	8	Seminar and practical workshops. Experiments and discussions.
	VR/AR applications for all age groups and professional applications. Behavioural experiments and use cases. Virtual and real environment participants. Virtual and real time data.	4	8	Seminar and practical workshops. Experiments and discussions.
	IoT potential to manage and maintain VR/AR contents. Role of IoT and networking technologies in VR/AR environments. Visualization of IoT elements in context of smart cities.	4	16	Seminar and practical workshops. Experiments and discussions. Practical demonstrations and online test.
	Hours total:	**24**	**56**	