

**FACULTY OF ENGINEERING  
STUDY COURSE DESCRIPTION**

<b>Course Title:</b>	<b>Web Based VR and AR Applications</b>				
<b>Course code (VAIS):</b>	<b>DatZ1029</b>				
<b>Study programme:</b>	<b>Information Technologies</b>				
<b>Level of Study programme:</b>	<input type="checkbox"/>	<b>1st level professional higher education</b>			
	<input type="checkbox"/>	<b>Professional Bachelor</b>			
	<input checked="" type="checkbox"/>	<b>Professional Master</b>			
	<input type="checkbox"/>	PhD level			
<b>Type of Study programme:</b>	<input checked="" type="checkbox"/>	Compulsory course (Part A)			
	<input type="checkbox"/>	Professional specialization courses (Part B, compulsory)			
	<input type="checkbox"/>	Professional specialization optional courses (Part B, optional)			
	<input type="checkbox"/>	Elective courses (Part C)			
<b>Course Workload:</b>	<b>Credits</b>	<b>ECTS</b>	<b>Academic hours</b>	<b>Contact hours</b>	<b>Independent work hours</b>
	2	3	80	24	56
<b>Course Author/ Tutor:</b>	<b>Kristaps Asniņš</b>				
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	kristapsx@gmail.com				
	Consultation: according to the schedule for each semester				
<b>Course Form:</b>	Full-time				
<b>Study year, semester:</b>	Year 1, semester 1				
<b>Language:</b>	Latvian				
<b>Prerequisites for the Course:</b>	-				
<b>Course Summary:</b>	The aim of this course is to give students knowledge about development of webXR based web applications. Providing introduction in WebGL 3D content creation. During the course students are introduced to WebGL basic principles using Three JS and VR hardware.				
<b>Course Methods:</b>	Lectures, practical activities, theory and practical, final assessment.				
<b>Assessment:</b>	Examination				
<b>Requirements for Credits:</b>	Grade of successfully completed homework – 25% Grade of successfully passed test – 25% Grade of successfully passed exam – 50%				
<b>Course Contents:</b>	Introduction and history in we based 3D applications, used frameworks and tools. Basic principles of Canvas, Web GL and WebXR. ThreeJS structure and components, including detailed review about used methods, objects, materials and shaders. Usage demo of basic controls as Camera, Objects, Animations, Lightning and Shaders. VR hardware implementation, using WebXR framework components.				
<b>Learning Outcomes; the evaluation methods and criteria</b>	<b>Learning Outcomes</b>			<b>The evaluation methods and criteria</b>	
	<b>Knowledge</b>				
	Knowledge of web based VR and AR theory and terminology.			Practical work, home work, test	

	Knowledge of current state and devices available in the market.	Practical work, home work, test
	Knowledge of available frameworks for use to create VR, AR contents for the web.	Practical work, home work, test
	Knowledge of basic and advanced functionality that can be realized.	Practical work, home work, test
<b>Skills</b>		
	Skills to create use API's and link various libraries and software modules.	Practical work, home work, test
	Skills to design and develop interactive environments for web browsers.	Practical work, home work, test
	Skills to use WebGL, Three.js, WebXR.	Practical work, home work, test
<b>Competency</b>		
	The ability to determine which elements to use to develop a project with required functions.	Practical work, home work, test
	Ability to customize requirements and plan a workflow.	Practical work, home work, test
	Ability to respect and integrate requirements related to performance and security.	Practical work, home work, test
<b>Course Compulsory literature:</b>	Farhad Ghayour, Real-Time 3D Graphics with WebGL 2: Build interactive 3D applications with JavaScript and WebGL 2 (OpenGL ES 3.0), 2nd Edition, ISBN: 1788629698, 2018	
<b>Course additional literature:</b>	Jos Dirksen, Learn Three.js: Programming 3D animations and visualizations for the web with HTML5 and WebGL, 3rd Edition 3rd Edition, ISBN-13: 978-1788833288, 2018.	
<b>Course confirmation date:</b>		
<b>Date of course description update:</b>		

### Study Course Plan:

Date	Theme	Academic hours		Study Form
		Contact hours	Independent work hours	
	Introduction and history in we based 3D applications, used frameworks	2	4	Lecture, practical work / home work.
	Basic principles of Canvas, Web GL and WebXR. Three JS structure and components. Used tools for development and usage of components, as camera, mesh objects, animations and lighting.	8	26	Lecture, practical work / home work.
	Usage of Three JS components as input controls, effects, geometry and shaders. WebXR components implementation. Principles of WebXR emulation without hardware.	5	26	Lecture, practical work / home work.
	Groups work	9	-	Exam