Real time 3D visualization, 6 ECTS **UJM semester 2**

Learning outcomes

The first aim of this course is to understand the modern GPU architectures and capabilities. The second is to understand and apply the basic and advanced techniques of real-time 3D rendering in the context of XR. A focus will be placed on the web technologies (WebGL, WebVR and WebXR) that will be used to implement these techniques.

Content

- GPU architecture
- Introduction to WebGL, WebVR and WebXR
- Concept of the third dimension to create realistic 3D animations.
- Lighting and materials
- GPU programming with shaders
- Advanced 3D visualization techniques with **Three.js** (https://threejs.org/)

Modes of study

Course and project work, active participation and a 3 days development sprint.

Teaching methods

- Lectures: 12 hours
- Practical work (during the lectures): 24 hours
- 3 days development sprint

Study materials

- The Graphics Codex, V2.15, by Morgan McGuire, 2011-2018
- The Book of Shaders - https://thebookofshaders.com
- Real-Time 3D Graphics with WebGL 2, Second Edition, by Farhad Ghayour and Diego Cantor, Packt Publishing, October 2018

Evaluation criteria

(Written exam / written assignments / project work / …)

1 theoretical examination (1h30, 1/2), 1/2 project (3 days sprint included)

Scale to be defined

Prerequisites

- Basic knowledge of HTML
- Basic knowledge of JavaScript/Typescript