Virtual Reality Techniques

Programme course

6 credits

VR-teknik

TNM086

Valid from: 2017 Spring semester

Determined by
Board of Studies for Computer Science and Media Technology

Date determined
2017-01-25

Offered for the last time
Autumn semester 2023

Replaced by
TNM116

Main field of study

Information Technology, Computer Science and Engineering, Media Technology and Engineering

Course level

Second cycle

Advancement level

A1X

Course offered for

- Media Technology and Engineering, M Sc in Engineering
- Computer Science and Engineering, M Sc in Engineering
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- Applied Physics and Electrical Engineering, M Sc in Engineering
- Information Technology, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Computer Science and Software Engineering, M Sc in Engineering
- Computer Science, Master's programme

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

3D computer graphics, linear algebra, C++ programming, OpenGL

Intended learning outcomes

With the rapid development of technology, VR has once again become highly topical and VR technologies are becoming more and more common in both games and other applications. The goal of the course is for students to gain insight into what VR is, how it is used and how it can be implemented. They will also learn to analyze needs and challenges, and learn to apply the theories and principles in order to realize effective VR interface and interaction.
In order to pass the course, students need to demonstrate the ability to

- describe the needed for VR with respect to
    - human factors
    - displays, tracking and other interaction devices
    - haptic interaction
    - sound and audio interaction
- create interactive, immersive VR applications

Course content

The course covers a wide range of different aspects associated with the specification, design, development and implementation of Virtual Reality environments for many types of equipment. We will look at many different types of stereo displays, from desktop to large scale VR theaters and Cube/CAVE systems, methods for efficient implementation of high-performance computer graphics, methods of interaction in VR and how sound and other senses are used to create a compelling and useful immersive environment for a variety of applications.

Teaching and working methods

Much of the material is presented through lectures supplemented by scientific publications. Optional topic summaries may be submitted after each lecture to help the student to create an overview of the topic and verify their understanding of the content. Substantial laboratory work is also included, where theories are transformed into practical knowledge. Students taking the course are given access to the VR laboratory and its equipment. The culmination of the laboratory work is the last exercises in which students will develop real VR applications for advanced VR equipment.

Examination

MUN1	Oral examination	2 credits	U, 3, 4, 5
LAB1	Laboratory work	4 credits	U, G

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department
Institutionen för teknik och naturvetenskap

Director of Studies or equivalent
Camilla Forsell

Examiner
Karljohan Lundin Palmerius

Course website and other links

Education components
Preliminary scheduled hours: 46 h
Recommended self-study hours: 114 h

Course literature

Additional literature

Other
The principal source of supplemental literature is scientific articles.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.