DH2310 Extended Reality in Theory and Practice 7.5 credits

Utvidgad verklighet i teori och praktik

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

The official course syllabus is valid from the autumn semester 2024 in accordance with decision by Head of School : J-2023-2251.Date of decision: 2023-10-17

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Computer Science and Engineering

Specific prerequisites

Knowledge and skills in programming, 6 credits, equivalent to completed course DD1337/DD1310-DD1319/DD1321/DD1331/DD100N/ID1018.

Knowledge in basic computer science, 6 credits, equivalent to completed course DD1338/DD1320-DD1328/DD2325/ID1020/ID1021.

Knowledge in basic human-computer interaction, 4.5 higher education credits, equivalent DH1623/DH1622.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course, the student should be able to

- give an account of current technologies and application areas for extended reality (XR)
- give an account of current research directions and challenges in XR
- create basic models in modelling software and integrate them in XR projects
- independently develop XR applications in game engines and distribute them on XR headsets and smart phones
- explain and justify which experiential qualities that are essential in XR applications and how they can be measured
- choose essential and necessary measures to assess experiences in specific XR experiments
- analyse strengths and weaknesses of XR as a medium and discuss how it can be improved

in order to

- be able to orientate themselves within XR theory and practice
- be able to develop and evaluate XR applications
- prepare for further studies in the area.

Course contents

The course contains lectures and labs.

Lectures:

1. Current XR technologies
2. XR and human perception
3. Interaction Design for XR
4. Input in XR and related challenges
5. Haptics in XR and related challenges
6. Application areas for XR
7. Current research questions and challenges within XR

Laboratory work:

1. Basic knowledge: game objects, pre-fabricated objects, programming/scripting
2. Camera, light, input, collisions, user interfaces, programmable objects
3. Navigation, Cinemachine in Unity, asynchronous functions, coroutines, pooling
4. Basic and advanced animation principles, advanced programmable objects
5. Modelling, texturing, animation, scripting in Blender
6. ARCore, ARKit, ARFoundation, Ankare, Vuforia
7. Teleportation and interaction

Examination

- DAT1 - Computer assignments, 5.0 credits, grading scale: A, B, C, D, E, FX, F
- INL1 - Hand-in assignments, 2.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.