3D graphics in VR

Lecturer
Daniele Bonatto (Coordinator)

Course mnemonic
INFO-H502

ECTS credits
5 credits

Language(s) of instruction
English

Course period
First term

Campus
Solbosch

Course content

The student will learn to render 3D in OpenGL (Open Graphics Library), which is the core engine of any 3D rendering in 3D graphics and Virtual Reality (VR).

Objectives (and/or specific learning outcomes)

Students develop a 3D game OpenGL project (in groups of +- 2 students, each), acquiring OpenGL programming skills in a "learn by example" approach. There are, however, no exercises on Unity or Unreal for creating a 3D game; only the core OpenGL 3D engine will be used, possibly augmented with open-source libraries.

Pre-requisits and co-requisits

Required knowledge and skills

C/C++ programming skills (medium level; no need to master Object-Oriented concepts).

Teaching method and learning activities

The exercises will help the student to program in OpenGL with shaders in GLSL (Graphics Library Shader Language), while the theory will provide the main architectural concepts behind the OpenGL pipeline.

Contribution to the teaching profile

3D next-generation rendering techniques for multimedia engineers.

References, bibliography and recommended reading

- JungHyun Han, "Introduction to Computer Graphics with OpenGL ES," CRC Press, 31 March 2021, 978-0367781187
- Joey de Vries, "Learn OpenGL: Learn modern OpenGL graphics programming in a step-by-step fashion," Kendall & Wells, 17 June 2020, ISBN: 978-9090332567

Course notes

Syllabus and Université virtuelle

Other information

Place(s) of teaching

Solbosch

Contact(s)

Prof. Gauthier Lafruit, LISA-VR

Evaluation method(s)

Oral examination and Project

Evaluation method(s) (additional information)

The evaluation is mainly based on an oral exam, presenting the OpenGL project (report and source code to be submitted, one week prior to the exam).

Some theoretical questions are punctually asked during the presentation, but the main part of the exam is rather about the practically implemented OpenGL project.

Determination of the mark (including the weighting of partial marks)

A mini-project (typically rendering a simple object in 3D) with written report has to be delivered mid-term, enabling us to check whether the students are ready for their final OpenGL project. It counts for 20% of the marks; the remaining 80% come from the oral exam itself.

Main language(s) of evaluation

English

Other language(s) of evaluation, if applicable

French

Programmes

Programmes proposing this course at the Brussels School of Engineering

MA-IRCB | Master of science in Biomedical Engineering | finalité Professional/unit 2, MA-IREL | Master of science in Electrical Engineering | finalité electronics and information technologies/unit 2 and MA-IRIF | Master of science in Computer Science and Engineering | finalité Professional/unit 1 and finalité Professional/unit 2