

UE Computer Graphics



Level
Baccalaureate
+5



ECTS
6 credits



Component
UFR IM2AG
(informatique,
mathématiques
et
mathématiques
appliquées)



Semester
Automne

- > **Teaching language(s):** English
- > **Open to exchange students:** Yes
- > **Code d'export Apogée:** GBXMO63

Presentation

Description

This is an advanced lecture in Computer Graphics. It is divided in the three topics Geometric Modeling, Animation and Rendering. In Geometric Modeling we focus on the theory behind subdivision curves and surfaces. We present the main results for proving the convergence of a subdivision scheme and the smoothness of its limit. We provide practical recipes for applying these theoretical results to subdivision schemes. We illustrate the results in a homework in which students program subdivision curves and visualize their smoothness. The animation part is composed of 12 lessons presented during 4 lectures. Each lesson focuses on one important concept in computer animation, one of the 12 principles of traditional animation, and one research paper. This includes Keyframe animation, Forward and inverse kinematics, Motion planning, Rigging and skinning, and Mass spring systems. The rendering part focus on how to display a picture on the screen, so that it looks pleasing for the viewer. The topics presented include Materials and BRDFs, Shadow and shadow maps, Global illumination techniques, Monte-carlo ray-tracing , Level-of-Detail techniques and Expressive rendering. The main rendering techniques are implemented by the students in three homeworks.

Objectives

The overall objective is to acquire advanced knowledge in Geometric Modeling, Animation and Rendering. In Geometric Modeling, the objective is to understand the theory behind subdivision curves and surfaces. In Animation the goal is to learn the 12 principles

of traditional animation. In Rendering the objective is to learn and implement the main techniques for real-time rendering, photorealistic rendering and expressive rendering.

Course parts

Lectures	Lectures (CM)	36h
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Recommended prerequisites

Basic knowledge in linear algebra and computer graphics

Knowledge check

Written exam (note EXAM1) and homeworks (note CC)

Period : Semester 9

Useful info

Contacts

Program director

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Campus

› [Grenoble - University campus](#)