

# UE Computer Graphics



Niveau d'étude  
Bac +5



ECTS  
6 crédits



Crédits ECTS  
Echange  
6.0



Composante  
UFR IM2AG  
(informatique,  
mathématiques  
et  
mathématiques  
appliquées)



Période de  
l'année  
Automne (sept.  
à dec./janv.)

- > **Langue(s) d'enseignement:** Anglais
- > **Ouvert aux étudiants en échange:** Oui
- > **Crédits ECTS Echange:** 6.0
- > **Code d'export Apogée:** GBX9MO63

## Présentation

### 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.

### Objectifs

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.

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## Heures d'enseignement

CM	CM	36h
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## Pré-requis recommandés

Basic knowledge in linear algebra and computer graphics

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## Contrôle des connaissances

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

**Période** : Semestre 9

## Infos pratiques

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### Contacts

Responsable pédagogique

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### Campus

› Grenoble - Domaine universitaire