# Teaching guide

**IDENTIFICATION DETAILS**

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| Degree: | Diploma Technical Artist (UFV-Awarded Title associated with the Video Game Creation) |

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| Field of Knowledge: | Social and Legal Science |

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| Faculty/School: | Communication Science |

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| Course: | LIGHTING AND RENDERING |

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| Type: | Compulsory Internal | ECTS credits: | 6 |

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|---|---|---|---|
| Year: | 3 | Code: | 46117 |

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| Teaching period: | Sixth semester |

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| Teaching type: | Classroom-based |

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| Language: | English |

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| Total number of student study hours: | 150 |

| Teaching staff | E-mail |
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| David García León | david.garcialeon@ufv.es |

**SUBJECT DESCRIPTION**

Advanced techniques for lighting and rendering in game engines.  Techniques and strategies to create lights and materials in game engines

Advanced techniques for lighting and rendering in game engines. Techniques and strategies to create lights and materials in game engines
This Subject is divided into two independent parts:

Part 1 Lighting and rendering in Unity (Represents 50% of the subject)
This part develops the techniques and strategies to create lights materials in Unity.
Part 2 Lighting and rendering in Unreal Engine 5, (Represents 25% of the subject). In this part will introduce the techniques to create material and lights in Unreal Engine 5

## GOAL

PART 1 UNITY
The student will be able to understand how to create materials for any kind of model and also create different sets of lights to prepare the illumination of scenes in Unity
PART 2 UNREAL
The student will be able to understand how to create materials for any kind of model and also create different sets of lights to prepare the illumination of scenes in Unreal Engine.

## PRIOR KNOWLEDGE

Some of the knowledge that contribute the subjects of Art, Animation and Management of engines:
- Introduccion a la Imagen Digital
- Representacion Conceptual
- Introduccion al modelado, concept y animacion 2D
- Fundamentos de la Programacion Basica en Videojuegos - Animacion Interactiva
Necessary background knowledge:
- Knowledge of 3D content creation for videogames
- Knowledge of the Unity game engine and how to use it.
- Knowledge  of the Unreal game engine and how to use it.

## COURSE SYLLABUS

PART 1 LIGHTING IN UNITY

A)Unity´s Materials.
 1.Material parameters.
 2.Shader Graph Editor
   a.Creating shader graphs
   b.Procedural shaders using Shader Graph

B)Lighting in Unity.
 1.Global Illumination.
   a.Lightmapper
   b.Lighting Modes.
   c.Uvs for Lightmaps
   d.Light probes.
   e.Reflection probes..
   f.Global illumination modes

C)Rendering Pipelines
  1.Understanding Pipelines
  2.Universal Render Pipeline (URP)
  3.High Definition Render PIpeline (HDRP)

D)Post-processing system
  1.Volume post-processing system
  2.Effects

PART 2 PROCEDURAL MATERIAL CREATION (ADOBE SUBSTANCE DESIGNER)

A) Interface Substance Designer
B)Prodecural Creation
C) Export Material to render Engine

PART 3 LIGHTING IN UNREAL 5

A)Unreal Materials.
  1.Material Editor
  2.Instanced Materials
  3.Material Shading Models
  4.Layered Materials
  5.Material Functions
  6.Material Parameter Collections

B)Lighting in Unreal
  1.General concepts
  2.Precomputed Lighting
  3.Dynamic Lighting
  4. Lumen system

C)Post-processing effects system.
  1.Understanding post process effects
  2.Effects

## EDUCATION ACTIVITIES

FLIPPED CLASSROOM: Unlike the classical masterclass, in his method the teacher gives the essential material (Videos and lesson notes) to understand the basic concepts and to develop the main strategies, that gives the students the standard workflows, there are going to need in the future.
AUTONOMOUS WORK. In this methodology, the student takes the initiative with or without the help of others (teachers, Companions, tutors, mentors). It is the student who diagnoses their learning needs, formulates their Learning goals, identifies the resources it needs to learn, choose and implement Learning and assesses the

results of their learning. The teacher thus becomes the guide, the Facilitator and in a source of information that collaborates in that autonomous work. This methodology will Special interest in the development of research related skills

COLLABORATIVE LEARNING is a method of teaching and learning in which the student's team together to explore a significant question or create something. In this case, the students team up in different groups to develop a collaborative project together as if they were working in the game studio.

COOPERATIVE LEARNING is a specific kind of collaborative learning. In cooperative learning, students work together in small groups on a structured activity. They are individually accountable for their work, and the work of the group as a whole is also assessed. Cooperative groups work face-to-face and learn to work as a team.

TUTORIAL ACTION SYSTEM: which includes interviews, discussion groups, self-reports andFollow-up tutorial.

RESEARCH: Search of information from various sources and documents, analysis and synthesis of data and development of conclusions.

## DISTRIBUTION OF WORK TIME

| CLASSROOM-BASED ACTIVITY | INDEPENDENT STUDY/OUT-OF-CLASSROOM ACTIVITY |
|---|---|
| 60   hours | 90   hours |
| COOPERATIVE EXERCISE  20h<br>COLLABORATIVE EXERCISE 40h | COOPERATIVE EXERCISE  40h<br>FLIPPED CLASSROOM WORK 50h |

## SKILLS

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## LEARNING RESULTS

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| The student can create materials and lights to different objects and scenes in Unity game engine and Unreal game engine 5. |

## LEARNING APPRAISAL SYSTEM

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| The regular evaluation will be done by the continuous assessment system. And you must comply with the following:<br>Students must obtain a minimum of 5 in all qualification elements in order to pass. |

Assistance must not be less than 80%.

ORDINARY EVALUATION Qualification elements:
•Collaborative exercises 30%
•Cooperative exercise.(Project) 50%
•Assistance and laboratory work 20%

EXTRAORDINARY EVALUATION
Final global exam or exercise 100%

Plagiarism behaviors, as well as the use of illegitimate tools in the evaluation tests, will be sanctioned in accordance with those established in the University's Evaluation Regulations and Coexistence Regulations

## BIBLIOGRAPHY AND OTHER RESOURCES

### Basic

Borromeo N. Hands-On Unity Game Development Second Edition Packt. 2023