

Teaching guide

IDENTIFICATION DETAILS

Degree:	Expert Technical Artist (UFV-Awarded Title associated with the Video Game Creation)		
Faculty/School:	Communication Science		
Course:	LIGHTING AND RENDERING		
Type:	Compulsory Internal	ECTS credits:	6
Year:	3	Code:	46117
Teaching period:	Sixth semester		
Teaching type:	Classroom-based		
Language:	English		
Total number of student study hours:	150		

Teaching staff	E-mail
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SUBJECT DESCRIPTION

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 4, (Represents 25% of the subject). In this part will introduce the techniques to create material and lights in Unreal Engine 4

GOAL

Part 1

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

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

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 (Substance Designer)

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

Part 3. Lighting in Unreal Engine

A)Unreal Materials.

- a.Material Editor
 - b.Instance Materials
- c.Material Shading Models
- d.Layered Materials
- f.Material Functions
- g.Material Parameter Collections

B)Lighting in Unreal

- a.General concepts
- b.Precomputed Lighting
- c.Dynamic Lighting

C)Post-processing effects system.

- a.Understanding post process effects
- b.Effects

EDUCATION ACTIVITIES

The activities, as well as the distribution of working times, can be modified and adapted depending on the different scenarios established following the indications of the health authorities.

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 and Follow-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 COLLABORATIVE EXERCISE 40h	COOPERATIVE EXERCISE 40h FLIPPED CLASSROOM WORK 50h

SKILLS

LEARNING RESULTS

The student can create materials and lights to different objects and scenes in Unity engine and Unreal engine 4.

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:

Students must obtain a minimum of 5 in all qualification elements in order to pass.

Assistance must not be less than 80%.

Qualification elements:

- Individual and group exercises 20%
- Project 60%
 - Product evaluation 30%
 - Group evaluation 20%
 - Auto-evaluation 10%
- Assistance and laboratory work 20%

Extraordinary Evaluation:

Final global exam or exercise 100%

In case of quarantine scenario, all the activities can be done online.

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

Moniem, Muhammad A. (2015) "Unreal Engine Lighting and Rendering Essentials". Packt Publishing.

Tavakkoli, A. (2015) "Game Development and Simulation with Unreal Technology". CRC press.

Engel W. (2017) "Advanced Rendering Techniques". Black Cat Publishing.