Course guide
804493 - EN3D - 3D Environments

Last modified: 10/09/2025

Unit in charge: Image Processing and Multimedia Technology Centre
Teaching unit: 804 - CITM - Image Processing and Multimedia Technology Centre.

Degree: BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Optional subject).
BACHELOR'S DEGREE IN DESIGN, ANIMATION AND DIGITAL ART (Syllabus 2023). (Optional subject).
BACHELOR'S DEGREE IN DIGITAL DESIGN AND MULTIMEDIA TECHNOLOGIES (Syllabus 2023). (Optional subject).

Academic year: 2025 **ECTS Credits:** 6.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: Miranda González, Miguel

Others:

TEACHING METHODOLOGY

The subject has a practical focus. The methodology will be:
- Expository method / lecture.
- Participatory class.
- Case study.
- Independent work.

LEARNING OBJECTIVES OF THE SUBJECT

- Identify the basic concepts and know how to operate the Unreal.
- Use the different processes to create scenarios, going through the various phases of production.
- Learn to estimate the time and workflow for the production of a professional scenario.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	18,0	12.00
Guided activities	12,0	8.00
Hours large group	30,0	20.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

A. INTRODUCTION

Description:
1. Program presentation, Unreal applications, requirements, usage context: VFX, animation, video game (open world or indie).
2. Interface, navigation, configuration. Open Unreal and first project.
3. General asset pipeline and project optimization. Git/Perforce.
4. Folder structures, naming conventions.

Full-or-part-time: 5h
Theory classes: 5h

B. BLOCKOUT AND BASIC MODELING

Description:
5. Technical storyboard, previs, and layout in UE. Grey Boxing, blockout, and modular design. Scale and environmental storytelling.
6. Workflow with other software (Maya, Blender, Substance, etc.).
7. Basic modeling: BSP and Geometry Tools. Import/export FBX, OBJ, LODs.
8. Collisions, optimization, static and dynamic meshes.

Full-or-part-time: 20h
Self study : 20h

C. PBR Materials, Textures and Importing

Description:
9. PBR in Unreal. Master & Instance Materials and Functions. Shaders for landscapes: blend layers, parallax occlusion…
10. Textures: tiling, maps, importing.

Full-or-part-time: 20h
Theory classes: 10h
Guided activities: 10h

D. LIGHTNING AND ATMOSPHERE

Description:
11. Lighting, Lumen, and post-processing. Lightmass settings.
12. Volumetrics, sky atmosphere, LUTs, cine camera.

Full-or-part-time: 20h
Theory classes: 10h
Self study : 10h

E. FOLIAGE, LANDSCAPE AND NIAGARA SYSTEMS

Description:
13. Vegetation: Foliage Tool and Landscape grass.
14. Terrains: Landscape system and sculpting. Erosion and atmospheric effects. Landmass plugin.
15. Niagara system. VFX: dust, fire, smoke, fog. Triggers.

Full-or-part-time: 20h
Theory classes: 10h
Guided activities: 10h

F. NANITE AND PHOTOGRAMMETRY

Description:
16. Optimization, LODs, Occlusion, and Nanite. World partition. Profiling.
17. Visual and environmental AI.
18. Photogrammetry and 3D scanning in environments.
19. LOD and HLODs.

Full-or-part-time: 20h
Theory classes: 10h
Guided activities: 10h

G. METAHUMAN

Description:
20. Ambient sound design
21. MetaHuman. The importance of characters

Full-or-part-time: 20h
Theory classes: 10h
Self study : 10h

H. SEQUENCER AND FINAL PROYECT

Description:
22. Art direction for environments.
23. Sequencer
24. Render layers.
25. Final project: create your own short film or interactive video game. Interactive or cinematic environment. References, pipeline, and time management. Production.
26. Portfolio

Full-or-part-time: 25h
Practical classes: 25h

GRADING SYSTEM

Practice 1: 20% of the final grade
Practice 2: 20% of the final grade
Final project 1: 25% of the final grade
Final project 2: 25% of the final grade
Participation and learning attitude: 10%

EXAMINATION RULES.

- Exercises and practical submissions. There is no exam; the subject is 100% practical.
- Exercises will be carried out following the teacher's instructions. Evaluation will consider not only the practices and submissions but also the processes carried out. A making of report of the final project must be submitted.
- Practical work will be done during autonomous work hours.
- Late submission of a practical will result in a failing grade.
- Due to the nature of the subject and the university-level character of the degree, both the content of the exercises and their correct writing and formatting will be assessed.
- Irregular actions that may lead to a significant variation in the grade of one or more students constitute a fraudulent act in an assessment. This action results in a descriptive grade of fail and a numeric grade of 0 for the overall ordinary assessment of the subject, without the right to reevaluation.
- If instructors have evidence of the use of unauthorized AI tools in assessment tasks, they may call the students involved for an oral test or a meeting to verify authorship.

BIBLIOGRAPHY

Basic:

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- Doran, J. P., & Misra, N.. Unreal Engine 5 Game Development Cookbook. . Packt Publishing.,
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- Plowman, J. 3D Game Design with Unreal Engine 4 and Blender.. Packt Publishing.,
- Kremers, R.. Level Design: Concept, Theory, and Practice.. CRC Press.,
- Jenkins, H. Game design as narrative architecture. In N. Wardrip-Fruin & P. Harrigan (Eds.), First person: New media as story, performance, and game (pp. 118–130). MIT Press.,
- Mauviel, P.. Mastering Unreal Engine 4.x.. Packt Publishing.,
- Byrne, E. Game Level Design. . CRC Press.,
- Birn, J. . Digital Lighting and Rendering (3rd ed.). New Riders.,
- Block, B.. The Visual Story: Creating the Visual Structure of Film, TV and Digital Media (2nd ed.).. Focal Press.,
- Gurney, J.. Color and Light: A Guide for the Realist Painter.. Andrews McMeel Publishing.,
- Quixel.. Megascans Library. Epic Games.
- Smith, G., Nelson, M., & Mateas, M.. A survey of level design tools for 3D games. Foundations of Digital Games Conference. .
- William Faucher – YouTube Channel. .
- Virtus Learning Hub. (n.d.). Unreal Engine Tutorials.
- Ulibarri, Stephen. Unreal Engine 5 Collision Essentials.