UAB
Universitat Autònoma de Barcelona

Art and Architecture of Virtual Maps and Environments

2026/2027

Code: 104755
Credits: 6

Degree programme	Type	Course
Interactive Communication	OP	4

Contact lecturer

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Group languages

You can consult this information at the end of the document.

Prerequisites

- It is recommended that students bring their own laptop computer for class sessions.
- It is recommended to take this course alongside *Digital Object Creation*, although it is not an essential requirement.

Objectives

Learn to design competitive stages and virtual environments for video games, virtual reality (VR), and augmented reality (AR) products using industry-standard software (Blender, Quixel Mixer, Unity 3D).

Learning outcomes

1. Interpret and discuss documents on the main theories on virtual environments.
2. Plan and execute academic projects in the field of virtual environment theory.
3. Present a summary of the studies made, orally and in writing.
4. Show expertise in operating the relevant computer programmes.
5. Use the virtual spaces created as narrative contexts.
6. Design objects that combine aesthetic norms with perfect technical functionality.
7. Create geographies or maps that act as interfaces and allow users to interact with games.
8. Create virtual spaces using suitable software and efficient visibility techniques.
9. Distinguish the salient features in all types of documents within the subject.
10. Cross-check information to establish its veracity, using evaluation criteria.
11. Form part of groups working on virtual-production projects.
12. Submit course assignments on time, showing the individual and/or group planning involved.
13. Propose new methods or well-founded alternative solutions.
14. Propose projects and actions that are in accordance with the principles of ethical responsibility and respect for fundamental rights and obligations, diversity and democratic values.
15. Propose projects and actions that incorporate the gender perspective.
16. Communicate using language that is not sexist or discriminatory.
17. Analyse a situation and identify its points for improvement.

18. Weigh up the risks and opportunities of both one's own and other people's proposals for improvement.

Contents

CONTENTS

- TOPIC 1: Theory of interior and exterior environment creation
- TOPIC 2: Material creation and properties (PBR workflow)
- TOPIC 3: Creation of modular props in Blender and environment kit design (*tilesets*)
- TOPIC 4: Advanced optimization techniques: Trim textures and Texture Atlases
- TOPIC 5: Texturing and surface generation in Quixel Mixer
- TOPIC 6: Asset integration, lighting, and environment configuration in Unity 3D

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Project	21	0.84	1, 2, 3, 4, 5, 6, 7, 8
Theory sessions	15	0.6	1, 9, 10, 11
Practicum	12	0.48	1, 2, 4, 5, 6, 7, 8, 12
Autonomous work practicum	39	1.56	1, 2, 3, 4, 5, 6, 7, 8, 12
Study for evaluatiion	15	0.6	1, 9, 10
Work on Practicum	12	0.48	2, 4, 5, 6, 8, 11, 12, 13, 15, 16, 17, 18

METHODOLOGY

This course places greater weight on the practical and project components compared to the theoretical component. The practical and project parts will be carried out in work sessions tutored by the instructor, work demonstration sessions, submissions of reports and documentation, and autonomous work carried out by the student individually or in groups.

- THEORY: Lectures with material that will be previously provided on the Virtual Campus, introducing theoretical concepts (exterior and interior environment creation, theory of materials, and visual effects) as well as practical concepts (Blender, Quixel, and Unity) of the course. Despite being theory classes, a large part of the session will be dedicated to solving problems posed by the instructor, either individually or in groups.
- PRACTICALS: Practical cases of different environments will be posed in groups of 3 people, where a prompt will be provided and students must implement and present a solution for the case using Blender and Unity. These practical cases will require the application of the concepts explained in the theory classes.
- PROJECT (Virtual Environment Development): Mid-course, students will form tutored work teams to fully develop the visual and artistic environment suitable for a Virtual Reality (VR) and/or Augmented Reality (AR) application over 6 weeks. During class sessions, students will do group work where they must define tasks, assign them to each member, and periodically submit meeting minutes and monitoring logs to the Virtual Campus. On the last day of class, each group will give an oral presentation of the project, having previously submitted a report of the work done along with the functional interactive environment.

COMPETENCES

- Develop autonomous learning strategies.

- Capacity for organization and planning of the artistic production pipeline.
- Capacity for technical problem-solving within game engines (Unity).

SOFTWARE

Blender, Quixel Mixer, Unity 3D.

The detailed calendar with the content of the different sessions will be displayed on the presentation day of the course and will also be available on the Virtual Campus, where students can find the various teaching materials that the teaching staff deems appropriate and all the information necessary for the proper monitoring of the course. In the event of a change in teaching modality due to force majeure according to the competent authorities, the teaching staff will report the changes that will occur in the programming of the course and in the teaching methodologies.

NOTE: The content of the course will be sensitive to aspects related to the gender perspective and the use of inclusive language.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Individual Continuous evaluation on theory	0.2	3	0.12	1, 2, 3, 6, 14
Practicum evaluation	0.2	3	0.12	1, 2, 3, 6, 14
Assistance and participation in project sessions	0.1	24	0.96	2, 6, 11, 12, 13, 14, 15, 16, 17, 18
Project evaluation	0.5	6	0.24	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

EVALUATION

1. Continuous Evaluation Activities The evaluation activities graded out of 10 are the following:

- a) Theoretical test (20% of the final grade)
- b) Submission of practical assignments (20% of the final grade)
- c) Practical execution (Virtual Environment Project) (40% of the final grade)
- d) Monitoring, submission of minutes, and log control of project sessions (10% of the final grade)
- e) Oral presentation of assignments and project (10% of the final grade)

2. Criteria to Calculate the Final Grade

- To calculate the final grade of the course, a minimum grade of 5.0 will be required in the Theoretical test, the Submission of practical assignments, and the Global Grade of the Project.
- Activity *d) Monitoring and minutes* does not require a minimum grade to be factored into the average.
- To pass the course, students must obtain a minimum global final grade of 5.0.

3. Criteria for the Assignment of a "Non-Assessable" (No Avaluable) According to point 9 of article 266 of the UAB Academic Regulations, when it is considered that the student has not been able to provide sufficient evidence of evaluation, this course must be graded as non-assessable. In this course, a "Non-Assessable" grade will be assigned if the student does not take the theoretical test and, at the same time, does not submit the final environment project.

4. Reassessment / Recovery Process

- Students will be entitled to reassessment in the course if they have been evaluated on a set of activities accounting for at least two-thirds of the total course grade (article 261.2 of the UAB Academic Regulations).
- The reassessable activities are the Theoretical test and the conceptual practical assignments. Due to its nature as a group production tutored over 6 weeks, the Final Environment Project (40%) is defined as a non-reassessable activity.
- To participate in the reassessment activities, the teaching staff requires students to have obtained a minimum grade of 3.5 in the corresponding failed activity.
- The maximum grade that can be obtained in the reassessment process of a failed activity will be 8.0. Reassessment is not provided for passing students who wish to raise their grade.

5. Single Evaluation This course/module does not provide for a single-evaluation system.

6. Management and Stability of Work Groups Work groups are considered stable and cannot be dissolved or modified after the first three project sessions. If, for justified reasons of force majeure, a modification is required before this deadline, the express authorization of the instructor will be necessary. In such a case, the faculty will adjust the scope of the assignment according to the number of group members or establish an individualized work plan for the affected members, while maintaining the same competence criteria and weighting percentages set in this guide. Failure to accept these bases of tutored work will result in the immediate suspension of the activity.

7. Students in Second Enrollment or Beyond In the case of a second enrollment, students may opt to take a single synthesis test consisting of a control of theoretical contents and advanced practical exercises in environment creation. The final grade for the course will correspond entirely to the grade of this synthesis test. Students wishing to choose this modality must notify the course coordinator in writing before the deadline established by the center.

BREAKDOWN AND DETAIL OF ACTIVITIES

- a) THEORETICAL TEST: Individual theoretical exam on environment composition, lighting, PBR material behavior, and modular structures.
- b) SUBMISSION OF PRACTICAL ASSIGNMENTS: Exercises on creating modular metric pieces, developing Trim maps, and configuring Atlases in Blender.
- c) PROJECT (Virtual Environment): The evaluation of the environment will be based on a collective group grade (70%) weighted with individual involvement and milestones (30%), considering the following elements:
- Executable Application and Scene: Correct and optimized integration of the environment into Unity 3D, proper application of PBR materials, and adequate technical performance for VR/AR.
- Technical Report / Group Portfolio: Explanatory document covering the project approach, task organization, artistic references, and assembly manuals.
- d) MONITORING AND MINUTES: Weekly submission of group meeting minutes reflecting the agreements reached and the control of tasks assigned to each member.
- e) ORAL PRESENTATION: Visual defense and technical exposition of the scene on the last day of the course before the class.

REGULATIONS ON SANCTIONS AND USE OF ARTIFICIAL INTELLIGENCE

Restricted Use of Artificial Intelligence (AI) For this course, the use of Artificial Intelligence (AI) technologies is

permitted exclusively as a support tool for searching for artistic references, programming auxiliary support scripts or shaders under their own responsibility, support tasks such as bibliographic or information searches, text correction, or report translations. The final result must necessarily reflect a significant and original contribution by the students in geometric modeling, environment design, and personal analysis. Students must clearly identify any parts supported by this technology, specify the tools used, and include a critical reflection in the documentation. Failure to disclose the use of AI will be considered a breach of academic integrity and may result in a grade of 0 for the activity, or more serious sanctions in severe cases.

Mention of Academic Irregularities In the event that a student commits any irregularity (academic fraud, plagiarism, impersonation, or improper use of AI) that could lead to a significant variation in the grade of an evaluation act, this evaluation act will be graded with a 0, regardless of the disciplinary process that may be instructed. If several irregularities occur within the evaluation acts of the same course, the final grade for this course will be 0.

Action in Cases of Suspected Irregularities Any student or group suspected of submitting environment elements that have been generated by AI without authorization, purchased, or copied, may be asked to provide preliminary development work (original *.blend* files, Quixel Mixer layers, or version control logs in Unity) that demonstrate original authorship. The teaching staff may conduct any checks and individual interviews deemed appropriate to verify the authorship of the submitted pieces. If irregularities are detected, the evaluation act will be graded zero.

Bibliography

Core & Theoretical Bibliography

- Ahearn, L. (2016). *3D Game Environments: Create Professional 3D Game Worlds*. CRC Press.

An industry-standard reference focused on the planning, composition, and optimization of both interior and exterior environments for game engines.

- Akenine-Möller, T., Haines, E., & Hoffman, N. (2018). *Real-Time Rendering* (4th ed.). CRC Press.

A fundamental reference text for understanding material theory, the PBR (Physically Based Rendering) workflow, and how modern engines manage real-time lighting.

- Solarski, J. (2017). *Interactive Stories and Video Game Art: A Storytelling Framework for Game Design*. Routledge.

Essential for learning environment composition theory, detailing how the shapes, lines, and colors of a scene guide the player's psychology and navigation.

Practical Manuals & Software Documentation

- Blender Studio (Online). *Blender Open Movies & Training Platform*. https://studio.blender.org

The official Blender platform containing up-to-date documentation on modular modeling, digital sculpting, retopology, and UV mapping workflows.

- Thorn, A. (2020). *Unity 2020 By Example: A project-based guide to building 2D, 3D, VR, and AR games* . Packt Publishing.

An excellent guide for understanding asset importation, configuring modular prefabs, and optimization pipelines specific to Virtual and Augmented Reality.

- Unity Technologies (Online). *Unity Manual and User Guide*. https://docs.unity3d.com/Manual/

Indispensable official documentation for configuring lightmapping systems (both baked and real-time) and managing interactive digital materials.

Software

- Unity, graphic engine to develop videojocs and interactive and immersive applications.
- Blender, 3D content creator software to make models and animations.
- Quixel Mixer, industry standardized 3D model texturing software.
- Krita, layer and image editing software.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this link. To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	6	Spanish	first semester	afternoon
(PLAB) Practical laboratories	61	Spanish	first semester	afternoon