

Degree programme	Type	Course
Interactive Communication	OP	4

Contact lecturer

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Prerequisites

It is recommended to take this subject together with the subject of Art and Architecture of Maps and Virtual Environments.

Group languages

You can consult this information at the [end](#) of the document.

Objectives

To be able to develop a Virtual and/or Augmented Reality application using tools such as Unity.

Learning outcomes

1. Interpret and discuss documents on the main theories on virtual environments.
2. Plan and conduct academic studies in the field of augmented and virtual reality.
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 augmented reality products by combining technical skills and mastery of specific software with aesthetic taste.
8. Create geographies or maps that act as interfaces and allow users to interact with games.
9. Create virtual spaces using suitable software and efficient visibility techniques.
10. Develop augmented reality projects, integrating digital and real-world elements.
11. Distinguish the salient features in all types of documents within the subject.
12. Cross-check information to establish its veracity, using evaluation criteria.
13. Form part of groups working on virtual-production projects.
14. Submit course assignments on time, showing the individual and/or group planning involved.
15. Propose new methods or well-founded alternative solutions.
16. 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.
17. Propose projects and actions that incorporate the gender perspective.
18. Communicate using language that is not sexist or discriminatory.
19. Analyse a situation and identify its points for improvement.
20. Weigh up the risks and opportunities of both one's own and other people's proposals for improvement.

Contents

1.Computer Graphics

- Definitions
- Applications
- Graphic Application
- 3D Graphics

2.Virtual Reality

- Definitions
- History and applications
- Components of a VR system

3.Unity and Virtual Reality

4.Augmented Reality

5.Unity and Augmented Reality

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Practicum	12	0.48	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14
Individual theory study	12	0.48	1, 11, 12
Project autonomous work	70	2.8	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14
Solving practical exercises	12	0.48	2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14
Project	21	0.84	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20
Theory sessions	15	0.6	1, 11, 12

This subject places greater emphasis on practical work and project development compared to theoretical aspects. The practical and project component will be carried out through supervised work sessions with the professor, work demonstrations, and the submission of reports, documentation, and individual or group assignments.

Theory Classes: These are lecture-style classes where theoretical concepts (Computer Graphics, Virtual Reality, Augmented Reality) and practical applications (Unity) of the subject will be introduced. Although these are theory classes, a significant portion of the session will be dedicated to solving problems individually or in groups, as presented by the professor. It is recommended to have a laptop for these sessions.

Practical Work: Practical cases using Unity will be proposed for groups of two individuals. An assignment will be provided, and students are required to implement and present a Unity solution for the given case. These practical assignments will require the application of concepts explained in the theory classes.

Project: Midway through the course, students will form groups of 3 or 4 and will be provided with a project proposal involving the development of a Virtual and/or Augmented Reality application. The students will work on this project for a period of 6 weeks. Alternatively, students may propose their own projects. During class sessions, students will work on the project under the guidance of the professor, and periodic documentation submissions (such as progress reports and control documents) will be required. On the last day of class, each group will give an oral presentation of their project, accompanied by a previously submitted project report.

Note: The course content will be sensitive to issues related to 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
Delivery of practical work	0.2	3	0.12	2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14
Attendance and participation in project sessions	0.1	0	0	13, 14
Theory test	0.2	1.5	0.06	3, 11, 12
Project realization	0.4	3	0.12	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
Oral presentation	0.1	0.5	0.02	3, 13

The evaluation activities that can be scored out of 10 are the following:

- a) Theory test (20% of the final grade)
- b) Submission of practical exercises (10% of the final grade, optional)
- c) Handing in practical assignments (20% of the final grade)
- d) Practical work (project) (40% of the final grade)
- e) Attendance and participation in the project sessions (10% of the final grade)

For the calculation of the final grade, each of the assessment activities must have a grade greater than 5, except for the submission of practical exercises.

The grade for remedial activities will be graded with a maximum of 8.

Students who have passed an assessment activity can present themselves for remedial work and in this case the mark will be assessed with a maximum of 10.

The maximum will be taken into account note of the two assessments.

In the event that the student commits any irregularity that could lead to a significant variation in the grade of an assessment act, this assessment act will be graded with 0, regardless of the disciplinary process that may be instituted. In the event that several irregularities occur in the evaluation acts of the same subject, the final grade for this subject will be 0.

This subject does not provide for the single assessment system.

In this course, the use of Artificial Intelligence (AI) technologies is permitted as an integral part of assignment development, provided that the final outcome demonstrates a significant contribution from the student in terms of analysis and personal reflection. Students must clearly identify any content generated using AI, specify the tools employed, and include a critical reflection on how these technologies have influenced both the process and the final result of the assignment. Failure to disclose the use of AI in this assessed activity will be considered a breach of academic integrity and may result in a partial or total penalty to the assignment grade, or more serious sanctions in severe cases.

Bibliography

- J.F. Hughes, A. van Dam, M. McGuire, D.F.Sklar, F.D. Foley, S.K. Feiner, K. Akeley, Computer Graphics. Principles and Practice, third edition in C, Addison-Wesley, 2014.
- E. Pangilinan, S. Lukas, V. Mohan, Creating Augmented & Virtual Realities, O'Reilly Media, 2019.
- B. Arnaldi, P. Guitton, G. Moreau, Virtual and Augmented Reality, ISTE, John Wiley & Sons, 2018.
- <https://docs.unity3d.com/Manual/index.html>, Unity official website.
- <https://library.vuforia.com/>, Vuforia official website.
- <https://desktop.github.com/>, Github Desktop official website

Software

- Unity
- Github Desktop

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	Catalan	first semester	afternoon
(PLAB) Practical laboratories	61	Catalan	first semester	afternoon