Teaching Guide				
Identifying Data				2024/25
Subject (*)	Immersive, Interactive and Entertainment Systems		Code	614G01062
Study programme	Grao en Enxeñaría Informática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Fourth	Optional	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputación			
Coordinador	Fernández Blanco, Enrique		E-mail	enrique.fernandez@udc.es
Lecturers	Dorado de la Calle, Julian Fernández Blanco, Enrique Suárez Lorenzo, Fernando		E-mail	julian.dorado@udc.es enrique.fernandez@udc.es f.suarezl@udc.es
Web				
General description	A asignatura ten como obxetivo principal proveer do coñecemento sobre as ferramentas e as técnicas para o desenvolvemento de aplicacións interactivas. Estas poderían incluir características de inmersividade, sobre todo, pero non só, aplicadas no ámbito do entretemento (videoxogos).			

Study programme competences / results	
Code	Study programme competences / results
A43	Capacidade para adquirir, obter, formalizar e representar o coñecemento humano nunha forma computable para a resolución de problemas mediante un sistema informático en calquera ámbito de aplicación, particularmente os relacionados con aspectos de computación, percepción e actuación en ambientes ou contornos intelixentes.
A44	Capacidade para desenvolver e avaliar sistemas interactivos e de presentación de información complexa e a súa aplicación á resolución de problemas de deseño de interacción persoa-computadora.
B1	Capacidade de resolución de problemas
B9	Capacidade para xerar novas ideas (creatividade)
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Develop interactive and immersive systems, both in 2D and 3D, that can be interacted through different devices.	A43 A44	B1 B9	C6

Contents	
Topic	Sub-topic
1. Introduction	1. Introduction
2. Videogames and animations development	2.1 Introduction 2.2. Historical perspective 2.3. 2D development 2.4. 3D engines 2.5. Artificial intelligence in games
3. Immersive and Advanced Display Contours	3.1 Virtual Reality 3.2 Augmented Reality 3.3 Multiverse
4. Peripheral Devices	4. Peripheral Devices

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A43 A44 C6	21	42	63
Objective test	A43 A44 B1 C6	2	20	22
ICT practicals	A43 A44 B1 B9	21	42	63
Personalized attention		2	0	2
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Once a week, at the time designated by the centre, a synchronous session will be held using the telematic tools provided by the centre. Based on a Flip Teaching model, during these sessions, teachers will review or make special emphasis on the more complex concepts that they have previously selected from written material and/or explanatory videos. The expectation is that the students will plant the problems or doubts that arise from the review of the material previously provided. The objective of these sessions is that the students acquire the basic knowledge that later will allow them to undertake with guarantees and to understand better the work carried out in the practices.
Objective test	The course will be developed by the modality of continuous evaluation. For this purpose, a series of partial tests and/or essays will be established in order to evaluate the acquisition of the competences. These partial tests will have a mixed format with a test part, but also with essay questions or problems. In these the students must demonstrate the knowledge acquired both of theoretical concepts, as well as demonstrate or their knowledge of how to apply them. If the students do not pass the subject with the partial tests, they will have a mixed test at the end of the four-month period that will cover all the contents.
ICT practicals	The practicum takes the shape of two small projects consisting of developing two completely original videogames in which the students apply all the concepts and techniques explained during the theory classes. For these projects, students will be organized in different teams in which each student is expected to take the role of the team leader during a part of the development. Beginning with the development of a short story that serves as the basis for the games, students will develop a first version of the game in 2D. This will allow them to explore concepts such as user interaction, methodologies adapted to this type of product, AI implementation, etc. Once the 2D part is done, the students will develop a second 3D version. In this part, they will attend to the difficulties inherent in 3D, such as the difficulty in determining collisions.

Personalized attention	
Methodologies	Description
ICT practicals	The mentoring is an important part of the development of the course. They are oriented in such a way that the students have and/or can consult different questions such as: 1. Possibilities of professional development 2. Problems in the development of the practices 3. Ways to focus on/organize practices 4. Resolution of doubts about theoretical issues Due to the configuration based on the non-presence of the schools, students are asked to make an appointment with the responsible teachers to make video calls by Teams within the tutorial schedules established in espazos.udc.es.

Assessment

Methodologies	Competencies / Results	Description	Qualification
Objective test	A43 A44 B1 C6	It will take the form of a mixed test conducted in person. The test may include multiple-choice questions and some short essay questions for students to demonstrate their understanding of the concepts. This test will cover the entirety of the subject's content.	40
ICT practicals	A43 A44 B1 B9	Development of a work consisting of two projects corresponding to the two video games to be developed. For the 2D, the PyGame platform will be used as a support engine in the development. In 3D, we will use one of the most common platforms, Unity3D. In addition to the video games, the quality of the documentation and the methodology applied in the development will also be evaluated.	60

Assessment comments
To pass the subject, the student must achieve a minimum grade of 5 out of 10 by combining the scores from the objective test and the practical work through ICT. It is important to note that in the objective test, a minimum grade of 3.5 out of 10 is required to pass the subject. Otherwise, the student will not be able to pass the subject regardless of their practical work grade through ICT. In such a case, the final grade will be the one obtained in the objective test. Regarding practical work, repeated absences from follow-up meetings without proper justification will result in a penalty on the final grade of the students who commit them, potentially leading to the loss of the entire grade for one of the practicals or the entire practical component if there is no active participation in their development. Specific evaluation and attendance criteria for part-time students: Practical work and assignments must be submitted on the same date and in the same manner as full-time students.The schedule for defenses will be flexible to facilitate the defense and submission of assignments.Second opportunity and advanced call: In case of attending these calls, the student must take the objective test, with the criteria for obtaining the total grade being those indicated at the beginning of this section.For the practical work grade, the previously obtained grade will be maintained, but students will have the opportunity to submit new 2D and 3D projects, this time done individually. These projects must have a quality and complexity proportionally similar to those presented in the first opportunity to recover the practical work grade. Students who choose to submit new projects will forfeit their previously obtained grade, regardless of whether the new grade is lower.Not Presented: Students who do not attend the objective test will receive a "Not Presented" grade.Equality: According to the various applicable regulations for university teaching, a gender perspective must be incorporated into this subject (non-sexist language will be used, bibliographies will include authors of both sexes, class participation by both male and female students will be encouraged...). Efforts will be made to identify and modify sexist prejudices and attitudes, and influence the environment to change them and promote values of respect and equality. Situations of gender discrimination must be detected and actions and measures proposed to correct them. All aspects related to "academic exemption," "study dedication," "continuity," and "academic fraud" will be governed in accordance with the current regulations of the UDC.

Sources of information	
Basic	- Ian Millington (2007). Game Phisics engine development. CRC Press - Stephen Cawood, Mark Fiala (2007). Augmented reality: a practical guide. Programatic Bookshelf - M.I. McShaffry (2009). Behavioral mathematics for game AI. Cengage Learning - J. J. Domínguez, R. Luque (2011). Tecnología Digital y Realidad Virtual. Síntesis - B. Furht (2011). Handbook of Augmented Reality. Springer Science & Businness Media - J. Gregory (2019). Game Engine Architecture (3rd Ed.). AK Peters/CRCPress - D. Mark (2009). Behavioral Mathematics for Game AI. Cengage Learning PTR

Complementary	- M. Buckland (2005). Programming game AI by example. Jones & Barlett Learning - N. Sathaye (2010). Python Multimedia. Packt Publishing Ltd - W. Goldstone (2011). Unity 3. x game development essentials. Packt Publishing Ltd - M. McShaffry and D. Graham (2012). Game Coding Complete (4th Ed.). Course Technology - R. Nystrom (2014). Game programming patterns. Genever Benning - I. Millington (2019). AI for Games. CRC Press - A. Asadi (2016). Videogames Hardware Handbook: Vol. 1.1977-1999. Imagine Publishing - G. C. Burdea and P. Coiffet (2003). Virtual reality technology. John Wiley & Sons

Recommendations
Subjects that it is recommended to have taken before
Programming I/614G01001 Programming II/614G01006 Algorithms/614G01011 Programming Paradigms/614G01014 Computer Graphics and Visualization/614G01066
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.