Teaching Guide				
Identifying Data				2021/22
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	Hybrid			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputación			
Coordinador	Fernández Blanco, Enrique	E-mail	enrique.fernandez@udc.es	
Lecturers	Castiñeiras Galdo, Brais Dorado de la Calle, Julian Fernández Blanco, Enrique Puente Castro, Alejandro	E-mail	brais.cgaldo@udc.es julian.dorado@udc.es enrique.fernandez@udc.es a.puentec@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 que poidan incluir características de inmersividade, sobre todo, pero non só, aplicadas no ámbito do entretemento (videoxogos).			
Contingency plan	1. Modifications to the contents 2. Methodologies *Teaching methodologies that are maintained *Teaching methodologies that are modified 3. Mechanisms for personalized attention to students 4. Modifications in the evaluation *Evaluation observations: 5. Modifications to the bibliography or webgraphy			

Study programme competences	
Code	Study programme competences
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

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 2.6. Multi-platform development
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**	**Ordinary class hours**	**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**	**Description**	**Qualification**
Objective test	A43 A44 B1 C6	A set of partial tests of the subject, which will take the form of classroom quizzes. These are mixed tests with multiple choice questions and some short essay questions in order that the students can demonstrate the assimilation of the concepts. If the students do not pass the subject with the partial tests, they will have a final theoretical exam with the same characteristics as the partial tests on the total content of the subject.	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

In order to pass the subject, the student must obtain a minimum mark of 5 out of 10 in the result of combining the marks of the objective test and the ICT practices. It should be noted that the objective test may take the form of partial exams or a final one. Regardless of the form, in order to pass the subject, a minimum grade of 1.4 points out of 4 is established for the objective test. Otherwise, the student will not be able to pass the subject regardless of the grade obtained in the ICT practicals. The grade on the basis of the partial exams will correspond to the arithmetical average of the exams. In the event of failing to achieve the minimum grade, students can always take the final exam. Those students who, despite achieving the minimum mark, choose to sit the final exam will lose the mark corresponding to the mid-term exams, regardless of whether the new mark is lower or not. With regard to the practicals, repeated absence from the follow-up meetings without due justification will result in a penalty in the final mark of the students who commit them and may result in the loss of a full mark for one of the practicals or all of them if they do not actively participate in the development of the practicals. Particular assessment and attendance criteria for part-time students: Practicals and assignments must be handed in on the same date and in the same way as for full-time students.The timetable for the defence will be flexible in order to facilitate the defence and delivery of the work. July exam and early call: In the event of having to incur these calls, the student will have to take the objective test exam, the criteria for obtaining the total mark being those indicated at the beginning of this section. In the case of the internship marks, the mark obtained will be maintained, although students will have the opportunity to hand in new projects, both 2D and 3D, but this time done individually. These projects must be of a quality and complexity proportionally similar to those presented at the first opportunity in order to recover the internship mark. Those students who choose to hand in new projects will forfeit the mark previously obtained regardless of whether the new grade is lower. Plagiarism: In any submission in which plagiarism is detected, the submission will be assessed with a zero. Plagiarism in the objective test will be sanctioned in accordance with current university regulations.

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.