



Teaching Guide				
Identifying Data				2020/21
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	Dorado de la Calle, Julian Fernández Blanco, Enrique	E-mail	julian.dorado@udc.es enrique.fernandez@udc.es	
Web				
General description	A asignatura ten como obxectivo principal proveer do coñecemento sobre as ferramentas e as técnicas para o desenvolvemento de aplicacións interactivas que poidan incluír características de inmersividade, sobre todo, pero non só, aplicadas no ámbito do entretemento.			
Contingency plan	<p>1. Modifications to the contents</p> <p>2. Methodologies *Teaching methodologies that are maintained *Teaching methodologies that are modified</p> <p>3. Mechanisms for personalized attention to students</p> <p>4. Modifications in the evaluation *Evaluation observations:</p> <p>5. Modifications to the bibliography or webgraphy</p>			

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
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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 / 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	<p>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:</p> <ol style="list-style-type: none">1. Possibilities of professional development2. Problems in the development of the practices3. Ways to focus on/organize practices4. Resolution of doubts about theoretical issues <p>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.</p>

Assessment

Methodologies	Competencies / Results	Description	Qualification
Objective test	A43 A44 B1 C6	<p>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.</p>	40
ICT practicals	A43 A44 B1 B9	<p>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.</p> <p>In addition to the video games, the quality of the documentation and the methodology applied in the development will also be evaluated.</p>	60

Assessment comments



To pass the subject, the student must obtain a minimum score of 5 out of 10 in the result of combining the qualifications of the objective test and the ICT practices.

It should be noted that the objective test can take the form of partial exams or a final test. Regardless of the form, in order to pass the course, a minimum score of 1.4 points out of 4 in the objective test is required. In another case, it is considered that the student will not pass the subject independently of the grade given in the ICT practices.

The grade based on partial tests will correspond to the arithmetic mean of those. In case of not reaching the minimum grade the students will always be able to do the final test. Those students who, even though they have reached the minimum grade, choose to take the final test will lose the corresponding grade of their partial exams, regardless of whether they get a new lower grade.

Particular criteria for evaluation and attendance for part-time students:

- Practice and work must be submitted at the same time as the full time students.
- The schedule for the defence will be flexible in order to facilitate the defence and delivery of two jobs

On the second opportunity ,

- Those students who achieve the minimum grade at the first opportunity of the objective test can keep the grade at the second opportunity. If they do not achieve the minimum grade, they will have to do a theoretical exam on two subjects. Those students who would like to improve their grade can take the exam but they must give up the previous grade regardless of the new lower grade.
- The grade obtained in the ICT Practice is kept, the students will have the opportunity to submit new projects both 2D and 3D but this time individually. These projects should be of similar quality and complexity as those presented in the first opportunity to recover the practice grade. Those students who choose to submit new projects, will renounce to the precious grade , regardless of whether the new grade is lower than the previous one.
- The criteria for obtaining the total grade are same as the ones described for the first opportunity.

Sources of information

Basic	<ul style="list-style-type: none"> - Ian Millington (2007). Game Physics 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 & Business Media - J. Gregory (2019). Game Engine Architecture (3rd Ed.). AK Peters/CRC Press
Complementary	<ul style="list-style-type: none"> - 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.