

BASIC DETAILS:

Subject:	MOTORES DE JUEGOS		
Id.:	31373		
Programme:	GRADUADO EN DISEÑO Y DESARROLLO DE VIDEOJUEGOS. 2013 (BOE 28/03/2014)		
Module:	PROGRAMACIÓN DE VIDEOJUEGOS		
Subject type:	OBLIGATORIA		
Year:	3	Teaching period:	Primer Cuatrimestre
Credits:	6	Total hours:	150
Classroom activities:	63	Individual study:	87
Main teaching language:	Inglés	Secondary teaching language:	Castellano
Lecturer:	IGLESIAS SORIA, ANTONIO (T)	Email:	aiglesias@usj.es

PRESENTATION:

This is an introduction to videogame engines. Students will learn how to use, design and implement an engine to develop videogames. They will investigate the purpose of game engines and explore their main components. Current state-of-the-art engines will be taken as a starting point to discuss about design and architecture. With the knowledge acquired students will design and implement their own simple game engine and learn how to extend any engine behaviour. Learning how to use new game engines and different development approaches will prove easier after the process is completed.

PROFESSIONAL COMPETENCES ACQUIRED IN THE SUBJECT:

General programme competences	G01	Ability to use learning strategies independently for use in the continuous improvement of professional practice.
	G07	Ability to handle different complex knowledge models through a process of abstraction and its application to approach and solve problems.
Specific programme competences	E03	Ability to develop the use and programming of computers, operating systems, databases and software and their application in the development of video games.
	E05	Ability to program applications both correctly, and efficiently, choosing the most appropriate paradigm and programming languages, applying knowledge of basic algorithmic procedures and using the types and structures of the most appropriate data.
	E12	Ability to understand and analyse the structure, organisation, function and interconnection of the devices and systems in video game platforms.
	E32	Ability to evaluate, use and spread game engines.
Learning outcomes	R01	Explain the operation and architecture of a game engine.
	R02	Build simple game engines.
	R03	Assess the basic features of a game engine.
	R04	Expand or modify existing game engines.
	R05	Use game engines to create video games.

PRE-REQUISITES:

It is recommended to have studied all subjects in previous semesters. Basic knowledge will be required in fields like design, programming, object oriented programming, UML, version control, Unity...

SUBJECT PROGRAMME:

Subject contents:

1 - Game Engines 101
1.1 - What?
1.2 - When?
1.3 - Where?
1.4 - Who?
1.5 - Why?

1.6 - How?
1.7 - Pros and Cons
2 - Internals
2.1 - Features
2.2 - Architecture
2.3 - Design
2.4 - Implementation
2.5 - Performance
2.6 - Wrappers
2.7 - Tools
2.8 - Extensions
3 - Building Game Engines
3.1 - Purpose
3.2 - Libraries
3.3 - Platforms
3.4 - Designing
3.5 - Implementing
3.6 - Tools
4 - Using External Engines
4.1 - Best fit
4.2 - Learning
4.3 - Prototyping
4.4 - Test capabilities
4.5 - Plan and development
4.6 - Unreal Engine

Subject planning could be modified due unforeseen circumstances (group performance, availability of resources, changes to academic calendar etc.) and should not, therefore, be considered to be definitive.

TEACHING AND LEARNING METHODOLOGIES AND ACTIVITIES:

Teaching and learning methodologies and activities applied:

- **Master classes** Lecturer will explain the theoretical part of the subject supported by ICT resources (computer, projector, internet) and a whiteboard. Students will ask questions found during individual work sessions. Student involvement, discussions, questions and concerns will be valued and will be added to final marks.
- **Practical work** Practical sessions will lay out different problems with the aim on solving real world situations with the help of the lecturer.
- **Project based learning** An important part of the learning process of the subject, and the final marks, will be obtained by solving practical problems while working individually and in groups. Students will receive the initial wording of the problem and a deadline. The main objective is to prepare the students to face real world problems and reach the learning outcomes of the subject easily and seamlessly.
- **Tutorial** Students will be able to ask the lecturer those questions that were not answered during the master classes or the ones that showed up during individual study. Students may ask for additional bibliography about a specific matter and any other kind of information related with this subject. On the other hand, along this sessions, students will be monitored and oriented in their way to complete the assigned tasks. Tutorial sessions will be set up by mutual agreement between the parts involved.

Student work load:

Teaching mode	Teaching methods	Estimated hours
Classroom activities	Master classes	15

	Practical exercises	15
	Workshops	12
	Laboratory practice	16
	Assessment activities	5
Individual study	Tutorials	9
	Individual study	22
	Individual coursework preparation	22
	Project work	20
	Research work	4
	Compulsory reading	5
	Recommended reading	5
	Total hours:	150

ASSESSMENT SCHEME:

Calculation of final mark:

Written tests:	20 %
Individual coursework:	25 %
Group coursework:	25 %
Final exam:	20 %
Involvement:	10 %
TOTAL	100 %

*Las observaciones específicas sobre el sistema de evaluación serán comunicadas por escrito a los alumnos al inicio de la materia.

BIBLIOGRAPHY AND DOCUMENTATION:

Basic bibliography:

JASON, Gregory. Game Engine Architecture. CRC Press, 2009
THORN, Alan. Game Engine Design And Implementation. Jones and Bartlett, 2010

Recommended bibliography:

BROOKS, Frederick P. The Mythical Man-Month: Essays on Software Engineering. Addison WesleyProfessional, 1995
HUNT, Andrew. The Pragmatic Programmer: From Journeyman to Master. Addison-Wesley Professional, 1999
GAMMA, HELM, JOHNSON, VLISSIDES, BOOCH. Design Patterns: Elements of Reusable Object-Oriented Software. Addison-Wesley Professional, 1994
BOURG, BYWALEC. Physics for Game Developers: Science, math, and code for realistic effects. O'Reilly Media, 2013

Recommended websites:

Gamasutra	http://gamasutra.com/
GameDev	http://www.gamedev.net/
Unity	https://unity3d.com
Unreal Engine	https://www.unrealengine.com