

## BASIC DETAILS:

<b>Subject:</b>	INFORMÁTICA GRÁFICA		
<b>Id.:</b>	31370		
<b>Programme:</b>	GRADUADO EN DISEÑO Y DESARROLLO DE VIDEOJUEGOS. 2013 (BOE 28/03/2014)		
<b>Module:</b>	PROGRAMACIÓN DE VIDEOJUEGOS		
<b>Subject type:</b>	OBLIGATORIA		
<b>Year:</b>	3	<b>Teaching period:</b>	Primer Cuatrimestre
<b>Credits:</b>	6	<b>Total hours:</b>	150
<b>Classroom activities:</b>	67	<b>Individual study:</b>	83
<b>Main teaching language:</b>	Inglés	<b>Secondary teaching language:</b>	Castellano
<b>Lecturer:</b>	BLASCO LATORRE, DANIEL (T)	<b>Email:</b>	dblasco@usj.es

## PRESENTATION:

The subject covers a general introduction to primary computer graphics concepts, 2D/ 3D image generation, a hardware/ software fundamentals overview and basic programming.

The main goal to be reached is learning fundamentals which enable developers to achieve a better understanding of computer graphics basics and related internal processes and, therefore, improving their proficiency to work with libraries or engines.

## PROFESSIONAL COMPETENCES ACQUIRED IN THE SUBJECT:

<b>General programme competences</b>	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.
<b>Specific programme competences</b>	E01	Ability to solve mathematical problems inherent to engineering. Ability to apply knowledge about: algebra; geometry; differential and integral calculus; optimisation and numerical methods
	E27	Ability to apply the methods in the creation and preservation of synthetic images
	E28	Ability to perform the design and construction of models with the information necessary for the creation and display interactive images.
	E29	Ability to understand and apply the techniques of visualisation, animation, simulation and interaction on models
<b>Learning outcomes</b>	R01	Explain the basic principles of the generation of 2D and 3D synthetic images.
	R02	Compare the technical specifications of the graphic libraries most used in the creation of synthetic images in video games.
	R03	Use graphic libraries for creating synthetic images for video games.

## PRE-REQUISITES:

The pre-requisites include object oriented programming knowledge in C++ and, since, apart from libraries, Unity will be used too, basic experience with that engine and C# is recommended.

## SUBJECT PROGRAMME:

### Subject contents:

<b>1 - General Introduction</b>
1.1 - Computer Graphics Initial Overview
1.2 - Mathematics Bases Review
<b>2 - Image Representation</b>
2.1 - Nature and Format
2.2 - Image Manipulation
2.3 - Textures
<b>3 - Scene Rendering</b>

3.1 - Visualization and Lighting
3.2 - Scene Control in Applications
<b>4 - Hardware Evolution Overview Appendix</b>
4.1 - Basic Principles
4.2 - Evolution and Performance

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:

#### Theory/ Practice Sessions:

During these sessions, the contents featured in the subject will be exposed using resources like whiteboards, slideshows, etc., to show examples and illustrate properly the different sections. Additionally, active involvement will be encouraged through theoretical or real life case discussion. These sessions will be supported by different exercises.

#### Individual/ Team Exercises:

A significant part of the overall score will depend on individual exercises dealing with the different sections studied. These exercises will involve programming or tool usage and they are meant not to be independent, but interrelated, as new content is presented/ added in the course. Each exercise will consist of a set of instructions and certain results to be delivered before a specific date. Apart from individual work, a group activity will be developed forming teams and under similar conditions.

#### Tests/ Exams:

Two written tests will act as a theory/ practice assessment method, each of them covering about a half of the content in the subject. The main purpose of these tests is evaluating the knowledge acquired and underlying the processes and cases studied and explored in both lectures and exercises.

#### Tutorials:

The students will take part, on demand, in tutorials to be conducted on Wednesdays at 11:00 AM, but schedules may vary according to particular necessities or circumstances. The main goal pursued is to clear up doubts, and help students strengthen the knowledge and skills to be acquired. Just like with other subjects, the PDU is a useful communication tool to ask for/ share information on the course.

#### Student work load:

Teaching mode	Teaching methods	Estimated hours
<b>Classroom activities</b>	Master classes	15
	Other theory activities	4
	Practical work, exercises, problem-solving etc.	15
	Workshops	8
	Laboratory practice	18
	Assessment activities	5
<b>Individual study</b>	Extra-curricular activities (visits, conferences, etc.)	2
	Tutorials	5
	Individual study	22
	Individual coursework preparation	22
	Project work	20
	Research work	4
	Compulsory reading	5

	Recommended reading	5
	<b>Total hours:</b>	150

### ASSESSMENT SCHEME:

#### Calculation of final mark:

Written tests:	30 %
Individual coursework:	24 %
Group coursework:	16 %
Final exam:	30 %
<b>TOTAL</b>	<b>100 %</b>

\*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:

HEARN, Donald, BAKER M. Pauline, CARITHERS, Warren R. Computer Graphics with OpenGL. Fourth Edition. London: Pearson, 2011.  
HILL, F. S., STEPHEN, M. Kelley. Computer Graphics using OpenGL. Third Edition. New Jersey. Pearson, 2007.

#### Recommended bibliography:

HUGHES, John F., VAN DAM, Andries, MCGUIRE, Morgan, SKLAR, David.F, FOLEY, James D., FEINER, Steven K., AKELEY, Kurt. Computer Graphics. Principles and Practice. Third Edition. Madrid: Addison-Wesley, 2013.

#### Recommended websites:

OpenGL	<a href="https://www.opengl.org/">https://www.opengl.org/</a>
Unity Technologies	<a href="https://unity3d.com/es">https://unity3d.com/es</a>