

BASIC DETAILS:

Subject:	MODELADO GEOMETRICO		
Id.:	30083		
Programme:	GRADUADO EN INGENIERÍA INFORMÁTICA. PLAN 2008 (BOE 15/12/2008)		
Module:	INFORMATICA GRAFICA		
Subject type:	OPTATIVA		
Year:	4	Teaching period:	Segundo Cuatrimestre
Credits:	3	Total hours:	75
Classroom activities:	34	Individual study:	41
Main teaching language:	Inglés	Secondary teaching language:	Castellano
Lecturer:		Email:	

PRESENTATION:

Computer Graphics is the art and science of communicating information using images that are created through computation. This subject explores how pictures, in the broadest sense of the word, can be captured or generated, modeled and processed with a computer. It aims to provide the student with an understanding of the basic concepts of Computer Graphics modeling, both from a bidimensional (digital images) and tridimensional (3D scenes) point of view.

PROFESSIONAL COMPETENCES ACQUIRED IN THE SUBJECT:

General programme competences	G02	Innovative capacity to propose and find new and efficient ways to undertake any task and/ or function within the professional environment - highly motivated by quality.
	G04	Capacity to always commit to working responsibly - creating a strong sense of duty and fulfilment of obligations.
	G06	Capacity to analyse and find a solution to complex problems or unforeseen situations which may arise while working in any type of socio-economic organisation.
	G13	Capacity to use individual learning strategies aimed at continuous improvement in professional life and to begin further studies independently.
	G15	Capacity to structure reality by means of linking objects, situations and concepts through logical mathematical reasoning.
Specific programme competences	E02	Capacity to apply the intrinsic engineering principles based on mathematics and a combination of scientific disciplines.
	E03	Capacity to recognise the technical principles and apply the appropriate practical methods satisfactorily to analyse and solve engineering problems.
	E04	Capacity to maintain an open mind to innovation and creativity within the framework of the engineering profession.
	E07	Capacity to work effectively in project teams, where appropriate assuming executive responsibilities, and consider the human, technological and financial sides.
	E09	Capacity to maintain professional competences through independent learning and continuous improvement.
	E11	Capacity to remain up-to-date in the technological and business worlds in the area of information and communication technologies.
	E13	Capacity to identify, assess and use current and emerging technologies, considering how they apply in terms of individual or organisational needs.
	E16	Capacity to understand an application demesne so as to be able to develop suitable IT applications.
	E21	Capacity to perform tests that verify the validity of the project (functional, data integrity, performance of the computer applications, equipment, communications, etc.).
	E22	Capacity to undertake implementation tasks which require a high degree of technical awareness in different spheres (programming, configuration of hardware and communications equipment, etc.).
E27	Capacity to write and maintain descriptive documentation of the origin, production and operability of IT systems.	
Learning outcomes	R1	Be able to handle the terminology related to 2D and 3D Computer Graphics modeling.
	R2	To know, understand and be able to program the basic techniques used in digital image processing.
	R3	Be able to use different 3D modeling software and discuss its potentialities and drawbacks.
	R4	To know the different application fields of Computer Graphics modeling.

PRE-REQUISITES:

Everyone taking this subject should have taken courses in, or reasonable exposure to, basic calculus, linear algebra, and algorithms. Familiarity with programming will be an asset.

SUBJECT PROGRAMME:

Subject contents:

1 - Introduction
2 - 2D modeling
3 - Digital Image Processing
4 - 3D modeling
5 - Applications and future trends

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:

The course consists of lectures, individual practices and group work. Lectures will consist of presentations by the instructor, and theoretical or practical discussions on one subject. Practices will be small problems proposed by the instructor and solved by the students during the practical sessions. Each student will hand in a paper and the code for their solution to the proposed practices, to be submitted to the Online University Platform on time. In the group work students will make a presentation and a technical and critical analysis of a state-of-the art scientific paper or application related to geometric modeling chosen by themselves. All the participants in the group must be prepared to discuss their work with the instructor in a 30 minutes oral presentation. Participation in class will be accounted for credit. All readings, exercises, practices and group works will be announced weekly using the Online University Platform (PDU).

Student work load:

Teaching mode	Teaching methods	Estimated hours
Classroom activities	Master classes	9
	Other theory activities	2
	Practical work, exercises, problem-solving etc.	5
	Debates	1
	Coursework presentations	2
	Films, videos, documentaries etc.	1
	Laboratory practice	10
	Other practical activities	2
	Assessment activities	2
Individual study	Tutorials	2
	Individual study	10
	Individual coursework preparation	12
	Group coursework preparation	12
	Research work	2
	Recommended reading	3
Total hours:		75

ASSESSMENT SCHEME:

Calculation of final mark:

Individual coursework:	60 %
Group coursework:	30 %
Participación en clase:	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:

All type of uploaded material in the PDU.
Geometric Modeling (3rd ed.) - M. Mortenson. Industrial Press (2006)
Digital Image Processing (3rd ed.) - R. Gonzalez y R. Woods. Prentice-Hall (2008)

Recommended bibliography:

Digital Image Processing - K.R. Castelman. Prentice-Hall, New Jersey (1996)
Computer Vision: A Modern Approach - Forsyth y Ponce. Prentice-Hall, New Jersey (2003)
Gráficas por Computadora (2nd ed.) - D. Hearn y P. Baker. Prentice-Hall (1995)
Mathematical Elements for Computer Graphics (2nd ed.) - D.F. Rogers, J.A. Adams. McGraw-Hill (1990)
3D Computer Graphics (3rd ed.) - A. Watt. Addison Wesley (1999)

Recommended websites:

Computer Graphics News	http://www.cgnews.com/
Computer Graphics Course. Massachusetts Institute of Technology.	http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-837-computer-graphics-fall-2012/
The Computer Vision Homepage	http://www.cs.cmu.edu/~cil/vision.html

* Guía Docente sujeta a modificaciones