UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: COMPUTER GRAPHICS
Code: 42393
Type: ELECTIVE
ECTS credits: 6
Degree: 347 - DEGREE PROGRAMME IN COMPUTER SCIENCE ENGINEERING (CR)
Academic year: 2021-22
Center: 108 - SCHOOL OF COMPUTER SCIENCE OF C. REAL
Group(s): 20
Year: 4
Duration: C2
Main language: English
Second language:
Use of additional languages:
English Friendly: N
Web site: Virtual space of the subject at https://campusvirtual.uclm.es
Bilingual: Y

Lecturer: **CARLOS GONZALEZ MORCILLO** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Fermín Caballero / 2.01	TECNOLOGÍAS Y SISTEMAS DE INFORMACIÓN	926052055	carlos.gonzalez@uclm.es	Available at https://esi.uclm.es/categories/profesorado-y-tutorias

2. Pre-Requisites

Computer Graphics relies on the skills and knowledge acquired in the subjects:

- Algebra and Discrete Mathematics
- Fundamentals of Programming I
- Fundamentals of Programming II

However, the mathematical base that will be used throughout the course will be recalled in the first topics of the course.

3. Justification in the curriculum, relation to other subjects and to the profession

Computer Graphics is an optional subject of the Degree in Computer Engineering, entirely offered in English, and its relevance is more than justified due to the importance of 2D/3D graphics in any computer application that is used in everyday life. In the context of this course, the student is expected to understand the importance of Computer Graphics in different areas of computing, such as modeling, rendering, animation and visualization of information.

Computer graphics represent one of the main pillars of markets that move billions of dollars, such as video game development, cartoons, special effects, simulation or even medicine. Due to its great importance, every student of Computer Engineering should have a basic knowledge of Computer Graphics because there is a constant demand for professionals in the recently commented markets. Likewise, Computer Graphics represent one of the key areas in the ACM/IEEE Computing Curricula.

Regarding the relationship with other subjects offered in the degree studies in Computer Engineering, Computer Graphics is related to Human-Computer Interaction I and II, and with the Multimedia course.

4. Degree competences achieved in this course

Course competences

Code	Description
BA01	Ability to solve mathematical problems which can occur in engineering. Skills to apply knowledge about: lineal algebra; integral and differential calculus; numerical methods, numerical algorithms, statistics, and optimization.
CM06	Ability to develop and assess interactive systems, and present complex information and its application in the solution of problems with the design of person-computer interaction.
INS01	Analysis, synthesis, and assessment skills.
INS02	Organising and planning skills.
INS04	Problem solving skills by the application of engineering techniques.
INS05	Argumentative skills to logically justify and explain decisions and opinions.
PER01	Team work abilities.
PER02	Ability to work in multidisciplinary teams.
PER03	Ability to work in an international context.
PER04	Interpersonal relationship skills.
PER05	Acknowledgement of human diversity, equal rights, and cultural variety.
SIS01	Critical thinking.
SIS03	Autonomous learning.
SIS05	Creativity.
UCLM01	Command of a second language at a B1 level within the Common European Framework of Reference for Languages
UCLM02	Ability to use Information and Communication Technologies.
UCLM03	Accurate speaking and writing skills.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Ability to develop and implement prototypes of multi-platform graphic representation systems.

Know the mechanisms of representation, storage and processing of geometry oriented to the treatment of three-dimensional graphic information.

Additional outcomes

Understand the evolution and importance of computer graphics and its economic impact in areas such as video game development, special effects, simulation and medicine.

6. Units / Contents

Unit 1: Introduction

Unit 2: Modeling

Unit 3: Materials and Textures

Unit 4: Animation

Unit 5: Rendering

ADDITIONAL COMMENTS, REMARKS

Topics will be dealt with in a logical order of exposition in an incremental manner, not the strict order indicated in the list of topics. Each face-to-face class will cover a part of the course syllabus. Each partial assessment exam will cover the subject matter studied up to the date of the exam.

Laboratory Practices

Practice 1. Work Environment

Practice 2. Modeling

Practice 3. Realistic Animation and Tracking

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CM06 INS01 INS02 INS05 SIS01 UCLM01 UCLM02 UCLM03	0.72	18	N	-	Teaching of the subject matter by lecturer (MAG)
Individual tutoring sessions [ON-SITE]	Other Methodologies	INS01 INS02 INS05 SIS01	0.18	4.5	N	-	Individual or small group tutoring in lecturer¿s office, classroom or laboratory (TUT)
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	BA01 CM06 INS01 INS04 INS05 SIS01 UCLM01 UCLM03	0.6	15	Y	N	Worked example problems and cases resolution by the lecturer and the students (PRO)
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	BA01 CM06 INS01 INS04 SIS03 SIS05 UCLM02	0.6	15	Y	Y	Realization of practicals in laboratory /computing room (LAB)
Study and Exam Preparation [OFF-SITE]	Self-study	BA01 CM06 INS01 INS02 INS04 SIS01 SIS03	2.1	52.5	N	-	Self-study (EST)
Other off-site activity [OFF-SITE]	Practical or hands-on activities	BA01 CM06 INS01 INS02 INS04 INS05 SIS01 SIS03 SIS05	0.6	15	N	-	Lab practical preparation (PLAB)
Writing of reports or projects [OFF-SITE]	Self-study	BA01 CM06 INS01 INS02 INS04 SIS01 SIS03 SIS05	0.9	22.5	Y	N	Preparation of essays on topics proposed by lecturer (RES)
Other on-site activities [ON-SITE]	Assessment tests	BA01 CM06 INS01 INS02 INS04 INS05 SIS03 UCLM01	0.15	3.75	Y	Y	Partial test 1 of the first half of the syllabus of the subject (EVA)
Other on-site activities [ON-SITE]	Assessment tests	BA01 CM06 INS01 INS02 INS04 INS05 SIS03 UCLM01	0.15	3.75	Y	Y	Partial test 2 of the second half of the syllabus of the subject (EVA)
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4					**Total class time hours: 60**
		Total credits of out of class work: 3.6					**Total hours of out of class work: 90**

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Test	25.00%	25.00%	Partial Test 1. Compulsory activity that can be retaken (rescheduling). To be carried out at the end of the first half of the teaching period for continuous mode students. The students of non-continuous modality will take this activity on the date scheduled for the final exam call.
Test	25.00%	25.00%	Partial Test 2. Compulsory activity that can be retaken. To be carried out within the planned dates of the final exam call. For students of the continuous modality, on this date, the recovery of the partial test 1 will be carried out for the ordinary exams.
			Non-compulsory activity that can be retaken. To be carried out

Assessment of problem solving and/or case studies	15.00%	15.00%	before end of teaching period.
Laboratory sessions	25.00%	25.00%	Compulsory activity that can be retaken. To be carried out during lab sessions.
Assessment of active participation	10.00%	10.00%	Non-compulsory activity that can be retaken. To be carried out in the theory/laboratory sessions for the students of the continuous modality. The students of non-continuous modality will be evaluated of this activity through a system alternative in the ordinary call.
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

In compulsory activities, a minimum mark of 40% is required in order to pass that activity and have the possibility to therefore pass the entire subject. The evaluation of the activities will be global and therefore must be quantified by means of a single mark. In the case of the activities that may be retaken (i.e., rescheduling), an alternative activity or test will be offered in the resit/retake exam call (convocatoria extraordinaria).

The partial tests will be common for all the theory/laboratory groups of the subject and will be evaluated by the lecturers of the subject in a serial way, i.e., each part of the partial tests will be evaluated by the same lecturer for all the students.

A student is considered to pass the subject if she/he obtains a minimum of 50 points out of 100, taking into account the points obtained in all the evaluable activities, and also has passed all the compulsory activities.

For students who do not pass the subject in the final exam call (convocatoria ordinaria), the marks of activities already passed will be conserved for the resit/retake exam call (convocatoria extraordinaria). If an activity is not recoverable, its assessment will be preserved for the resit/retake exam call (convocatoria extraordinaria) even if it has not been passed. In the case of the passed recoverable activities, the student will have the opportunity to receive an alternative evaluation of those activities in the resit/retake exam call and, in that case, the final grade of the activity will correspond to the latter grade obtained.

The mark of the passed activities in any call, except for the partial tests, will be conserved for the subsequent academic year at the request of the student, provided that mark is equal or greater than 50% and that the activities and evaluation criteria of the subject remain unchanged prior to the beginning of that academic year.

The failure of a student to attend the partial 1 and partial 2 tests will automatically result in her/him receiving a "Failure to attend" (no presentado). If the student has not passed any compulsory evaluation activity, the maximum final grade will be 40%.

Non-continuous evaluation:

Students may apply at the beginning of the semester for the non-continuous assessment mode. In the same way, the student may change to the non-continuous evaluation mode as long as she/he has not participated during the teaching period in evaluable activities that together account for at least 50% of the total mark of the subject. If a student has reached this 50% of the total obtainable mark or the teaching period is over, she/he will be considered in continuous assessment without the possibility of changing to non-continuous evaluation mode.

Students who take the non-continuous evaluation mode will be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences), through the assessment systems indicated in the column "Non-continuous evaluation".

In the "non-continuous evaluation" mode, it is not compulsory to keep the mark obtained by the student in the activities or tests (progress test or partial test) taken in the continuous assessment mode.

Specifications for the resit/retake exam:

Evaluation tests will be conducted for all recoverable activities.

Specifications for the second resit / retake exam:

Same characteristics as the resit/retake exam call.

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours **hours**

General comments about the planning: The course is given in three weekly sessions of 1.5 hours.

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	City	ISBN	Year	Description
S. Marschner, P. Shirley et al.	Fundamentals of Computer Graphics (4th Ed)	AK Peters	USA	978-1482229394	2015	
	https://www.crcpress.com/Fundamentals-of-Computer-Graphics-Fourth-Edition/Marschner-Shirley/p/book/9781482229394					
T. Akenine-Möller, E. Haines et al.	Real-Time Rendering (4th Ed)	AK Peters	USA	978-1138627000	2018	
	https://www.crcpress.com/Real-Time-Rendering-Fourth-Edition/Akenine-Moller-Haines-Hoffman/p/book/9781138627000					