

**1. General information****Course:** GRAPHIC DESIGN AND ANIMATION**Type:** ELECTIVE**Degree:** 406 - UNDERGRADUATE DEGREE IN COMPUTER SCIENCE AND ENGINEERING (AB)**Center:** 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)**Year:** 4**Main language:** English**Use of additional languages:****Web site:** <https://www.esiiaab.uclm.es/asig.php?codasig=42377&curso=2022-23>**Code:** 42377**ECTS credits:** 6**Academic year:** 2022-23**Group(s):** 17**Duration:** C2**Second language:** Spanish**English Friendly:** N**Bilingual:** N**Lecturer:** ARTURO SIMON GARCIA JIMENEZ - Group(s): 17

Building/Office	Department	Phone number	Email	Office hours
ESII / 0.A.4	SISTEMAS INFORMÁTICOS	97144	arturosimon.garcia@uclm.es	The office hours will be announced on the first day of class and will be available online at: https://www.esiiaab.uclm.es/pers.php?codpers=ArturoSimon.Garcia&curso=2022-23

2. Pre-Requisites

Experience in using computer tools based on a GUI.

Basic skills in C#.

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

This subject is part of a group of subjects aimed at providing the students with the basic skills needed to develop a videogame. The other subjects of the group are "Graphic Processing Units", "Videogames and Virtual Reality" and "Artificial Intelligence for Videogames". Every one of those subjects approaches this topic from a different point of view, but in such a way that those students that follow all these courses would have a complete vision of the main techniques required to develop a videogame. In any case, each subject is an independent unit, what means that a student can take full advantage of the topics covered in one subject without taking the other courses. In the specific case of "Graphic Design and Animation", it is focused on the creation and processing of 3D graphic models and animations to be used to create still images or movies as well as to be used as videogame assets.

4. Degree competences achieved in this course**Course competences**

Code	Description
CM04	Ability to know the fundamentals, paradigms, and techniques of intelligent systems, and analyse, design, and build systems, services, and digital, applications which could use such techniques in any application context.
INS01	Analysis, synthesis, and assessment skills.
INS04	Problem solving skills by the application of engineering techniques.
IS03	Ability to solve problems of integration according to strategy functions, standards, and available technologies.
SIS05	Creativity.

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Use of basic and advanced tools and techniques in the creation, editing and animation of graphic content.

Use of packages and libraries for third-party graphics in the development of graphic applications.

Understanding of the methods and algorithms used in the production of synthetic images, selection of the most appropriate ones according to the application, and their implementation as functions and procedures.

Development of graphic content in two and three dimensions following a production process.

Additional outcomes

Use external software libraries to develop graphical applications.

To develop graphical contents in 2D and 3D following production processes.

Use basic and advanced techniques to create, edit and animate graphical contents.

To understand methods and algorithms used in the production of synthetic images.

To understand techniques for scene modeling, with emphasis in the definition of file formats and data structures used to store these models.

6. Units / Contents**Unit 1: Introduction and basic concepts in computer graphics and animation****Unit 2: Introduction to Blender****Unit 3: Modeling I. Polygon modelling techniques****Unit 4: Modeling II. Other modelling techniques**

Unit 5: Materials and textures

Unit 6: Lighting and cameras

Unit 7: Animation I. Basic animation in Blender

Unit 8: Animation II. Shapekeys and Armatures

Unit 9: Animation III. Character creation and animation.

Unit 10: Introduction to Unity and the game asset pipeline

Unit 11: Particle systems and physics

7. Activities, Units/Modules and Methodology

7. Activities, Outcomes and Methodology							
Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CM04 INS01 INS04 IS03	0.48	12	Y	N	Developing of the main topics and contents for the course.
Class Attendance (practical) [ON-SITE]	Workshops and Seminars	CM04 INS01 INS04 IS03	0.4	10	Y	N	Discssion on the practical application of the studied theoretical concepts.
Computer room practice [ON-SITE]	Other Methodologies	CM04 INS04 IS03 SIS05	1.32	33	Y	N	Application of studied topics to solve particular problems.
Writing of reports or projects [OFF-SITE]	Project/Problem Based Learning (PBL)	CM04 INS01 INS04 IS03 SIS05	3.6	90	Y	Y	Developing and implementation of practical projects to apply the different techniques developed in the subject.
Project or Topic Presentations [ON-SITE]	Debates	INS01	0.2	5	Y	N	Viva defence of the project carried out by the student.
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
Practicum and practical activities reports assessment	10.00%	0.00%	Describe the work done in the deliveries.
Projects	70.00%	80.00%	Development of projects to solve real situations related to the contents of the subject [ESC, INF,PRES]
Assessment of active participation	20.00%	20.00%	Performing specific and small tasks about the units taught in the subject [INF, LAB].
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:

The evaluation will be based primarily on the development of individual projects where the concepts and techniques developed in the curriculum are applied to solve a real task related to the subject's scope. In order to pass the course, students must have a minimum mark of 3 in each of the projects.

If the mark obtained is higher than the minimum mark established for those parts that require it, the final mark will be the weighted average according to the established weights. Otherwise, the final mark obtained will not be higher than 4.00, even if the weighted average obtained for all the activities is greater than or equal to 5.00.

By default, students will be evaluated through continuous assessment. If a student wishes to change to non-continuous evaluation, he/she must indicate it through the following link <https://www.esiib.uclm.es/alumnos/evaluacion.php> before the end of the semester.

Non-continuous evaluation:

Students can transfer points obtained in previous assessment tests to this assessment. However, in those tests they wish to improve in order to pass the subject or obtain a higher mark, the work already done will not be re-evaluated, but they will have to repeat the whole test, presenting, if necessary, different work to that already done.

If the mark obtained is higher than the minimum mark established for those parts that require it, the final mark will be the weighted average according to the established weights. Otherwise, the final mark obtained will not be higher than 4.00, even if the weighted average obtained for all the activities is greater than or equal to 5.00.

Specifications for the resit/retake exam:

The same criteria will be applied as in the non-continuous assessment.

If the mark obtained is higher than the minimum mark established for those parts that require it, the final mark will be the weighted average according to the established weights. Otherwise, the final mark obtained will not be higher than 4.00, even if the weighted average obtained for all the activities is greater than or equal to 5.00.

Specifications for the second resit / retake exam:

The same criteria will be applied as in the extraordinary session (the resit/retake exam).

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	35
Project or Topic Presentations [PRESENCIAL][Debates]	4
General comments about the planning: This course schedule is APPROXIMATE. It could vary throughout the academic course due to teaching needs, bank holidays, etc. A weekly schedule will be properly detailed and updated on the online platform (Virtual Campus). Note that all the lectures, practice sessions, exams and related activities performed in the bilingual groups will be entirely taught and assessed in English. Classes will be scheduled in 3 sessions of one hour and thirty minutes per week. Evaluation activities or catch-up classes may exceptionally be scheduled in the afternoon (morning).	
Unit 1 (de 11): Introduction and basic concepts in computer graphics and animation	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Unit 2 (de 11): Introduction to Blender	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1.5
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1.5
Computer room practice [PRESENCIAL][Other Methodologies]	2
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	1.5
Unit 3 (de 11): Modeling I. Polygon modelling techniques	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	4
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	5
Unit 4 (de 11): Modeling II. Other modelling techniques	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	4
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	4
Unit 5 (de 11): Materials and textures	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	4
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	4
Unit 6 (de 11): Lighting and cameras	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	.5
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	.5
Computer room practice [PRESENCIAL][Other Methodologies]	2
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	4
Project or Topic Presentations [PRESENCIAL][Debates]	1
Unit 7 (de 11): Animation I. Basic animation in Blender	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	4
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	7
Unit 8 (de 11): Animation II. Shapekeys and Armatures	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	3.5
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	7.5
Unit 9 (de 11): Animation III. Character creation and animation.	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	4
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	8
Project or Topic Presentations [PRESENCIAL][Debates]	1
Unit 10 (de 11): Introduction to Unity and the game asset pipeline	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	.5
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	3
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	7
Unit 11 (de 11): Particle systems and physics	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	.5

Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	1
Computer room practice [PRESENCIAL][Other Methodologies]	3
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	7
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	10.5
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	10
Computer room practice [PRESENCIAL][Other Methodologies]	33.5
Writing of reports or projects [AUTÓNOMA][Project/Problem Based Learning (PBL)]	90
Project or Topic Presentations [PRESENCIAL][Debates]	6
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Jonathan Lampel	The beginners guide to Blender https://www.blenderhd.com/wp-content/uploads/2015/08/BeginnersGuideToBlender.pdf				2015	
James Chronister	Blender basics http://www.cdschools.org/cms/lib04/PA09000075/Centricity/Domain/81/BlenderBasics_5thEdition2017.pdf				2017	
John M Blain	An introduction to Blender 3D a book for beginners http://download.blender.org/documentation/pdf/John%20M%20Blain%20-%20An%20Introduction%20To%20Blender%203D%20-%20A%20Book%20For%20Beginners%20%282011%29.pdf				2011	
John M. Blain	The Complete Guide to Blender Graphics: Computer Modeling & Animation, Fifth Edition	CRC Press			2019	
Jason van Gumster	Blender for dummies, 4th Edition	Wiley		978-1-119-61698-6	2020	