

**1. General information****Course:** VIDEO GAMES AND VIRTUAL REALITY**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:** <http://www.esiiab.uclm.es/asig.php?codasig=42379>**Code:** 42379**ECTS credits:** 6**Academic year:** 2023-24**Group(s):** 17**Duration:** C2**Second language:** Spanish**English Friendly:** N**Bilingual:** N**Lecturer:** JOSE PASCUAL MOLINA MASSO - Group(s): 17

Building/Office	Department	Phone number	Email	Office hours
E.S. de Ingeniería Informática / Despacho 0.C.12	SISTEMAS INFORMÁTICOS	2544	josepascual.molina@uclm.es	<a href="https://www.esiiab.uclm.es/pers.php?codpers=120&amp;curso=2023-24">https://www.esiiab.uclm.es/pers.php?codpers=120&amp;curso=2023-24</a>

**2. Pre-Requisites**

Not specified.

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

This subject is part of the group of subjects "**Graphic Design and Videogames**", devoted to providing the students with the basic skills needed to develop a computer videogame. The other subjects are "Artificial Intelligence for Videogames", "Graphics Accelerators", and "Graphic Design and Animation". 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 can 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.

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

Code	Description
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.
INS02	Organising and planning skills.
INS05	Argumentative skills to logically justify and explain decisions and opinions.
PER02	Ability to work in multidisciplinary teams.
PER03	Ability to work in an international context.
PER05	Acknowledgement of human diversity, equal rights, and cultural variety.
TI06	Ability to foster systems, applications, and services based on network technologies, including the internet, web, electronic commerce, multimedia, interactive services, and mobile computation.
UCLM01	Command of a second language at a B1 level within the Common European Framework of Reference for Languages

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

Development of virtual reality applications, in particular video games that use these technologies, for one or more users, in the same or several computers connected in a local network or through the Internet.

Understanding of the existing techniques and their appropriate application.

Understanding of the possibilities and limits of virtual reality technologies, and the importance of the human factor within them.

**6. Units / Contents****Unit 1: From videogames to virtual reality.****Unit 2: The development process: methods and programming.****Unit 3: Mathematics for videogames.****Unit 4: Input devices.****Unit 5: Physics in videogames.****Unit 6: Multi-user worlds and games.****Unit 7: Graphics displays.****Unit 8: Sound displays.****Unit 9: Haptic displays.**

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]	Combination of methods	CM06 TI06 UCLM01	0.56	14	Y	N	
Class Attendance (practical) [ON-SITE]	Guided or supervised work	CM06 TI06 UCLM01	0.76	19	Y	N	Tutorials
Study and Exam Preparation [OFF-SITE]	Self-study	CM06 TI06 UCLM01	0.32	8	Y	N	Individual exercises and/or assignments
Study and Exam Preparation [OFF-SITE]	Self-study	CM06 TI06 UCLM01	0.48	12	Y	N	Study or preparation for tests
Writing of reports or projects [OFF-SITE]	Group Work	CM06 INS02 PER02 PER03 PER05 TI06 UCLM01	0.32	8	Y	N	Project proposal development
Project or Topic Presentations [ON-SITE]	Assessment tests	CM06 INS05 TI06 UCLM01	0.02	0.5	Y	N	Project proposal presentation
Computer room practice [ON-SITE]	Group Work	CM06 INS02 PER02 PER03 PER05 TI06 UCLM01	1	25	Y	N	Project development at laboratory
Writing of reports or projects [OFF-SITE]	Group Work	CM06 INS02 PER02 PER03 PER05 TI06 UCLM01	2	50	Y	N	Project development at home
Project or Topic Presentations [ON-SITE]	Assessment tests	CM06 INS05 TI06 UCLM01	0.02	0.5	Y	N	Alpha build demo
Project or Topic Presentations [ON-SITE]	Assessment tests	CM06 INS05 TI06 UCLM01	0.02	0.5	Y	N	Beta build demo
Writing of reports or projects [OFF-SITE]	Group Work	CM06 INS02 PER02 PER03 PER05 TI06 UCLM01	0.48	12	Y	N	User's guide
Project or Topic Presentations [ON-SITE]	Assessment tests	CM06 INS05 TI06 UCLM01	0.02	0.5	Y	N	Final demo
<b>Total:</b>			<b>6</b>	<b>150</b>			
<b>Total credits of in-class work: 2.4</b>			<b>Total class time hours: 60</b>				
<b>Total credits of out of class work: 3.6</b>			<b>Total hours of out of class work: 90</b>				

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
Projects	35.00%	35.00%	Individual exercises and/or assignments
Theoretical papers assessment	5.00%	5.00%	Team's class project proposal
Oral presentations assessment	5.00%	5.00%	Team's class project proposal
Oral presentations assessment	10.00%	0.00%	Team's alpha build demo
Oral presentations assessment	10.00%	0.00%	Team's beta build demo
Practicum and practical activities reports assessment	5.00%	5.00%	User's guide of team's class project
Oral presentations assessment	30.00%	50.00%	Team's final demo
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

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:

Individual exercises and/or assignments.  
Class project, developed in teams.

##### Non-continuous evaluation:

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

The student can transfer to this evaluation points obtained in previous evaluation tests. In the tests that the student wants to improve in order to pass or obtain a higher grade, the work already done will not be reevaluated but, instead, the complete test has to be repeated, presenting -where appropriate- different works to those already delivered.

In team tests, in case the student cannot be part of a team, they will take them individually.

#### Specifications for the resit/retake exam:

Same as in non-continuous evaluation.

#### Specifications for the second resit / retake exam:

Same as in non-continuous evaluation.

9. Assignments, course calendar and important dates
Not related to the syllabus/contents

Hours	hours
Writing of reports or projects [AUTÓNOMA][Group Work]	8
Project or Topic Presentations [PRESENCIAL][Assessment tests]	.5
Computer room practice [PRESENCIAL][Group Work]	25
Writing of reports or projects [AUTÓNOMA][Group Work]	50
Project or Topic Presentations [PRESENCIAL][Assessment tests]	.5
Project or Topic Presentations [PRESENCIAL][Assessment tests]	.5
Writing of reports or projects [AUTÓNOMA][Group Work]	12
Project or Topic Presentations [PRESENCIAL][Assessment tests]	.5
<b>General comments about the planning:</b> 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 (Campus Virtual). Classes will take place in three sessions of 1.5 hours a week until programmed total is completed. Note that all the lectures, practice sessions, exams and related activities performed in the bilingual groups will be entirely taught in English.	
<b>Unit 1 (de 9): From videogames to virtual reality.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
<b>Teaching period:</b> Week 1	
<b>Unit 2 (de 9): The development process: methods and programming.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	3
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	2
<b>Teaching period:</b> Weeks 2, 3, and 4	
<b>Unit 3 (de 9): Mathematics for videogames.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	1
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
<b>Teaching period:</b> Week 5	
<b>Unit 4 (de 9): Input devices.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	2
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	7
Study and Exam Preparation [AUTÓNOMA][Self-study]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	3
<b>Teaching period:</b> Weeks 5, 6, 7, 8, and 9	
<b>Unit 5 (de 9): Physics in videogames.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	1
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
<b>Teaching period:</b> Weeks 9 and 10	
<b>Unit 6 (de 9): Multi-user worlds and games.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	1
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
<b>Teaching period:</b> Weeks 10 and 11	
<b>Unit 7 (de 9): Graphics displays.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	2
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
<b>Teaching period:</b> Week 12	
<b>Unit 8 (de 9): Sound displays.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	1
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
<b>Teaching period:</b> Week 13	
<b>Unit 9 (de 9): Haptic displays.</b>	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Combination of methods]	1
Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	1
<b>Teaching period:</b> Week 14	
<b>Global activity</b>	
<b>Activities</b>	<b>hours</b>
Study and Exam Preparation [AUTÓNOMA][Self-study]	8

Class Attendance (practical) [PRESENCIAL][Guided or supervised work]	19
Writing of reports or projects [AUTÓNOMA][Group Work]	8
Project or Topic Presentations [PRESENCIAL][Assessment tests]	0.5
Computer room practice [PRESENCIAL][Group Work]	25
Writing of reports or projects [AUTÓNOMA][Group Work]	50
Project or Topic Presentations [PRESENCIAL][Assessment tests]	0.5
Project or Topic Presentations [PRESENCIAL][Assessment tests]	0.5
Writing of reports or projects [AUTÓNOMA][Group Work]	12
Project or Topic Presentations [PRESENCIAL][Assessment tests]	0.5
Class Attendance (theory) [PRESENCIAL][Combination of methods]	14
Study and Exam Preparation [AUTÓNOMA][Self-study]	12
<b>Total horas: 150</b>	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Burdea, Grigore C.	Virtual reality technology <a href="http://www.vrtechnology.org/">http://www.vrtechnology.org/</a>	J. Wiley-Interscience		0-471-36089-9	2003	
Rucker, R.	Software Engineering and Computer Games <a href="http://www.rudyrucker.com/computergames/">http://www.rudyrucker.com/computergames/</a>	Addison- Wesley			2002	
	Desarrollo de videojuegos : un enfoque práctico /	EdLibrix,		978-84-942382-9-1	2014	
Murray, Jeff W.	Building virtual reality with Unity and SteamVR /	CRC,		978-1-138-05124-9	2017	