

**1. General information****Course:** ARTIFICIAL INTELLIGENCE IN VIDEO GAMES**Code:** 42378**Type:** ELECTIVE**ECTS credits:** 6**Degree:** 406 - UNDERGRADUATE DEGREE IN COMPUTER SCIENCE AND ENGINEERING (AB)**Academic year:** 2022-23**Center:** 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)**Group(s):** 17**Year:** 4**Duration:** C2**Main language:** English**Second language:** Spanish**Use of additional languages:****English Friendly:** N**Web site:****Bilingual:** N**Lecturer:** MIGUEL ANGEL FERNANDEZ GRACIANI - Group(s): 17

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2. Pre-Requisites

It is desirable but not essential, that students have some programming skills. The same way any knowledge in the field of artificial intelligence will be suitable for achievement of the subject

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

This Subject within the degree programme, relationship with other subjects and with the CS profession. The world of video games has an important place in today's society. So much so that their level of business is greater even than that of other types of entertainment such as film. There is therefore a great need for experts in this domain. In the development process of a video game, the component associated with the behavior of its elements, requires knowledge of artificial intelligence techniques. Much of videogame programmers deal with this type of resource. This course contributes to the formation of this profile of professionals.

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.
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.
SIS05	Creativity.
SIS07	Knowledge about other cultures and customs.

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

Identification of the problems that arise during the development of video games and that can be solved using artificial intelligence techniques.

Improvement of communication skills of the student in English language

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

Additional outcomes

Understand the problems associated with Artificial Intelligence related to videogames and know how to solve it at a conceptual and programming level

6. Units / Contents**Unit 1: Introduction****Unit 2: Video Games classification****Unit 3: Basic concepts****Unit 4: Learning****Unit 5: Basic behavior****Unit 6: Search techniques****Unit 7: Rule based systems****Unit 8: Case based reasoning****Unit 9: Connectionism****Unit 10: Evolutionary computation****Unit 11: Agents****Unit 12: Evolutionary behavior****Unit 13: Future possibilities**

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	CM04 CM06	0.6	15	Y	N	The teacher will explain the basic fundamentals of the subject
Workshops or seminars [ON-SITE]	Other Methodologies	CM04 CM06	0.6	15	Y	N	The different technologies associated with the subject are analyzed and tested (HTML, XML, Javascript, Ajax, PHP, unity, etc.)
Class Attendance (practical) [ON-SITE]	Project/Problem Based Learning (PBL)	CM04 CM06	0.72	18	Y	N	The students work in person in the development of a project for the subject
In-class Debates and forums [ON-SITE]	Debates	CM04 CM06 SIS05 SIS07	0.32	8	Y	N	Students discuss with their classmates the solutions adopted with respect to their course work
Project or Topic Presentations [ON-SITE]	Workshops and Seminars	CM04 CM06 SIS05	0.08	2	Y	N	Students present the project made throughout the course
Analysis of articles and reviews [OFF-SITE]	Self-study	CM04 CM06 SIS07	0.6	15	Y	N	The students analyze the bibliography and documentation associated with the concepts of the subject
Analysis of articles and reviews [OFF-SITE]	Group Work	CM04 CM06 SIS05 SIS07	0.6	15	Y	N	Students work together with their classmates in the analysis of the bibliography and documentation associated with the subject
Writing of reports or projects [OFF-SITE]	Group Work	CM04 CM06 SIS05	2	50	Y	N	Students perform, along with their group of practices, the course work of the subject
Practicum and practical activities report writing or preparation [OFF-SITE]	Group Work	CM04 CM06 SIS05	0.4	10	Y	N	The students, perform as a group, the memory associated with the course work of the subject
Final test [ON-SITE]	Self-study	CM04 CM06 SIS05 SIS07	0.08	2	Y	N	The students take the exam corresponding to the concepts exposed throughout the course
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	25.00%	0.00%	
Final test	10.00%	100.00%	
Theoretical papers assessment	10.00%	0.00%	
Progress Tests	15.00%	0.00%	
Laboratory sessions	20.00%	0.00%	
Oral presentations assessment	20.00%	0.00%	
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:

Assessment Criteria in the regular exam session. Student assessment is done mainly by the development of course work. También se tomara en cuenta, la nota obtenida en el examen correspondiente a los conceptos de la asignatura, student participation in debates and exhibitions, and the contribution of concepts to work, both for its workgroup, and the rest of the work than the other groups performed during the course. The evaluable activities are normally carried out in groups.

Non-continuous evaluation:

Evaluation criteria not defined

Specifications for the resit/retake exam:

Assessment Criteria in the extra session. The work must be equal to the ordinary call, and also demands a presence test.

Specifications for the second resit / retake exam:

Assessment Criteria in the special session for completion of studies. The work must be equal to the ordinary call, and also demands a presence test.

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

Hours	hours
Workshops or seminars [PRESENCIAL][Other Methodologies]	15
Class Attendance (practical) [PRESENCIAL][Project/Problem Based Learning (PBL)]	20
Project or Topic Presentations [PRESENCIAL][Workshops and Seminars]	2
Analysis of articles and reviews [AUTÓNOMA][Self-study]	7
Analysis of articles and reviews [AUTÓNOMA][Group Work]	7
Writing of reports or projects [AUTÓNOMA][Group Work]	50
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	8
Final test [PRESENCIAL][Self-study]	2
General comments about the planning: This course schedule is APROXIMATE. It could vary throughout the academis course due to teaching needs, bank holidays, etc.. A weekly schedule will be properly detailed and updated on the online platform (Campus Virtual). Note that all the lectures, practice sessions, exams and activities performed in the bilingual groups will be entirely taught in English. Classroom teaching is organized in three weekly classes of 1.5 hours each.	
Unit 1 (de 13): Introduction	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 2 (de 13): Video Games classification	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 3 (de 13): Basic concepts	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
In-class Debates and forums [PRESENCIAL][Debates]	1.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	1.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	1.5
Unit 4 (de 13): Learning	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 5 (de 13): Basic behavior	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 6 (de 13): Search techniques	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 7 (de 13): Rule based systems	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 8 (de 13): Case based reasoning	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 9 (de 13): Connectionism	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 10 (de 13): Evolutionary computation	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5

Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 11 (de 13): Agents	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 12 (de 13): Evolutionary behavior	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
In-class Debates and forums [PRESENCIAL][Debates]	.5
Analysis of articles and reviews [AUTÓNOMA][Self-study]	.5
Analysis of articles and reviews [AUTÓNOMA][Group Work]	.5
Unit 13 (de 13): Future possibilities	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
In-class Debates and forums [PRESENCIAL][Debates]	1
Analysis of articles and reviews [AUTÓNOMA][Self-study]	1
Analysis of articles and reviews [AUTÓNOMA][Group Work]	1
Global activity	
Activities	hours
Workshops or seminars [PRESENCIAL][Other Methodologies]	15
Class Attendance (theory) [PRESENCIAL][Lectures]	15
Class Attendance (practical) [PRESENCIAL][Project/Problem Based Learning (PBL)]	20
In-class Debates and forums [PRESENCIAL][Debates]	8
Project or Topic Presentations [PRESENCIAL][Workshops and Seminars]	2
Analysis of articles and reviews [AUTÓNOMA][Self-study]	15
Analysis of articles and reviews [AUTÓNOMA][Group Work]	15
Writing of reports or projects [AUTÓNOMA][Group Work]	50
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	8
Final test [PRESENCIAL][Self-study]	2
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Stuart Russell & Peter Norvig	Inteligencia Artificial. Un enfoque moderno	Prentice Hall			1996	Libro de Inteligencia Artificial The subject requires multiple consultations on the web
	http://www.google.es/					
Ian Millington	Artificial Intelligence for games	Elsevier	San Francisco	13:978-0-12-497782-2	2006	
Jose Mira Mira	Aspectos básicos de la Inteligencia Artificial	Sanz y Torres			1995	Libro de Inteligencia Artificial
	Game AI Pro 3. Collected Wisdom of Game AI Professionals	Steve Rabin		13 978 1 4987 4258 0	2017	
Brian Beuken	The Fundamentals of C/C++ Game programming	CRC Press		13 978 1 4987 8874 8	2018	