UNIVERSIDAD DE CASTILLA - LA MANCHA
GUÍA DOCENTE

1. General information

Course: INTELLIGENT SYSTEMS DEVELOPMENT

Type: CORE COURSE

Degree: 2362 - MÁSTER UNIVERSITARIO EN INGENIERÍA INFORMÁTICA (CR) - (2020)

Center: 108 - SCHOOL OF COMPUTER SCIENCE OF C. REAL

Year: 1

Main language: Spanish

Use of additional languages:

Web site:

Code: 310606

ECTS credits: 6

Academic year: 2023-24

Group(s): 20

Duration: C2

Second language:

English Friendly: Y

Bilingual: N

Lecturer: **EUSEBIO ANGULO SANCHEZ HERRERA** - Group(s): **20**				
Building/Office	Department	Phone number	Email	Office hours
2.17	MATEMÁTICAS	926295300 EXT 3711	eusebio.angulo@uclm.es	
Lecturer: **ARTURO PERALTA MARTIN-PALOMINO** - Group(s): **20**				
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FERMIN CABALLERO	TECNOLOGÍAS Y SISTEMAS DE INFORMACIÓN	926295300	Arturo.Peralta@uclm.es	

2. Pre-Requisites

This course is based on the skills and knowledge acquired in the subjects of the degree in Computer Science related to Artificial Intelligence as: Logic, Statistics, Subjects related to programming and intelligent systems.

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

This subject is integrated into the Computer Science part of the school curriculum.

This subject, which is among the most required in the resolution of complex problems, presents an introduction to the methodologies and tools associated with the intelligent analysis of large volumes of data. Currently society lives immersed in the phenomenon of Big Data due to the exponential increase in the volume of data generated. That is why it is essential to use intelligent automatic techniques that are capable of analyzing and converting this data into useful knowledge for decision support in any type of organization, company or institution. Thus, this aspect of data analysis and recommendation systems allows to address problems raised in conjunction with other subjects, such as case studies in Business Intelligence, Smart Cities, Big Data, etc.

4. Degree competences achieved in this course

Course competences

Code	Description
CE12	Ability to apply mathematical, statistical and artificial intelligence methodologies in the modelling, design and development of applications, services, intelligent systems and further systems based on knowledge.
INS01	Analysis, synthesis and assessment 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.
PER04	Interpersonal relationship skills.
SIS01	Critical thinking.
SIS03	Autonomous learning.
UCLM02	Ability to use Information and Communication Technologies.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Gain insight into the development, implementation and operation of an intelligent system

Design, model and validate intelligent systems in typical application areas (configuration, classification, etc.)

Assess the feasibility and necessity of implementing an intelligent system to solve complex issues

Additional outcomes

Know how to use machine learning algorithms, knowledge representation and data mining, creatively applying them to solve problems for specific areas such as: recommender systems, business intelligence, etc.

Acquire the skills to design and develop an Intelligent System. Consolidate in a practical way the previously acquired knowledge about Artificial Intelligence and Knowledge Based Systems.

6. Units / Contents

Unit 1: Data processing-based systems

Unit 2: Models based on unsupervised learning

Unit 3: Models based on supervised learning

Unit 4: Applications based on data analytics

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	CE12 UCLM02	0.6	15	N	-	Exposure of the subject matter by the teacher (MAG)
Problem solving and/or case studies [ON-SITE]	Workshops and Seminars	CE12 PER01 PER02 PER04	0.6	15	Y	N	Resolution of exercises by teacher and students (PRO)
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CE12 PER01 PER02 PER04 UCLM02	0.72	18	Y	N	Carrying out the programmed practices in the laboratory (LAB)
Individual tutoring sessions [ON-SITE]	Guided or supervised work	SIS01	0.18	4.5	N	-	Individual or small group tutorials in the teacher's office, classroom or laboratory (TUT)
Study and Exam Preparation [OFF-SITE]	Other Methodologies	CE12 SIS03	1.8	45	N	-	Individual Study (EST)
Other off-site activity [OFF-SITE]	Problem solving and exercises	CE12 INS04 SIS03	0.9	22.5	Y	N	Making a report on a topic proposed by the teacher (RES)
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	INS01 INS04 INS05 SIS01 SIS03 UCLM02	0.9	22.5	Y	N	Preparation of laboratory practices (PLAB)
Final test [ON-SITE]	Assessment tests	CE12 INS01 INS05	0.3	7.5	Y	Y	Performance a final exam of the entire 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
Final test	40.00%	40.00%	Compulsory activity that can be retaken. [EVA] The Final Test is held during the examination period (ordinary and extraordinary). It consists of the presentation and defense of the final report of the Project. The final report of the Project is previously sent through the "Campus Virtual".
Laboratory sessions	10.00%	10.00%	Non-compulsory activity that can be retaken. [LAB] Supervision of the work done in the laboratory by the student. This activity can be retrieved at the time of the final test.
Practicum and practical activities reports assessment	20.00%	20.00%	Non-compulsory activity that can be retaken. [PLAB] Implementation of data analysis problem solving. It consists of the delivery of a "laboratory notebook" and the related source code that will complement the work report by providing technical details, implementation, and experimental results explaining the problems and difficulties overcome. This activity can be retrieved at the time of the final test.
Oral presentations assessment	10.00%	10.00%	Non-compulsory activity that can be retaken. [PRO] Seminars will be held with presentations of individual and/or group work. This activity can be retrieved at the time of the final test.
Assessment of problem solving and/or case studies	20.00%	20.00%	Non-compulsory activity that can be retaken. [RES] Carrying out a Project to analyse a data set. This activity can be retrieved at the time of the final test.
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 final exam 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 final exam 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 examcall (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 final exam, 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 final exam 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 who are unable to attend training activities on a regular basis may apply at the beginning of the semester for the non-continuous assessment mode. Similarly, if a student who is undergoing continuous assessment incurs any circumstance that prevents her/him from regularly attending the classroom-based training activities, she/he may renounce the accumulated mark in continuous assessment and apply for the non-continuous assessment mode. In this case, a notification by the student must be given before the date scheduled for the tests in the ordinary call, in accordance with a deadline that will be informed at the beginning of the semester.

Students who take the non-continuous assessment 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 assessment".

In the "non-continuous assessment" 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: This course will be taught in 1.5 hour sessions spread over the school calendar

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Theodoridis, Sergios	Machine Learning A Bayesian and Optimization Perspective	Elsevier		978-0-12-801522-3	2015	
	https://www.sciencedirect.com/book/9780128015223/machine-learning#book-info					
Everitt, Brian	A handbook of statistical analyses using R	Chapman and Hall/CRC		978-1-4200-7933-3	2010	
Lantz, Brett	Machine learning with R : learn how to use R to apply powerf	Packt Publishing,		978-1-78216-214-8	2013	
Loshin, David	Big data analytics: from strategic planinning to enterprise	Elsevier		978-0-12-417319-4	2013	
	Ingeniería del conocimiento :aspectos metodológicos	Pearson Educación		84-205-4192-3	2004	