UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: TECHNIQUES OF AUTOMATED LEARNING
Code: 42392
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: First semester
Main language: English
Second language: Spanish
Use of additional languages:
English Friendly: N
Web site: Virtual space of the course at https://campusvirtual.uclm.es
Bilingual: Y

Lecturer: **FRANCISCO PASCUAL ROMERO CHICHARRO** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Fermin Caballero / 3.17	TECNOLOGÍAS Y SISTEMAS DE INFORMACIÓN	926051535	franciscop.romero@uclm.es	Available at https://esi.uclm.es/categories/profesorado-y-tutorias

Lecturer: **JESUS SERRANO GUERRERO** - Group(s): **20**

Building/Office	Department	Phone number	Email	Office hours
Fermín Caballero/2.05	TECNOLOGÍAS Y SISTEMAS DE INFORMACIÓN	6332	jesus.serrano@uclm.es	Available at https://esi.uclm.es/categories/profesorado-y-tutorias

2. Pre-Requisites

This subject is based on the skills and knowledge acquired in the subjects of Intelligent Systems, Knowledge-Based Systems and Algorithm Design (Computer Science Specialization)

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

This subject is elective for the degree. It is related to the subjects in the field of Artificial Intelligence and can serve as a complement to subjects in the intensification of Computer Science as Data Mining. It also presents an introduction to advanced data analysis (Big Data Analytics).

4. Degree competences achieved in this course

Course competences

Code	Description
CM7	Ability to know and develop computational learning techniques, and design and implement applications and systems which could use them, including the ones for the automatic extraction of information and knowledge from great batches of information.
INS01	Analysis, synthesis, and assessment skills.
INS02	Organising and planning skills.
INS03	Ability to manage information and data.
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.
SIS04	Adaptation to new scenarios.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Knowledge of the fundamental aspects and techniques of automatic learning within the supervised, unsupervised and reinforcement paradigms. Ability to explain the distinctions between different learning styles and to determine which is most appropriate for a given problem domain.

Additional outcomes

Comprehensive view of the types of machine learning algorithms and understand their evolution Knowledge of how to make use of machine learning algorithms, knowledge representation and data mining, applying them creatively in the solution of problems where inferred knowledge is required and parallel distributed processing techniques using up-to-date artificial intelligence technologies. Ability to apply basic concepts of human learning in the solution of machine learning problems.

6. Units / Contents

Unit 1: Introduction to Machine Learning

Unit 2: Unsupervised Learning

Unit 3: Supervised Learning

Unit 4: Machine Learning Applications

ADDITIONAL COMMENTS, REMARKS

Completion of a capstone project encompassing the following data analysis tasks: transformation, exploratory data analysis, unsupervised and supervised learning techniques.

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	CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	0.72	18	N	-	Teaching of the subject matter by lecturer (MAG)
Individual tutoring sessions [ON-SITE]		CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	0.18	4.5	N	-	Individual or small group tutoring in lecturer¿s office, classroom or laboratory (TUT)
Study and Exam Preparation [OFF-SITE]	Self-study	CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	2.1	52.5	N	-	Self-study (EST)
Other off-site activity [OFF-SITE]	Practical or hands-on activities	CM7 INS01 INS02 INS03 INS04 INS05 PER01 PER02 PER04 SIS01 SIS03 SIS04	0.6	15	N	-	Lab practical preparation (PLAB)
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	0.6	15	Y	N	Worked example problems and cases resolution by the lecturer and the students (PRO)
Writing of reports or projects [OFF-SITE]	Self-study	CM7 INS01 INS02 INS03 INS04 INS05 PER01 PER02 PER04 SIS01 SIS03 SIS04	0.9	22.5	Y	N	Preparation of essays on topics proposed by lecturer (RES)
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	0.6	15	Y	Y	Realization of practicals in laboratory /computing room (LAB)
Progress test [ON-SITE]	Assessment tests	CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	0.1	2.5	Y	N	Progress test 1 of the first third of the syllabus of the subject (EVA)
Progress test [ON-SITE]	Assessment tests	CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	0.1	2.5	Y	N	Progress test 2 of the two first thirds of the syllabus of the subject (EVA)
Progress test [ON-SITE]	Assessment tests	CM7 INS01 INS02 INS03 INS04 INS05 SIS01 SIS03 SIS04	0.1	2.5	Y	N	Progress test 3 of the complete 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
Progress Tests	7.50%	0.00%	Progress test 1. Non-compulsory activity that can be retaken (rescheduling). To be carried out at the end of the first third of the teaching period.
Progress Tests	15.00%	0.00%	Progress test 2 Non-compulsory activity that can be retaken. To be carried out at the end of the second third of the teaching period.
Progress Tests	27.50%	0.00%	Progress test 3. Non-compulsory activity that can be retaken. To be carried out during the non-teaching period.
Theoretical papers assessment	15.00%	15.00%	Non-compulsory activity that can be retaken. To be carried out before end of teaching period
Laboratory sessions	25.00%	25.00%	Compulsory activity that can be retaken. To be carried out during lab sessions
Oral presentations assessment	10.00%	10.00%	Non-compulsory activity that can be retaken. The students in the continuous mode will be evaluated in theory/laboratory sessions The students of non-continuous mode will be evaluated from this activity through of an alternative system.
Final test	0.00%	50.00%	Compulsory activity that an be retaken to to be carried out on the date scheduled for the final ordinary exam.
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 progress 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 progress 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 progress 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 progress test 3 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. Due to the nature of the progress tests, in the resit/retake exam (convocatoria extraordinaria) there will be a single progress test that includes the three progress tests.

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 taught in three weekly sessions of 1.5 hours.

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Bishop, Christopher M.	Pattern recognition and machine learning	Springer		978-0-387-31073-2	2006	
Harrington, Peter (1977-)	Machine learning in action	Manning		978-1-61729-018-3	2012	
	Machine learning in python /	Wiley,		978-1-118-96174-2	2015	
Alpaydin, Ethem	Introduction to machine learning	The MIT Press		0-262-01211-1	2004	
Hearty, John.	Advanced machine learning with Python : solve challenging da	Packt Publishing,		978-1-78439-863-7	2016	