UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: PROGRAMMING METHODOLOGY
Code: 42316
Type: CORE COURSE
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 21 22
Year: 2
Duration: C2
Main language: English
Second language: Spanish
Use of additional languages: Use of English as main language in bilingüal group and Spanish in the rest of groups.
English Friendly: N
Web site: https://campusvirtual.uclm.es
Bilingual: Y

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2. Pre-Requisites

This course is based on the competencies and knowledge obtained in the previous courses:

- Programming Fundamentals I
- Programming Fundamentals II
- Calculus and Numerical Methods
- Algebra and Discrete Mathematics
- Logic
- Data Structures

As general suggestion it is strongly recommended:

- To know how to determine roots of polynomials, limits and sum of series
- To have a good programming level either for iterative or recursive code
- To know and handle efficiently the data structures introduced in previous courses

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

This course is integrated in the “Programming” subject within the common Module of the Computer Science branch of the “Bachelor's Degree in Computer Engineering”. The course provides the basis for solving real and complex problems. Therefore, the course is key to later years courses, specially to:

- Design of algorithms
- Software Engineering

- Intelligent systems

4. Degree competences achieved in this course

Course competences

Code	Description
BA03	Ability to understand basic concepts about discrete mathematics, logic, algorithms, computational complexity, and their applications to solve engineering problems.
CO06	Knowledge and application of basic algorithms in digital technologies for the development of solutions, analysing their appropriateness and complexity.
CO07	Knowledge, design, and efficient use of types of data and structures which arise as most appropriate in problem solving.
INS01	Analysis, synthesis, and assessment skills.
INS04	Problem solving skills by the application of engineering techniques.
PER01	Team work abilities.
PER02	Ability to work in multidisciplinary teams.
PER04	Interpersonal relationship skills.
PER05	Acknowledgement of human diversity, equal rights, and cultural variety.
SIS01	Critical thinking.
SIS03	Autonomous learning.
UCLM02	Ability to use Information and Communication Technologies.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Design of solutions for problems by the analysis of appropriateness and complexity of suggested algorithms.

Resolution of problems throughout basic techniques of algorithm design.

Additional outcomes

Sorting of algorithms according their complexity. Choose and implement the most appropriate computational methodology to solve a problem.

6. Units / Contents

Unit 1: Analysis of algorithms

Unit 2: Divide and conquer algorithms

Unit 3: Greedy algorithms

Unit 4: Backtracking algorithms

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	BA03 CO06 CO07	0.72	18	N	-	Presentation of the concepts by the teacher (MAG)
Individual tutoring sessions [ON-SITE]		BA03 CO06 CO07 UCLM02	0.18	4.5	N	-	Individual or in small groups office hours at the office, classroom or laboratory (TUT)
Study and Exam Preparation [OFF-SITE]	Self-study	BA03 CO06 CO07 SIS01 SIS03	2.1	52.5	N	-	Self study (EST)
Other off-site activity [OFF-SITE]	Self-study	BA03 CO06 CO07 INS01 INS04 PER01 PER02 PER04 PER05 SIS03	0.6	15	N	-	Preparation of tasks at the laboratory (PLAB)
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	BA03 CO06 CO07 INS04 PER01 PER02 PER04 PER05 SIS01 SIS03 UCLM02	0.6	15	Y	N	Solving of exercises by students and teacher (PRO)
Writing of reports or projects [OFF-SITE]	Self-study	BA03 CO06 CO07 INS01 INS04 PER02 PER04 PER05	0.9	22.5	Y	N	Preparation a report about a topic proposed by the teacher (RES)
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	BA03 CO06 CO07 INS04 PER01 PER02 PER04 PER05	0.6	15	Y	Y	Taking the scheduled lab tasks (LAB)
Final test [ON-SITE]	Assessment tests	BA03 CO06 CO07 INS01 INS04	0.3	7.5	Y	Y	Taking a final exam of the whole 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	Description

		evaluation*	
Final test	50.00%	50.00%	Compulsory activity that can be retaken (rescheduling) to be carried out within the planned exam dates of the final exam call (convocatoria ordinaria)
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
Assessment of active participation	10.00%	10.00%	Non-compulsory activity that can be retaken. To be carried out during the theory/lab sessions (for students in continuous assessment modality). Students of non-continuous modality will be evaluated of this activity through an alternative system in the final exam call (convocatoria ordinaria).
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 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.

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
BALCAZAR,JL.	Programación Metódica	McGraw Hill	España		1993	
BRASSARD,G. BRATLEY,P	Fundamentos de Algorítmia	Prentice hall	España		2000	
HOROWITZ,E., SAHNI,S., RAJASEKARAN,S	Computer Algorithms/C++	Computer Science Press	EE.UU.		2007	
PEÑA, R.	Diseño de Programas, Formalismo y Abstracción	Pearson			2005	
			New Jersey,			

R. Sedgewick, K. Wayne	Algorithms, 4th Edition http://algs4.cs.princeton.edu/home/	Addison Wesley	USA	978-0321573513	2011
T Cormen, C Leiserson, R Rivest and C Stein	Introduction to Algorithms https://mitpress.mit.edu/books/introduction-algorithms	MIT Press	Cambridge, MA, USA	978-0262533058	2009