Teaching Guide				
Identifying Data				2023/24
Subject (*)	Introduction to Computers		Code	614G03012
Study programme	Grao en Intelixencia Artificial			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	Basic training	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría de Computadores			
Coordinador	Amor Lopez, Margarita	E-mail	margarita.amor@udc.es	
Lecturers	Amor Lopez, Margarita Gonzalez Gomez, Patricia	E-mail	margarita.amor@udc.es patricia.gonzalez@udc.es	
Web				
General description	This subject reveals the fundamentals of the architecture of a computer, its basic operation, how it is programmed in assembly language and how the memory and I/O subsystems are and how they work. In addition, the structure and basic components of an operating system will be shown. On the other hand, the development of efficient codes that take optimal advantage of the hardware resources available in the computer will be presented.			

Study programme competences / results	
Code	Study programme competences / results
A4	Conocer la estructura, organización, funcionamiento e interconexión de los sistemas informáticos (computador, sistemas operativos y redes de computadores).
A6	Capacidad para realizar el análisis, diseño, implementación de aplicaciones que requieran trabajar con grandes volúmenes de datos, aplicando arquitecturas hardware/software adecuadas.
B2	Que el alumnado sepa aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posea las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio.
B3	Que el alumnado tenga la capacidad de reunir e interpretar datos relevantes (normalmente dentro de su área de estudio) para emitir juicios que incluyan una reflexión sobre temas relevantes de índole social, científica o ética.
B5	Que el alumnado haya desarrollado aquellas habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía.
C3	Capacidad para crear nuevos modelos y soluciones de forma autónoma y creativa, adaptándose a nuevas situaciones. Iniciativa y espíritu emprendedor.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Understand the internal workings of a computer and its functional blocks.	A4	B3	
Know the machine language of the computer and be able to develop very simple codes in said language.		B2	
Have the ability to develop codes that take optimal advantage of the hardware resources available on the computer.		B2 B5	C3
Understand the interrelationship between the operating system software and the hardware on which it executes.	A6	B2	C3
Understand the different models of parallel systems and their programming.	A6		

Contents	
Topic	Sub-topic

1.- Introduction to computers and operating systems	- Basic functional blocks of a general purpose computer - Basic concepts of the Operating System - Performance metrics
2.- Information Representation	- Coding of integers - Coding of real numbers - Coding of characters
3.- The processor	- Instruction set - Types of processors - Instruction-level parallelism
4.- The memory system	- Memory hierarchy - Cache - Principal memory - Virtual memory
5.- Input/Output	- Basic concepts - I/O Techniques - File systems
6.- Operating system	- Operating system components - Processes
7- Parallel Systems	- Introduction to parallel systems - Multicore Systems - Shared Memory Systems - Distributed Memory Systems

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Laboratory practice	A4 B2 B3 B5 C3	20	28	48
Guest lecture / keynote speech	A4 A6 B5	30	30	60
Objective test	A4 B2 B3	3	9	12
Problem solving	A4 A6 B2 B3 C3	10	17	27
Personalized attention		3	0	3
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Laboratory practice	Activity that allows students to learn and consolidate the knowledge already acquired through practical sessions in the laboratory. This methodology allows exercising and evaluating the A4, B2, B3 and B5 skills. The acquisition of the transversal competence C3 will also be taken into account in these sessions.
Guest lecture / keynote speech	Master sessions will be held on the contents of the agenda, normally as a starting point for the rest of the planned activities. These contents will be focused on the A4 and the A6 competition. The sessions will be focused in such a way as to promote the acquisition of transversal and core competencies of the subject.
Objective test	At the end of the semester there will be an exam that will evaluate the contents of the subject. The test will place particular emphasis on the A5, A6 and B5 skills
Problem solving	Problems will be proposed to the students to solve as personal work. Solutions will be discussed in problem classes. This methodology allows exercising the A4, A6, B2 and B3 skills. The acquisition of the transversal competence C3 will also be taken into account in these sessions.

Personalized attention	
Methodologies	Description

Problem solving Laboratory practice	Personalized attention is essential to guide the students in carrying out the proposed problems and for laboratory practices. On the other hand, students will be recommended to attend tutorials as a method of help.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Laboratory practice	A4 B2 B3 B5 C3	The practices carried out by the students during the development of them in the laboratory sessions will be evaluated. With the results of these practices, it is sought to evaluate the A4, B2, B3 and B5 competencies.	30
Objective test	A4 B2 B3	At the end of the semester there will be a written exam on the contents of the subject. This exam will assess the A4, B2 and B3 skills.	70

Assessment comments
In the first opportunity, in order to pass the course, it will be necessary to take the final exam and have a total grade (practicals plus exam) equal or higher than 50% of the maximum grade.In the second opportunity the grade of the exam will be 100% of the total, that is, the whole syllabus will be evaluated including 30% of the practices. In order to pass the course, the final grade (exam plus practicals) must be equal or higher than 50% of the maximum grade. For students who take the advanced opportunity in December, the grade of the exam will be 100% of the total, that is, the entire syllabus will be evaluated including 30% of practices. Students with part-time enrollment may choose the internship group that best fits their schedules, allowing them group mobility throughout the course. Those who have been granted academic dispensation are exempted from class attendance, they will only have to take the internship tests corresponding to the continuous evaluation.Failure qualification in the call in which the fault is committed and respecting the subject in which it was committed: the student will be qualified with "suspenso" (numerical grade 0) in the corresponding call of the academic year, whether the commission of the fault occurs in the first opportunity or in the second one. For this, the student's grade will be modified in the record of the first opportunity, if necessary.

Sources of information	
Basic	- David A.Patterson and John L. Hennessy (2017). Computer Architecture and Design RISC-V. Morgan Kaufmann Publishers - J. Carretero Pérez, F. García Carballeira, F. Pérez Costoya (2020). Sistemas operativos: una visión aplicada. Mc Graw Hill
Complementary	- F. García Carballeira, J. Carretero, J.D. García Sánchez y D. Expósito Singh (2015). Problemas Resueltos de Estructura de Computadores. Paraninfo - M. Beltrán Pardo y A. Guzmán Sacristán. (2010). Diseño y Evaluación de Arquitectura de Computadores. Grupo Anaya Publicaciones Generales - David A. Patterson y John L. Hennessy (2011). Estructura y Diseño de Computadores. Reverté - John Waldron (1999). Introduction to RISC Assemblée Language Programming. Addison-Wesley

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments

According to the different regulations applicable to university teaching, the gender perspective must be incorporated in this subject: - non-sexist language will be used, bibliography of authors of both sexes will be used, the intervention of male and female students in class will be encouraged.- we work will be done to identify and modify sexist prejudices and attitudes, and the environment will be influenced to modify them and promote values of respect and equality. - If situations of gender discrimination are detected, actions and measures to correct them will be proposed.