



## Teaching Guide

Identifying Data					2020/21
Subject (*)	Fundamentals of Computers	Code	614G02005		
Study programme	Grao en Ciencia e Enxeñaría de Datos				
Descriptors					
Cycle	Period	Year	Type	Credits	
Graduate	1st four-month period	First	Basic training	6	
Language	SpanishGalician				
Teaching method	Hybrid				
Prerequisites					
Department	Enxeñaría de Computadores				
Coordinador	Sanjurjo Amado, Jose Rodrigo	E-mail	jose.sanjurjo@udc.es		
Lecturers	Darriba López, Diego Gonzalez Gomez, Patricia Sanjurjo Amado, Jose Rodrigo	E-mail	diego.darriba@udc.es patricia.gonzalez@udc.es jose.sanjurjo@udc.es		
Web	moodle.udc.es				
General description	Esta materia pretende dar a coñecer os fundamentos da arquitectura dun computador, o seu funcionamento básico, como é a súa programación en linguaxe ensamblador e como son e como funcionan os subsistemas de memoria e E/S. Ademais se mostrarán a estrutura e compoñentes básicos dun sistema operativo.				
Contingency plan	<p>1. Modifications to the contents</p> <p>2. Methodologies</p> <p>*Teaching methodologies that are maintained</p> <p>*Teaching methodologies that are modified</p> <p>3. Mechanisms for personalized attention to students</p> <p>4. Modifications in the evaluation</p> <p>*Evaluation observations:</p> <p>5. Modifications to the bibliography or webgraphy</p>				

## Study programme competences / results

Code	Study programme competences / results
A10	CE10 - Coñecemento da arquitectura e funcionamento dos computadores, a interconexión dos compoñentes que os forman e o seu software de sistema básico.
B1	CB1 - Que os estudantes demostrasen posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral, e adóitase atopar a un nivel que, aínda que se apoia en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo
B5	CB5 - Que os estudantes desenvolvesen aquelas habilidades de aprendizaxe necesarias para emprender estudos posteriores cun alto grao de autonomía
B6	CG1 - Ser capaz de buscar e seleccionar a información útil necesaria para resolver problemas complexos, manexando con soltura as fontes bibliográficas do campo.
C1	CT1 - Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.

## Learning outcomes



Learning outcomes	Study programme competences / results		
Coñecer e comprender a estrutura básica dun computador e como representa a información internamente	A10	B1 B5	
Coñecer os fundamentos da arquitectura e funcionamento básico dos bloques funcionais dun computador (procesador, memoria, E/S)	A10	B5	
Desenvolver as capacidades básicas para programar a baixo nivel un procesador mediante unha linguaxe ensamblador	A10	B5 B6	C1
Comprender a estrutura e funcionamento dos subsistemas de memoria, E/S e almacenamento externo dun computador	A10	B1 B5 B6	C1
Coñecer a estrutura e compoñentes básicos dun sistema operativo e saber utilizalo a nivel de usuario	A10	B5 B6	C1

Contents	
Topic	Sub-topic
1. Arquitectura básica dun sistema computador	1.1 Modelo Von Neumann 1.2 Concepto de programa almacenado
2. Representación da información	2.1 Sistemas de numeración 2.2 Codificación de números enteros 2.3 Codificación de números reais (IEEE 754)
3. O procesador	3.1 Repertorio de instrucións 3.2 Camiño de datos 3.3 Unidade de control
4. Xerarquía de memoria	4.1 Memoria principal 4.2 Memoria caché 4.3 Memoria virtual
5. Subsistema de E/S	5.1 Módulos de E/S 5.2 Direccionamento dos módulos de E/S 5.3 Xestión da E/S
6. Software de sistema	6.1 O sistema operativo 6.2 Software de utilidade
7. Sistemas de almacenamento	7.1 Tipos de dispositivos de almacenamento 7.2 RAID de discos

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student's personal work hours	Total hours
Problem solving	A10 B1 B5 B6	10	17	27
Laboratory practice	A10 B1 B5 B6 C1	20	28	48
Guest lecture / keynote speech	A10 B1 B5	30	30	60
Objective test	A10 B1 B5 B6	3	9	12
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



Problem solving	Proporanse aos alumnos problemas para resolver como traballo persoal. Debatiranse as solucións nas clases de problemas. Tamén se realizarán controis parciais durante o curso. Esta metodoloxía permite exercitar e avaliar as competencias B1, B5 e B6 en relación á competencia A10.
Laboratory practice	Actividade que permite aos estudantes aprender e afianzar os coñecementos xa adquiridos mediante a realización de sesións prácticas no laboratorio. Esta metodoloxía permite exercitar e avaliar as competencias B1, B5 e B6 en relación á competencia A10. Tamén se terá en conta nestas sesións a adquisición da competencia transversal C1.
Guest lecture / keynote speech	Realizaranse sesións maxistras sobre os contidos do temario, normalmente como punto de partida para o resto de actividades previstas. Estes contidos estarán centrados na competencia A10. As sesións enfocaranse de xeito que se promova a adquisición das competencias transversais e nucleares da materia.
Objective test	Ao remate do cuadrimestre haberá un exame que avaliará os contidos da materia. A proba fará particular énfase nas competencias A10, B1 e B5, pero sen descoidar o resto de competencias (B6 e C1).

### Personalized attention

Methodologies	Description
Problem solving Laboratory practice	<p>Personalized attention is essential to guide students in carrying out the proposed exercises and lab practices and lead them to acquire this course's competences. Furthermore, this personalized attention can assess and validate student work. Besides, tutorial attendance is recommended whenever some help is needed.</p> <p>Part-time Students may choose the lab group that better fits their timetables, even with the possibility of change during the term. Moreover, part-time students with an approved dispensation for non-attendance at classes only need to perform the practices corresponding to the continuous assessment of the subject.</p>

### Assessment

Methodologies	Competencies / Results	Description	Qualification
Problem solving	A10 B1 B5 B6	Exercises will be proposed to the students to be solved on their own. This personal work will be evaluated by written exams during the term. These exams will assess the competences B1, B5 and B6 in relation to competences A10.	20
Laboratory practice	A10 B1 B5 B6 C1	Experimental work done by the students in the lab sessions will also be evaluated. This evaluation is focused to assess the acquisition of the competences B1, B5, B6 and C1 in relation to the competence A10.	30
Objective test	A10 B1 B5 B6	A written exam covering the syllabus that was not evaluated during the term will be carried out at the end of the term. This exam will mainly assess the competences A10, B1, B5 and B6.	50

### Assessment comments



To pass the course it is mandatory to obtain: At least a 25% of the maximum grade in each midterm exam and the final test. A final grade (lab sessions + midterm exams + final objective test) at least a 50% of the maximum possible grade. The final objective test for the 2nd opportunity call will cover the complete syllabus and will provide the 70% of the final grade. The grades from the problem solving exams during the course will be discarded. The remaining 30% corresponds to the laboratory practices grade obtained during the course. Students taking advantage of the ahead December call will be evaluated using their laboratory practices grade from the previous term. The condition to pass the course in this call is to obtain a final grade, adding this exam grade and the laboratory practices grade, equal to or greater than 50% of the maximum possible grade. Part-time students may choose the lab group that better fits their timetables, even with the possibility of change during the term. Moreover, part-time students with an approved dispensation for non-attendance at classes only need to perform the practices corresponding to the continuous assessment of the subject.

### Sources of information

<b>Basic</b>	<ul style="list-style-type: none"><li>- David A. Patterson, John L. Hennessy (2014). Computer organization and design : the hardware/software interface. Morgan Kaufmann Publishers</li><li>- J. Carretero Pérez, F. García Carballeira, P. de Miguel Anasagasti, F. Pérez Costoya (2007). Sistemas operativos: una visión aplicada. Mc Graw Hill</li><li>- F. García Carballeira, J. Carretero, J.D. García Sánchez y D. Expósito Singh (2015). Problemas resueltos de estructura de computadores (2ª ed.). Paraninfo</li></ul>
<b>Complementary</b>	<ul style="list-style-type: none"><li>- Miles J. Murdocca y Vicent P. Heuring (2002). Principios de arquitectura de computadoras. Prentice Hall</li></ul>

### Recommendations

#### Subjects that it is recommended to have taken before

#### Subjects that are recommended to be taken simultaneously

#### Subjects that continue the syllabus

High Performance Computing Infrastructures/614G02015

#### Other comments

We strongly recommend the use and exploitation of the teacher's office hours to get some help or advice about any topic of the course.

(\*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.