



Teaching Guide				
Identifying Data				2019/20
Subject (*)	Operating Systems	Code	614G01016	
Study programme	Grao en Enxeñaría Informática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatory	6
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputación			
Coordinador	Barreiro Garcia, Álvaro	E-mail	alvaro.barreiro@udc.es	
Lecturers	Barreiro Garcia, Álvaro Cabalar Fernandez, Jose Pedro Fariña Martinez, Antonio Martín Rodilla, Patricia Paris Fernandez, Javier Rodriguez Rubio, Miguel Jose Santos Reyes, Jose Yañez Izquierdo, Antonio Fermin	E-mail	alvaro.barreiro@udc.es pedro.cabalar@udc.es antonio.farina@udc.es patricia.martin.rodilla@udc.es javier.paris@udc.es miguel.rodriguez.rubio@udc.es jose.santos@udc.es antonio.yanez@udc.es	
Web	<a href="http://www.dc.fi.udc.es/~so-grado/">http://www.dc.fi.udc.es/~so-grado/</a>			
General description	Introductory course to Operating Systems dealing with File Systems, Memory, Input/Output, Processes and Concurrency. Practical examples are included using modern OS like Unix and its descendants.			

Study programme competences / results	
Code	Study programme competences / results
A4	Coñecementos básicos sobre o uso e a programación dos ordenadores, sistemas operativos, bases de datos e programas informáticos con aplicación na enxeñaría.
A16	Coñecemento das características, funcionalidades e estrutura dos sistemas operativos, e deseñar e implementar aplicacións baseadas nos seus servizos.
B1	Capacidade de resolución de problemas
B2	Traballo en equipo
B3	Capacidade de análise e síntese
B4	Capacidade para organizar e planificar
B5	Habilidades de xestión da información
B6	Toma de decisións
B7	Preocupación pola calidade
B9	Capacidade para xerar novas ideas (creatividade)
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.
C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
C3	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.
C4	Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

## Learning outcomes



Learning outcomes	Study programme competences / results		
C1 - C8 (See Nuclear competences of the studies)			C1 C2 C3 C4 C6 C7 C8
Knowledge of the characteristics, functionalities and structure of operating systems and design and implement applications based on its services.	A4 A16		
B9-B17 (Transversal capacities: see study competences)		B1 B2 B3 B4 B5 B6 B7 B9	

Contents	
Topic	Sub-topic
Introduction	Introduction OS Concepts OS Services
Process management & scheduling	Processes Process Control Block Process States Process Scheduling. Algorithms Process communications Unix Processes
Memory management	Basic Concepts Segmentation & Pagination Virtual memory. Page replacement Examples of current systems Memory management in Unix
File Systems	File Systems. Methods for assignment and accounting Directory structures Protection Unix File Systems
Input/Output	Basic concepts. Memory-mapped and port-mapped I/= Polling and Direct Memory Access for I/O I/O software layers

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours



Laboratory practice	A4 A16 B1 B2 B3 B4 B5 B6 B7 B9 C2 C3 C4 C6 C7	20	20	40
Supervised projects	B1 B6 B7 B9 C1 C2 C3 C4 C6 C7 C8	10	20	30
Objective test	A4 A16 B1 B9 C1 C6 C8	4	20	24
Guest lecture / keynote speech	A4 A16 B7 C1 C4 C6 C7 C8	30	21	51
Personalized attention		5	0	5

(\*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	Laboratory assignments. Systems programming,
Supervised projects	Problems and projects to do under de teacher's supervision
Objective test	Written exam
Guest lecture / keynote speech	Lectures with contents detailed in step 3

### Personalized attention

Methodologies	Description
Laboratory practice Supervised projects	The teacher will individually respond the questions of students about the work to do in laboratory assignments, problems and exercises.

### Assessment

Methodologies	Competencies / Results	Description	Qualification
Laboratory practice	A4 A16 B1 B2 B3 B4 B5 B6 B7 B9 C2 C3 C4 C6 C7	The students must finish and send their laboratory assignments according with the established procedures and correctly answer the teacher's questions about their work. The maximum score of this part is 2.5/10	25
Objective test	A4 A16 B1 B9 C1 C6 C8	The written exam can contain question about the contents of the lectures, problems, exercises and laboratory assignments, The maximum score of this part is 7.5/10 It is required to obtain a 40% of the score in this part to pass the subject.	75

### Assessment comments

The students that do not get the minimum required in th objective test can only get a maximum score of 4.5 (out of 10)  
Partial time students must contact the teacher in charge of the coordination of the OS course asking for an alternative evaluation,

### Sources of information



<b>Basic</b>	<ul style="list-style-type: none"><li>- Gary Nutt (). Sistemas Operativos. Addison Wesley</li><li>- William Stallings (). Sistemas Operativos. Prentice Hall</li><li>- Andrew S. Tanenbaum (). Sistemas Operativos Modernos. Pearson</li><li>- Bach (). The design of the unix operating system. Prentice Hall</li><li>- Vahalia (). Unix internals: the new frontiers. Prentice Hall</li><li>- Márquez García (). Unix: programacion avanzada. Ra-ma</li><li>- Samuel J. Leffler, Marshall Kirk McKusick, et al. (). The Design and Implementation of the 4.3 BSD UNIX Operating System. Addison-Wesley</li><li>- Abrahan Sibersschatz et al (). Operating System Concepts . Wiley</li></ul>
<b>Complementary</b>	

## Recommendations

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

Computer Science Preliminaries/614G01002  
Programming II/614G01006  
Computer Structure/614G01012

### Subjects that are recommended to be taken simultaneously

Networks/614G01017

### Subjects that continue the syllabus

Concurrency and Parallelism/614G01018  
Computer Security and Legislation/614G01024  
Infrastructure Management/614G01025  
Operating Systems Administration/614G01047  
Operating Systems Administration/614G01212

### Other comments

(\*)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.