



## IDENTIFYING DATA

### Operating system security and administration

Subject	Operating system security and administration			
Code	O06M132V03313			
Study programme	Máster Universitario en Ingeniería Informática			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	2nd	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Méndez Reboredo, José Ramón			
Lecturers	Méndez Reboredo, José Ramón			
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Web	<a href="http://moovi.uvigo.gal">http://moovi.uvigo.gal</a>			
General description	<p>This subject is focused on corporate systems administration including, among others, the following aspects of this area</p> <ul style="list-style-type: none"> <li>+ Corporate authentication.</li> <li>+ Virtualization.</li> <li>+ Clustering: Load balancing and high availability.</li> <li>+ Deployment of messaging and videoconferencing services.</li> <li>+ Massive network storage.</li> <li>+ Management of expenses derived from corporate IT systems.</li> <li>+ Outsourcing of services.</li> </ul> <p>Given the current nature of the topics, it may be necessary to use materials written in English and/or tools with a user interface in English.</p>			

## Training and Learning Results

Code	
A2	(CB7) That the students know how to apply the acquired knowledge and their problem-solving capacity in new or little-known environments within broader (or multidisciplinary) contexts related to their area of study
A3	(CB8) That the students are able to integrate knowledges and confront to the complexity to formulate trials from an information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of his knowledges and trials.
A5	(CB10) That the students possess the skills of learning that allow them continue studying of a way that must greatly be self-directed or autonomous.
B1	Ability to project, calculate and design products, processes and installations in all areas of computer engineering.
B2	Ability to manage works and install computer systems, complying with current regulations and ensuring the quality of service.
B8	Ability to apply the acquired knowledge and solve problems in new or little-known environments within broader and multidisciplinary contexts, being able to integrate this knowledge
C4	Ability to model, design, define the architecture, implement, manage, operate, administer and maintain applications, networks, systems, services and computer content.
C9	
C20	(*)Capacidade para manexar correctamente sistemas operativos, redes e linguaxes de programación dende o punto de vista da seguridade informática e das comunicacións
C21	(*)Capacidade para deseñar, desenvolver e xestionar mecanismos de seguridade no tratamento e acceso á información nun sistema de procesamento local ou distribuído
D1	Develop an espírito innovative and emprendedor
D4	Capacity to communicate knowledge and conclusions to públicos especializados and no especializados, of oral way and written

D5	Capacity of work in team
D6	Skills of relations interpersonales
D7	Capacity of reasoning crítico and creativity
D8	Responsibility and commitment ético in the desempeño of the professional activity
D9	Respect and promoción of the human rights, the principles democráticos, the principles of equality between men and women, of solidarity, of universal accessibility and diseñador for all
D10	Orientation to quality and continuous improvement
D11	Capacity of learning autónomo
D12	Capacity to resolve problems in new surroundings or little known inside contexts más wide or multidisciplinares
D13	Capacity to integrate knowledges and enfrentarse to the complexity to formulate trials from an información incomplete

### Expected results from this subject

Expected results from this subject	Training and Learning Results
RA01 - Be able to protect today's leading operating systems	A2 A3 B1 B2 B8 C4 C9 C20 C21 D7 D8 D9 D10 D11 D12 D13
RA02 - Understand and be able to correctly manage the mechanisms of AAA (Authentication, Authorization and Accounting) in the main operating systems for use in corporate environments.	A2 A3 B1 B2 B8 C4 C20 C21 D7 D8 D9 D10 D12 D13
RA03 - Be able to configure systems to improve flexibility, scalability and availability using virtualization and clustering techniques.	A2 A3 A5 B1 B2 C4 C9 C20 C21 D1 D4 D5 D6 D7 D11 D12 D13

### Contents

Topic	
1. Introduction	1.1. Data Processing Centres 1.2. DPC architectures

2. Basic tools	2.1 Infrastructure automation and provisioning 2.2 Virtualization - Concepts of virtualization - Hypervisors and installation 2.3 Containers - Orchestration of containers
3. Authentication, Authorization and Accounting	3.1 AAA built into operating systems 3.2 Corporate AAA (LDAP)
4. Clustering	4.1 Introduction to Clustering 4.2 Common uses of clustering: High availability, load balancing, high performance computing 4.3 Practical example of the use of clustering on the web 4.4 Security considerations
5. Other network services	5.1. E-mail 5.2. Web

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	10	0	10
Laboratory practical	20	15	35
Laboratory practice	17	70	87
Objective questions exam	1	17	18

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

## Methodologies

	Description
Lecturing	Different activities will be used in the classroom, aimed at the whole group or small groups. Mainly, lectures will be held to develop the fundamental contents of the subject and to achieve the active participation of students, short individual or group activities will be carried out to apply the concepts presented and solve problems. The proposed activities will promote the acquisition of knowledge and its application in the professional and research field of Computer Science.  Attendance at these sessions is not mandatory.
Laboratory practical	Practical activities, guided laboratory sessions, problem-solving seminars, etc. will be carried out in groups, under the guidance of a lecturer. Activities prior to and after the laboratory and seminar sessions may be included to help achieve the proposed objectives. Activities aimed at the development of projects, practical cases, reports, etc. will be especially encouraged. In addition, assessment activities may be organised in these sessions.  Attendance at these sessions is not mandatory.

## Personalized assistance

Tests	Description
Laboratory practice	Problems are posed some time before the end of the class so that students can come up with solutions (and support can be provided). The implementation of the solution is done autonomously until the next day of class. At the beginning of the next class, the students still have some time to finish the activity and be able to solve last minute technical questions.

## Assessment

	Description	Qualification	Training and Learning Results			
Laboratory practice	The activities that the student will develop in a non-presential way will be oriented mainly to the acquisition of knowledge in the professional and research field of Computer Science, and to the development of the projects and works requested, either individually or in group.  The performance of activities will be evaluated autonomously in the laboratory and not in person. Learning outcomes: RA01, RA02 and RA03.	60	A2 A3 A5	B1 B2 B8	C4 C9 C20 C21	D1 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13

Objective questions exam	Examination. The dates are given in the section on other comments and second call. Learning outcomes: RA01, RA02 and RA03.	40	A2 A3 A5	B1 B2 B8	C4 C9 C20 C21	D1 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13
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## Other comments on the Evaluation

### CONTINUOUS EVALUATION SYSTEM

The continuous evaluation system consists of two parts: (i) the exam of objective questions and (ii) the laboratory practices.

#### (i). Examination of objective questions

This is an exam that will take place on the date scheduled in the final exam calendar of the center. It will consist of short or multiple-choice questions and will serve to evaluate the theoretical knowledge acquired by the student.

Methodology(s) applied: Examination of objective questions.

% Grading: 40%.

Minimum %: To pass the \*subject the student must obtain a grade between the two tests of the subject higher than 5 out of 10.

Competences assessed: A2, A3, A5, B1, B2, B8, C4, C9, C20, C21, D1, D4, D5, D6, D7, D8, D9, D10, D11, D12 and D13.

Assessed outcomes: R01, R02 and R03.

#### (ii). Laboratory practice

Consists of the delivery of all the laboratory practices proposed throughout the course.

Methodology(ies) applied: Laboratory practicals.

% Grade: 60% in total (around 15% each of them).

Minimum %: To pass the subject the student must obtain a grade between the two tests of the subject higher than 5 out of 10.

Competences assessed: A2, A3, A5, B1, B2, B8, C4, C9, C20, C21, D1, D4, D5, D6, D7, D8, D9, D10, D11, D12 and D13.

Assessed outcomes: R01, R02 and R03.

A student who submits any of the laboratory practicals is understood to be under the continuous evaluation procedure described above.

If a student does not submit any of the tests, he/she will be assigned a grade of 0 in it.

### GLOBAL EVALUATION SYSTEM

When a student does not present any of the laboratory practices, it will be understood that he/she chooses the global evaluation modality.

In the same way as in the previous case, the global evaluation system consists of two parts: (i) the exam of objective questions and (ii) the laboratory practicals.

#### (i). Examination of objective questions

This is an exam that will be held on the date scheduled in the final examination calendar of the center. It will consist of short or multiple-choice questions and will serve to evaluate the theoretical knowledge acquired by the student.

Methodology(s) applied: Examination of objective questions.

Grading %: 40%. Minimum %: To pass the subject the student must obtain a grade between the two tests of the subject higher than 5 out of 10. Competences assessed: A2, A3, A5, B1, B2, B8, C4, C9, C20, C21, D1, D4, D5, D6, D7, D8, D9, D10, D11, D12 and D13.

Assessed outcomes: R01, R02 and R03.

#### (ii). Laboratory practice

It is assumed that the student does not attend regularly to the practical sessions and/or does not make the corresponding deliveries so he/she will have to take an exam that will be held after (and on the same day) the exam of objective questions where the acquisition of the practical knowledge of the subject will be evaluated. Methodology(ies) applied: Examination of laboratory practices.

% Grading: 60% in total (around 15% each one).

Minimum %: To pass the subject the student must obtain a grade between the two tests of the subject higher than 5 out of 10.

Competences assessed: A2, A3, A5, B1, B2, B8, C4, C9, C20, C21, D1, D4, D5, D6, D7, D8, D9, D10, D11, D12 and D13.

Assessed results: R01, R02 and R03.

**EVALUATION CRITERIA FOR THE EXTRAORDINARY AND END-OF-COURSE EXAMS**The continuous and global evaluation systems described above will be used. For these exams, the grades of the parts passed in the common exam will be kept.

**GRADING PROCESS**In any case, the grade that will appear in the minutes will be the weighted mean of the grades recorded in the exam of objective questions and in the laboratory practice.

**EVALUATION DATES**The official exam dates for the different exams, officially approved by the ESEI's Xunta de Centro, are published on the ESEI's web page (<https://esei.uvigo.es>).

**USE OF MOBILE DEVICES**All students are reminded of the prohibition of the use of mobile devices during the evaluation tests. In particular, Article 13.2.d) of the University Student Statute, regarding the duties of university students, establishes the duty to refrain from "the use of or cooperation in fraudulent procedures in evaluation tests, in the work carried out or in official university documents".

#### **QUERY/REQUEST FOR TUTORIALS**

Tutorials can be consulted through the faculty member's personal page, accessible through the address <https://esei.uvigo.es/docencia/profesorado/>.

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#### **Sources of information**

##### **Basic Bibliography**

Gerald Carter, **LDAP System Administration**, 9781565924918, 1, O'Reilly Media, 2003

Docker, **Get Started with Docker** (<https://www.docker.com/get-started>). Last Access 08/07/2022, 2019

Ansible, **Ansible Documentation** (<https://docs.ansible.com>). Last Access 08/07/2022, 2019

Debian, **Debian -- Documentation** (<https://www.debian.org/doc/>). Last Access 08/07/2022, 2019

Samba community, **Samba Wiki** ([https://wiki.samba.org/index.php/Main\\_Page](https://wiki.samba.org/index.php/Main_Page)). Last Access 08/07/2022, 2019

Jeff Geerling, **Ansible for DevOps: Server and configuration management for humans**, 978-0986393426, 2, Leanpub, 2022

##### **Complementary Bibliography**

The Kubernetes Authors, **Kubernetes Documentation** (<https://kubernetes.io/es/docs/home/>). Last Access 08/07/2022, 2019

OpenStack community, **OpenStack Docs: Stein** (<https://docs.openstack.org/stein/index.html>). Last Access 08/07/2022, 2019

Grafana Labs, **Grafana Documentation** (<https://grafana.com/docs/grafana/latest/>). Last Access 08/07/2022, 2019

Yevgeniy Brikman, **Terraform - Up and Running: Writing Infrastructure as Code**, 978-1098116743, 3, O'Reilly Media, 2022

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#### **Recommendations**

##### **Subjects that continue the syllabus**

Security Auditing and Management/O06M132V03203

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

network security/O06M132V03312

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

Security Auditing and Management/O06M132V03203

##### **Other comments**

The student must be able to use the tools of the Internet to obtain information (search engines, forums, etc.).

It is recommended to have typing skills for this and other subjects.