Universida de Vigo

IDENTIFYING DATA
Operating Systems

Subject	Operating Systems
Code	V05G306V01303
Study programme	Grado en Ingeniería de Tecnologías de Telecomunicación

Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	1st

Teaching language	Spanish
Department	
Coordinator	Rivas Costa, Carlos
Lecturers	Rivas Costa, Carlos
E-mail	carlos.rivas.costa@gmail.com
Web	http://moovi.uvigo.es
General description	The aim of this subject is that the student was able to learn the foundations of the current operating systems and to comprise its importance inside the architecture of a computer.

Training and Learning Results

Code	
B3	CG3: The knowledge of basic subjects and technologies that enables the student to learn new methods and technologies, as well as to give him great versatility to confront and adapt to new situations
B4	CG4: The ability to solve problems with initiative, to make creative decisions and to communicate and transmit knowledge and skills, understanding the ethical and professional responsibility of the Technical Telecommunication Engineer activity.
B9	CG9: The ability to work in multidisciplinary groups in a Multilanguage environment and to communicate, in writing and orally, knowledge, procedures, results and ideas related with Telecommunications and Electronics.
C33	CE33/TEL7 The ability to program network and distributed applications and services.
D2	CT2 Understanding Engineering within a framework of sustainable development.
D3	CT3 Awareness of the need for long-life training and continuous quality improvement, showing a flexible, open and ethical attitude toward different opinions and situations, particularly on non-discrimination based on sex, race or religion, as well as respect for fundamental rights, accessibility, etc.
D4	CT4 Encourage cooperative work, and skills like communication, organization, planning and acceptance of responsibility in a multilingual and multidisciplinary work environment, which promotes education for equality, peace and respect for fundamental rights.

Expected results from this subject

Expected results from this subject	Training and Learning Results		
Understanding of the basic functions of the operating system as part of a computer system.	B3		D3
Knowledge of the main concepts and the principles of design of the operating systems.	B3		D3
Ability to identify the components of an operating system, recognise its functions and the interrelationships between them.	B3		D3
Knowledge of the lastest advances and tendencies related with operating systems	B3		D3
Knowledge and ability to evaluate the different alternatives for the design of an operating system and its main components.	B4		D2
Acquisition of basic skills for the configuration and the utilisation of operating system services.	B9	C33	D4
Manage and know the operative associated to the administration of current operating systems.	B3		D3

Contents

Topic

Introduction and general perspective of the Operating systems	&#149; Concept of operating system. &#149; Structure of an operating system. &#149; Types of operating systems. &#149; Emulation and virtualization.
Processor management.	&#149; Concept of process and thread. &#149; Strategies of allocation of capacity of computation.
Memory management.	&#149; Strategies of contiguous allocation. &#149; Concepts of fragmentation, protection, compactation, relocation and sharing of memory. &#149; Strategies of non-conriguous allocation: paging, segmentation and hybrid methods. &#149; Virtual memory.
Permanent storage of the information.	&#149; Functions of a file system. Concepts of file and directory. &#149; Interface with the file system. &#149; File sharing. &#149; File Protection. &#149; File system implementation. &#149; Free space management. &#149; Methods for allocation of space to files.
Input/Output (I/O) management.	&#149; I/O Controllers. &#149; I/O Interfaces. &#149; Secondary and tertiary storage. &#149; Disk scheduling. &#149; Management of disk. &#149; Replication and consistency of the information. RAID and RAIN technologies.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	18	46	64
Practices through ICT	13	26	39
Workshops	5	30	35
Problem and/or exercise solving	1	0	1
Problem and/or exercise solving	1	0	1
Problem and/or exercise solving	1	0	1
Laboratory practice	1	0	1
Essay	2	6	8

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

Methodologies

	Description
Lecturing	Presentation of the ideas, concepts, technics and algorithms of each lesson. This activity develops the CG3, CG4, CT2 and CT3 competencies.
Practices through ICT	The students will resolve under the supervision of the professors practical problems that pose in each session of laboratory. This activity develops the CG4, CT2 and CE33 competencies.
Workshops	Each group of students will tackle the design and implementation of a software project with half complexity. This task will be realised in successive steps, that will be discussed and validated in each one of the face-to-face sessions. The aim of this methodology of work is to provide a suitable feedback to improve the proposed solutions. This activity develops the CG4, CG9, CT2 and CT4 competencies.

Personalized assistance

Methodologies	Description
Practices through ICT	The professor will be present during the realisation of the practices, answering all the doubts that can arise to the students. Tutoring: The schedules and mechanisms for requesting tutoring can be consulted through the Moovi platform https://moovi.uvigo.gal
Workshops	The professor will be present during the realisation of the workshops, answering all the doubts that can arise to the students. Tutoring: The schedules and mechanisms for requesting tutoring can be consulted through the Moovi platform https://moovi.uvigo.gal

		Lecturing	During the development of the master sessions, the students will be able to interrupt and formulate all the questions or doubts that can arise them. Tutoring: The schedules and mechanisms for requesting tutoring can be consulted through the Moovi platform https://moovi.uvigo.gal

Assessment

	Description	Qualification	Training and Learning Results	
Problem and/or exercise solving	Proof of theoretical contents exposed in the master classes.	20	B3 B4	D2 D3
Problem and/or exercise solving	Proof of theoretical contents exposed in the master classes.	20	B3 B4	D2 D3
Problem and/or exercise solving	Proof of theoretical contents exposed in the master classes.	20	B3 B4	D2 D3
Laboratory practice	Validation of the work realised in the sessions of laboratory.	20	B4 C33	D2
Essay	In the last face-to-face session of workshop, students will deliver and will expose to their mates the design and the proposed solution for their project. This solution will be exposed to debate for students and professors. The professor will do questions to each member of the group, what will allow his individual evaluation.	20	B4 B9	D2 D4

Other comments on the Evaluation

The subject can be surpassed by means of Continuous Assessment according to the following criteria, having opened the possibility to opt by the Exam-only assessment anytime until the beginning of the final examination to celebrate the day fixed to such effect in the official calendar of the EET. All those students that opt by the Continuous Assessment will consider presented if they evaluate of the part of the work in Workshops.

Continuous Assessment:

The final note will result of the sum of the corresponding notes to the three following components:

1.   Three tests of type short answer questions to evaluate the contents given in the masterclasses. Each proof will take place in one of the master classes , except the last that will realize in one of the sessions of the Workshop. **Scoring:** Up to 2 points each test. (T=t1+t2+t3)

2.   One Practical Test that will realize at the last session of laboratory. **Scoring:** Up to 2 points. (L)

3.   Presentation of the Project proposed like work in the sessions of the Workshop. **Scoring:** Up to 2 points. (P)

To pass the subject by Continuous Assessment will have to give the three following conditions: (i) obtain an equal or upper qualification to 2 points in the group of the tests.; (ii) More than 0,75 points in the practical test; and (iii) to attend all the face-to-face sessions and obtain more than 0 points in the presentation of the project. In the case to fulfill the three previous conditions, the final mark of the Continuous Assessment will be the sum of the three components (Mark=T+L+P). If the student does not fulfill any of the three conditions, the mark of the Continuous Assessment will be a fail (Mark=min[4.9, T+L+P]).

Global Assessment:

By means of an examination on 10 points scheduled in the official calendar of the EET.

Extraordinary Exam and End-of-program exam:

It will be governed by the indicated for the Global Assessment.

Sources of information

Basic Bibliography

Abraham Silberschatz, Greg Gagne y Peter B. Galvin, **Operating System Concepts**, 10, Wiley, 2018

Robert Love, **Linux Kernel Development**, 3, Addison-Wesley Professional, 2010

Complementary Bibliography

William Stallings, **Operating Systems: Internals and Design Principles**, 9, Prentice Hall, 2018

Gary Nut, **Operating System : A Modern Perspective**, 3, Adison-Wesley Longman, Inc., 2004

Jesús Carretero, Felix García, Pedro de Miguel y Fernando Pérez, **Sistemas Operativos: Una Visión Aplicada**, 2, McGraw Hill, 2007

Ralf Steinmetz y Klara Nahrstedt, **Multimedia Systems**, 1, Springer, 2004

Frederic Magoules , Jie Pan, Kiat-An Tan y Abhinit Kumar, **Introduction to Grid Computing**, 1, CRC Press, 2009

John Rittinghouse y James Ransome, **Cloud Computing: Implementation, Management, and Security**, 1, CRC Press, 2009

Charles Crowley, **Operating Systems: A Design-Oriented Approach**, 1, McGraw Hill, 1996

Andrew S. Tanenbaum, **Modern Operating Systems**, 4, Prentice Hall, 2014

Daniel P. Bovet y Marco Cesati, **Understanding the Linux Kernel**, 3, O'Reilly Media, 2005

Wolfgang Mauerer, **Professional Linux Kernel Architecture (Wrox Programmer to Programmer)**, 1, Wrox, 2008

Recommendations

Subjects that it is recommended to have taken before

Informatics: Computer Architecture/V05G301V01109

Programming I/V05G301V01105

Programming II/V05G301V01110