



IDENTIFYING DATA

Operating Systems

Subject	Operating Systems			
Code	V05G300V01541			
Study programme	(*)Grao en Enxeñaría de Tecnoloxías de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	1st
Teaching language	Spanish			
Department				
Coordinator	Pazos Arias, José Juan			
Lecturers	Pazos Arias, José Juan Ramos Cabrer, Manuel			
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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.			

Competencies

Code	
A3	CG3: The knowledge of basic subjects and technologies that capacitates the student to learn new methods and technologies, as well as to give him great versatility to confront and update to new situations
A4	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.
A9	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.
A42	CE33/TEL7 The ability to program network and distributed applications and services.

Learning aims

Expected results from this subject	Training and Learning Results
CG3: The knowledge of basic subjects and technologies that capacitates the student to learn new methods and technologies, as well as to give him great versatility to confront and update to new situations	A3
Knowledge of the main concepts and the principles of design of the operating systems.	A3
Ability to identify the components of an operating system, recognise its functions and the interrelationships between them.	A3
Knowledge of the latest advances and tendencies related with operating systems	A3
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.	A4
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.	A9
TEL7 The ability to program network and distributed applications and services.	A42
Acquisition of basic skills for the configuration and the utilisation of operating system services.	A42

Contents

Topic

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

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	20	46	66
Practice in computer rooms	13	26	39
Workshops	5	30	35
Multiple choice tests	1	0	1
Practical tests, real task execution and / or simulated.	1	0	1
Jobs and projects	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
Master Session	Presentation of the ideas, concepts, technics and algorithms of each lesson. This activity develops the CG3 and CG4 competencies.
Practice in computer rooms	The students will resolve under the supervision of the professors practical problems that pose in each session of laboratory. This activity develops the CG4 and CE33/TEL7 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 and CG9 competencies.

Personalized attention

Methodologies	Description
Practice in computer rooms	Personalised attention will be provided through individual and face-to-face meetings in the timetables published at start of the course. In the practices of laboratory and workshops, this attention will be provided by means of the follow-up of the work of each student, monitoring the partial solutions proposed and reorienting them if it was precise.
Workshops	Personalised attention will be provided through individual and face-to-face meetings in the timetables published at start of the course. In the practices of laboratory and workshops, this attention will be provided by means of the follow-up of the work of each student, monitoring the partial solutions proposed and reorienting them if it was precise.

Master Session	Personalised attention will be provided through individual and face-to-face meetings in the timetables published at start of the course. In the practices of laboratory and workshops, this attention will be provided by means of the follow-up of the work of each student, monitoring the partial solutions proposed and reorienting them if it was precise.
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Assessment		
	Description	Qualification
Multiple choice tests	Proof of theoretical contents exposed in the master classes. In these works, CG3 and CG4 competencies will be evaluated.	60
Practical tests, real task execution and / or simulated.	Validation of the work realised in every laboratory session. In these works, CG4 and CE33/TEL7 competencies will be evaluated.	20
Jobs and projects	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. In these works, CG4 and CG9 competencies will be evaluated.	20

Other comments on the Evaluation

The subject can be surpassed by means of Continuous Evaluation according to the following criteria, having opened the possibility to opt by the No Continuous Evaluation 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 evaluation will consider presented if they evaluate of the part of the work in Workshops.

Continuous evaluation:

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

1. Four proofs of type Test to evaluate the contents given in the masterclasses. Each proof will take place in one of the master classes , except the last that will realise in one of the sessions of the Workshop.

Punctuation: Up to 1,5 points each proof.

2. Six Practical Proofs that will realise when finalising each one of the sessions of laboratory and that will consist in the validation of the results obtained during said session.

Punctuation: Up to 1/3 points each proof.

3. Presentation of the Project proposed like work in the sessions of the Workshop.

Punctuation: Up to 2 points.

To pass the subject by Continuous Evaluation 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) Upper qualification to 0 points in, at least, four of the six practical proofs; and (iii) to attend all the face-to-face sessions and obtain more than 0 points in the presentation of the project.

No Continuous Evaluation:

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

Final Call:

It will be governed by the indicated for the No Continuous evaluation.

Sources of information

Basic referemces:

1. "Operating System Concepts". Abraham Silberschatz, Greg Gagne y Peter B. Galvin, 8ª edición actualizada. 2011, Wiley.
2. "Understanding the Linux Kernel". Daniel P. Bovet y Marco Cesati, 3ª edición. 2005, O'Reilly Media.
3. "Hello, Android: Introducing Google's Mobile Development Platform". Ed Burnette, 3ª edición. 2010, Pragmatic Bookshelf.

Complementary references:

1. "Operating Systems: Internals and Design Principles". William Stallings, 7ª edición. 2011, Prentice Hall.
2. "Operating System : A Modern Perspective". Gary Nut, 3ª edición. 2004, Adison-Wesley Longman, Inc.
3. "Sistemas Operativos: Una Visión Aplicada". Jesús Carretero, Felix García, Pedro de Miguel y Fernando Pérez, 2ª edición. 2007, McGraw Hill.
4. "Multimedia Systems". Ralf Steinmetz y Klara Nahrstedt, 1ª edición. 2004, Springer.
5. "Introduction to Grid Computing". Frederic Magoules , Jie Pan, Kiat-An Tan y Abhinit Kumar, 1ª edición. 2009, CRC Press.
6. "Cloud Computing: Implementation, Management, and Security". John Rittinghouse y James Ransome, 1ª edición. 2009, CRC Press.
7. "Operating Systems: A Design-Oriented Approach". Charles Crowley, 1ª edición. 1996, McGraw Hill.
8. "Modern Operating Systems". Andrew S. Tanenbaum, 3ª edición. 2007, Prentice Hall.
9. "Linux Kernel Development". Robert Love, 3ª edición. 2010, Addison-Wesley Professional.
10. "Professional Linux Kernel Architecture (Wrox Programmer to Programmer)". Wolfgang Mauerer, 1ª edición. 2008, Wrox.
11. "Unlocking Android: A Developer's Guide". Frank Ableson, Charlie Collins y Robi Sen, 1ª edición. 2009, Manning Publications.
12. "The Busy Coder's Guide to Advanced Android Development". Mark L .Murphy, 1ª edición. 2011, CommonsWare, LLC.

Recommendations

Subjects that continue the syllabus

Distributed and Concurrent Programming/V05G300V01641

Information Systems/V05G300V01644

Subjects that are recommended to be taken simultaneously

Network Security/V05G300V01543

Subjects that it is recommended to have taken before

Informatics: Computer Architecture/V05G300V01103

Programming I/V05G300V01205

Programming II/V05G300V01302
