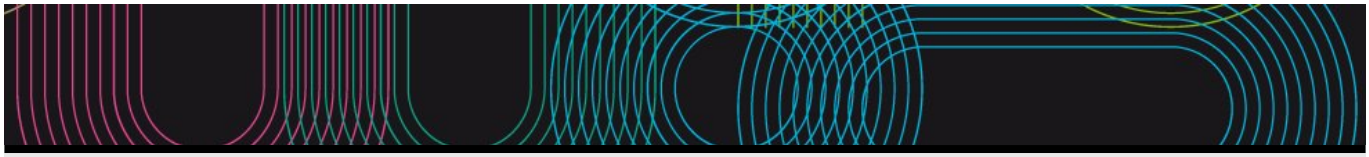

IDENTIFYING DATA				
Wireless and mobile networks				
Subject	Wireless and mobile networks			
Code	V05G300V01942			
Study programme	Degree in Telecommunications Technologies Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	Spanish Galician			
Department				
Coordinator	López Bravo, Cristina			
Lecturers	López Bravo, Cristina			
E-mail	clbravo@det.uvigo.es			
Web	http://faitic.uvigo.es			
General description	The subject "Wireless and Mobile Networks" (redes sen fíos e móbiles) examines the area of wireless and mobile networks, one of the technological basis of the present society, studying the existing challenges for the communications protocols, and looks at the opportunities that provides continuous connectivity even in movement. The focus of this subject will be on network protocols above physical layer (nevertheless, it will touch the most important physical layer properties). The documentation will be available in english.			

Competencies	
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.
C85	(CE85/OP28) The ability to analyze, plan and deploy wireless communication networks for different coverage ranges: metropolitan, local and short range.
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.

Learning outcomes			
Expected results from this subject	Training and Learning Results		
Understand the main concepts of wireless communications.	B3	C85	D2 D3
Understand the main concepts of mobile communications.	B3	C85	D2 D3
Know the main protocols used in wireless communication networks.	B3	C85	D2 D3

Know the architectures used in wireless communication networks.	B3	C85	D2 D3
Ability to design mobile wireless networks.	B4 B9	C85	D2 D3 D4

Contents	
Topic	
Introduction to wireless communications	Channel characteristics Multiple access Modulation
Principles of operation of wireless networks	Mobility management Introduction to ubiquitous computing Ad hoc networks, routing Security Network topologies
Wide area networks	Architecture Mobile networks Network topologies Practical case
Local networks	Architecture: ad hoc and infrastructure based networks User authentication approaches Security Quality of services Practical case
Low range networks	Architecture Bandwidth/power consumption balance Personal communication Industrial communication

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	19	38	57
Integrated methodologies	6	28	34
Laboratory practises	13	39	52
Reports / memories of practice	0	3	3
Systematic observation	1	0	1
Jobs and projects	1	0	1
Short answer tests	2	0	2

*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	Professors present the main theoretical contents related to wireless and mobile networks. Through this methodology the competencies CG3 and CE85 are developed.
Integrated methodologies	Team development of the design, implementation and validation of a protocol, system, application or service. Through this methodology the competencies CG3, CG4, CG9, CE85, CT2, CT3 and CT4 are developed.
Laboratory practises	Students will complete guided and supervised practices in the laboratory. Through this methodology the competencies CG3, CG4 and CE85 are developed.

Personalized attention

Methodologies	Description
Master Session	The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. Questions will be answered during the master sessions or during tutorial sessions. Teachers will establish timetables for this purpose at the beginning of the course. This schedule will be published on the subject website.
Integrated methodologies	The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. Questions will be answered during the supervising sessions or during tutorial sessions. Teachers will establish timetables for this purpose at the beginning of the course. This schedule will be published on the subject website.

Laboratory practises	The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. Questions will be answered during the lab sessions or during tutorial sessions. Teachers will establish timetables for this purpose at the beginning of the course. This schedule will be published on the subject website.

Assessment

	Description	Qualification	Training and Learning Results
Master Session	Students will be evaluated to asses what they have learned in master sessions.	30	B3 C85
Integrated methodologies	Students will be divided in groups to complete the design, implementation and validation of a protocol, a system, an application or service. The result will be evaluated after the delivery, having into account key aspects such as the correction, the quality, the performance and the functionalities. In addition, during the implementation of the project, the design and the evolution of the development will be evaluated. The evaluation will be by group and by person: each one of the members of a team must document his/her tasks and answer the questions related to them.	50	B3 C85 D2 B4 D3 B9 D4
Laboratory practises	Students will fill lab reports, individually, to asses the correct realization and understanding of the laboratory tasks.	20	B3 C85 B4

Other comments on the Evaluation

In order to pass the course it is necessary to complete the different parts of the course (master sessions, practices in labs, and tutored works - integrated methodologies). The final grade will be the **weighted geometric mean** of the grades of the different parts (i.e. it is not possible to pass the subject with a zero in one part). If "x" is the grade obtained for the master sessions, "y" for the practices in labs, and "z" for the tutored works - integrated methodologies, the final grade will be: FG = x^0.3*y^0.2*z^0.5.

During the first month, students must declare if they opt for continuous or final assessment. Students who select continuous assessment and submit the first task or lab report may not be listed as "Not Present".

Students that opt by the final assessment procedure, must submit an additional dossier with detailed information about the events and issues that arose during the execution of the different tasks, and especially the tutored work. In addition, during the first month of the course, professors will notify students if they have to do the tutored work individually, in the case they opt for final assessment.

Second opportunity to pass the course

The course final exam will only be held for students who failed the course in the first oportunity (semester final exam).

In order to pass the course it is necessary to complete the different parts of the subject, which will be evaluated as is indicated in the tests description section. Besides, it will be necessary to submit an additional dossier with detailed information about the events and issues that arose during the execution of the different tasks, and especially the tutored work.

Students that have opted by the continuous assessment procedure, can decide to maintain the grades of the parts they have already passed in the first opportunity or discard them.

Other comments

The documentation will be in English. The course will be tough in Spanish and Galician (including examns). Hower students will be able to ansewr in English, Spanish or Galician, as they prefer.

The grades obtained are only valid for the current academic year.

Although the tutored work will be completed (if possible) in groups, the performance of each student in his or her group will be analyzed continuously

Although the tutored work will be completed (if possible) in groups, the performance of each student in his or her group will be monitored continuously. In the case in which the performance of a member of the group wouldn't be adequate compared with the performance of his or her team mates, he or she could be excluded from the group and/or qualified individually.

The use of any material during the tests will have to be explicitly authorized.

In case of detection of plagiarism in any of the tasks/tests done, the final grade will be "failed (0)" and the professors will

communicate the incident to the head of the school to take the measures that they consider appropriate.

Sources of information

Basic Bibliography

Coty Beard, William Stallings, **Wireless communication networks and systems**, 1, Pearson Education, 2013

Viajy Garg, **Wireless Communications and Networking**, 1, Morgan Kaufmann-Elsevier, 2007

Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farre, **Wireless Networking Complete**, 1, Morgan Kaufmann-Elsevier, 2010

Kaveh Pahlavan, Prashant Krishnamurthy, **Networking Fundamentals: Wide, Local and Personal Area Communications**, 1, Wiley and Sons, 2009

Kevin Townsend, Carles Cufí, Akiba, Robert Davidson, **Getting started with Bluetooth Low Energy**, 1, O'Reilly, 2014

Complementary Bibliography

James F. Kurose, Keith W. Ross, **Computer Networking: A Top-Down Approach**, 7, Pearson Education, 2017

Recommendations

Subjects that it is recommended to have taken before

Computer Networks/V05G300V01403

Data Networks: Technology and Architecture/V05G300V01542