



IDENTIFYING DATA

Wireless Networks and Ubiquitous Computation

Subject	Wireless Networks and Ubiquitous Computation			
Code	V05M145V01211			
Study programme	Telecommunication Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	5	Optional	1st	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Gil Castiñeira, Felipe José			
Lecturers	Gil Castiñeira, Felipe José López Bravo, Cristina			
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General description	The subject "Wireless Networks and Ubiquitous Computing" examines mobile communications, the new services that they enable, and the technologies that support them. That is, this subject studies the different wireless communication systems, the more renowned protocols, the predominant architectures, and the new services enabled by the ubiquitous computing paradigm.			

The subject is taught in Galician and Spanish, but the documentation is written in English.

Competencies

Code	
A1	CB1 The knowledge and understanding needed to provide a basis or opportunity for being original in developing and/or applying ideas, often within a research context.
A5	CB5 Students must have learning skills to allow themselves to continue studying in largely self-directed or autonomous way
B3	CG3 The ability to lead, plan and monitor multidisciplinary teams.
B8	CG8 The ability to apply acquired knowledge and to solve problems in new or unfamiliar environments within broader and multidiscipline contexts, being able to integrate knowledge.
B12	CG12 To have skills for lifelong, self-directed and autonomous learning.
C4	CE4 The ability to design and plan networks for transporting, broadcasting and distribution of multimedia signals.
C6	CE6 The ability to model, design, implement, manage, operate, and maintain networks, services and contents.
C7	CE7 The capacity for planning, decision making and packaging of networks, services and applications, taking into account the quality of service, direct and operating costs, plan implementation, monitoring, safety procedures, scaling and maintenance, as well as managing and ensuring quality in the development process.
C9	CE9 The ability to solve convergence, interoperability and design of heterogeneous networks with local, access and trunk networks; as well as the integration of telephonic, data, television and interactive services.
C24	CE24/TE1 Ability to understand the fundamentals of distributed systems and distributed computing paradigms, and its application in the design, development and management in grid, ubiquitous computing scenarios and cloud systems.

Learning outcomes

Expected results from this subject	Training and Learning Results
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To understand the basic concepts for wireless communications.	A1
To understand the basic concepts behind mobile communications.	A5 B3 B8
To know the main protocols and architectures used in wireless and mobile networks.	B12 C4
Knowledge of the basis and main concepts of ubiquitous/pervasive computing.	C6 C7
To understand the relationship/dependence between ubiquitous computing and context information (context-aware computing). To know different pervasive computing systems. Knowledge of recent advances and trends related to ubiquitous computing.	C9 C24

Contents

Topic	
Principles of wireless networks.	Channel characteristics; medium access control; mobility management; routing and discovery; security issues.
Architectures and standards.	Wireless access/local/personal area networks; wireless sensor networks; TCP/IP issues related with the connectivity/communication of wireless/mobile devices.
Basis of ubiquitous computing.	Context-aware computing; service architecture; data dissemination and management; synchronization and consistency; service discovery.

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	15	22.5	37.5
Laboratory practises	10	10	20
Integrated methodologies	5	57.5	62.5
Long answer tests and development	2	0	2
Reports / memories of practice	0	2	2
Jobs and projects	1	0	1

*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 will present the main theoretical contents related with wireless networks and ubiquitous computing. This methodology will contribute to develop the competences CE4, CE6, CE7, CE9, CE24.
Laboratory practises	Students will complete guided and supervised practices in the laboratory. With this methodology students will develop competences CE4, CE6 and CE24.
Integrated methodologies	Students will work in group in the design, implementation and validation of a protocol, system, application or service. With this methodology students will work in the development of competences CB1, CB5, CG8, CG3, CG12, CE7 and CE9.

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.
Laboratory practises	The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. The professors will guide and help the students to complete the assigned laboratory practises. 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.
Integrated methodologies	The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. The professors will guide and help the students to complete the assigned project. Questions will be answered during the supervising sessions, group 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.

Assessment

Description	Qualification	Training and Learning Results

Master Session	Students will complete an exam to assess what they have learned in master sessions.	40	A1	C4 C6 C7 C9 C24
Laboratory practises	The students will fill questionnaires and/or reports to assess the correct completion and understanding of the laboratory tasks. The concepts studied in the laboratory can be also part of the final exam.	20	A1 A5	C4 C6 C7 C9 C24
Integrated methodologies	The students will work in groups in the design, implementation and proof of a protocol, system, 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.	40	A1 A5	B3 B8 B12 C4 C6 C7 C9 C24

Other comments on the Evaluation

In order to pass the course it is necessary to complete the different parts of the subject (master sessions, practices in labs, and projects). 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 project, the final grade will be: $grade = x^{0.4} * y^{0.2} * z^{0.4}$

During the first month, students must provide a written declaration to opt for final assessment. In other case, it will be considered that they opt for continuous assessment. Students who select continuous assessment and submit the first task or questionnaire may not be listed as "Absent".

Students who opt for the final assessment procedure must pass the short answer test (40%), submit a project (40%) and submit the laboratory practises (20%). These parts will be evaluated as indicated in the tests description section. The final grade will be the **weighted geometric mean** of the grades of the different parts. Besides, they must submit an additional dossier that must be defended in-person in front of the professors, with detailed information about the events and issues that arose during the execution of the different tasks, and especially the project. In addition, during the first month of the course, professors will notify students who opted for final assessment if they have to do the tutored work individually.

Although the project will be developed in groups, the ongoing activities of each student in a group will be monitored individually. In case a student's performance is below his or her group mates, he or she could be expelled from the group or graded on an individual basis.

Second opportunity to pass the course

The end of course exam will only be held by students who failed the end of semester exams.

In order to pass the course it is necessary to complete the different parts of the subject: pass the short answer test (40%), submit a project (40%) and submit the laboratory practises (20%). These parts will be evaluated as indicated in the tests description section. The final grade will be the **weighted geometric mean** of the grades of the different parts. Besides, it will be necessary to submit an additional dossier that must be defended in-person in front of the professors, with detailed information about the events and issues that arose during the execution of the different tasks, and especially the project.

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 grades obtained are only valid for the current academic year.

Although the tutored work will be completed (if possible) in groups, each student should keep a record of his or her activities. 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 or unethical behavior in any of the tasks/tests done, the final grade will be "failed (0)" and the professors will communicate the incident to the academic authorities to take the appropriate measures.

Sources of information

Cory Beard, William Stallings, **Wireless Communication Networks and Systems**, 1,

Viajy Garg, **Wireless Communications and Networking**, 1,

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

Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farre, **Wireless Networking Complete**, 1,

F. Adelstein, Sandeep K.S. Gupta, Golden G. Richard III, Loren Schwiebert, **Fundamentals of Mobile and Pervasive Computing**, 1,

Jean-Philippe vasseur, Adam Dunkels, **Interconnecting smart objects with IP**, 1,

James F. Kurose, Keith W. Ross, **Computer Networking: A Top-Down Approach**, 6,

Recommendations
