IDENTIFYING DATA
Telematics arquitectures and services

Subject	Telematics arquitectures and services				
Code	V05G300V01645				
Study programme	Degree in Telecommunications Technologies Engineering				
Descriptors	ECTS Credits		Choose	Year	Quadmester
	6		Optional	3rd	2nd
Teaching language	Spanish				
Department	Telematics Engineering				
Coordinator	Mikic Fonte, Fernando Ariel				
Lecturers	Caeiro Rodríguez, Manuel Mikic Fonte, Fernando Ariel				
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General description	This course focuses on the architectonic solutions for the design of distributed systems. More specifically, the course is oriented to scenarios based on services (service-oriented architectures) and the deployment of SOA solutions by means of Web Services Technologies (WS-*). Taking the WS-* stack as our techonological layout, the course focuses on the description, discovery and invocation of services in SOA. Finally, the course introduces models for services composition in SOA (again using Web Services as deployment technology). This subject will be taught in Spanish.				

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.
B6	CG6: The aptitude to manage mandatory specifications, procedures and laws.
C29	CE29/TEL3 The ability to build, operate and manage computer services using planning, sizing and analytical tools
C32	CE32/TEL6 The ability to design networks and service architectures.
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.

Learning outcomes

Expected results from this subject	Training and Learning Results		
To know the main architectures for telematic services of medium & high complexity.	B3 B6	C29 C32	D2 D3
To Understand the concept of middleware as a supporting element for services, and to know the main models used today.	B3	C29 C32	
To understand the importance and utility of web services for the development of telematic services.	B6	C29 C32	
To know the main technologies to build complex services by combining other services.	B6	C29 C32	
To master the basic concepts and technologies associated with the management of services and their security.	B3	C29 C32	

| To Acquire skills to build complex telematic services. | B4 | D2 |
| | | D3 |

Contents

Topic	
Introduction	▯ Distributed Systems. ▯ Client-server Model: RPC. ▯ Message Middlewares. ▯ Web Services and SaaS. ▯ SOA : Roles, operations, layers.
Web Services	▯ Simple SOA with REST. ▯ API Styles for Web Services. ▯ RPC, messages and resources APIs. ▯ Stack of Web Services technologies.
Technological Basis	▯ Review of XML. ▯ SOAP Protocol & Messages. ▯ WSDL: Description of Services. ▯ Services Discovery.
Designing Services	▯ Design of Web Services. ▯ Web Service LifeCycle. ▯ Implementation Axis2.
Composing Services	▯ Model of composition ▯ Orchestration and choreography ▯ Orchestration with WS-BPEL ▯ Description of choreography: WS-CDL
Addressing services	▯ Introduction to WS-Addressing. ▯ Routing SOAP messages ▯ Notification services.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	19	38	57
Computer practices	10	20	30
Problem solving	3	6	9
Project based learning	2	22	24
Presentation	2	8	10
Laboratory practice	4	8	12
Essay questions exam	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	Classes that will combine the exhibition of the concepts and small exercises. These will be resolved by the teacher or by the students individually and/or in groups. The aim is to boost the debate in the class and reinforce the acquisition of skills. COMPETENCES: CG3, CE29, CE32
Computer practices	During all the course, the lab sessions will be devoted to the development of small prototypes that allow to materialise the fundamental concepts of the course. COMPETENCES: CG4, CG6
Problem solving	In the laboratory or in the classroom, the professor will pose small challenges that will be resolved collectively so that the students can discuss abouth the underlying concepts and the different options. COMPETENCES: CG3, CG4.
Project based learning	The students, in groups, will develop a software system with specific requirements. The follow-up of the project will be carried out during the C sessions. COMPETENCES: CE29, CE32, CT2, CT3
Presentation	Each workgroup will justify in an oral presentation the adopted solution for the course project and its performance. COMPETENCES: CG4, CT2, CT3

Personalized attention

Methodologies	Description

Project based learning	The students, organized in groups, develop a project that addresses the design and implementation of a distributed service-oriented architecture. Personalized attention related to these projects will take place in the sessions type C in the course. In each session of personalized attention, groups would discuss with the teacher the following questions concerning the progress of the project: What work has been addressed since the previous meeting? What problems have been found? What problems have not been solved? and What is the planning of future work?			

Assessment

	Description	Qualification	Training and Learning Results	
Project based learning	Each workgroup will deliver a preliminary design of the project and later the final implementation of the course project. The delivery will consist of the design, implementation and documentation. After delivering the project, a practical test will be performed on the project implemented by each of the groups .	20	B4 B6	C32 D2 D3
Presentation	Each workgroup will justify in an oral presentation the solution adopted in his project. They also will give to the teachers an explaination about the project. Questions will be asked to each member of the group individually to verify the involvement of each student in the project.	10	B4	D2 D3
Laboratory practice	One individual practical test will be made. Each student will carry out an exercise to demonstrate competence in the use of course technologies in a practical setting.	10	B6	C29
Essay questions exam	Individual writing test will take place in the date indicated in the official calendar of exams. Books, class notes and other matrial will not be allowed during the exam.	60	B3	C29 C32

Other comments on the Evaluation

In first call students can follow up a continuous assessment or an eventual assessment model. Once a student selects ⬚continuous assessment⬚ (having done the first intermediate practical assignment) his/her grade will never be ⬚not taken⬚.

Final grade will be calculated using the weighted geometric mean formula with two partial results: (i) written exam (60%) and (ii) practical assignments (40%).

- The written exam will take place when and where the official calendar specifies.
- Practical assignments:

    1. Continuous assessment: 1 intermediate practical assignment (10%) and the course project: design (5%), implementation (15%), and presentation (10%). Grade will be individual.
    2. Eventual assessment: Delivery of practical assignment and project.

In second call and extraordinary call scheme is exactly the same as the eventual assessment (with the possible modifications of practice and/or project that will be specified at the convenient time).

The schedule of the intermediate exams/assignments will be approved in the Comisión Académica de Grado (CAG) and will be available at the beginning of each academic semester.

Plagiarism is regarded as serious dishonest behavior. If any form of plagiarism is detected in any of the tests or exams, the final grade will be FAIL (0), and the incident will be reported to the corresponding academic authorities for prosecution

Sources of information

Basic Bibliography

Michael Papazoglou, **Web Services & SOA: Principles and Technology**, 1, Pearson Education, 2012

Deepal Jayasinghe, Arkham Azeez, **Apache Axis2 Web Services**, 2, Packt Publishing, 2011

Complementary Bibliography

Steve Graham, Doug Davis, Simeon Simeonov, Glen Daniels, Peter Brittenham, Yuichi Nakamura, Paul Fre, **Building Web Services with Java: Making Sense of XML, SOAP, WSDL, and UDDI**, 1, Sams, 2004

Thomas Erl, **Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services**, 1, Prentice Hall, 2004

Eric Newcomer, **Understanding Web Services: XML, WSDL, SOAP, and UDDI**, 1, Addison-Wesley Professional, 2002

Mark D. Hansen, **SOA Using Java Web Services**, 1, Prentice Hall, 2007

George F. Coulouris, **Distributed Systems: Concepts and Design**, 5, Addison Wesley, 2011

Harvey M. Deitel, Paul J. Deitel, B. DuWaldt, L. K. Trees, **Web Services: A Technical Introduction**, 1, Prentice Hall, 2002

Robert Daigneau, **Service Design Patterns: Fundamental Design Solutions for SOAP/WSDL and RESTful Web Services**, 1, Addison-Wesley Professional, 2011

Nicolai M. Josuttis, **SOA in Practice: The Art of Distributed System Design (Theory in Practice)**, 1, O'Reilly Half, 2007

Binildas To. Christudas, **Service Oriented Architecture with Java: Using SOA and Web Services to build powerful Java applications**, 1, Packt Publishing, 2008

Michael Rosen, **Applied SOA: Service-Oriented Architecture and Design Strategies**, 1, Wiley, 2008

Thomas Erl, **SOA Principles of Service Design**, 1, Prentice Hall, 2007

Thomas Erl, **Service-Oriented Architecture (SOA): Concepts, Technology, and Design**, 1, Prentice Hall, 2005

Recommendations

Subjects that it is recommended to have taken before

Programming II/V05G300V01302

Internet Services/V05G300V01501