Universida_{de}Vigo

IDENTIFYING DATA

Architectures and Services

Subject	Architectures and Services				
Code	V05G301V01310				
Study programme	Grado en Ingeniería de Tecnologías de Telecomunicación				
Descriptors	ECTS Credits		Choose	Year	Quadmester
	6		Optional	3rd	2nd
Teaching language	Spanish Galician				
Department					
Coordinator	Mikic Fonte, Fernando Ariel				
Lecturers	Mikic Fonte, Fernando Ariel				
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Web	http://moovi.uvigo.es				
General description	This course focuses on the architectonic solutions for the design of telematic services. More specifically, the course is oriented to scenarios based on services (service-oriented architectures) and the deployment of SOA and RESTful solutions by means of Web Services Technologies. Taking the Web Services as our techonological layout, the course focuses on the description, discovery and invocation of services in SOA and ReSTful. Finally, the course introduces models for services composition in SOA and RESTful (again using Web Services as deployment technology). This subject will be taught in Spanish and Galician.				

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.
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.

Expected results from this subject

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 telematic services.	B3	C29 C32	
To acquire skills to build complex telematic services.	B4		D2 D3

Contents

Topic	
Theory: Infrastructure for distributed computing	⬜ Distributed systems and y Middleware. ⬜ Types of distributed systems. ⬜ Architectural patterns. ⬜ Inter-process communication.
Theory: SOA and Web Services / WSDL	⬜ SOA ⬜ Web Services. ⬜ WSDL.
Theory: SOAP (Simple Object Access Protocol)	⬜ History. ⬜ Core items. ⬜ Messages. ⬜ Coding and interaction. ⬜ Error management.
Theory: RESTful Web Services	⬜ JSON. ⬜ REST. ⬜ Node.js. ⬜ Non-SQL Databases. ⬜ Angular.
Theory: Microservices	⬜ Case study: Netflix. ⬜ Architectures. ⬜ Decomposition of monolithic systems into microservices. ⬜ Design. ⬜ Communication between microservices. ⬜ Data management. ⬜ Deployment.
Practice: Creating and managing RESTful web services using the MEAN stack.	⬜ Installation. ⬜ Development and deployment of a web service. ⬜ Development and deployment of web microservices.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	15	45	60
Project based learning	14	20	34
Presentation	1	2	3
Workshops	2	1	3
Gamification	2	2	4
Project based learning	6	38	44
Objective questions exam	1	0	1
Objective questions exam	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
Lecturing	Classes that will expose the concepts to be treated in the subject. The aim is to encourage discussion and reinforce the acquisition of skills (B3, C29, C32).
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 B and C sessions (B4, B6, C29, C32, D2, D3).
Presentation	Each workgroup will justify in a presentation the adopted solution for the course project and its performance (B4, D2, D3).
Workshops	Introductory workshop on technologies commonly used in the companies (B3, B6, C32, D2).
Gamification	Test-type exercises to carry out formative assessment (not taken into account for the final grade of the subject), and promote participation and attendance in class (B3, D3).
Project based learning	

Personalized assistance

Methodologies	Description
Lecturing	Tutorships: https://moovi.uvigo.gal/user/profile.php?id=11299

	Description	Qualification	Training and Learning Results		
Project based learning	Each working group will deliver a preliminary part of the project of the subject. The delivery will consist of design, implementation and documentation. After each delivery, a practical test will be carried out on the part implemented by each of the groups. This test will be individual, including modifications of the delivered project.	15	B4 B6	C29 C32	D2 D3
Presentation	Each workgroup will justify in a presentation the solution adopted in the project. They also will give to the teachers an explanation about the project. Questions will be asked to each member of the group individually to verify the involvement of each student in the project.	5	B4		D2 D3
Project based learning	Each working group will deliver the final project of the subject. The delivery will consist of design, implementation and documentation. After each delivery, a practical test will be carried out on the part implemented by each of the groups. This test will be individual, including modifications of the delivered project.	30	B4 B6	C29 C32	D2 D3
Objective questions exam	An individual exam will take place in the date indicated by the Comisión Académica de Grado (CAG) . The exam may include the following types of questions: problem solving, short questions to be solved by applying the theoretical concepts explained in class, reasoned justification if one or more statements are true or false, small tests on theoretical and application aspects. Books, class notes and other material will not be allowed during the exam. The number and combination of these questions will be set for each particular exam.	15	B3	C29 C32	
Objective questions exam	An individual exam will take place in the date indicated in the official calendar of exams. The exam may include the following types of questions: problem solving, short questions to be solved by applying the theoretical concepts explained in class, reasoned justification if one or more statements are true or false, small tests on theoretical and application aspects. Books, class notes and other material will not be allowed during the exam. The number and combination of these questions will be set for each particular exam.	35	B3	C29 C32	

Other comments on the Evaluation

In ordinary exam students can follow up a continuous assessment or a global assessment model. Once a student selects continuous assessment (joining a group of the practical part) his/her grade will never be not taken. In case of choosing continuous assessment, a period of 1 month is offered from that moment to be able to renounce it.

Final grade will be the sum of the grades obtained in the theoretical and practical part: (i) theoretical part (50%) and (ii) practical assignments (50%).

To pass the course, a final grade greater than or equal to 50% is required, with a minimum grade for each of the parts (theoretical and practical) of 15% (if this minimum is not met in each of the parts, the final grade will never be greater than 40%).

- Theoretical part:
    1. Continuous assessment: EC1 exam (15%) + EC2 exam (35%).
    2. Global assessment: Final exam (50%).
- Practical assignments:
    1. Continuous assessment: Partial delivery of the project (15%) + presentation (5%) + project: design and final

implementation (30%). Grade will be individual. Practices are mandatory.

2. Global assessment: Delivery of the project (50%).

In extraordinary exam and end-of-program exam scheme is exactly the same as the global assessment (with the possible modifications of the 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. The EC2 exam and the Final exam will take place on the date published in the official calendar for the exam of the subject.

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

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Sources of information

Basic Bibliography

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

Valentin Bojinov, **RESTful Web API Design with Node.js**, 1, Packt Publishing, 2015

Bruno Joseph Dmello, **What You Need To Know About Node.js**, 1, Packt Publishing, 2016

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

Shannon Bradshaw, Eoin Brazil, Kristina Chodorow, **MongoDB: The Definitive Guide 3e: Powerful and Scalable Data**, 3, O'Reilly Media, Inc, USA, 2019

Adam Freeman, **Pro Angular 9: Build Powerful and Dynamic Web Apps**, 4, Apress, 2020

Complementary Bibliography

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

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

Basarat Syed, **Beginning Node.js**, 1, Apress Ed., 2014

Recommendations

Subjects that it is recommended to have taken before

Internet Services/V05G301V01301