

SUBJECT TEACHING GUIDE

1088 - Protocols and services for new generation networks

Master's Degree in Telecommunication Engineering

Academic year 2025-2026

1. IDENTIFYING DATA					
Degree	Master's Degree in Telecommunication Engineering			Type and Year	Compulsory. Year 2
Faculty	School of Industrial Engineering and Telecommunications				
Discipline					
Course unit title and code	1088 - Protocols and services for new generation networks				
Number of ECTS credits allocated	5	Term	Semester based (1)		
Web	http://www.timat.unican.es				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIA DE COMUNICACIONES				
Name of lecturer	JORGE LANZA CALDERON				
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Other lecturers	LUIS SANCHEZ GONZALEZ				

3.1 LEARNING OUTCOMES
- Understand the architectures to design and develop distributed systems for next generation networks.
- Understand the methodologies to deploy services that fits the business requirements
- Understand and apply techniques for data management and interpretation
- Use of mechanisms for secure identification and management of services

4. OBJECTIVES

- Study in detail the concept of integration of services and the employed methodologies
- Interpret the architectures for the discovery and publication of services in distributed systems
- Understand the procedures for the deployment of services employing cloud computing resources
- Exploit the semantic information as a link between data and services to improve the interoperability among applications and systems
- Analyze different alternatives to provide services and enable intercommunication between devices in a secure manner making use of smart card technologies and near field communications.

6. SUBJECT PROGRAM

CONTENTS

1	THEME IV: SECURE SERVICES THROUGH WIRELESS TECHNOLOGIES. Smart Cards. Near Field Communications. Java development over Bluetooth. Routing. Energy saving over wireless networks
2	THEME I: SERVICE ORIENTED ARCHITECTURES (SOA). Terminology. Architecture. Distributed services and web services: SOAP, REST. Service Discovery. Web applications development. Services in Sensor Networks and IoT MQTT
3	THEME II: CLOUD COMPUTING. Concept. Features. Service models: SaaS, PaaS, IaaS

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Continuous Evaluation	Written exam	No	No	20,00
Practice sessions	Laboratory evaluation	Yes	Yes	40,00
Final exam	Written exam	Yes	Yes	40,00
TOTAL				100,00
Observations				
<p>The final grade for the course is obtained by applying the following formula, where TEOR is the theory mark and PRAC is the practical mark:</p> $\text{FINAL_GRADE} = \text{THEOR} * 0.6 + \text{PRAC} * 0.4$ <p>- THEOR It will be calculated from the marks of the Continuous Evaluation (CE) and the Final Exam (FE). CE is calculated as the arithmetic mean of the marks obtained in the continuous assessment tests. FE is the mark obtained in the final exam, in which a minimum of 5.0 is required. In addition, the grade of the CE will not penalize the final grade, therefore: $\text{TEOR} = \max\{0.7 * \text{FE} + 0.3 * \text{CE} ; \text{FE}\}$</p> <p>- PRAC Completing the practical exercises is compulsory. Some of the programmed practical sessions require in-person attendance due to the need for specific equipment available in the laboratory. The calculation of the PRAC mark will be the weighted average of all the marks obtained in the evaluation tests of the laboratory sessions. If a grade lower than 4.0 is obtained, the student will have the opportunity to recover it in the extraordinary period exam, and must also achieve a grade higher than 4.0 for it to be included in the calculation of the FINAL_GRADE.</p> <p>In any case, being THEOR greater than or equal to 5.0 and PRAC being greater than or equal to 4.0, in order to pass the course the final grade FINAL_GRADE must be equal to or higher than 5.0. Otherwise the final grade will be calculated as follows: $\text{FINAL_NOTE} = \text{minimum}\{\text{FINAL_NOTE}, 4.9\}$</p> <p>In the event that a new health alert makes it impossible to carry out the assessment in person, remote evaluation of assignments, practical laboratory exercises, and written tests is foreseen. All forms of evaluation can be conducted remotely using online methods. In any case, the professor may organize individual sessions for students to defend their performance in these assessments.</p>				
Observations for part-time students				
Continuous Evaluation is not mandatory. Those students that do not take it will have their final mark from the marks of the Practice sessions and from the Final Exam.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Erl, Thomas, "Service-oriented architecture: concepts, technology, and design", The Prentice Hall service-oriented computing series from Thomas Erl, 2005
Richardson, Leonard y Ruby, Sam, "RESTful web services", O'Reilly 2007
Wolfgang Rankl, Wolfgang Effing, Smart Card Handbook, 4th Edition, Ed. Willey, 2010
Sosinsky, Barrie, "Cloud computing bible", Ed. Willey 2011
Dean Allemang, James Hendler, "Semantic Web for the Working Ontologist, Second Edition: Effective Modeling in RDFS and OWL", 2011

