

SUBJECT TEACHING GUIDE

G665 - Development of Information Systems

Degree in Computer Systems Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Computer Systems Engineering			Type and Year	Optional. Year 3
Faculty	Faculty of Sciences				
Discipline	Subject Area: Software Engineering Mention in Software Engineering				
Course unit title and code	G665 - Development of Information Systems				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web	https://moodle.unican.es/course/view.php?id=17966				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA				
Name of lecturer	MARTA ELENA ZORRILLA PANTALEON				
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Office	Facultad de Ciencias. Planta: + 1. DESPACHO PROFESOR (1072)				
Other lecturers	RICARDO DINTEN HERRERO				

3.1 LEARNING OUTCOMES
- Design and development of information systems with relational back-end using the database life cycle: conceptual, logical and physical design
- Design and management of data warehouses, ETL processes and analytic queries
- Development of the persistence layer of an Information System with relational backend
- Security in Information Systems with relational backend

4. OBJECTIVES

- Specify, design and implement relational databases and multidimensional data bases.
- Use of data models and CASE tools for conceptual, logical and physical design.
- Master the key concepts of relational database technology (physical and logical data independence, transaction concept, indexing and efficiency, etc.)
- Acquire the basics of dimensional model and OLAP technology .
- Know common patterns for the enterprise application development and, in particular, design and implement the persistence layer.
- Master the SQL language (standard SQL2016)
- Know the threats and vulnerabilities of information systems and, in particular, in databases and how to mitigate them.

6. SUBJECT PROGRAM

CONTENTS

1	Analysis and design of operational information systems
1.1	Unit 1: Introduction. Life cycle of information systems. Database design phases : conceptual design, logical design and physical design. Techniques, data models and tools.
1.2	Unit 2. Conceptual design: Requirements. Entity-relationship. UML.
1.3	Unit 3. Logical design: Transformation rules from EER to relational model. Normalization
1.4	Unit 4. Physical design. Files. Tables and constraints. Views. Indexes. Transactions and levels of isolation. Query optimization.
2	Analysis and design of decisional information systems
2.1	Unit 5: Introduction to data warehousing. OLTP vs OLAP. Architecture and tools.
2.2	Unit 6: Dimensional design. Life cycle. Fact and dimension tables. Star and snowflake models. ETL processes. Analytic SQL
3	Implementation of database applications
3.1	Unit 7. Security in Information systems: Introduction. Threats. Elements to securize. Security in DBMSs. Security in database applications.
3.2	Unit 8: Enterprise application architecture. Introduction. Patterns. Persistence layer. Persistence frameworks

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Partial written exam: questions and exercises	Written exam	No	Yes	35,00
Partial written exam: questions and exercises	Written exam	No	Yes	20,00
Lab exam: SQL	Laboratory evaluation	Yes	Yes	15,00
project: design and building of a database and its persistence layer	Work	No	Yes	30,00
Final exam: tests, questions and exercises	Written exam	Yes	Yes	0,00
TOTAL				100,00
Observations				
Final mark will be computed as weighted-sum of all learning activities. Qualification can be increased up to 1 point by performing activities during the semester, as long as the final mark is higher than 4,5. The evaluation in July will be: - Written exam: 55% - Lab exam: 15% - Individual project: 30%				
Observations for part-time students				
Part time students will be assessed according to: - Written exam: 55% - Lab exam: 15% - Peer project: 30% Qualification can be increased up to 1 points by performing activities during the semester, as long as the final mark is higher than 4,5				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Elmasri, R., Navathe, S.B., Fundamentals of database systems. Pearson Education, 2017.

Alejandro Vaisman, Esteban Zimányi. Data warehouse systems : design and implementation. Springer, cop. 2014. ISBN: 978-3-642-54654-9