

## SUBJECT TEACHING GUIDE

### 332 - Technologies for the development of entrepreneurial applications on Internet

#### Master's Degree in computing engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Master's Degree in computing engineering			Type and Year	Compulsory. Year 1
Faculty	Faculty of Sciences				
Discipline	SOFTWARE ENGINEERING				
Course unit title and code	332 - Technologies for the development of entrepreneurial applications on Internet				
Number of ECTS credits allocated	6	Term	Semester based (2)		
Web	<a href="http://moodle.unican.es">http://moodle.unican.es</a>				
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. INGENIERÍA INFORMÁTICA Y ELECTRÓNICA				
Name of lecturer	PABLO SANCHEZ BARREIRO				
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Other lecturers	JUAN MARIA RIVAS CONCEPCION				

3.1 LEARNING OUTCOMES
- Analyse and design multilayer architectures for enterprise software systems
- To be able to design the presentation, business and persistence layer of a enterprise software system.
- To be able to construct domain models for enterprise software systems.
- To be able to use advanced tools for the automated development of enterprise software systems.
- To be able to use software technologies and platforms for the development of enterprise software systems.
- To know how to manage quality and security assurance for enterprise software systems.

**4. OBJECTIVES**

To understand how a enterprise software system decomposes into layers.
To understand how enterprise software system is physically distributed.
To be able to use design patterns for the development of the business layer of a enterprise software system . More specifically, the student will be able to design a domain model for a enterprise software system and understand strengths and weaknesses of this technique.
To be able to use design patterns for the development of the service layer of a enterprise software system.
To be able to specify and design a REST service layer.
To be able to use design patterns for the development of presentation layer of a enterprise software system , focusing ofn techniques related to web technologies.
To understand and be able to configure the design patterns commonly used by Object-Relational Mappers.
To be able to use tools for the automatic generation of object-relational bridges.
To be able to use built-in services, such as security, provided by application servers.

**6. SUBJECT PROGRAM**

**CONTENTS**

1	<p>Unit 1. Foundations</p> <p>Software Architectures. Enterprise Systems. Architectural Patterns for Enterprise Systems. Decomposition of a Enterprise System into Layers. Physical Mapping of Logical Layers. Layer Isolation: Dependency Injection. Dependency Injection in Spring.</p>
2	<p>Unit 2. Business Layer: Domain Entities</p> <p>Responsibilities of the Business Layer. Business Rules. Design Patterns for the Business Layer: Transaction Script, Table Module, Domain Model. Antipattern: Anemic Domain Models. Domain-Driven Design.</p>
3	<p>Unit 3. Persistence Layer</p> <p>Responsibilities of the Persistence Layer. Object-Relational Mapping. Strategies for the Object-Relational Mapping: Identity Field, Embedded Value, Serialised Blob, Foreign Key Mapping, Association Table Mapping, Single Table Mapping, Concrete Table Mapping, Class Table Inheritance Mapping. Design Patterns for the Persistence Layer: Repository, Data Mappers, Lazy Load, Identity Map, Query Objects, Metadata Mapping. Tools for the Automatic Generation of Object-Relational Mappers: Java Persistence API (JPA), Hibernate, Spring Data.</p>
4	<p>Unit 4. Business Layer: Services</p> <p>Responsibilities of the Service Layer. HTTP Protocol. Data Interchange Formats: JSON. REST Architectures. Specification of REST Resources and REST APIs. Service Layer Patterns: Data Transfer Objects, Page Controller, Front Controller. Transaction Management Patterns: Unit of Work. Implementation od REST Controllers in Spring: Spring MVC, Jackson, Entity Manager and Transactional Methods.</p>
5	<p>Unit 5. Presentation Layer</p> <p>Responsibilities of the Presentation Layer. Technologies for the Presentation Layer: HTML, CSS, Javascript and AJAX. Bootstrap, jQuery, Javascript Frameworks. Design Patterns for the Presentation Layer: Model-View-Controller, Model-View-Presenter, Single-Page Applications, Model-View View-Model. Introduction to Rich Internet Applications (RIA). AngularJS/React: Components, Routing, Services, AJAX, Dynamic Content Generation, Filters. Local Storage. Cross-Origin Resource Sharing (CORS).</p>
6	<p>Unit 6. Authentication and Access Control</p> <p>HTTP Authentication Strategies. Token-based Authentication. Authentication in Spring and in AngularJS.</p>

**7. ASSESSMENT METHODS AND CRITERIA**

Description	Type	Final Eval.	Reassessn	%
Development of a Enterprise Software System	Work	No	Yes	85,00
Test about Foundations of Enterprise Architectures.	Written exam	Yes	Yes	15,00
<b>TOTAL</b>				<b>100,00</b>

**Observations**

When the number of students enrolled in the subject is low, and their performance and commitment is noticeable, some students might be freed of accomplishing the final test. In this case, the final mark for the subject will be the mark of the developed project.

**Observations for part-time students**

Part time students will follow the same system as full time students, since attendance to lectures is not mandatory. Attendance is only required for the final test, that will be celebrated in the date officially announced by the Faculty Council.

**8. BIBLIOGRAPHY AND TEACHING MATERIALS**

**BASIC**

Martin Fowler. "Patterns of Enterprise Application Architecture" Addison-Wesley, 2002.