



Universitat de Lleida

DEGREE CURRICULUM  
**SYSTEMS INTEGRATION**

Coordination: GIMENO ILLA, JUAN MANUEL

Academic year 2017-18

## Subject's general information

<b>Subject name</b>	SYSTEMS INTEGRATION			
<b>Code</b>	102057			
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	Degree	Course	Typology	Modality
	Bachelor's Degree in Computer Engineering	4	COMPULSORY	Attendance-based
<b>ECTS credits</b>	9			
<b>Groups</b>	1GG			
<b>Theoretical credits</b>	4.5			
<b>Practical credits</b>	4.5			
<b>Coordination</b>	GIMENO ILLA, JUAN MANUEL			
<b>Department</b>	INFORMATICA I ENGINYERIA INDUSTRIAL			
<b>Teaching load distribution between lectures and independent student work</b>	40% lectures; 60% student work			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Catalan			
<b>Distribution of credits</b>	Ferran Perdrix (3) Xavier Piñol (6)			
<b>Office and hour of attention</b>	Ferran Perdrix (1.06 EPS by appointment) Xavier Piñol (1.06 EPS by appointment)			

Professor/a (s/es)	Adreça electrònica professor/a (s/es)	Crèdits	Horari de tutoria/lloc
GIMENO ILLA, JUAN MANUEL	jmgimeno@diei.udl.cat	0	By previous appointment.
PERDRIX SAPIÑA, FERNANDO	ferranp@diei.udl.cat	3	By previous appointment.
PIÑOL ESTEBAN, XAVIER	xavi.pinyol@diei.udl.cat	6	By previous appointment.

## Subject's extra information

Knowledge of Java, Data Bases and Web Applications is assumed to properly follow the subject.

## Learning objectives

- To know the motives for the necessity of systems integration
- To identify the main involved elements in an integration effort
- To apply current technologies to solve the integration needs
- To install and configure an application server
- To publish client and server applications for a web service on an application server.

## Competences

### Strategic competences of the UdL

- **CT1:** Mastering a foreign language, especially English.
- **CT2:** Training Experience in the use of the new technologies and the information and communication technologies.

### Cross-disciplinary competences

- **EPS11:** Capacity to understand the needs of the user expressed in a non technical language.

### Specific competences

- **GII-IS3:** Capacity to give solution to problems of integration taking into account the strategies, standards and available technologies.
- **GII-IS5:** Capacity to identify, evaluate and manage the potential risks that can arise.

## Subject contents

### Xavier Pinyol's Theory:

#### 1. Java EE

##### 1.1 Definition

- 1.2 Versions
- 1.3 Specifications
- 1.4 Application Server
- 2. Enterprise Applications
  - 2.1 Characteristics
  - 2.2 Types of Architectures
  - 2.3 Architecture Patterns
  - 2.4 Enterprise Archive (EAR)
- 3. Enterprise Applications Implementation
  - 3.1 HTTP
  - 3.2 Servlet
  - 3.3 Java Server Pages (JSP)
  - 3.4 Session
- 4. Persistence
  - 4.1 JDBC
  - 4.2 SQL and Java Types
  - 4.3 Data Sources
  - 4.4 Connection Pools
- 5. Web Services
  - 5.1 What Web Services are?
  - 5.2 Types of Web Services
- 6. SOAP Web Services
  - 6.1 Introduction
  - 6.2 Simple Object Access Protocol (SOAP)
  - 6.3 Web Service Description Language (WSDL).
  - 6.4 Universal Description, Discovery and Integration (UDDI)
- 7. Esquema Nacional Interoperabilitat (ENI)
  - 7.1 Introduction
  - 7.2 Legal norms
  - 7.3 Esquema Nacional Interoperabilitat
  - 7.4 Technical norms

## **Ferran Pèrdrix's Theory**

- 1. Legacy Systems

1.1 Introduction

1.2 Motives for change

1.3 Legacy System Structure

1.4 Inherited Data

1.5 ETL Processes

1.6 Design

1.7 Evaluation

## 2. Open Data

2.1 Definition

2.2 Basic principles

2.3 Formats

2.4 Problems and critiques

2.5 Big Data

2.6 Linked Data

2.7 Available Open Data

2.8 Examples

## 3. Semantic Web

3.1 Definition

3.2 Introduction (example)

3.3 Architecture

3.4 Fundamentals

3.5 RDF / RDF Schema

3.6 OWL Ontologies

## 4. SPARQL Language

4.1 Definition

4.2 Query Types

4.3 Parts of a SPARQL query

4.4 Definition optimization

4.5 Other clauses

4.6 Examples

### Used software:

- PostgreSQL
- JBoss Developer Studio
- Pentaho ETL

## Methodology

### Theory sessions:

- The basic concepts of the subject are presented, always working on concrete examples.

### Laboratory sessions:

- Tools to use in the project are presented
- The project is developed and students solve the difficulties they find.

### Autonomous work:

- For completing the tools and technologies learning and finish project development.

## Development plan

Week	Theory by Xavier Pinyol	Theory by Ferran Pèrdrix	Laboratory
1	Java EE Introduction Business applications	Legacy Systems	
2		Open Data / Big Data	Installation of tools
3	Servlets & JSPs	Pentaho Environment	Servlets & JSPs
4	JDBC		Pentaho / DB
5	Web Services	Semantic Web	Data Source
6	Web Services	Semantic Web / SPARQL	
7			Web Services SPARQL
8	Q&A about project		Development of project
9	First midterm		
10			Development of project Delivery of Part 1
11			Presentation of Part 2 Development of project
12	ENI		Development of project
13	Application case: eAccessible		Development of project
14	Application case: Open Data at the Lleida's City Council		Development of project

Week	Theory by Xavier Pinyol	Theory by Ferran Pèrdrix	Laboratory
15			Development of project Delivery of Part 2
16	Second midterm		
17	Second midterm		
18	Tutorials		
19	Recoveries		

## Evaluation

Acr.	Description	Weight	Minimum grade	Mandatory	Recoverable	Ind/Group
Pa1	First midterm	20%	5.0	YES	YES	Ind
Pa2	Second midterm	20%	5.0	YES	YES	Ind
Pr1	First deliverable	20%	5.0	YES	YES	2-4
Pr2	Second deliverable	30%	5.0	YES	YES	2-4
Ex	Exercises ETL/SPARQL	10%	NO	NO	NO	Ind

Final grade =  $0,20 * Pa1 + 0,20 * Pa2 + 0,20 * Pr1 + 0,30 * Pr2 + 0,10 * Ex$

- Subject is passed when final grade is greater or equal than 5,0 and all parts are greater than the minimum grade.

## Bibliography

- M. C. Feathers, Working effectively with Legacy Code, Prentice-Hall (2005).
- M. Fowler, Refactoring. Improving the Design of Existing Code, Addison-Wesley (1999)
- J. Kerievsky, Refactoring to Patterns, Addison-Wesley (2005)