



Universitat de Lleida

DEGREE CURRICULUM
SYSTEMS INTEGRATION

Coordination: PIÑOL ESTEBAN, XAVIER

Academic year 2020-21

Subject's general information

Subject name	SYSTEMS INTEGRATION			
Code	102057			
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Computer Engineering	4	COMPULSORY	Attendance-based
Course number of credits (ECTS)	9			
Type of activity, credits, and groups	Activity type	PRALAB	TEORIA	
	Number of credits	3.6	5.4	
	Number of groups	1	1	
Coordination	PIÑOL ESTEBAN, XAVIER			
Department	COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING			
Teaching load distribution between lectures and independent student work	40% lectures; 60% student work			
Important information on data processing	Consult this link for more information.			
Language	Catalan			
Distribution of credits	Ferran Perdrix (3) Xavier Piñol (6)			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
PERDRIX SAPIÑA, FERNANDO	ferran.perdrix@udl.cat	3	
PIÑOL ESTEBAN, XAVIER	xavier.pinol@udl.cat	6	

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 no 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
15			Development of project Delivery of Part 2
16	Second midterm		
17	Second midterm		

Week	Theory by Xavier Pinyol	Theory by Ferran Pèrdrix	Laboratory
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)