



Universitat de Lleida

DEGREE CURRICULUM
SYSTEMS INTEGRATION

Coordination: GIMENO ILLA, JUAN MANUEL

Academic year 2023-24

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
	Bachelor's Degree in Computer Engineering	4	OPTIONAL	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	GIMENO ILLA, JUAN MANUEL			
Department	COMPUTER ENGINEERING AND DIGITAL DESIGN			
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 (classnotes in english)			
Distribution of credits	Juan Manuel Gimeno Illa (9)			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GIMENO ILLA, JUAN MANUEL	juanmanuel.gimeno@udl.cat	9	By appointment

Subject's extra information

Knowledge of Java, data structures, web applications architecture and data bases is assumed.

Learning objectives

The main objective of this subject is to introduce the functional paradigm for the design of applications

So,

- We will present the Scala programming language, which integrates both object-oriented and functional paradigms
- We will present the main concepts of functional programming
- We will introduce the ZIO framework and some libraries based on it
- We will analyse the architecture and design of some applications

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

1. The Scala 3 programming language
2. Functional Programming Fundamentals
3. The ZIO Framework
4. Zio Ecosystem
 1. Testing
 2. HTTP app server
 3. Database access
 4. Streaming
5. Study of Applications

Methodology

Theory / Laboratory sessions:

- The main theoretical concepts are presented, but always working on practical examples
- We'll use some videos with presentations and tutorials
- We'll practice the concepts presented in theory on
- We'll analyze the code and structure of existing projects
- Live-programming sessions on simplifications of the libraries we'll use

Autonomous work:

- Programming on practice exercises
- Reading of additional materials
- Viewing of additional videos

Development plan

Week	Contents
1	Presentation + Scala 3
2	Scala 3
3	Functional Programming Fundamentals
4	Functional Programming Fundamentals
5	Functional Programming Fundamentals
6	Functional Programming Fundamentals
7	Functional Programming Fundamentals
8	The ZIO Framework
9	First midterm
10	The ZIO Framework
11	The ZIO Framework
12	The ZIO Framework
13	The ZIO Framework
14	Analysis of applications
15	Analysis of applications
16	Second midterm
17	Second midterm

Evaluation

Continuous evaluation

- A midterm block, with two midterms about basic concepts and simple problems: 10% each, no minimum grade and non recoverable
- Four practices blocks, using the techniques and libraries presented: 20% each, no minimum grade and non recoverable
 - Practices will be presented, depending on the advancement velocity, on weeks 3, 6, 10 and 13

- Each one will have a two week duration
- Individual work

Alternative evaluation

- A single exam, both with theory and problem solving questions

NOTE: The evaluation will be done according to the [Regulations for the Assessment and Grading of Student Learning in UDL Bachelor's and Master's Degrees](#) (translation to english, pending)

Bibliography

- Michael Pilquist, Paul Chiusano, Rúnar Bjarnason, [Functional Programming in Scala \(2nd. Edition\)](#), Manning (2023)
- Martin Odersky, Lex Spoon, Bill Venners and Frank Sommers, [Programming in Scala \(Fifth Edition\)](#), Artima (2021)
- Debasish Ghosh, [Functional and Reactive Domain Modeling](#), Manning (2017)