DEGREE CURRICULUM

SYSTEMS INTEGRATION

Coordination: GIMENO ILLA, JUAN MANUEL

Academic year 2022-23

SYSTEMS INTEGRATION 2022-23

Subject's general information

<table>
<tr><td>Subject name</td><td>SYSTEMS INTEGRATION</td></tr>
<tr><td>Code</td><td>102057</td></tr>
<tr><td>Semester</td><td>2nd Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Computer Engineering</td><td>4</td><td>COMPULSORY</td><td>Attendance-based</td></tr>
<tr><td>Bachelor's Degree in Computer Engineering</td><td>4</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
</table>
</td></tr>
<tr><td>Course number of credits (ECTS)</td><td>9</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><td>PRALAB</td><td>TEORIA</td></tr>
<tr><th>Number of credits</th><td>3.6</td><td>5.4</td></tr>
<tr><th>Number of groups</th><td>1</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>Coordination</td><td>GIMENO ILLA, JUAN MANUEL</td></tr>
<tr><td>Department</td><td>COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>40% lectures; 60% student work</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Catalan (classnotes in english)</td></tr>
<tr><td>Distribution of credits</td><td>Juan Manuel Gimeno Illa (9)</td></tr>
</table>

SYSTEMS INTEGRATION 2022-23

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 Bases and Web Applications is assumed to properly follow the subject.

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 funcional paradigms
- We will present the main concepts of functional programming
- We will introducethe 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 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

1. The Scala 3 programming language
2. Functional Programming Fundamentals
3. The ZIO 2.0 Framework
4. Zlo Ecosystem
    1. Testing
    2. HTTP app server
    3. Database access
    4. Streaming
5. Study of Applications

SYSTEMS INTEGRATION 2022-23

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 cpncepts presented in theory on
- We'll analyze the code and structure of existing projects
- Live-programming sessions on simplifications of the linraries 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	The ZIO 2.0 Framework
8	The ZIO 2.0 Framework
9	**First midterm**
10	zio-test
11	zio-http
12	zio-jdbc
13	zio-stream
14	Analysis of applications
15	
16	**Second midterm**
17	**Second midterm**

NOTE: As tha main of the syllabus has been modified, this planning is provisional at the time of configuring this guide.

Evaluation

- Two midterms, about basic concepts (short answers), 10% of final grade each one
- Four projects using different techniques and libraries: 20% each

Bibliography

- Paul Chiusano, Rúnar Bjarnason, Functional Programming in Scala, Manning (2015)
- 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)