DEGREE CURRICULUM

SYSTEMS INTEGRATION

Coordination: GIMENO ILLA, JUAN MANUEL

Academic year 2023-24

SYSTEMS INTEGRATION 2023-24

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>
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<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>
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<tr><td>Coordination</td><td>GIMENO ILLA, JUAN MANUEL</td></tr>
<tr><td>Department</td><td>COMPUTER ENGINEERING AND DIGITAL DESIGN</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>
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SYSTEMS INTEGRATION 2023-24

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 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 Framework
4. Zlo Ecosystem
    1. Testing
    2. HTTP app server
    3. Database access
    4. Streaming
5. Study of Applications

SYSTEMS INTEGRATION 2023-24

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	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 Franework
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)