



Universitat de Lleida

DEGREE CURRICULUM  
**SPECIFICATION AND ANALYSIS  
OF INTERACTIVE SYSTEMS**

Coordination: SAYAGO BARRANTES, SERGIO

Academic year 2020-21

## Subject's general information

<b>Subject name</b>	SPECIFICATION AND ANALYSIS OF INTERACTIVE SYSTEMS			
<b>Code</b>	102382			
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	Degree	Course	Character	Modality
	Bachelor's degree in Digital Interaction and Computing Techniques	2	COMPULSORY	Attendance-based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	TEORIA	
	<b>Number of credits</b>	3	3	
	<b>Number of groups</b>	1	1	
<b>Coordination</b>	SAYAGO BARRANTES, SERGIO			
<b>Department</b>	COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING			
<b>Teaching load distribution between lectures and independent student work</b>	<p>According to the academic framework of bachelor's degrees of the EPS:</p> <ul style="list-style-type: none"> <li>- 1 ECTS = 25 hours; 6 ECTS = 150 hours</li> <li>- 40% (60h) of in-class work and 60% (90h) of autonomous work</li> </ul> <p>The distribution of hours in this course is:</p> <ul style="list-style-type: none"> <li>- In-class work: theory (28h) + laboratories (28h) = 56 h + 4 hours of exams = 60h</li> <li>- Autonomous work: study (45h) + project (45h) = 90h</li> </ul>			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	English, Spanish and Catalan			
<b>Distribution of credits</b>	See type of activity, credits and groups			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
SAYAGO BARRANTES, SERGIO	sergio.sayago@udl.cat	6	

## Subject's extra information

Software dominates the world and the development of professional software is a formal task. The Specification and Analysis of Interactive Systems (SPAIS) is a mandatory course of 6 ECTS. SPAIS is held during the second semester of the second year of the Bachelor's degree in Digital Interaction and Computing Techniques (GTIDIC).

GTIDIC aims to train qualified professionals in the computing field with a very practical side, giving special emphasis to the design and implementation of interactive applications. The graduates will acquire solid programming knowledge, focusing on mobile and web applications, Internet technologies, administration tools and security systems, and interface design and development.

SPAIS is designed to provide students with a guided and hands-on introduction to Software Engineering, given special emphasis to the design (specification and analysis) of interactive systems, so that students can integrate themselves in professional software engineering teams quickly. To achieve this objective, the student will carry out a project in which they will apply aspects related to Requirement Engineering, and other important elements of Software Engineering, such as domain analysis, UML (Unified Modelling Language), standards and quality in software, and management of projects. The project will be conducted alongside three other subjects (Applications for Mobile Devices, Innovation in ICT, and User Experience), to provide students with a real software engineering experience, and an integrated perspective.

SPAIS complements Object Oriented Programming and Application Platforms, providing students with a Software Engineering perspective, and is an introduction to Interactive Applications Design, where students will learn further aspects about design patterns.

## Learning objectives

1. To know basic aspects of Software Engineering and development process models
2. To be able to design and create use cases
3. To gather and specify different types of requirements in a rigorous and professional way
4. To design the class diagram of an interactive system following the paradigm of object oriented design
5. To be able to use UML modelling tools
6. To understand software code as something that evolves over time
7. To be able to write unit tests
8. To understand the key tenets of object oriented design
9. To understand the concept of responsible design in object oriented design

## Significant competences

According to the table of competences of the GTIDIC (<https://ja.cat/zvyK4>):

### Basic competences

**B03.** That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.

### Transversal competences

**CT3.** Acquire training in the use of new technologies and information and communication technologies.

### General competences

**CG1.** Conceive, plan and developed projects in the field of ICT

**CG2.** Design, develop, evaluate and guarantee the accessibility, ergonomics, usability and security of computer systems.

**CG4.** Use software engineering methods to develop interactive ICT applications.

**CG9.** Capacity for being analytic and synthetic.

### Specific competences

**CE3.** Basic knowledge of the use and programming of computers, operating systems and databases, and their use in the development of interactive applications.

**CE6.** Capacity to design, develop, select and evaluate applications and computer systems, ensuring its reliability, security and quality.

**CE10.** Capacity to analyse, design, build and maintain safe and efficient applications, choosing the most suitable paradigm and programming languages.

**CE13.** Knowledge and application of the characteristics, functionalities and structure of the databases, that allow their suitable use, and the design and the analysis and implementation of interactive applications based on them.

**CE16.** Capacity to design and evaluate person-computer interfaces that guarantee the usability of systems, services and computer applications.

**CE17.** Capacity to apply knowledge on design to propose and defend a design concept for an interactive system and use proper creative technologies to develop each project.

**CE25.** Capacity to analyse, organize, label and visualize the structure that defines the interaction with digital contents, by applying information architecture methods, techniques and tools that facilitate accessibility.

**CE26.** Capacity to apply universal design and accessibility principles and standards to design experiences that guarantee equal opportunity for users.

## Subject contents

- Key concepts of Software Engineering
- Requirements engineering (analysis and specification)
- Domain analysis
- Introduction to test-driven development
- Principles of software design

## Methodology

Methodology	Theory (virtual)	Laboratory (virtual)	Independent student's work
Lectures	X		
Integrated project (in laboratories)		X	
Integrated project (at home)			X
Study			X

At present, both theory and laboratories are virtual activities conducted via the videoconference system of the

## Integrated project

The laboratories are carried out within the context of an integrated project. This project is conducted in four courses: Innovation, Mobile Development, Specification and Design of Interactive Systems, and this course.

The integrated project aims to have students work in an agile software development project, which is designed to set up an start-up by designing and developing an mobile app. The project also aims to enable students to develop important skills and competences, such as being able to work in teams, present ideas in public, and team organization.

## Development plan

Week	Theory (virtual)	Laboratories (virtual)
1	Presentation T1. Introduction to Software Engineering	Presentation P1. Introductory aspects
2	T2. Introduction to Requirements Engineering	P1 (submission) P2. Requirements
3	T2 (cont.)	P2 (cont.)
4	T2 (cont.)	P2 (cont.) + submission
5	T3. Software development processes	P3. Domain analysis
6	T4. UML	P3 (cont.)
7	T5. Software design principles (SOLID; GRASP)	NO CLASS
8	T6. Introduction to software management quality; software evolution	P3. Submission P4. DAFO + submission
9	Exams	
10	T7. Introduction to software quality; unitary tests	P5. Sprint1
11	P5 (cont.)	P5. Sprint 1 (cont. + submission)
12	P6. Sprint 2	NO CLASS
13	P6 (cont.)	P6. Sprint 2 (cont + submission)
14	P7. Sprint 1	P7 (cont.)
15	P7 (cont.)	P7 (cont. + submission)
16	Exams	
17	Exams	
18	Revisions	
19	Retakes	

The development plan of the integrated project is available at the Campus Virtual.

## Evaluation

The assessment instruments and its relationship with the learning objectives and specific competences are listed below:

Instrument	Learning objectives	Specific competences
Integrated project	All	6-10-16-17
Exams	1-2-3-6-8-9	6-10

The assessment of this course is detailed next:

Continuous evaluation - all activities are mandatory
<p>Final Grade (NF) = <math>Laboratories * 0.3 + Integrated\_Project * 0.2 + Theory * 0.5 \geq 5</math></p> <ul style="list-style-type: none"> <li>• <i>Laboratories</i> (30% de la NF) <math>\geq 5</math> <ul style="list-style-type: none"> <li>◦ <u>Deliverable I</u> (15%) = P1+P2+P3+P4</li> <li>◦ <u>Deliverable II</u> (15%) = P5 + P6 + P7</li> </ul> </li> <li>• <i>Integrated project</i> (20% de la NF) <math>\geq 5</math> (see below) <ul style="list-style-type: none"> <li>◦ <u>Presentation</u> (10%)</li> <li>◦ <u>Progress</u> (10%)</li> </ul> </li> <li>• <i>Theory</i> (50% de la NF) <math>\geq 5</math> (max ( [1ex*0.20 + 2ex*0.20], [1ex*0.15 + 2ex*0.25], [1ex*0.25 + 2ex*0.15] ) + ap*0.1 <ul style="list-style-type: none"> <li>◦ <u>First exam</u> [15%-25%]. 2 h.</li> <li>◦ <u>Second exam</u> [15%-25%]. 2 h.</li> <li>◦ <u>Attendance and participation</u> (10%)</li> </ul> </li> </ul>
Retakes - minimum grade = 5. Maximum grade = 7.5
<ul style="list-style-type: none"> <li>• Retakes are not for getting a higher grade</li> <li>• If <i>Theory</i> &lt; 5: <u>Final exam</u>. 2 hours.</li> <li>• If <i>Laboratories</i> &lt; 5: <u>Submission of deliverables I and II</u></li> <li>• If <i>Integrated_Project</i> &lt; 5: <u>Presentation</u>.</li> </ul>

## Integrated project

The integrated project corresponds to 20% of the FG. It consists of two parts:

- presentation. Public presentation. 10%

- evolution and management. We will assess the progress of the teams and the use they make of the tools provided in the project. 10%

The grade of the integrated project will be the same for all the courses.

At the end of the course, the students will be provided with a summary report with information regarding their progress in the project.

If a student is not enrolled in all courses, the student will be evaluated according to his or her work in the courses in which s/he is enrolled. Thus, it is possible to carry out the project without being enrolled in the four courses.

## Pandemy COVID-19

Exams are in-class activities. These activities will go virtual provided that the authorities of the University of Lleida decide that exams can't be conducted in class. The weight of the assessment activities will not change.

## Bibliography

[Applying UML and patterns : an introduction to object-oriented analysis and design and iterative development / Craig Larman](#)

[Requirements engineering / Jeremy Dick, Elizabeth Hull, Ken Jackson](#)

[Software engineering / Ian Sommerville](#)

