ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000871 - Programming Of User Interfaces

DEGREE PROGRAMME

10AM - Master Universitario En Ingenieria Del Software

ACADEMIC YEAR & SEMESTER

2023/24 - Semester 1

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	103000871 - Programming Of User Interfaces
No of credits	6 ECTS
Type	Optional
Academic year ot the programme	First year
Semester of tuition	Semester 1
Tuition period	September-January
Tuition languages	English
Degree programme	10AM - Master Universitario en Ingenieria del Software
Centre	10 - Escuela Tecnica Superior De Ingenieros Informaticos
Academic year	2023-24

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Angel Lucas Gonzalez Martinez	D2310	lucas.gmartinez@upm.es	M - 09:30 - 11:00 M - 16:30 - 17:30 Tu - 09:30 - 10:30 W - 10:00 - 12:30 Please, set up an appointment by email

Guillermo Roman Diez	D2304	guillermo.roman@upm.es	M - 12:00 - 15:00 W - 12:00 - 15:00 Please, set up an appointment by email
Raul Alonso Calvo (Subject coordinator)	D2315/5004	raul.alonso@upm.es	M - 10:00 - 13:00 W - 10:00 - 13:00 Please, set up an appointment by email

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

3.2. Other recommended learning outcomes

- Programming skills, including elementary knowledge of object-oriented programming.

4. Skills and learning outcomes *

4.1. Skills to be learned

CE4 - Aplicar los modelos de proceso de desarrollo a las características de un proyecto software

CG1 - Que los estudiantes sepan aplicar los conocimientos adquiridos y su capacidad de resolución de problemas en entornos nuevos o poco conocidos dentro de contextos más amplios (o multidisciplinares) relacionados con su área de estudio (RD)

CG4 - Que los estudiantes posean las habilidades de aprendizaje que les permitan continuar estudiando de un modo que habrá de ser en gran medida autodirigido o autónomo (RD)

CG9 - Aplicación de los métodos de resolución de problemas más recientes o innovadores y que puedan implicar el uso de otras disciplinas

4.2. Learning outcomes

RA26 - Group work skill SC13, SC14, CG17 A

RA90 - Apply techniques for designing and implementing prototypes of different fidelity levels

RA99 - Implement basic interactive desktop applications

RA100 - Implement basic interactive web applications using different JavaScript frameworks

RA101 - Implement basic interactive android applications

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

This course introduces the fundamentals of programming techniques for interactive systems. Students will learn how to design and implement good user interfaces, how user interface systems work and integrate with operating systems.

The course will focus on prototyping and development of simple graphical user interfaces (GUI) using rapid development tools such as graphical user interface layout editors combined with simple code to create functioning interfaces.

The course also focuses on practice in the skills needed for development of user interfaces to be deployed on desktop, on the World Wide Web, and on mobile platforms.

Concretely, students will learn to use technologies that are used for desktop, web and mobile applications:

- Basics on GUI, such as event-driven programming, or design patterns, like Model-View-Controller (MVC).
- Android framework and development, including system interaction, application states, layout generation, basic UI components.
- Web programming, learning basics of HTML, CSS, DOM, JavaScript client-side Frameworks, server-side

languages, and, client-server communications .

- Java Swing and JavaFX and their UI components, including aspects like drag-and-drop, data transfer, etc.

5.2. Syllabus

1. Introduction
   1.1. Introduction to principles in software design and development processes
   1.2. Principles of object oriented programming and design techniques for GUI
2. Programming Web Apllications
   2.1. Introduction to Web applications development
   2.2. Web UI client-side components
   2.3. Developing UI using Javascript Frameworks
3. Programming Mobile Applications
   3.1. Introduction to Android architecture
   3.2. Android UI layouts and components
   3.3. Developing UI in Android
4. Programming Desktop Applications
   4.1. Desktop application interfaces
   4.2. UI desktop common components
   4.3. Developing UI using Java Swing and JavaFX

6. Schedule

6.1. Subject schedule*

Week	Classroom activities	Laboratory activities	Distant / On-line	Assessment activities
1	**1.1 Introduction to principles in software design and development processes** Duration: 01:00 Lecture **1.2 Principles of object oriented programming and design techniques for GUI** Duration: 01:00 Lecture **2.1 Introduction to Web applications development** Duration: 02:00 Lecture			
2	**2.2 Web UI client-side components** Duration: 02:00 Lecture	**4.2 Web UI client-side components** Duration: 02:00 Laboratory assignments		
3	**2.3 Developing UI using Javascript Frameworks** Duration: 02:00 Lecture	**2.3 Developing UI using Javascript Frameworks** Duration: 02:00 Laboratory assignments		
4				**Group assignment 3 (GA3): Implementation of a web application UI prototype** Group work Continuous assessment and final examination Not Presential Duration: 08:00
5	**4.1 Desktop application interfaces** Duration: 02:00 Lecture **4.2 UI desktop common components** Duration: 01:00 Lecture	**4.2 UI desktop common components** Duration: 01:00 Laboratory assignments		
6	**4.3 Developing UI using Java Swing and JavaFX** Duration: 02:00 Lecture	**4.3 Developing UI using Java Swing and JavaFX** Duration: 02:00 Laboratory assignments		
7	**4.3 Developing UI using Java Swing and JavaFX** Duration: 02:00 Lecture	**4.3 Developing UI using Java Swing and JavaFX** Duration: 02:00 Laboratory assignments		

8				**Group assignment 2 (GA2): Implementation of a desktop application UI prototype** Group work Continuous assessment and final examination Not Presential Duration: 08:00
9	**3.1 Introduction to Android architecture** Duration: 02:00 Lecture **3.2 Android UI layouts and components** Duration: 01:00 Lecture	**3.2 Android UI layouts and components** Duration: 01:00 Laboratory assignments		
10	**3.2 Android UI layouts and components** Duration: 02:00 Lecture	**3.2 Android UI layouts and components** Duration: 02:00 Laboratory assignments		
11	**3.3 Developing UI in Android** Duration: 02:00 Lecture	**3.3 Developing UI in Android** Duration: 02:00 Laboratory assignments		
12		**Workgroup** Duration: 04:00 Laboratory assignments		**Group assignment 1 (GA1): Implementation of an Android application UI prototype** Group work Continuous assessment and final examination Not Presential Duration: 08:00
13		**Workgroup** Duration: 04:00 Laboratory assignments		
14		**Workgroup** Duration: 04:00 Laboratory assignments		
15		**Workgroup** Duration: 04:00 Laboratory assignments		
16				
17				**Pupil portfolio presentation** Individual presentation Continuous assessment and final examination Presential Duration: 03:00

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
4	Group assignment 3 (GA3): Implementation of a web application UI prototype	Group work	No Presential	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
8	Group assignment 2 (GA2): Implementation of a desktop application UI prototype	Group work	No Presential	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
12	Group assignment 1 (GA1): Implementation of an Android application UI prototype	Group work	No Presential	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
17	Pupil portfolio presentation	Individual presentation	Face-to-face	03:00	10%	5 / 10	CE4 CG9 CG1 CG4

7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
4	Group assignment 3 (GA3): Implementation of a web application UI prototype	Group work	No Presential	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
8	Group assignment 2 (GA2): Implementation of a desktop application UI prototype	Group work	No Presential	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
12	Group assignment 1 (GA1): Implementation of an Android application UI prototype	Group work	No Presential	08:00	30%	3 / 10	CE4 CG9 CG1 CG4

17	Pupil portfolio presentation	Individual presentation	Face-to-face	03:00	10%	5 / 10	CE4 CG9 CG1 CG4

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Group assignment 1 (GA1): Implementation of a desktop application UI prototype	Group work	Face-to-face	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
Group assignment 2 (GA2): Implementation of a web application UI prototype	Group work	Face-to-face	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
Group assignment 3 (GA3): Implementation of an Android application UI prototype	Group work	Face-to-face	08:00	30%	3 / 10	CE4 CG9 CG1 CG4
Pupil portfolio presentation	Individual presentation	Face-to-face	00:30	10%	5 / 10	CE4 CG9 CG1 CG4

7.2. Assessment criteria

Student portfolio presentation will be held on final exam date. So, **it will not be resit in global evaluation** due to a lack of time. So, it will be retaken in referred (re-sit) examination.

Assessment projects for web UI, desktop GUI and Android UI. **They will not be retaken in global evaluation** due to:

- **Working overload for students**. Project retakes in the global evaluation, could interfere whit other subjects or courses
- **Working overload for teachers**. Evaluation process takes a lot of effort. So, it is impossible to make

projects evaluations in global evaluation

So, they will be retaken in referred (re-sit) examination

Grade Criteria based on:

- Students proactive participation in class
- Quality of pupil assignment
- Ability to understand concepts
- Capacity of presenting their work

NOTE: The groups of 3 people created to develop GA1, GA2 and GA3 cannot change along the course.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Moodle	Web resource	https://moodle.upm.es/titulaciones/oficiales
Java Foundations: Introduction to Program Design and Data Structures	Bibliography	Lewis J., DePasquale P., Chase J., 2/E, Pearson, 2010
Java SDK	Others	
Eclipse EE	Others	
Android SDK	Others	
Android Studio	Others	

9. Other information

9.1. Other information about the subject

NOTE: This course has 4 hours per week, thus, the course has a duration of 12 weeks instead of 15 weeks.