ANX-PR/CL/001-01
LEARNING GUIDE

SUBJECT

103000482 - Requirements Engineering

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	103000482 - Requirements Engineering
No of credits	6 ECTS
Type	Compulsory
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 *
Oscar Dieste Tubio (Subject coordinator)	D5106	oscar.dieste@upm.es	Tu - 16:00 - 19:00 W - 17:00 - 19:00 F - 16:00 - 17:00
Natalia Juristo Juzgado	D5104	natalia.juristo@upm.es	Sin horario. Please check office hours in the "Course information section" at Moodle.

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

3. Skills and learning outcomes *

3.1. Skills to be learned

CE5 - Educir, analizar y especificar las necesidades de los clientes, usuarios y otras partes interesadas, teniendo en cuenta los posibles condicionantes que pudieran afectar al sistema a desarrollar

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)

CG3 - Que los estudiantes sepan comunicar sus conclusiones y los conocimientos y razones últimas que las sustentan a públicos especializados y no especializados de un modo claro y sin ambigüedades (RD)

3.2. Learning outcomes

RA74 - The students will be able to analize, specify and validate software requirements

RA75 - The students will be able to manage and negotiate requirements with project stakeholders

RA73 - The students will be able to elicit and conceptualize customer and user's needs

* 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.

4. Brief description of the subject and syllabus

4.1. Brief description of the subject

The requirements engineering course aims to teach or expand students' abilities regarding software requirements: elicitation, analysis, documentation, validation and management. The course will balance lectures and practical activities. Special attention will be paid to tool support. Whenever possible, professional from industry will deliver keynotes about specific requirements engineering topics.

4.2. Syllabus

1. Requirements engineering processes
2. Requirements elicitation
3. Requirements analysis
4. Requirements documentation
5. Requirements validation
6. Requirements management/release planning

5. Schedule

5.1. Subject schedule*

Week	Classroom activities	Laboratory activities	Distant / On-line	Assessment activities
1	**Course goals and methodology** Duration: 00:10 Lecture **Requirements engineering process (including agile approaches)** Duration: 00:30 Lecture **Software project proposal** Duration: 00:10 Additional activities **Term paper proposal** Duration: 00:10 Additional activities	**Requirement types** Duration: 02:00 Problem-solving class		**Identifying software requirements for an existing software application** Individual work Continuous assessment Not Presential Duration: 02:00 **Lecture 1 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00
2	**Software requirements specification** Duration: 00:30 Lecture **Software requirements attributes (and relationship with Management)** Duration: 00:20 Lecture **User stories, features, and use cases** Duration: 00:10 Lecture	**Tool support for requirements specification: Rational Requisite Pro or a similar tool** Duration: 02:00 Laboratory assignments		**Creation a requirement specification using Requisite Pro or a similar tool** Individual work Continuous assessment Not Presential Duration: 03:00 **Lecture 2 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00
3	**Requirements validation** Duration: 00:40 Lecture **Requirements reviews** Duration: 00:20 Lecture	**Conduct a requirements review** Duration: 00:45 Cooperative activities **Apply validation approaches (user manual, requirements testing)** Duration: 01:15 Problem-solving class		**PROJECT: Software project proposal** Group work Continuous assessment Not Presential Duration: 03:00 **Report the validation exercises** Individual work Continuous assessment Not Presential Duration: 01:00 **Lecture 3 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00

4	**Requirements elicitation** Duration: 00:30 Lecture **Elicitation with interviews** Duration: 00:30 Lecture	**PROJECT: Conduct the elicitation of a software project using interviews** Duration: 01:00 Cooperative activities **Tool support for requirements projects: IBM Doors Next Generation** Duration: 00:30 Laboratory assignments		**Midterm exam** Written test Continuous assessment Presential Duration: 00:30 **PROJECT: Add elicitation information to DOORS** Group work Continuous assessment Not Presential Duration: 04:00 **Lecture 4 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00
5	**Analysis: Overview** Duration: 00:10 Lecture **Requirements identification** Duration: 00:20 Lecture **Analysis: Weak techniques** Duration: 00:30 Cooperative activities	**PROJECT: Identify features/use cases/requirements** Duration: 01:15 Cooperative activities **Perform a checklist-based analysis using DOORS** Duration: 00:45 Cooperative activities		**PROJECT: Add features/use cases/requirements to DOORS** Group work Continuous assessment Not Presential Duration: 01:00 **Lecture 5 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00
6	**Prototyping** Duration: 01:00 Lecture	**PROJECT: Conduct the evaluation of the project's low-fidelity prototype** Duration: 02:00 Cooperative activities		**PROJECT: Add prototyping information to DOORS** Group work Continuous assessment Not Presential Duration: 02:00
7	**Elicitation: Other techniques, e.g., brainstorming, quizzes, etc.** Duration: 01:00 Lecture	**PROJECT: Conduct the elicitation of a software project using interviews** Duration: 02:00 Cooperative activities		**PROJECT: Add elicitation information to DOORS** Group work Continuous assessment Not Presential Duration: 02:00 **Lecture 7 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00
8	**Analysis: Conceptual models** Duration: 01:00 Cooperative activities	**PROJECT: Create models for the different product perspectives** Duration: 02:00 Cooperative activities		**PROJECT: Add the conceptual models and the cross-checks to DOORS** Group work Continuous assessment Not Presential Duration: 02:00 **Lecture 8 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00

9	**Elicitation: Requirements workshops** Duration: 01:00 Lecture	**PROJECT: Conduct the elicitation of a software project using a requirements workshop** Duration: 02:00 Cooperative activities		**PROJECT: Add elicitation information to DOORS** Group work Continuous assessment Not Presential Duration: 02:00 **Lecture 9 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00
10	**Requirements management** Duration: 00:30 Lecture **Requirements prioritization** Duration: 00:30 Lecture	**Perform a change management process** Duration: 01:00 Problem-solving class **Perform a requirements prioritization** Duration: 00:30 Cooperative activities		**Midterm exam** Written test Continuous assessment Presential Duration: 00:30 **Report the change management process** Group work Continuous assessment Not Presential Duration: 01:00 **Lecture 10 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00
11	**Early estimation** Duration: 03:00 Problem-solving class			**PROJECT: Creation a preliminary requirement specification using DOORS** Group work Continuous assessment Not Presential Duration: 04:00 **Report the early estimation** Group work Continuous assessment Not Presential Duration: 01:00
12	**Negotiation** Duration: 00:30 Lecture **Triage and release planning** Duration: 00:30 Lecture	**Perform a triage process** Duration: 02:00 Problem-solving class		**PROJECT: Perform the peer-evaluation of the software requirements specification** Group work Continuous assessment Not Presential Duration: 05:00 **Report the triage process** Group work Continuous assessment Not Presential Duration: 01:00 **Lecture 11 self-evaluation** Written test Continuous assessment Not Presential Duration: 02:00

13	**Keynote: Practical experiences managing requirements** Duration: 01:00 Additional activities	**Modeling requirements with UML** Duration: 02:00 Problem-solving class		**Term paper submission** Individual work Continuous assessment Not Presential Duration: 15:00 **Develop a simple specification using UML** Individual work Continuous assessment Not Presential Duration: 02:00
14		**Seminar: Model checking** Duration: 03:00 Laboratory assignments		**Term paper presentation submission** Individual presentation Continuous assessment Not Presential Duration: 02:00 **Develop a simple set of rules to check a specification** Individual work Continuous assessment Not Presential Duration: 02:00
15		**Seminar: Model-driven engineering** Duration: 03:00 Laboratory assignments		**Development of a simple application using MDA** Individual work Continuous assessment Not Presential Duration: 04:00
16	**Project: Retrospective** Duration: 00:30 Cooperative activities **Keynote: Artefact-driven Requirements Engineering** Duration: 02:00 Lecture			**Midterm exam** Written test Continuous assessment Presential Duration: 00:30
17				**Term paper evaluation** Individual work Continuous assessment Not Presential Duration: 03:00 **Global examination** Written test 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.

6. Activities and assessment criteria

6.1. Assessment activities

6.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
1	Identifying software requirements for an existing software application	Individual work	No Presential	02:00	3%	3 / 10	CE5
1	Lecture 1 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
2	Creation a requirement specification using Requisite Pro or a similar tool	Individual work	No Presential	03:00	2%	3 / 10	CE5
2	Lecture 2 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
3	PROJECT: Software project proposal	Group work	No Presential	03:00	2%	3 / 10	CE5 CG1 CG3
3	Report the validation exercises	Individual work	No Presential	01:00	2%	3 / 10	CE5 CG3
3	Lecture 3 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
4	Midterm exam	Written test	Face-to-face	00:30	10%	3 / 10	CE5
4	PROJECT: Add elicitation information to DOORS	Group work	No Presential	04:00	3%	3 / 10	CE5
4	Lecture 4 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
5	PROJECT: Add features/use cases/requirements to DOORS	Group work	No Presential	01:00	2%	3 / 10	CE5
5	Lecture 5 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
6	PROJECT: Add prototyping information to DOORS	Group work	No Presential	02:00	3%	3 / 10	CE5
7	PROJECT: Add elicitation information to DOORS	Group work	No Presential	02:00	2%	3 / 10	CE5
7	Lecture 7 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
8	PROJECT: Add the conceptual models and the cross-checks to DOORS	Group work	No Presential	02:00	3%	3 / 10	CE5 CG3
8	Lecture 8 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
9	PROJECT: Add elicitation information to DOORS	Group work	No Presential	02:00	2%	3 / 10	CE5

9	Lecture 9 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
10	Midterm exam	Written test	Face-to-face	00:30	10%	5 / 10	CE5
10	Report the change management process	Group work	No Presential	01:00	2%	3 / 10	CE5 CG3
10	Lecture 10 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
11	PROJECT: Creation a preliminary requirement specification using DOORS	Group work	No Presential	04:00	4%	3 / 10	CE5
11	Report the early estimation	Group work	No Presential	01:00	3%	3 / 10	CE5
12	PROJECT: Perform the peer-evaluation of the software requirements specification	Group work	No Presential	05:00	10%	3 / 10	CE5 CG1 CG3
12	Report the triage process	Group work	No Presential	01:00	2%	3 / 10	CE5 CG3
12	Lecture 11 self-evaluation	Written test	No Presential	02:00	1%	5 / 10	CE5
13	Term paper submission	Individual work	No Presential	15:00	5%	0 / 10	CG3
13	Develop a simple specification using UML	Individual work	No Presential	02:00	2%	3 / 10	CE5
14	Term paper presentation submission	Individual presentation	No Presential	02:00	1%	0 / 10	CG3
14	Develop a simple set of rules to check a specification	Individual work	No Presential	02:00	1%	0 / 10	CE5
15	Development of a simple application using MDA	Individual work	No Presential	04:00	3%	3 / 10	CE5
16	Midterm exam	Written test	Face-to-face	00:30	10%	5 / 10	CE5
17	Term paper evaluation	Individual work	No Presential	03:00	3%	0 / 10	CG1

6.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Global examination	Written test	Face-to-face	03:00	100%	5 / 10	CE5 CG1 CG3

6.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Final exam (extraordinary session)	Written test	Face-to-face	04:00	100%	5 / 10	CE5 CG1 CG3

6.2. Assessment criteria

Progressive evaluation

- The assessment of assignments will depend on (1) the quality of the submissions, e.g., presentation, cleanliness, etc., and (2) the correctness of the results.
- The final grade will be calculated using a weighted average, as described before.
- The laboratory cooperative activities labeled "**PROJECT:**" are compulsory. Skipping these activities without due reason implies failing the project.
- The course project- related activities are labelled "**PROJECT:**". The students cannot retake the course project in the global evaluation. The project requires the cooperation of groups of students and has a pre-specified calendar, including face-to-face sessions. These activities cannot be scheduled at different times because it is not guaranteed that fellow students have other time slots available apart from the ones assigned to the Requirements Engineering course.
- The students cannot retake the term paper. First, this activity does not have a minimum grade, i.e., there is no "fail" grade. Second, the term paper is evaluated using peer review; it implies that the paper should be available at the designated time. Finally, the term paper requires a substantial effort that students cannot likely perform between the submission time and the Global Examination date; these dates correspond to the course evaluation period.

Global evaluation (January)

- All assignments can be re-submitted and regraded. When the instructors provide the feedback, they will specify a deadline for the resubmission.
- The students can resit the midterm exams in January (on the date/time specified by the administration).
- The project and the term paper cannot be retaken.

Global evaluation (July)

- Students will take a single exam. This exam includes all topics (theoretical and practical) covered in the course. Preparatory materials will be available at Moodle.

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
Course material	Web resource	All required materials will be available at moodle