ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000482 - Requirements engineering

DEGREE PROGRAMME

10AM - Master Universitario En Ingenieria Del Software

ACADEMIC YEAR & SEMESTER

2018/19 - Semester 1

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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	2018-19

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Oscar Dieste Tubio (Subject coordinator)	D6203	oscar.dieste@upm.es	Sin horario. Please check office hours in the "Course information section" at Moodle.
Natalia Juristo Juzgado	D5104	natalia.juristo@upm.es	Sin horario. Please check office hours in the "Course information section" at Moodle.

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* 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

3.2. Learning outcomes

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

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

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

    2.1. Regular elicitation techniques

    2.2. Market-oriented elicitation techniques

    2.3. Scenario analysis

3. Requirements analysis

    3.1. Weak techniques

    3.2. Natural language processing tools

    3.3. Conceptual models

        3.3.1. Process

        3.3.2. Data

        3.3.3. State

4. Requirements documentation

    4.1. Requirements types and properties

    4.2. Standards

        4.2.1. Tool support

5. Requirements validation

    5.1. Reviews

    5.2. Model checking

        5.2.1. Tool support

    5.3. Prototyping

        5.3.1. Tool support

6. Requirements management

    6.1. Change management

    6.2. Negotiation and prioritization

    6.3. Time and cost estimation

7. Goal-oriented requirements engineering

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8. Model-driven architecture

    8.1. Tool support

9. System/acceptance testing

    9.1. Tool support

5. Schedule

5.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Other face-to-face activities	Assessment activities
1	**Course goals and methodology** Duration: 00:30 Lecture **Requirements engineering process** Duration: 00:30 Lecture **Requirement types** Duration: 02:00 Cooperative activities			**Identifying software requirements for an existing software application** Individual work Continuous assessment Duration: 02:00
2	**Software requirements attributes** Duration: 00:30 Lecture **Software requirements specification** Duration: 01:00 Lecture	**Tool support for requirements specification** Duration: 01:30 Laboratory assignments		**Creation a requirement specification using a software tool** Individual work Continuous assessment Duration: 03:00
3	**Early estimation** Duration: 01:30 Cooperative activities **Requirements management** Duration: 01:00 Lecture **Agile Requirements Engineering** Duration: 00:30 Lecture			**Submission of a software project proposal** Group work Continuous assessment Duration: 04:00
4	**Negotiation (/triage) and release planning** Duration: 02:00 Cooperative activities **Requirements prioritization** Duration: 01:00 Lecture			**Requirements negotiation I** Group work Continuous assessment Duration: 01:00
5	**Elicitation: overview** Duration: 00:30 Lecture **Elicitation : Interviews** Duration: 00:30 Lecture **Elicitation using interviews** Duration: 01:30 Cooperative activities			**Midterm exam** Written test Continuous assessment Duration: 00:30

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6	**Elicitation: Other regular techniques** Duration: 00:30 Lecture **Elicitation: Technique selection** Duration: 01:00 Cooperative activities **Elicitation: Scenario analysis** Duration: 00:30 Cooperative activities **How to improve communication among stakeholders?** Duration: 01:00 Cooperative activities			**Interview evaluation** Group work Continuous assessment Duration: 02:00
7	**Analysis: Overview** Duration: 00:30 Lecture **Analysis: Model notations & UML** Duration: 00:30 Lecture **Analysis: How to use models** Duration: 01:00 Cooperative activities	**Analysis: other approaches** Duration: 01:00 Lecture		**Model evaluation** Group work Continuous assessment Duration: 02:00 **Requirements evaluation I** Group work Continuous assessment Duration: 02:00
8	**Validation: Overview** Duration: 00:30 Cooperative activities **Validation: Prototyping** Duration: 01:00 Cooperative activities **Validation: Other techniques** Duration: 01:30 Cooperative activities			**Prototype evaluation** Group work Continuous assessment Duration: 02:00 **Requirements negotiation II** Group work Continuous assessment Duration: 01:00
9	**System/acceptance testing** Duration: 00:30 Lecture	**Tool support for system/acceptance testing** Duration: 02:00 Laboratory assignments		**Midterm exam** Written test Continuous assessment Duration: 00:30 **System testing plan** Group work Continuous assessment Duration: 03:00 **Term paper submission** Individual work Continuous assessment Duration: 20:00
10		**Model-driven engineering** Duration: 02:00 Laboratory assignments	**Term paper paper presentation** Duration: 01:00 Additional activities	**Development of a simple application using MDA** Group work Continuous assessment Duration: 05:00

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11	**Techniques for reactive systems** Duration: 01:00 Cooperative activities	**Tool support for reactive systems I** Duration: 01:00 Laboratory assignments	**Term paper paper presentation** Duration: 01:00 Additional activities	**Requirements evaluation II** Group work Continuous assessment Duration: 03:00
12	**Model validation** Duration: 02:00 Lecture		**Keynote: Practical experiences managing requirements** Duration: 01:00 Additional activities	
13		**Tool support for reactive systems II** Duration: 02:00 Laboratory assignments	**Term paper paper presentation** Duration: 01:00 Additional activities	**Model validation using PROMELA** Individual work Continuous assessment Duration: 05:00
14	**Requirements engineering models** Duration: 02:00 Lecture		**Keynote: Formal methods in requirements engineering** Duration: 01:00 Additional activities	
15	**Goal-oriented requirements engineering** Duration: 02:00 Lecture		**Term paper paper presentation** Duration: 01:00 Additional activities	**Modeling a system using i*** Group work Continuous assessment Duration: 04:00
16	**Large-scale Requirements Engineering** Duration: 01:30 Lecture		**Keynote: Problems in Requirements Engineering** Duration: 01:00 Lecture **Retrospective** Duration: 00:30 Additional activities	
17				**End term exam** Written test Continuous assessment Duration: 01:00 **Exam** Written test Final examination Duration: 03:00

The independent study hours are training activities during which students should spend time on individual study or individual assignments.

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 subject schedule is based on a previous theorical planning of the subject plan and might go to through experience some unexpected changes along throughout the academic year.

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6. Activities and assessment criteria

6.1. Assessment activities

6.1.1. Continuous 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	5%	4 / 10	CE5
2	Creation a requirement specification using a software tool	Individual work	No Presential	03:00	5%	4 / 10	CE5
3	Submission of a software project proposal	Group work	No Presential	04:00	4%	4 / 10	CE5
4	Requirements negotiation I	Group work	No Presential	01:00	1%	4 / 10	CE5
5	Midterm exam	Written test	Face-to-face	00:30	8%	5 / 10	CE5
6	Interview evaluation	Group work	No Presential	02:00	3%	4 / 10	CE5
7	Model evaluation	Group work	No Presential	02:00	3%	4 / 10	CE5
7	Requirements evaluation I	Group work	No Presential	02:00	2%	4 / 10	CE5
8	Prototype evaluation	Group work	No Presential	02:00	3%	4 / 10	CE5
8	Requirements negotiation II	Group work	No Presential	01:00	1%	4 / 10	CE5
9	Midterm exam	Written test	Face-to-face	00:30	8%	5 / 10	CE5
9	System testing plan	Group work	No Presential	03:00	7%	4 / 10	CE5
9	Term paper submission	Individual work	No Presential	20:00	15%	5 / 10	CE5
10	Development of a simple application using MDA	Group work	No Presential	05:00	7%	4 / 10	CE5
11	Requirements evaluation II	Group work	No Presential	03:00	2%	4 / 10	CE5
13	Model validation using PROMELA	Individual work	No Presential	05:00	8%	4 / 10	CE5
15	Modeling a system using i*	Group work	No Presential	04:00	8%	4 / 10	CE5
17	End term exam	Written test	Face-to-face	01:00	10%	5 / 10	CE5

6.1.2. Final examination

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

6.1.3. Referred (re-sit) examination

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Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Final exam (extraordinary session)	Written test	Face-to-face	03:00	100%	5 / 10	CE5

6.2. Assessment criteria

Continuous evaluation

- The assessment of assignments will depend on (1) presentation made by the students and (2) the correctness of the results.
- The final grade will be calculated using a weighted average as described before.

Final exam (January)

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

Final exam (extraordinary session)

- See **Final Exam (January)**

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