ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000540 - Critical software

DEGREE PROGRAMME

10AM - Master Universitario en Ingenieria del Software

ACADEMIC YEAR & SEMESTER

2017/18 - Semester 1

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1. Description

1.1. Subjet details

Name of the subject	103000540 - Critical software
No of credits	3 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	Escuela Tecnica Superior de Ingenieros Informaticos
Academic year	2017-18

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Andres Silva Vazquez (Subject coordinator)	5107	andres.silva@upm.es	Tu - 11:00 - 14:00 Th - 11:00 - 14:00

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

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3. Skills and learning outcomes *

3.1. Skills to be learned

CE13 - Tener una visión de los distintos aspectos específicos y emergentes de la ingeniería del software, y profundizar en algunos de ellos

CE14 - Comprender lo que pueden y no pueden conseguir las prácticas actuales de ingeniería del software, y sus limitaciones y su posible futura evolución.

3.2. Learning outcomes

RA19 - The student explains what are the software engineering limits and frontiers, and the base for new trends and developments, and about the advanced issues and their application.

RA17 - Given a specific software engineering field, the student assesses and designs the most appropriate solution to solve some of its problems, presenting the technical difficulties and applicability limitations.

RA18 - Given a real problem, the student chooses the most appropriate software engineering solution, analyzing the solution feasibility, what can and cannot be achieved through the current status of the chosen solution, and what it can advance in the future.

* 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.

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4. Brief description of the subject and syllabus

4.1. Brief description of the subject

No hay descripción de la asignatura.

4.2. Syllabus

1. Safeware concepts

   1.1. Normal Accidents theory

   1.2. Basic Concepts

   1.3. Reliability vs. Safety

   1.4. Hazard & Risk Analysis

   1.5. Common Techniques

2. Design and Safeware

   2.1. Hazard elimination

   2.2. Hazard reduction

   2.3. Hazard control

   2.4. Examples

3. Concepts from the IEC61508 Standard

   3.1. Introduction to IEC61508

   3.2. Concepts: SIL, functional safety, etc.

   3.3. Hazard log

   3.4. Limits of IEC61508

4. Human and Organizational Factors

   4.1. Performance models

   4.2. Human error

   4.3. Organizational problems

   4.4. Solution proposals

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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	**Lecture/workshop on topics 1.1 and 1.2** Duration: 02:00 Cooperative activities			**Elaboration of the presentation and draft of the expository writing** Group presentation Continuous assessment Duration: 06:00
2	**Lecture/workshop on topics 1.3. 1.4 and 1.5** Duration: 02:00 Cooperative activities			
3	**Lecture/workshop on topics 2.1 and 2.2** Duration: 02:00 Cooperative activities			**Elaboration of the presentation and draft of the expository writing** Group presentation Continuous assessment Duration: 06:00
4	**Lecture/workshop on topics 2.3 and 2.4** Duration: 02:00 Cooperative activities			
5	**Lecture/workshop on topics 3.1, 3.2** Duration: 02:00 Cooperative activities			**Elaboration of the presentation and draft of the expository writing** Group presentation Continuous assessment Duration: 06:00
6	**Lecture/workshop on topics 3.3 and 3.4** Duration: 02:00 Cooperative activities			
7	**Lecture/workshop on topics 4.1 and 4.2** Duration: 02:00 Cooperative activities			
8	**Lecture/workshop on topics 4.3 and 4.4** Duration: 02:00 Cooperative activities			**Elaboration of the presentation and draft of the expository writing** Group presentation Continuous assessment Duration: 06:00 **Examen final** Written test Final examination Duration: 05:00
9				
10				
11				

12				
13				
14				
15				
16				
17				

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	Elaboration of the presentation and draft of the expository writing	Group presentation	No Presential	06:00	25%	3 / 10	CE13 CE14
3	Elaboration of the presentation and draft of the expository writing	Group presentation	No Presential	06:00	25%	3 / 10	CE13 CE14
5	Elaboration of the presentation and draft of the expository writing	Group presentation	No Presential	06:00	25%	3 / 10	CE13 CE14
8	Elaboration of the presentation and draft of the expository writing	Group presentation	No Presential	06:00	25%	3 / 10	CE13 CE14

6.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
8	Examen final	Written test	No Presential	05:00	100%	3 / 10	CE13 CE14

6.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

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6.2. Assessment criteria

The grading criteria for this subject are closely linked to the working methods. This method will be concept-oriented. For each topic and subtopic there will be a lecture/workshop in the classroom, and the teacher will choose a key concept. Later, the students, preferably in groups, will have one week for reading concept-related bibliography and elaborate a presentation and an expository writing (8 pages max.).

Each group of students will present a draft of their work in the classroom, which may be evaluated (anonymously) by the other students.The rhythm of work will be, approximately, as follows: every two weeks, each group of students will submit the expository writing of past week's concept. In parallel, the students will attend the lectures/workshops that will be done in the classroom, and possibly qualify them.

With more detail, the following two-week procedure will be followed for each concept:

1. The teacher will provide an introduction to a concept, relevant bibliography and documentation for the concept at hand. Such documentation will be a starting point for the student, who will explore other relevant sources of information.
2. Each group of students will elaborate a presentation related to the concept. In parallel, they should start elaborating a draft document with the expository writing of the concept.
3. The following week, in the classroom, the concept will be presented, the mistakes and problems detected in the presentation will be discussed and a consensus will be achieved. The rest of the students in the classroom may evaluate the presentations.
4. The final expository writing (8 pages max.) will be uploaded to Moodle.

The concepts of the course are listed below, but they could be dynamically modified, along the course. For some topics the teacher will provide problems for being solved by the group: Hazard. Reliability vs. Safety. Risk. SafeWare and associated techniques. Concepts from the Std. IEC 61508: SIL, ALARP. Automation and Overautomation. Norman's Model. Latent errors and violations. Models: STAMP (Leveson), ChiDeltas (Hall-Silva). Other concepts to be announced.

he mechanics of the course will be as follows:

- The communication among the students and the teacher will be done through Moodle. The steps to be done at each point during the course will be announced always through Moodle.
- Problem resolution and clarification of student's questions will be done also through Moodle.
- The documentation for each concept will be provided on demand, via Moodle.
- The purpose of evaluating the presentations by other students is to get an idea on how clear the concept has been explained. Of course, those qualifications are just informative for the teacher, who will have a final

decision on the overall evaluation.

The final qualification will be an average of the teacher's qualifications for each submitted work, taking into account also the effort and overall attitude of each group of students.

7. Teaching resources

7.1. Teaching resources for the subject

Name	Type	Notes
Bibliografía	Bibliography	Bibliografía recopilada por el profesor de la asignatura y disponible en http://www.citeulike.org/user/asilva/tag/emse y en http://www.citeulike.org/user/asilva/tag/safety