ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000484 - Software architecture

DEGREE PROGRAMME

10AM - Master Universitario En Ingenieria Del Software

ACADEMIC YEAR & SEMESTER

2018/19 - Semester 2

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	103000484 - Software architecture
No of credits	4 ECTS
Type	Compulsory
Academic year ot the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
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 *
Jaime Ramirez Rodriguez (Subject coordinator)	5112	jaime.ramirez@upm.es	M - 11:00 - 13:00 Tu - 16:00 - 18:00 F - 11:00 - 13:00
Angelica De Antonio Jimenez	5108/3354	angelica.deantonio@upm.es	M - 12:00 - 14:00 W - 11:00 - 12:00 F - 10:30 - 13:30

* 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

El plan de estudios Master Universitario en Ingenieria del Software no tiene definidas asignaturas previas recomendadas para esta asignatura.

3.2. Other recommended learning outcomes

- Object oriented design

4. Skills and learning outcomes *

4.1. Skills to be learned

CE12 - Concebir y realizar el diseño de los sistemas software asegurando atributos relevantes de calidad.

4.2. Learning outcomes

RA4 - To design the system according to the requirements, constraints, quality norms and organization goals.

RA6 - Ability to document the software architecture

RA5 - To apply the architectural concepts that are relevant in the architectural design

* 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

The goal of the subject is to teach the basis of the software architectural design. For that purpose, it will be shown how the quality attribute requirements of the system can be satisfied by applying some tactics. In addition, architectural styles will be addressed and their relationship with quality attributes will be explained. Then, some representative architectural patterns will be explained showing how they can be reused to solve some design problems providing well proven solutions without the need of re-inventing the wheel. Throughout the course, application examples will be briefly described to illustrate the concepts.

5.2. Syllabus

1. Previous Concepts on Software Architecture
    1.1. What is Software Architecture?
    1.2. Architectural Views
    1.3. Software Architecture in the Development Process
2. Defining a Software Architecture
    2.1. Quality Attributes related to Software Architecture
    2.2. Achieving Quality Attributes through Tactics
    2.3. Architectural Styles
    2.4. Architectural Patterns

6. Schedule

6.1. Subject schedule*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Other face-to-face activities	Assessment activities
1	**Presentación** Duration: 01:00 Lecture **Previous concepts on Software Architecture** Duration: 01:00 Lecture			
2	**2.1 Quality attributes related to software architecture** Duration: 01:00 Lecture			**Practical exercises on topics that are being explained in classroom** Group work Continuous assessment Duration: 00:45
3	**2.2 Achieving quality attributes through tactics** Duration: 01:00 Lecture			**Practical exercises on topics that are being explained in classroom** Group work Continuous assessment Duration: 03:00 **Practical exercises on topics that are being explained in classroom** Group work Continuous assessment Duration: 00:45
4	**2.3 Architectural styles** Duration: 02:00 Lecture			
5	**2.3 Architectural styles** Duration: 01:00 Lecture			**Practical exercises on topics that are being explained in classroom** Group work Continuous assessment Duration: 10:00 **Practical exercises on topics that are being explained in classroom** Group work Continuous assessment Duration: 00:45
6	**2.3 Architectural styles** Duration: 02:00 Lecture			
7	**2.3 Architectural styles** Duration: 02:00 Lecture			**Practical exercises on topics that are being explained in classroom** Group work Continuous assessment Duration: 05:00

8	**2.4 Architectural patterns** Duration: 01:00 Lecture			**Brief presentation of the project** Group work Continuous assessment Duration: 00:45
9	**2.4 Architectural patterns** Duration: 02:00 Lecture			**Project** Group work Continuous assessment Duration: 10:00
10	**2.4 Architectural patterns** Duration: 02:00 Lecture			**Project** Group work Continuous assessment Duration: 10:00
11	**2.4 Architectural patterns** Duration: 02:00 Lecture			**Project** Group work Continuous assessment Duration: 12:00
12				**Oral presentation on the project** Group presentation Continuous assessment Duration: 02:00 **Project** Group work Continuous assessment Duration: 20:00
13	**2.4 Architectural patterns** Duration: 01:00 Lecture			
14	**2.4 Architectural patterns** Duration: 02:00 Lecture			**Project** Group work Continuous assessment Duration: 09:00
15	**2.4 Architectural patterns** Duration: 02:00 Lecture			**Exam** Written test Continuous assessment Duration: 01:00
16				
17				**Final Exam** Written test Final examination Duration: 01:00

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.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
2	Practical exercises on topics that are being explained in classroom	Group work	Face-to-face	00:45	%	/ 10	
3	Practical exercises on topics that are being explained in classroom	Group work	No Presential	03:00	5%	/ 10	CE12
3	Practical exercises on topics that are being explained in classroom	Group work	Face-to-face	00:45	%	/ 10	
5	Practical exercises on topics that are being explained in classroom	Group work	No Presential	10:00	10%	/ 10	CE12
5	Practical exercises on topics that are being explained in classroom	Group work	Face-to-face	00:45	%	/ 10	
7	Practical exercises on topics that are being explained in classroom	Group work	No Presential	05:00	10%	/ 10	CE12
8	Brief presentation of the project	Group work	Face-to-face	00:45	%	/ 10	
9	Project	Group work	No Presential	10:00	10%	5 / 10	CE12
10	Project	Group work	No Presential	10:00	10%	5 / 10	CE12
11	Project	Group work	No Presential	12:00	10%	5 / 10	CE12
12	Oral presentation on the project	Group presentation	Face-to-face	02:00	%	/ 10	
12	Project	Group work	No Presential	20:00	10%	5 / 10	CE12
14	Project	Group work	No Presential	09:00	10%	5 / 10	CE12
15	Exam	Written test	Face-to-face	01:00	25%	4 / 10	CE12

7.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Final Exam	Written test	Face-to-face	01:00	100%	4 / 10	CE12

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Project	Individual work	Face-to-face	00:00	100%	5 / 10	CE12

7.2. Assessment criteria

Along the semester, in order to pass the course, the student will have to do the following assignments:

- Practical exercises: the student will have to do some practical exercises where he/she will have to apply the concepts, techniques and principles explained in the classroom.
- Final exam: the student will have to do a final exam where he/she will show that he/she has acquired the basic concepts explained in the classroom.
- Project: the student will have to propose a project and an architectural solution for it. This work will have to be reflected in a document. In addition, before delivering this document, the student will have to do an oral presentation in classroom where the preliminary results of his/her work will be summarized.

The final grade (FG) will be calculated from the practical exercises grade (PEG), the exam grade (EG) and project grade (PG) by means of the following formula:

FG=0.25*PEG+0.25*EG+0.5*PG if PEG>=4 and EG>=4 and PG>=5

FG = 0 otherwise

Where all the grades take value between 0 and 10

When failed, in the extra exam period the final grade will be obtained from the grade of a research work or project.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Moodle site	Web resource	http://moodle.upm.es/titulaciones/oficiales/course/view.php?id=2835
Bass, L. et al. (2003) Software Architecture in Practice. Addison-Wesley, Boston, MA, second edition	Bibliography	
Buschmann, F. et al. (1996) Pattern-Oriented Software Architecture: A System of Patterns, volume 1 de Software Design Patterns. John Wiley & Sons.	Bibliography	
Taylor, R. N. et al. (2009) Software Architecture: Foundations, Theory and Practice. John Wiley & Sons.	Bibliography	
Bachmann, F. et al. (2007) Modificability Tactics. Inf. Téc. CMU/SEI-2007-TR-002, Software Engineering Institute - Carnegie Mellon University, Pittsburg, PA, USA.	Bibliography	
Gorton I. (2006) Essential Software Architecture. Springer-Verlag.	Bibliography	