UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: SOFTWARE ENGINEERING I
Code: 42314
Type: CORE COURSE
ECTS credits: 6
Degree: 406 - UNDERGRADUATE DEGREE IN COMPUTER SCIENCE AND ENGINEERING (AB)
Academic year: 2022-23
Center: 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)
Group(s): 10 11 12
Year: 2
Duration: First quarter
Main language: Spanish
Second language: English
Use of additional languages: English in the bilingual group (Group I)
English Friendly: N
Web site: http://campusvirtual.uclm.es
Bilingual: Y

Lecturer: **JOAQUIN FERNANDEZ MARTINEZ** - Group(s): **11**

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Lecturer: **MARIA DOLORES LOZANO PEREZ** - Group(s): **12**

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Lecturer: **FRANCISCO MONTERO SIMARRO** - Group(s): **10**

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2. Pre-Requisites

Students are expected to have passed the subject "Information Systems" in the first year and have acquired knowledge of the Object Oriented Paradigm. To this end, it is advisable to have passed the subject of Fundamentals of Programming I and II, in the first year.

3. Justification in the curriculum, relation to other subjects and to the profession

This subject provides a general view of the discipline called Software Engineering and the role it plays within the context of computer science and engineering. To this end, the course includes the basic concepts and the main features and techniques to be applied during the stages of software development, that is to say, requirements, analysis, design and implementation, taking into account the Object-Oriented Paradigm.

As a result, students will acquire the basic skills and knowledge needed to work as a software engineer. With the foundations acquired in this course, students will be able to deepen in more specific software engineering-related subjects offered throughout the degree.

4. Degree competences achieved in this course

Course competences

Code	Description
BA04	Basic knowledge about the uses and programming of computers, operating systems, data bases, and digital programmes with applications in engineering.
CO01	Ability to design, develop, select, and assess, applications and digital systems, guaranteeing their reliability, security, and quality, according to ethical principles and the current and common laws.
CO02	Ability to conceive, plan, develop and manage projects, services, and digital systems in any context, leading their start and applying continuous improvements, assessing their economic and social impact.
CO03	Ability to understand the important of negotiation, work efficiency, leadership, and communication abilities in every context of software development.
CO08	Ability to analyse, design, build and maintain applications in a strong, safe, and efficient manner by selecting the most appropriate paradigms and programming languages.
CO16	Knowledge and application of principles, methodologies, and life spans of software engineering.
INS03	Ability to manage information and data.
PER01	Team work abilities.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Building design models, both high leveled and detailed, for the construction of software systems that implement them.

Identification, modelling, and specifications of software and business requirements for the construction of software systems that implement them.

Knowledge about tools that support the construction of software systems and the storage and processing of data.

Knowledge of the principles of software engineering and the main methodologies for the construction of quality software.

6. Units / Contents

Unit 1: Introduction to Software Engineering
- **Unit 1.1** Background and definitions
- **Unit 1.2** Fundamental concepts

Unit 2: Requirements Engineering
- **Unit 2.1** Introduction
- **Unit 2.2** Requirement: Definition, types and features
- **Unit 2.3** Requirements Engineering Process Models
- **Unit 2.4** Requirements Elicitation Stage
- **Unit 2.5** Requirements Analysis Stage
- **Unit 2.6** Requirements Validation and Verification Stage

Unit 3: Requirements modelling with UML 2.0: Use Case Diagrams
- **Unit 3.1** Introduction
- **Unit 3.2** Use Cases Specification
- **Unit 3.3** Graphical Notation
- **Unit 3.4** Relationships within a Use Case Diagram
- **Unit 3.5** Examples and practical cases

Unit 4: Object Oriented Analysis with UML 2.0
- **Unit 4.1** Introduction to Software Modelling with UML 2.0
- **Unit 4.2** Domain Class Diagrams
- **Unit 4.3** Analysis Class Diagrams
- **Unit 4.4** Activity Diagrams

Unit 5: Object Oriented Design with UML 2.0
- **Unit 5.1** State Diagrams
- **Unit 5.2** Sequence Diagrams
- **Unit 5.3** Communication Diagrams
- **Unit 5.4** Components Diagrams
- **Unit 5.5** Deployment Diagrams

Unit 6: Object Oriented Software Development: Unified Process (RUP)
- **Unit 6.1** Introduction
- **Unit 6.2** Basic Principles of RUP
- **Unit 6.3** RUP Stages

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CO01 CO02 CO03 CO16	0.88	22	N	-	MAG: Lectures dedicated to explain the theoretical concepts of the subject, in which different methods will be used, combining master lessons with other teaching methods.
Problem solving and/or case studies [ON-SITE]	Group Work	CO03 INS03 PER01	0.4	10	Y	N	PRO, RES: Working groups (WG) will be established, composed of 3 students, who will consider various problems or specific cases that the WGs will have to solve by applying the techniques and methods seen in face-to-face theory sessions.
Group tutoring sessions [ON-SITE]	Guided or supervised work	PER01	0.2	5	N	-	RES: Advice and resolution of doubts on the exercises proposed to the WGs
Class Attendance (practical) [ON-SITE]	Workshops and Seminars	BA04 INS03	0.08	2	N	-	PLAB: Introductory session to the practices of the subject as a seminar to present the software tools to be used at the laboratory.
Computer room practice [ON-SITE]	Project/Problem Based Learning (PBL)	CO01 CO02 CO03 CO08 CO16 INS03 PER01	0.4	10	Y	Y	LAB: Practical sessions in the laboratory where students in groups of two develop a project throughout the course.
Group tutoring sessions [ON-SITE]	Guided or supervised work	CO01 CO02 CO03 CO16 INS03 PER01	0.16	4	N	-	TUT: Tutoring sessions to the practice groups to solve doubts.
Project or Topic Presentations [ON-SITE]	Assessment tests	CO08 INS03	0.16	4	Y	Y	EVA: A total of 4 hours will be devoted throughout the course for the students to perform individual practice assessment activities.
Study and Exam Preparation [OFF-SITE]	Self-study	CO01 CO02 CO03 CO16 INS03	1.6	40	N	-	EST: Hours dedicated to study the theory of the subject
Study and Exam Preparation [OFF-SITE]	Problem solving and exercises	INS03 PER01	0.8	20	N	-	Preparation of the exercises and problems proposed to be solved by the working groups
Study and Exam Preparation [OFF-SITE]	Practical or hands-on activities	BA04 CO01 CO02 CO03 CO08 CO16 INS03 PER01	0.6	15	N	-	PLAB: Preparation of practical laboratory sessions
Practicum and practical activities report writing or preparation [OFF-	Group Work	BA04 CO08 INS03 PER01	0.6	15	Y	Y	PLAB: Preparation of the practice reports and generation of the different documents that students

SITE]							must submit about their practice work.
Final test [ON-SITE]	Assessment tests	CO01 CO02 CO03 CO16 INS03	0.12	3	Y	Y	EVA: Individual final exam
		Total:	**6**	**150**			
Total credits of in-class work: 2.4				**Total class time hours: 60**			
Total credits of out of class work: 3.6				**Total hours of out of class work: 90**			

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Theoretical exam	30.00%	70.00%	ESC: Compulsory individual test on the contents of the subject, which includes both theoretical concepts and problem solving. Students must get a minimum of 4 points in this part.
Theoretical exam	30.00%	0.00%	
Laboratory sessions	15.00%	30.00%	LAB: The practice part of the course will be assessed taking into account the practice reports generated during the lab sessions together with an individual practice exam. Students must get a minimum of 4 points in the practice part of the course. The practice reports must be correct to pass this part.
Practicum and practical activities reports assessment	0.00%	0.00%	LAB: It will be compulsory to pass the practice reports that will be assessed as Pass or Fail. These reports will not have a concrete mark.
Laboratory sessions	15.00%	0.00%	
Assessment of active participation	10.00%	0.00%	INF: Evaluation corresponding to the participation in the resolution of exercises by the working groups. This part is not compulsory.
Total:	**100.00%**	**100.00%**	

According to art. 6 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 13.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

In order to pass the course, it is compulsory to have performed the two theory exams and the submission of the reports and examinations of the laboratory practices. In order to pass the practice part, it is essential to have submitted the reports correctly. In addition, a minimum of 4 points out of 10 is required in each of the theory exams and in the practice mark. The final mark is obtained by applying the following formula, provided that the abovementioned criterion is met:

Final Mark = 1st Theory exam * 0.30 + 2nd Theory exam * 0.30 + 1st Practice Exam* 0.15 + 2nd Practice Exam * 0.15 + Working Groups * 0.10

Those students not reaching a mark of at least 4 (out of 10) both in Theory and Practice cannot pass the subject, and will get a mark no greater than 4.00 even if the final mark obtained by applying the formula is greater than 5.

IMPORTANT NOTE:
By default, the student will be assessed by continuous assessment. If you wish to change to non-continuous assessment, you must do so via the following link: https://www.esiiab.uclm.es/alumnos/evaluacion.php before the end of the term.

Non-continuous evaluation:

In order to pass the course, it is compulsory to take the theory exam and the submission of the practice reports and examination of the laboratory practices. In order to pass the practice part, it is essential to have submitted the reports correctly. In addition, a minimum of 4 points out of 10 is required in both the theory exam and in the practice mark. The final mark is obtained by applying the following formula, provided that the abovementioned criterion is met:

Final Mark = Theory exam * 0.70 + Practice Exam* 0.30

Those students not reaching a mark of at least 4 (out of 10) both in Theory and Practice cannot pass the subject, and will get a mark no greater than 4.00 even if the final mark obtained by applying the formula is greater than 5.

Specifications for the resit/retake exam:

ASSESSMENT CRITERIA IN THE EXTRAORDINARY EXAM SESSION:

The assessment criteria are exactly the same as in the regular exam session in Non-continuous evaluation modality with the following considerations:

- The students will only need to retake the failed parts (Theory and /or Practice). The parts already passed by the student will not need to be repeated and their mark will be kept during the current academic course. Marks will not be kept from one academic course to the next.

Specifications for the second resit / retake exam:

ASSESSMENT CRITERIA IN THE SPECIAL EXAM SESSION FOR COMPLETION OF STUDIES:

Same criteria as in the extraordinary exam session

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours

Final test [PRESENCIAL][Assessment tests]	3

General comments about the planning: This course schedule is APPROXIMATE. It could vary throughout the academic course due to teaching needs, bank holidays, etc. A weekly schedule will be properly detailed and updated on the online platform (Virtual Campus). Note that all the lectures, practice sessions, exams and related activities performed in the bilingual groups will be entirely taught and assessed in English. Classes will be scheduled in 3 sessions of one hour and a half per week.

Unit 1 (de 6): Introduction to Software Engineering

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	3

Teaching period: Week 1

Unit 2 (de 6): Requirements Engineering

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	3
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	2

Teaching period: Week 1 and 2

Unit 3 (de 6): Requirements modelling with UML 2.0: Use Case Diagrams

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Group Work]	2
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	7
Study and Exam Preparation [AUTÓNOMA][Problem solving and exercises]	6
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	3
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	2.5

Teaching period: Weeks 2 and 3

Unit 4 (de 6): Object Oriented Analysis with UML 2.0

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Group Work]	4
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	2
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	2
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	3
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	8
Study and Exam Preparation [AUTÓNOMA][Problem solving and exercises]	7
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	4
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	3.5

Teaching period: Weeks 4 to 9

Unit 5 (de 6): Object Oriented Design with UML 2.0

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Problem solving and/or case studies [PRESENCIAL][Group Work]	4
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	2
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	7
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	3
Project or Topic Presentations [PRESENCIAL][Assessment tests]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	12
Study and Exam Preparation [AUTÓNOMA][Problem solving and exercises]	7
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	4
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	3.5

Teaching period: Weeks 10 to 14

Unit 6 (de 6): Object Oriented Software Development: Unified Process (RUP)

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Project or Topic Presentations [PRESENCIAL][Assessment tests]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	3
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	1
Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	3.5

Teaching period: Week 14

Global activity

Activities	**hours**
Project or Topic Presentations [PRESENCIAL][Assessment tests]	4
Computer room practice [PRESENCIAL][Project/Problem Based Learning (PBL)]	10
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	4
Class Attendance (theory) [PRESENCIAL][Lectures]	22
Class Attendance (practical) [PRESENCIAL][Workshops and Seminars]	2
Study and Exam Preparation [AUTÓNOMA][Self-study]	40
Study and Exam Preparation [AUTÓNOMA][Problem solving and exercises]	20
Study and Exam Preparation [AUTÓNOMA][Practical or hands-on activities]	15

Practicum and practical activities report writing or preparation [AUTÓNOMA][Group Work]	15
Final test [PRESENCIAL][Assessment tests]	3
Problem solving and/or case studies [PRESENCIAL][Group Work]	10
Group tutoring sessions [PRESENCIAL][Guided or supervised work]	5
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
DEBRAUWER, L.	UML 2.0. Iniciación, Ejemplos y Ejercicios corregidos	Ediciones-ENI	Barcelona	978-2-7460-4741-9	2009	
JACOBSON, I.	El Proceso Unificado de Desarrollo de Software.	Addison-Wesley			2005	
LESZEK A. MACISZEK.	Requirements analysis and system design: developing information systems with UML.	Addison Wesley			2001	
MILES, R.	Learning UML 2.0.	O'Reilly.		0-596-00982-8	2006	.
PRESSMAN, R.	Ingeniería del software. Un enfoque práctico. 6ª Edición	McGraw-Hill			2006	
Pilone, Dan	UML 2.0 in a nutshell	O'Reilly		978-0-596-00795-9	2005	
SOMMERVILLE, I.	Software Engineering, 8ª Edición.	Addison Wesley			2007	
Ambler, Scott W.	The elements of UML 2.0 style	Cambridge University Press		978-0-521-61678-2	2007	