



# UNIVERSIDAD DE CASTILLA - LA MANCHA

## GUÍA DOCENTE

### 1. General information

**Course:** SOFTWARE ENGINEERING II

**Type:** CORE COURSE

**Degree:** 406 - UNDERGRADUATE DEGREE IN COMPUTER SCIENCE AND ENGINEERING (AB)

**Center:** 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)

**Year:** 3

**Main language:** Spanish

**Use of additional languages:**

**Web site:**

**Code:** 42324

**ECTS credits:** 6

**Academic year:** 2022-23

**Group(s):** 10 11 12

**Duration:** First quarter

**Second language:** English

**English Friendly:** N

**Bilingual:** Y

Lecturer: GREGORIO DIAZ DESCALZO - Group(s): 11				
Building/Office	Department	Phone number	Email	Office hours
ESIIA/0B8	SISTEMAS INFORMÁTICOS	2373	gregorio.diaz@uclm.es	<a href="https://www.esiia.uclm.es/pers.php?codpers=158&amp;curso=2022-23">https://www.esiia.uclm.es/pers.php?codpers=158&amp;curso=2022-23</a>
Lecturer: VICTOR MANUEL LOPEZ JAQUERO - Group(s): 10				
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ESII / 0.B.8	SISTEMAS INFORMÁTICOS	2461	victormanuel.lopez@uclm.es	<a href="https://www.esiia.uclm.es/pers.php?codpers=134&amp;curso=2022-23">https://www.esiia.uclm.es/pers.php?codpers=134&amp;curso=2022-23</a>
Lecturer: ELENA MARIA NAVARRO MARTINEZ - Group(s): 11 12				
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### 2. Pre-Requisites

Students are required to have already passed Programming Fundamentals I and II, as well as Software Engineering I and Databases to have a minimum guarantee of passing this course. Those students who haven't already passed these courses and are interesting in getting enrolled in Software Engineering II, should make a major effort to acquire the necessary knowledge and experience of software design and databases.

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

This subject pretends to offer a big picture of the Software Engineering processes and their relations to create work teams that develop information systems industrializing such processes, highlighting that this development is always cooperative and multidisciplinary.

For this aim, the subject introduces the concept of Software Lifecycle and describes a map of the processes necessary to develop software with a work team, explaining its enactment when different software development methodologies are used. Moreover, different important process are presented such as configuration management, quality management, testing management and maintenance management.

As result, it is expected that the student will be able to achieve the abilities and knowledge necessary to work as Software Engineer.

Moreover, it is important to highlight that this subject belong to the module of Software Engineering, Information Systems and Intelligent Systems of the curriculum and provides the basis for the subjects of the specialty of Software Engineering:

- Requirements Engineering
- Software Design
- Process of Software Engineering
- Quality of Software Engineering
- Software Project Management
- Databases Development
- Enterprise Information Systems
- Security of Software Systems

### 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,

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.
CO05	Knowledge, administration, and maintenance of systems, services and digital systems.
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.
PER01	Team work abilities.
SIS04	Adaptation to new scenarios.

## 5. Objectives or Learning Outcomes

### Course learning outcomes

#### Description

Knowledge and use of the technologies that support the construction and use of information systems.  
 Implementation and maintenance of applications according to the analysis and design activities previously carried out.  
 Knowledge about tools that support the construction of software systems and the storage and processing of data.  
 Knowledge and application of different types of software life cycle models.  
 Consideration of the aspects of quality in software development such as usability, accessibility, security, reliability, etc.

### Additional outcomes

Achieve professional preparation of computer scientists for entering in the labor market in teams oriented to the development and exploitation of computer applications.  
 Understand the need of version control and change control as a self-protection mechanism in the software development process and be able to correctly apply these principles.  
 Select and apply the appropriate testing techniques according to both the characteristics of the product and the development process.  
 Adequately plan and document the testing process according to the specific needs of the project.  
 Have an overview of quality in software development as a key for its success.  
 Have an overview and knowledge of international standards related to the quality of a software product.  
 Have an overview and knowledge of international standards related to the maturity of software processes.  
 Know and appropriately apply existing software maintenance techniques.

## 6. Units / Contents

### Unit 1: Configuration Management

### Unit 2: Software Testing: Techniques and Strategies

### Unit 3: DevOps

### Unit 4: Software Testing: Strategies and Processes

### Unit 5: Software Testing: Processes and Documentation

### Unit 6: Software Quality

### Unit 7: Software maintenance

## 7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CO02 CO03 CO05	0.74	18.5	N		Lectures will be provided about the different topics of the subject. This is an individual activity.
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	CO02 CO08 PER01 SIS04	0.16	4	Y	N	Collaborative problem solving. Group Activity.
Workshops or seminars [ON-SITE]	Workshops and Seminars	BA04 CO02 CO03 CO08 PER01	0.62	15.5	Y	N	Seminars about the tools to be used during the laboratory session, explaining their relationship with theoretical concepts. An assessment of the theoretical and practical ideas explained will be carried out.
Practicum and practical activities report writing or preparation [OFF-SITE]	Other Methodologies	CO02 CO03 CO08 PER01	0.24	6	N		Autonomous activity to assess some theoretical concepts.
Study and Exam Preparation [OFF-SITE]	Other Methodologies	CO02 CO08	1.28	32	N		Autonomous activity to study and understand the topics presented in the subject.
Laboratory practice or sessions [ON-SITE]	Group Work	BA04 CO01 CO02 CO03 CO08 CO16 PER01 SIS04	0.72	18	N		Team activity to carry out the lab assignments as both autonomous and tutorized work. As far as possible, it would be coordinated with the assignments of the Project Management subject.
Laboratory practice or sessions [ON-SITE]	Assessment tests	CO02 CO03 CO08 PER01 SIS04	0.05	1.25	Y	Y	Assesment of the lab assignments considering both team and individual work.
Writing of reports or projects [OFF-SITE]	Cooperative / Collaborative Learning	BA04 CO01 CO02 CO03 CO05 CO16 PER01 SIS04	2.08	52	N		Team work to carry out reports, models, implementation, etc required for the lab assignments.
Final test [ON-SITE]	Assessment tests	CO02 CO08	0.11	2.75	Y	Y	Final exam carried out by the

<b>Total:</b>	<b>6</b>	<b>150</b>	student.
<b>Total credits of in-class work:</b>	<b>2.4</b>	<b>Total class time hours:</b> 60	
<b>Total credits of out of class work:</b>	<b>3.6</b>	<b>Total hours of out of class work:</b> 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
Assessment of active participation	10.00%	0.00%	The different activities related to the theoretical content of the subject presented in the seminars will be evaluated [PRES].  For those students who select Non-continuous evaluation this activity won't be retaken.
Laboratory sessions	45.00%	45.00%	Continuous evaluation ----- The laboratory work will be carried out in groups of 3-4 people. 3 EVALUATIONS will be conducted throughout the semester for each one of the Iterations (1-3). Thus, the mark of Laboratory will be calculated as: Laboratory = 10% Iteration 1 + 30% Iteration 2 + 60% Iteration 3  In case of failing, the student must attend the Extraordinary Call, which will take place at the end of February.  The mark of each one of the evaluations will be assigned in a hybrid way: group and individual. In each evaluation, the following will be carried out: - group tasks, whose evaluation will depend on the result generated by the group as a whole, - individual tasks, the evaluation will depend on the work of each student. In the evaluation process, the teachers of the subject will choose which people of the group will be responsible for presenting the work done. In each of the evaluation acts, both the work done in the laboratory [LAB] (22.5%) and the requested reports [INF] (22.5%) will be evaluated. In addition, the CO2, CO3, CO8, PER1, SIS4 competences will be also evaluated.  NON-CONTINUOUS Evaluation ----- Alternatively, if the students decide to follow the NON-CONTINUOUS evaluation, the student will present the project carried out and the same criteria and requirements will be applied as for the continuous evaluation. The NON-CONTINUOUS evaluation will be carried out on the same date as the evaluation of iteration 3 in the Ordinary call. The Extraordinary call will be evaluated at the end of February.
Final test	45.00%	45.00%	A final exam [ESC] will be carried out to evaluate both theoretical and practical contents. Moreover, competences CO2 and CO8 will be also evaluated.
Other methods of assessment	10.00%	10.00%	[Optional] Teams participating in international contests, such as Imagine CUP or ACM Student Research Competition, as result of their work in the subject may obtain 1 additional point. Such point will be obtained provided the team has really submitted its work achieving certain quality levels, once it has been approved by the teacher, and having a final score higher or equal than 5 out of 10 for both Theory and Lab sessions.
Other methods of assessment	10.00%	10.00%	[Optional] Those students interested in carrying out a theoretical/practical report related to a topic of the subject, may obtain 1 additional point once such work has been approved by the teacher.
<b>Total:</b>	<b>120.00%</b>	<b>110.00%</b>	

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:

To pass the subject, the student must obtain a 5 in the subject satisfying the following criteria:

- Theory [ESC]: To pass the subject, it will be necessary to obtain 4 out of 10.
- Laboratory[INF] [LAB]: To pass the subject, it will be necessary to obtain 4 out of 10. The practical mark will be saved for future calls as long as the score is higher than 5.

The Final grade of the subject will be calculated as:

Final = (Final test \* 0.45) + (Laboratory\* 0.45) + Active Participation + Optional Assignments + Contests

If Theory [ESC] or Laboratory[INF] [LAB] are lesser than 4 out of 10, then Final Grade of the subject will be FAILED and the score of the subject will be calculated as the minimum between [Final] and 4,0.

It is mandatory that Final must be greater than or equal to 5 in order to pass the subject.

By default, all the students will be evaluated by continuous assessment. In case someone wishes to change to non-continuous evaluation, he/she will use the following link to notify it before the end of the semester:  
<https://www.esiib.uclm.es/alumnos/evaluacion.php>

Any student may change to the non-continuous assessment mode as long as they have not participated during the teaching period in assessable activities that together account for at least 50% of the total assessment of the subject. If a student has achieved that 50% of assessable activities or if, in any case, the class period has ended, it will be considered in continuous evaluation without the possibility of change evaluation modality.

**Non-continuous evaluation:**

To pass the subject, the student must obtain a 5 in the subject satisfying the following criteria:

- Theory [ESC]: To pass the subject, it will be necessary to obtain 4 out of 10.
- Laboratory[INF] [LAB]: To pass the subject, it will be necessary to obtain 4 out of 10. The practical mark will be saved for future calls as long as the score is higher than 5.

The Final grade of the subject will be calculated as:

Final = (Final test \* 0.45) + (Laboratory\* 0.45) + Active Participation + Optional Assignments + Contests

If Theory [ESC] or Laboratory[INF] [LAB] are lesser than 4 out of 10, then Final Grade of the subject will be FAILED and the score of the subject will be calculated as the minimum between [Final] and 4,0.

It is mandatory that Final must be greater than or equal to 5 in order to pass the subject.

**Specifications for the resit/retake exam:**

To pass the subject, the student must obtain a 5 in the subject satisfying the following criteria:

- Theory [ESC]: To pass the subject, it will be necessary to obtain 4 out of 10.
- Laboratory[INF] [LAB]: To pass the subject, it will be necessary to obtain 4 out of 10. The practical mark will be saved for future calls as long as the score is higher than 5.

The Final grade of the subject will be calculated as:

Final = (Final test \* 0.45) + (Laboratory\* 0.45) + Active Participation + Optional Assignments + Contests

If Theory [ESC] or Laboratory[INF] [LAB] are lesser than 4 out of 10, then Final Grade of the subject will be FAILED and the score of the subject will be calculated as the minimum between [Final] and 4,0.

It is mandatory that Final must be greater than or equal to 5 in order to pass the subject.

**Specifications for the second resit / retake exam:**

To pass the subject, the student must obtain a 5 in the subject satisfying the following criteria:

- Theory [ESC]: To pass the subject, it will be necessary to obtain 4 out of 10.
- Laboratory[INF] [LAB]: To pass the subject, it will be necessary to obtain 4 out of 10. The practical mark will be saved for future calls as long as the score is higher than 5.

The Final grade of the subject will be calculated as:

Final = (Final test \* 0.45) + (Laboratory\* 0.45) + Active Participation + Optional Assignments + Contests

If Theory [ESC] or Laboratory[INF] [LAB] are lesser than 4 out of 10, then Final Grade of the subject will be FAILED and the score of the subject will be calculated as the minimum between [Final] and 4,0.

It is mandatory that Final must be greater than or equal to 5 in order to pass the subject.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
<b>Hours</b>	<b>hours</b>
Practicum and practical activities report writing or preparation [AUTÓNOMA][Other Methodologies]	6
Laboratory practice or sessions [PRESENCIAL][Group Work]	18
Laboratory practice or sessions [PRESENCIAL][Assessment tests]	1.25
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	52
Final test [PRESENCIAL][Assessment tests]	2.75
<b>General comments about the planning:</b> 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 1h30m per week. Evaluation activities or catch-up classes may exceptionally be scheduled in the afternoon (morning).	
Unit 1 (de 7): Configuration Management	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	1.75
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	5.5
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	7
<b>Teaching period:</b> Week 1-5	
<b>Comment:</b> 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 1h30m per week.	
Unit 2 (de 7): Software Testing: Techniques and Strategies	
<b>Activities</b>	<b>Hours</b>
Class Attendance (theory) [PRESENCIAL][Lectures]	3.75
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	3
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	6

**Teaching period:** Week 6-7

**Comment:** 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 1h30m per week.

**Unit 3 (de 7): DevOps**

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	3
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	3

**Teaching period:** Week 8-11

**Comment:** 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 1h30m per week.

**Unit 4 (de 7): Software Testing: Strategies and Processes**

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	5
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	6

**Teaching period:** Week 12-13

**Comment:** 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 1h30m per week.

**Unit 5 (de 7): Software Testing: Processes and Documentation**

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	2

**Teaching period:** Week 14

**Comment:** 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 1h30m per week.

**Unit 6 (de 7): Software Quality**

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	1
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	6

**Comment:** 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 1h30m per week.

**Unit 7 (de 7): Software maintenance**

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	2
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	2

**Comment:** 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 1h30m per week.

**Global activity**

Activities	hours
Writing of reports or projects [AUTÓNOMA][Cooperative / Collaborative Learning]	52
Final test [PRESENCIAL][Assessment tests]	2.75
Class Attendance (theory) [PRESENCIAL][Lectures]	18.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	4
Workshops or seminars [PRESENCIAL][Workshops and Seminars]	15.5
Practicum and practical activities report writing or preparation [AUTÓNOMA][Other Methodologies]	6
Study and Exam Preparation [AUTÓNOMA][Other Methodologies]	32
Laboratory practice or sessions [PRESENCIAL][Group Work]	18
Laboratory practice or sessions [PRESENCIAL][Assessment tests]	1.25

**Total horas: 150**

**10. Bibliography and Sources**

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Kaner, Cem	Testing computer software	John Wiley & Sons,		0-471-35846-0	1999	Pruebas
Fowler, Martin (1963-)	Refactoring : improving the design of existing code	Addison-Wesley,		978-0-13-475759-9	2019	Mantenimiento
Galin, Daniel	Software quality assurance: from theory to implementation	Pearson		0-201-70945-7	2004	Calidad
BROWN, W.J., MCCORMICK, H.W., THOMAS, S.W.	AntiPatterns: refactoring software, architectures and projec	John Wiley and Sons		0-471-19713-0	1998	Mantenimiento
Humble, Jez & Farley, David	Continuous Delivery: Reliable Software Releases through Build, Test, and Deployment Automation	Addison-Wesley		978-0-321-60191-9	2011	Gestión de Configuración

Gregory, Janet	More agile testing: learning journeys for the whole team /	Addison-Wesley	978-0-321-96705-3	2015	Pruebas
Kim, Gene.	The devops handbook : how to create world-class agility, rel	IT Revolution Press, LLC,	978-1-942788-00-3	2016	Gestión de Configuración
Kan, Stephen H.	Metrics and models in software quality engineering	Addison-Wesley	0-201-63339-6	2002	Calidad
Pigoski, Thomas M.	Practical software maintenance	John Wiley & Sons	0-471-17001-1	1997	Mantenimiento
LEON, A.	Software Configuration Management Handbook	Artech House	1580530729	2005	Gestión de Configuración
Burnstein, Ilene	Practical software testing: a process-oriented approach	Springer	0-387-95131-8	2003	Pruebas