

Degree programme	Type	Course
Computer Engineering	OB	3
Computer Engineering	OP	4

Contact lecturer

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Teaching staff

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

The subject has no prerequisites. However, students should be familiar with the most basic concepts of Object Oriented Analysis and Design, as well as UML. Students should review these topics, which are part of the subject in Software Engineering given in the second year.

Objectives

- Study the main methodologies proposed to manage the requirements of a software project.
- Understand the problem of Requirements Engineering, and its relationship with other phases of Software Engineering.
- Know the participants involved in Requirement Engineering.
- Acquire practical experience in the application of techniques for collecting and managing requirements.

Learning outcomes

1. Specify the client's needs in a software specification document.
2. Plan software development by taking into account the available resources.
3. Analyse and evaluate requirements taking into account the existing limitations.
4. Identify and model cases that employ UML.
5. Analyse and evaluate requirements.
6. Design specifications that integrate the legal, ethical, social and economic restrictions of information flow.
7. Determine the requirements of computer applications in an organisation's information systems.
8. Adapt software design to applicable security standards.

9. Work independently.
10. Communicate efficiently, orally or in writing, knowledge, results and skills, both in the professional environment and before non-expert audiences.

Contents

Introduction to Requirements Engineering.

- Motivation of Requirements Engineering.
- Definitions
- The 3 Dimensions of Requirements Engineering.
- Knowledge and skills of a Requirements Engineer.
- Context of a System.

Requirements Elicitation

- Requirement sources.
- Types of requirements and elicitation.
- Requirements production process.
- Relationship with Stakeholders.
- Elicitation techniques.
- Elicitation support techniques.

Requirements documentation.

- Documentation motivation.
- Documentation Techniques.
- Standard document templates.

Documentation based on Natural Language.

- Transformational effects of natural language.
- Goal documentation: means-ends tree.
- Documentation of scenarios and use cases: Structured natural language.
- Requirements documentation: Ambiguity, metrics and syntactic patterns.

Model-based documentation.

- Modeling languages.
- Transformational effects of models.
- Modeling of Objectives (Goals).
- Scenario and use case modeling.
- Modeling of Requirements: functional, data and behavioral perspective.

Conflict management

- Objective-based conflict management.
- Impact of conflict resolution.
- Conflict resolution strategies.
- Mediation vs Negotiation.
- Principle-based negotiation.

Requirement validation.

- Validation of objectives, scenarios and requirements.
- Quality Aspects of requirements.
- The 6 principles of validation.
- Validation techniques.

Requirements engineering management.

- Context management.
- Process management.
- Artifact management: traceability and prioritization.
- Change management.

Requirements-based Testing.

- Test cases.
- Types of test.
- Test levels
- Definition of test cases based on requirements.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Theoretical classes / lectures	22	0.88	2, 3, 4, 5, 6, 7
Tutoring and consultations	2	0.08	9
Evaluation tests	4	0.16	1, 2, 3, 4, 5, 6, 7
Preparing practical assignments	24	0.96	9
Exercise resolution outside class	24	0.96	9
Exercise-based classes	12	0.48	3, 4, 5, 7, 9
Study	50	2	9
Practical work sessions	12	0.48	1, 3, 4, 5, 6, 7, 8, 9, 10

The different activities that will be carried out in the subject are organized as follows:

- Theory sessions: Lectures dedicated to explain the basics of the subject and provide directions on how to complete and deepen the exposed topics. Activities are carried out in the classroom, some of which will have to be prepared in the autonomous work.
- Problem sessions: Dedicated to extend by means of practical work topics seen tangentially in the master classes. Problems are solved and case studies are discussed. With the activities proposed it is promoted the autonomous and cooperative work of students, their ability to analyze and synthesise, their critical reasoning, training in that way students in the resolution of problems.
- Practices: During the course practical work will be carried out in groups of 4 or 5 people. A series of activities will be scheduled to collect and document the requirements of a software system, with an established delivery schedule. The teams will carry out some of these activities in the practice sessions, in which their work will also be monitored and where they will receive feedback on the work done.

Use of Artificial Intelligence. In this subject, the use of Artificial Intelligence (AI) technologies is allowed as an integral part of the development of the practical work, provided that the final result reflects a significant contribution of the student in the analysis and personal reflection. The student must clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how these have influenced the process and the final result of the activity. The lack of transparency in the use of AI will be considered a lack of academic honesty and may lead to a penalty in the grade of the activity, or greater sanctions in serious cases.

General considerations. The 'Campus virtual' platform will be used to disseminate information to students. The dates of continuous evaluation and delivery of works will be published through this medium, and may be

subject to possible programming changes for reasons of adaptation to possible incidents. 'Campus virtual' will be used to inform about these possible changes, since this is the platform for the exchange of information between the teaching staff and the students.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
[E1]-Exp2: Midterm Exam 2	25	0	0	1, 3, 5, 6, 7, 8
[E3]-PracE: Practical work:Elicitation	15	0	0	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
[E1]-Exp1: Midterm Exam 1	25	0	0	1, 3, 4, 5, 6, 7, 8
[E2]-Prob: Delivered exercises	10	0	0	1, 3, 4, 5, 6, 7
[E3]-PracD: Practical work:Documentation	25	0	0	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

a) Processes and scheduled evaluation activities

The evaluation of the subject will be carried out continuously based on the learning evidences collected in the following processes:

- [E1]. Carrying out individual written tests (exams).
- [E2]. Resolution and delivery of questionnaires and exercises proposed in the sessions of theory and problems, individually.
- [E3]. Completion of practical work, evaluated from different activities and deliveries, in groups.

The subject consists of the following assessment activities, each evaluated with a score between 0 and 10 (inclusive):

- [E1]-Exp1, partial exam 1, 25% on the final grade.
- [E1]-Exp2, partial exam 2, 25% on the final grade.
- [E2]-Prob, resolution of exercises proposed in the sessions of theory and problems, 10% of the final grade.
- [E3]-PracE, practical activities related to the eligibility of requirements, 15% on the final grade.
- [E3]-PracD, practical activities related to the documentation of requirements, 25% on the final grade.

In order to be able to pass the subject through continuous evaluation, a grade equal or bigger than 5 must be drawn in the following expression:

- $(0.5 * \text{Grade [E1]-Exp1}) + (0.5 * \text{Grade [E1]-Exp2}) + (0.1 * \text{Grade [E2]-Prob})$

In the case of passing the condition to pass, the final mark of the subject will be calculated from the weighted average of the grades, using the expression:

- $(0.25 * \text{Grade [E1]-Exp1}) + (0.25 * \text{Grade [E1]-Exp2}) + (0.1 * \text{Grade [E2]-Prob}) + (0.15 * \text{Grade [E3]-PracE}) + (0.25 * \text{Grade [E3]-PracD})$

In the case of NOT passing the condition to pass, the student's final grade will be the lower value between 4.5 and the weighted average of the grades, using the expression:

- $\min(4.5, ((0.25 * \text{Grade [E1]-Exp1}) + (0.25 * \text{Grade [E1]-Exp2}) + (0.1 * \text{Grade [E2]-Prob}) + (0.15 * \text{Grade [E3]-PracE}) + (0.25 * \text{Grade [E3]-PracD})))$

$$\text{Grade [E3]-PracE) + (0.25 * Grade [E3]-PracD))}$$

Keep in mind that:

- Exercises in [E2]-Prob must be delivered within an established period, and will be evaluated with a score between 0 and 10 (both inclusive). Exercises not delivered within their term will be evaluated with a score of 0, and can not be recovered.
- Activities [E3]-PracE and [E3]-PracD will be evaluated based on different sub-activities proposed, which will have a delivery deadline fixed. Each sub-activity will be evaluated with a score between 0 and 10 (both inclusive). Subactivities not made or delivered out of their term will be evaluated with a grade of 0, and can not be recovered.

In case of irregularities in the evaluation activities, the one detailed in section f) will be applied.

It is important to bear in mind that evaluation activities will not be carried out on a date or time different from the established one, except for justified causes, duly informed in advance to the teaching staff.

b) Programming of evaluation activities

The scheduling of the different assessment activities will be detailed in the Virtual Campus, in the Moodle classroom of the subject. The dates of the written tests (activities [E1]-Exp1 and [E1]-Exp2) will also be made public on the website of the School of Engineering, in the section of exams.

c) Recovery process

The only recoverable evaluation activities are the written tests [E1]-Exp1 and [E1]-Exp2.

The student has the option to improve the grades of these tests (one of them, or both) through a written test provided he/she has been evaluated in a set of activities that represent a minimum of two thirds of the total grade of the subject.

In order to compute the final grade of the subject, the mark obtained in the recovery exam will replace the one of the corresponding exam carried out in the continuous assessment.

In accordance with the coordination of the Degree and the direction of the School of Engineering the following activities can not be recovered:

- [E2]-Prob, 10% on the final grade.
- [E3]-PracE, 15% on the final grade.
- [E3]-PracD, 25% on the final grade.

d) Procedure for the review of qualifications

For assessment activities based on written tests ([E1]-Exp1 and [E1]-Exp2), a procedure for booking a revision date and time will be established in which the student will be able to review the activity with the teaching staff. In this context, claims can be made about the activity grade, which will be evaluated by the teachers responsible for the subject. Likewise, it is possible to arrange with the teaching staff the review of the rest of the assessment activities up to two weeks before the recovery exams.

e) Special qualifications

If the student has not performed any of the tests [E1]-Exp1 and [E1]-Exp2 the "Non-assessable" grade will be assigned. It must be remarked that according to current regulations "Non-assessable" qualifications also exhaust convocation.

In order to pass the course with honours, the final grade must be a 9.0 or higher. Because the number of students with this distinction cannot exceed 5% of the number of students enrolled in the course, this distinction will be awarded to whoever has the highest final grade. In case of a tie, partial-test results will be taken into consideration.

f) Irregularities by the student, copy and plagiarism.

Notwithstanding other disciplinary measures deemed appropriate, assessment activities will receive a zero whenever a student commits academic irregularities that may alter such assessment. Therefore, copying, plagiarizing, cheating, ... in any of the assessment activities will imply suspending it with a zero.

g) Evaluation of repeating students

From the second enrollment, repeater students may request to validate the evaluation of the activities [E3]-PracE and [E3]-PracD, taking the grade obtained in a previous course as long as the grade for both activities is equal to or greater than 5. In order to be able to opt for this differentiated evaluation, repeater students must ask the faculty through an email.

h) Single evaluation

This subject does not provide for the single assessment system.

Bibliography

- K. Pohl. Requirements Engineering. Fundamentals, Principles and Techniques. Springer, 2010
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- D. Gray, S. Brown, J. Macanufo. Gamestorming: A Playbook for Innovators, Rulebreakers, and Changemakers. O'Reilly, 2010. (gamestorming.com)
- Thomas A. Pender. UML Weekend Crash Course. John Wiley & sons, 2002
- M. Delevic. Guide to the Logical Framework Approach, 2nd Edition. Republic of Serbia Government. European Integration Office, 2011.
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Software

The software used to carry out part of the practice deliveries is detailed below:

- MS Word
- Tools for making UML diagrams, selected by the students.
- Low-fidelity prototyping tools (Sketch), selected by the students.

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	420	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	421	Catalan	first semester	morning-mixed
(PLAB) Practical laboratories	421	Catalan/Spanish	first semester	morning-mixed
(PAUL) Classroom practices	422	Catalan	first semester	morning-mixed

(PLAB) Practical laboratories	422	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	423	Catalan/Spanish	first semester	morning-mixed
(PLAB) Practical laboratories	424	Catalan/Spanish	first semester	morning-mixed