

**1. General information****Course:** SOFTWARE DESIGN**Type:** ELECTIVE**Degree:** 407 - DEGREE PROGRAMME IN COMPUTER SCIENCE ENGINEERING**Center:** 108 - SCHOOL OF COMPUTER SCIENCE OF C. REAL**Year:** 3**Main language:** Spanish**Use of additional languages:****Web site:** Espacio virtual de la asignatura en <https://campusvirtual.uclm.es>**Code:** 42327**ECTS credits:** 6**Academic year:** 2023-24**Group(s):** 20**Duration:** C2**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** MACARIO POLO USAOLA - Group(s): 20

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2. Pre-Requisites

It is convenient that the student has passed the course Software Engineering I and II, has a very good programming pass and knows database design. This knowledge is not essential to take the course. However, deficiencies in this type of knowledge will require additional effort from the student to achieve satisfactory results in the subject.

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

This course is integrated into the Software Engineering Specific Technology subject of the curriculum and serves as the foundation for the profession of Software Engineer.

4. Degree competences achieved in this course**Course competences**

| Code | Description |
|-------|---|
| INS01 | Analysis, synthesis, and assessment skills. |
| INS02 | Organising and planning skills. |
| INS03 | Ability to manage information and data. |
| INS04 | Problem solving skills by the application of engineering techniques. |
| INS05 | Argumentative skills to logically justify and explain decisions and opinions. |
| IS01 | Ability to develop, maintain, and assess services and software systems which could fulfil all the user's needs and which work in an efficient and reliable manner, having feasible development and maintenance, and which comply with quality regulations, applying theories, principles, methodologies, and practical customs of software engineering. |
| IS02 | Ability to assess the user's needs and specify those software requirements so as to comply with such needs, combining goals which may originally be in conflict, throughout the search for acceptable compromise within the budget limits, time possibilities, and the availability of developed systems and organisations. |
| IS03 | Ability to solve problems of integration according to strategy functions, standards, and available technologies. |
| IS06 | Ability to design adequate solutions in one or several application frames by the use of software engineering which could integrate ethical, social, legal, and economic aspects. |
| PER01 | Team work abilities. |
| PER02 | Ability to work in multidisciplinary teams. |
| PER04 | Interpersonal relationship skills. |
| PER05 | Acknowledgement of human diversity, equal rights, and cultural variety. |
| SIS01 | Critical thinking. |
| SIS03 | Autonomous learning. |
| SIS04 | Adaptation to new scenarios. |
| SIS05 | Creativity. |
| SIS09 | Care for quality. |

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Knowledge and understanding of the application of the main notations, strategies and tools for the analysis and design of software.

An understanding of how to implement software by applying engineering techniques.

Knowledge of the main techniques and criteria for analyzing, designing and structuring software.

6. Units / Contents

Unit 1: Presentation and study of a client-server project

Unit 2: Architectural design

Unit 3: Design Patterns

Unit 4: Secure software design

Unit 5: Automatic code generation

7. Activities, Units/Modules and Methodology

| Training Activity | Methodology | Related Competences (only degrees before RD 822/2021) | ECTS | Hours | As | Com | Description |
|--|----------------------------------|--|---|------------|----|-----|--|
| Class Attendance (theory) [ON-SITE] | Lectures | INS01 INS04 INS05 IS01 IS02 IS03 IS06 PER05 SIS01 SIS05 SIS09 | 0.6 | 15 | N | | Teaching of the subject matter by lecturer (MAG) |
| Individual tutoring sessions [ON-SITE] | | IS01 IS02 IS03 IS06 PER01 PER04 PER05 SIS01 SIS04 SIS05 SIS09 | 0.18 | 4.5 | N | | Individual or small group tutoring in lecturer's office, classroom or laboratory (TUT) |
| Study and Exam Preparation [OFF-SITE] | Self-study | INS02 PER01 PER02 PER04 SIS03 SIS05 | 1.8 | 45 | N | | Self-study (EST) |
| Other off-site activity [OFF-SITE] | Practical or hands-on activities | INS01 INS02 INS03 INS04 INS05 IS01 PER05 SIS01 SIS03 SIS09 | 0.9 | 22.5 | N | | Lab practical preparation (PLAB) |
| Problem solving and/or case studies [ON-SITE] | Problem solving and exercises | INS01 INS04 INS05 IS01 IS02 IS03 IS06 PER01 SIS01 SIS04 SIS05 SIS09 | 0.6 | 15 | Y | N | Worked example problems and cases resolution by the lecturer and the students (PRO) |
| Writing of reports or projects [OFF-SITE] | Practical or hands-on activities | INS02 INS03 INS04 INS05 IS01 | 0.9 | 22.5 | Y | N | Preparation of essays on topics proposed by lecturer (RES) |
| Laboratory practice or sessions [ON-SITE] | Practical or hands-on activities | INS02 INS03 INS04 IS01 IS02 IS03 IS06 PER01 PER02 PER04 SIS01 SIS03 | 0.72 | 18 | Y | Y | Realization of practicals in laboratory /computing room (LAB) |
| Final test [ON-SITE] | Assessment tests | INS01 INS02 INS04 INS05 SIS01 SIS04 SIS05 | 0.3 | 7.5 | Y | Y | Final test of the complete syllabus of the subject (EVA) |
| 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 |
|------------------------------------|-----------------------|----------------------------|---|
| Laboratory sessions | 25.00% | 25.00% | Compulsory activity that can be retaken. To be carried out before end of teaching period |
| Final test | 50.00% | 50.00% | Compulsory activity that can be retaken (rescheduling) to be carried out within the planned exam dates of the final exam call (convocatoria ordinaria). |
| Assessment of active participation | 10.00% | 10.00% | Non-compulsory activity that can be retaken. To be carried out during the theory/lab sessions in the case of continuous evaluation students. The non-continuous evaluation students will have an alternative evaluation system for this activity. |
| Theoretical papers assessment | 15.00% | 15.00% | Compulsory activity that can be retaken. To be carried out during the theory/lab sessions |
| Total: | 100.00% | 100.00% | |

According to art. 4 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. 12.2) 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 compulsory activities, a minimum mark of 40% is required in order to pass that activity and have the possibility to therefore pass the entire subject. A compulsory activity cannot be divided into eliminatory parts, nor can minimum marks be established for each of its parts. In the case of the activities that may be retaken (i.e., rescheduling), an alternative activity or test will be offered in the resit/retake exam call (convocatoria extraordinaria).

The final exam will be common for all the theory/laboratory groups of the subject and will be evaluated by the lecturers of the subject in a serial way, i.e., each part of the final exam will be evaluated by the same lecturer for all the students.

A student is considered to pass the subject if she/he obtains a minimum of 50 points out of 100, taking into account the points obtained in all the evaluable activities, and also has passed all the compulsory activities.

For students who do not pass the subject in the final exam call (convocatoria ordinaria), the marks of activities already passed will be conserved for the resit/retake exam call (convocatoria extraordinaria). If an activity is not recoverable, its assessment will be preserved for the resit/retake exam call (convocatoria extraordinaria) even if it has not been passed. In the case of the passed recoverable activities, the student will have the opportunity to receive an alternative evaluation of those activities in the resit/retake exam call and, in that case, the final grade of the activity will correspond to the latter grade obtained.

The mark of the passed activities in any call, except for the final exam, will be conserved for the subsequent academic year at the request of the student, provided that mark is equal or greater than 50% and that the activities and evaluation criteria of the subject remain unchanged prior to the beginning of that academic year.

The failure of a student to attend the final exam will automatically result in her/him receiving a "Failure to attend" (no presentado). If the student has not passed any compulsory evaluation activity, the maximum final grade will be 40%.

Non-continuous evaluation:

Students may apply at the beginning of the semester for the non-continuous assessment mode. In the same way, the student may change to the non-continuous evaluation mode as long as she/he has not participated during the teaching period in evaluable activities that together account for at least 50% of the total mark of the subject. If a student has reached this 50% of the total obtainable mark or the teaching period is over, she/he will be considered in continuous assessment without the possibility of changing to non-continuous evaluation mode.

Students who take the non-continuous evaluation mode will be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences), through the assessment systems indicated in the column "Non-continuous evaluation".

In the "non-continuous evaluation" mode, it is not compulsory to keep the mark obtained by the student in the activities or tests (progress test or partial test) taken in the continuous assessment mode.

Specifications for the resit/retake exam:

Evaluation tests will be conducted for all recoverable activities. The failure of a student to attend the final exam will automatically result in her/him receiving a "Failure to attend" (no presentado), except in the case that the student conserves the mark for the final exam from the final exam call (convocatoria ordinaria). In the latter case, the student's carrying out of any other evaluable activity in the resit/retake exam call (convocatoria extraordinaria) will result in a numerical mark.

Specifications for the second resit / retake exam:

Same characteristics as the resit/retake exam call.

| 9. Assignments, course calendar and important dates | |
|---|-------|
| Not related to the syllabus/contents | |
| Hours | hours |
| General comments about the planning: The subject is taught in 3 x 1,5 hour sessions per week. | |

| 10. Bibliography and Sources | | | | | | |
|---|--|------------------|------|------|------|-------------|
| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
| Anton, K., J. Manico y J. Bird | OWASP PRO Active Controls for Developers, v3.0 | Addison-Wesley | | | 2018 | |
| Gamma, E.; Helm, R.; Johnson, R.; Vlissides, J. | Design patterns: elements of reusable object-oriented software | | | | 2002 | |
| Eduardo Fernández-Medina y Mario Piattini | Designing secure databases | | | | 2005 | |
| OWASP Foundation | OWASP, Application Security Verification Standard 4.0 | | | | 2019 | |