



## 1. General information

Course: DATABASES

Type: CORE COURSE

Degree: 347 - DEGREE PROGRAMME IN COMPUTER SCIENCE ENGINEERING (CR)

Center: 108 - SCHOOL OF COMPUTER SCIENCE OF C. REAL

Year: 2

Main language: English

Use of additional languages:

Web site:

Code: 42319

ECTS credits: 6

Academic year: 2022-23

Group(s): 20 21 22

Duration: C2

Second language: Spanish

English Friendly: N

Bilingual: Y

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## 2. Pre-Requisites

Databases and database systems are a basic component in the daily life of modern society, interaction with government, public services, etc. Companies can no longer be understood without the management of a database that allows communication between the various actors. At present, information technology cannot be understood without an underlying database to achieve the objectives. Technologies based on artificial intelligence, networks, web technologies, games, information systems, etc. would not be understood without database management.

Database management systems are therefore a fundamental component in information and communication technologies without which it would be impossible to imagine the social reach that the network and communications have reached in today's society.

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

This course is integrated into the subject of Software Engineering, Information Systems and Intelligent Systems and serves as a basis for the following courses:

- Database Development.
- Advanced Databases.
- Administration of Databases.

## 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.
CO12	Knowledge and application of the features, functions, and structure of data bases so as to lead to an appropriate use, and the design, analysis, and implementation of application based on them.
CO13	Knowledge and application of the required tools for the storage, process, and access to informational systems, even web based ones.
INS01	Analysis, synthesis, and assessment 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.
PER01	Team work abilities.
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

Building of applications that use databases.

Knowledge of the characteristics and structures of databases, as well as the functionalities of systems that manage them and the languages  $\delta\delta$  for their consultation and manipulation.

## 6. Units / Contents

### Unit 1: Introduction to Databases

**Unit 1.1** DB & DB Management Systems concepts and origin.

**Unit 1.2** DB & DBMS evolution

**Unit 1.3** DB Architectures

### Unit 2: Data Models

**Unit 2.1** Introduction to data modeling

**Unit 2.2** Conceptual, logical and physical modeling

### Unit 3: Relational Model

**Unit 3.1** Introduction to Relational Model

**Unit 3.2** Structuring data with the RM

**Unit 3.3** RM operators

**Unit 3.4** Integrity rules

**Unit 3.5** Transforming E/R into RM

### Unit 4: Structured Query Language

**Unit 4.1** Introduction to SQL

**Unit 4.2** Data Definition and Manipulation Languages in SQL

**Unit 4.3** Views in SQL

## ADDITIONAL COMMENTS, REMARKS

Laboratory contents:

- Accessing databases via programs

## 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	BA04 CO12 CO13 SIS01 SIS09 UCLM02	0.72	18	N	-	Exposure of the syllabus by the teacher (MAG).
Individual tutoring sessions [ON-SITE]	Other Methodologies	BA04 CO12 CO13 UCLM02	0.18	4.5	N	-	Individual or small group tutorials in the teacher's office, classroom or laboratory (TUT).
Study and Exam Preparation [OFF-SITE]	Self-study	BA04 CO12 CO13 SIS01 SIS09 UCLM02	2.1	52.5	N	-	Individual study (EST).
Other off-site activity [OFF-SITE]	Practical or hands-on activities	BA04 CO12 CO13 INS03 INS04 INS05 PER01 SIS03 SIS04 SIS05 UCLM02	0.6	15	N	-	Preparation of laboratory practices (PLAB).
Problem solving and/or case studies [ON-SITE]	Problem solving and exercises	BA04 CO12 INS01 INS04 PER01 SIS03 SIS09	0.6	15	Y	N	Resolution of exercises by the teacher and students (PRO)
Writing of reports or projects [OFF-SITE]	Self-study	CO12 INS01 INS04 INS05 PER01 SIS03	0.9	22.5	Y	N	Preparation of a report on a topic proposed by the teacher (RES).
Laboratory practice or sessions [ON-SITE]	Practical or hands-on activities	BA04 CO12 CO13 INS03 INS04 INS05 PER01 SIS03 SIS05 SIS09 UCLM02	0.6	15	Y	Y	Performance in the laboratory of the scheduled practices (LAB).
Other on-site activities [ON-SITE]	Assessment tests	BA04 CO12 CO13 INS01 INS04 INS05 UCLM02	0.15	3.75	Y	Y	Performance of the partial test 1 corresponding to the first half of the course syllabus (EVA).
Other on-site activities [ON-SITE]	Assessment tests	BA04 CO12 CO13 INS01 INS04 INS05 UCLM02	0.15	3.75	Y	Y	Performance of the partial test 1 corresponding to the second half of the course syllabus (EVA).
<b>Total:</b>			<b>6</b>	<b>150</b>			
<b>Total credits of in-class work: 2.4</b>			<b>Total class time hours: 60</b>				
<b>Total credits of out of class work: 3.6</b>			<b>Total hours of out of class work: 90</b>				

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
			Partial Test 2. Compulsory activity that can be retaken. To be

Mid-term tests	20.00%	20.00%	carried out within the planned dates of the final exam call. The Partial Test 1 retake will be performed at this date only for students in "continuous assessment mode".
Theoretical papers assessment	15.00%	15.00%	Non-compulsory activity that can be retaken. To be carried out before end of teaching period
Laboratory sessions	25.00%	25.00%	Compulsory activity that can be retaken. To be carried out during lab sessions
Assessment of active participation	10.00%	0.00%	Non-compulsory activity that cannot be retaken (rescheduling). To be carried out in the theory/laboratory sessions for the students of the continuous modality.
Mid-term tests	30.00%	30.00%	Partial Test 1. Compulsory activity that can be retaken (rescheduling). To be carried out at the end of the first half of the teaching period (approx.) by the students in "continuous assessment mode". Students in "non-continuous evaluation" will perform this activity together with the Partial Test 2 in the planned date of the final exam call.
<b>Total:</b>	<b>100.00%</b>	<b>90.00%</b>	

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. The evaluation of the activities will be global and therefore must be quantified by means of a single mark. 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 partial tests 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 partial tests 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 partial tests, 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 partial 1 and partial 2 tests 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.

#### 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
Individual tutoring sessions [PRESENCIAL][Other Methodologies]	4.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	52.5
Other off-site activity [AUTÓNOMA][Practical or hands-on activities]	15
Writing of reports or projects [AUTÓNOMA][Self-study]	22.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	15
Other on-site activities [PRESENCIAL][Assessment tests]	3.75
Other on-site activities [PRESENCIAL][Assessment tests]	3.75
<b>General comments about the planning:</b> The subject is taught in 3 x 1,5 hour sessions per week	
Unit 1 (de 4): Introduction to Databases	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	2.5
Unit 2 (de 4): Data Models	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3
Unit 3 (de 4): Relational Model	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	6

Unit 4 (de 4): Structured Query Language	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	8.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	9
Global activity	
Activities	hours
Other on-site activities [PRESENCIAL][Assessment tests]	3.75
Other on-site activities [PRESENCIAL][Assessment tests]	3.75
Class Attendance (theory) [PRESENCIAL][Lectures]	18
Study and Exam Preparation [AUTÓNOMA][Self-study]	52.5
Other off-site activity [AUTÓNOMA][Practical or hands-on activities]	15
Individual tutoring sessions [PRESENCIAL][Other Methodologies]	4.5
Problem solving and/or case studies [PRESENCIAL][Problem solving and exercises]	15
Writing of reports or projects [AUTÓNOMA][Self-study]	22.5
Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities]	15
<b>Total horas: 150</b>	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Connolly y Begg	Database Systems (6th edition) <a href="https://www.pearson.com/us/higher-education/program/Connolly-Database-Systems-A-Practical-Approach-to-Design-Implementation-and-Management-6th-Edition/PGM116956.html">https://www.pearson.com/us/higher-education/program/Connolly-Database-Systems-A-Practical-Approach-to-Design-Implementation-and-Management-6th-Edition/PGM116956.html</a>	Pearson Addison-Wesley		978-01-329-4326-0	2015	
Elmasri y Navathe	Fundamentals of Database Systems (6th edition) <a href="https://www.pearson.com/us/higher-education/product/Elmasri-Fundamentals-of-Database-Systems-6th-Edition/9780136086208.html">https://www.pearson.com/us/higher-education/product/Elmasri-Fundamentals-of-Database-Systems-6th-Edition/9780136086208.html</a>	Pearson Addison-Wesley		9780136086208	2011	
Marqués	Bases de Datos	Publicaciones Univ. Jaume I		978-84-693-0146	2011	
Piattini, Marcos, Calero y Vela	Tecnología y diseño de bases de datos <a href="http://www.ra-ma.es/libros/TECNOLOGIA-Y-DISENO-DE-BASES-DE-DATOS/235/978-84-7897-733-8">http://www.ra-ma.es/libros/TECNOLOGIA-Y-DISENO-DE-BASES-DE-DATOS/235/978-84-7897-733-8</a>	Ra-Ma		8478977333	2006	
Silberschatz, Korth y Sudarshan	Database System Concepts (6th edition) <a href="https://www.mheducation.com/highered/product/database-system-concepts-silberschatz-korth/M9780073523323.html">https://www.mheducation.com/highered/product/database-system-concepts-silberschatz-korth/M9780073523323.html</a> (Otra pagina <a href="http://www.db-book.com/db6/">www.db-book.com/db6/</a> )	McGraw-Hill		978-00-735-2332-3	2010	