UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: DATABASES
Code: 42319
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: C2
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **JESUS DAMIAN GARCIA-CONSUEGRA BLEDA** - Group(s): **10 11 12**

Building/Office	Department	Phone number	Email	Office hours
ESII / 1.A.15	SISTEMAS INFORMÁTICOS	2444	jesus.gbleda@uclm.es	

Lecturer: **ANTONIO LABIAN MOYA** - Group(s): **10**

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2. Pre-Requisites

This course reiles on the competences and knowledge acquired in:

- Programming Fundamentals I (1st)
- Programming Fundamentals II (1st)
- Data Structures (2nd)
- Software Engineering I (2nd)

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

In the age of digitalization, capturing, processing and querying information has become a key element for most services. Software engineers are aware of the need for efficient systems that are capable of managing large amounts of information of different nature. Therefore, at present, computer technology is not understood without an underlying database that supports reaching its 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 them it would be impossible to imagine the social expansion that networks and communications have reached in today's society.

This course is related to Software Engineering, Information Systems and Intelligent Systems subjects and serves as a foundation for the following courses:

- Database Development

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.
INS03	Ability to manage information and data.
INS05	Argumentative skills to logically justify and explain decisions and opinions.
SIS03	Autonomous learning.
UCLM02	Ability to use Information and Communication Technologies.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

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

Building of applications that use databases.

Additional outcomes

Obtain a global vision of the problem of the design and implementation of a Database through a work that starts from the analysis of requirements and ends with the implementation of the database, in the DBMS Postgres.

Introduce the design of Databases, focusing on the phases of conceptual and logical design from the conceptual model Entidad-Relación Extended.

To know in depth the Relational Data Model, the process of relational design through functional dependencies and normalization as well as relational languages and Relational Algebra.

Know the general characteristics of a Database Management System.
Learn to create, maintain and consult a database system using the SQL and PL / SQL languages.
From the analysis of requirements of a database, be able to define the active behavior of a database and implement it using triggers on a relational database.

6. Units / Contents

Unit 1: Unit 1. Database Management Systems
- **Unit 1.1** Origins and evolution of databases
- **Unit 1.2** Database concept: Purpose of Database
- **Unit 1.3** Data independence. Database architecture
- **Unit 1.4** Database Management Systems
- **Unit 1.5** Database Management

Unit 2: Introducing database design
- **Unit 2.1** Database design challenges
- **Unit 2.2** Design steps
- **Unit 2.3** Extended Entity-Relationship Model

Unit 3: Relational model concepts
- **Unit 3.1** Structure of relational databases
- **Unit 3.2** Integrity constraints
- **Unit 3.3** The theory of functional dependencies
- **Unit 3.4** Relacional languages. Relacional algebra

Unit 4: Relational database design
- **Unit 4.1** Introduction
- **Unit 4.2** Normalization based on the notion of functional dependencies
- **Unit 4.3** Logical design. Mapping E/R models to relational models.

Unit 5: Introduction to active databases
- **Unit 5.1** Concepts
- **Unit 5.2** Active rules
- **Unit 5.3** Triggers. Applications.

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 INS03 INS05	0.8	20	N	-	Group Class. In addition to the direct instruction method, tasks are carried out by the students. Some contents or topics may be taught by means of the flipped classroom method.
Problem solving and/or case studies [ON-SITE]	Combination of methods	CO12 CO13 INS03 INS05	0.56	14	Y	N	Solving exercises and problems, individually and in groups in class
Computer room practice [ON-SITE]	Practical or hands-on activities	BA04 CO12 CO13 INS03 INS05 SIS03 UCLM02	0.76	19	Y	Y	Small laboratory groups. Carrying out laboratory practices from a guide.
Progress test [ON-SITE]	Assessment tests	BA04 CO12 CO13 INS03 UCLM02	0.16	4	Y	N	Theoretical and practical test Individually done. Assessment keys: PRES.
Writing of reports or projects [OFF-SITE]	Self-study	BA04 CO12 CO13 INS03 INS05 UCLM02	0.8	20	Y	Y	Group and individual work to design and implement a database based on your requirements analysis. In this project, the INS3 competence assigned to the subject is evaluated. Assessment key: INF
Study and Exam Preparation [OFF-SITE]	Self-study	BA04 CO12 CO13 INS03 SIS03 UCLM02	2.8	70	Y	N	Individual study
Final test [ON-SITE]	Assessment tests	BA04 CO12 CO13 INS03 INS05 UCLM02	0.12	3	Y	Y	Final test of project, theory and laboratory. Evaluation keys: INF , ESC and LAB
		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
Progress Tests	10.00%	0.00%	Written controls in class of theory and problems. Key: ESC
Assessment of problem solving and/or case studies	20.00%	20.00%	Assignments in virtual campus (work). key: INF

Progress Tests	10.00%	0.00%	Realization of controls to evaluate and supervise the work done in the laboratory. Key: LAB
Final test	30.00%	40.00%	Final test of theory and problems. Key: ESC
Final test	30.00%	40.00%	Final test of laboratory. Key: LAB
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:

The evaluation will be carried out continuously throughout the semester. In the continuous evaluation the following aspects will be taken into account:

To pass the subject it is necessary to obtain a minimum score of 40% in all the parts of which it consists (theory/problems, practices, and project) and to obtain an average grade of greater than or equal to 5. For the calification of the practice grade, the progress grade (10%), the first midterm (15%) and the second midterm (15%) will be taken into account. The first midterm will be taken to evaluate the SQL part and the second midterm will be taken on the date of the regular one on plpgsql. It is necessary to obtain a minimum of 40% in each of them to compensate and the first midterm is not eliminatory.

Students who don't pass any of the parts will obtain a maximum grade of 4. The grade of the failure will be calculated proportionally to the percentages assigned to ESC, INF, and LAB.

By default, the student will be evaluated by continuous evaluation. If you wish to change to non-continuous evaluation, you must indicate it through the following link https://www.esiiab.uclm.es/alumnos/evaluacion.php before the end of the term and as long as it has not been evaluated 50% or more of the subject by continuous evaluation.

Non-continuous evaluation:

The evaluation will be carried out continuously throughout the semester. In the non-continuous evaluation the following aspects will be taken into account:

To pass the subject it is necessary to obtain a minimum score of 40% in all the parts of which it consists (theory/problems, practices, and project) and to obtain an average grade of greater than or equal to 5.

The progress tests will not be taken into account, using the weights of the non-continuous evaluation. Thus, the grade will be determined according to the following formula:

Final grade= project grade * 0,2 + theory grade * 0,4 + lab grade * 0,4

The suspended students, in some of the parts, will obtain a maximum grade of 4. The grade of the failure will be calculated proportionally to the percentages assigned to ESC, INF, and LAB.

Specifications for the resit/retake exam:

It will be evaluated as in the ordinary non-continuous call. Failed students will obtain a maximum grade of 4. For those student the grade will be calculated proportionally to the percentages assigned to ESC, INF, and LAB.
In the resit/retake exam, the progress tests are not taken into account.

Specifications for the second resit / retake exam:

As in "Specifications for the resit/retake exam"

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	**hours**
Progress test [PRESENCIAL][Assessment tests]	4
Final test [PRESENCIAL][Assessment tests]	3

General comments about the planning: The subject is taught in three weekly sessions of 1.5 hours. This planning is ORIENTATIVE, being able to vary throughout the course depending on the teaching needs, festivities, etc. Any modification in the planning will be duly communicated via the virtual campus platform.

Unit 1 (de 5): Unit 1. Database Management Systems

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	4

Teaching period: week 1

Unit 2 (de 5): Introducing database design

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Problem solving and/or case studies [PRESENCIAL][Combination of methods]	4
Computer room practice [PRESENCIAL][Practical or hands-on activities]	6
Writing of reports or projects [AUTÓNOMA][Self-study]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	18

Teaching period: weeks 2-5

Unit 3 (de 5): Relational model concepts

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Problem solving and/or case studies [PRESENCIAL][Combination of methods]	4
Computer room practice [PRESENCIAL][Practical or hands-on activities]	7
Writing of reports or projects [AUTÓNOMA][Self-study]	8
Study and Exam Preparation [AUTÓNOMA][Self-study]	25

Teaching period: weeks 6-10

Unit 4 (de 5): Relational database design

Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Problem solving and/or case studies [PRESENCIAL][Combination of methods]	4
Computer room practice [PRESENCIAL][Practical or hands-on activities]	4
Writing of reports or projects [AUTÓNOMA][Self-study]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	15

Teaching period: weeks 11-14

Unit 5 (de 5): Introduction to active databases

Activities	Hours
Problem solving and/or case studies [PRESENCIAL][Combination of methods]	2
Computer room practice [PRESENCIAL][Practical or hands-on activities]	2
Writing of reports or projects [AUTÓNOMA][Self-study]	4
Study and Exam Preparation [AUTÓNOMA][Self-study]	8

Teaching period: week 15

Global activity

Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	20
Problem solving and/or case studies [PRESENCIAL][Combination of methods]	14
Computer room practice [PRESENCIAL][Practical or hands-on activities]	19
Progress test [PRESENCIAL][Assessment tests]	4
Writing of reports or projects [AUTÓNOMA][Self-study]	20
Study and Exam Preparation [AUTÓNOMA][Self-study]	70
Final test [PRESENCIAL][Assessment tests]	3
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Miguel Castaño, Adoración de	Diseño de bases de datos relacionales	Ra-Ma		84-7897-385-0	1999	
Miguel Castaño, Adoración de	Fundamentos y modelos de bases de datos	Ra-Ma		84-7897-361-3	1999	
Piattini, M.; Marcos, E.	Tecnología y diseño de bases de datos	RA-MA		84-7897-733-3	2006	
Silberschatz, Abraham	Fundamentos de bases de datos	McGraw-Hill/Interamericana de España		84-481-4644-1	2006	
						Portal de PostgreSQL en español
	http://www.postgresql.org.es/					
						Página principal de PostGreSQL
	https://www.postgresql.org					
						Página principal de Oracle
	http://www.oracle.es					
						Documentación y software Oracle
	http://otn.oracle.com					