UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: DATABASES
Code: 42319
Type: CORE COURSE
ECTS credits: 6
Degree: 346 - DEGREE IN COMPUTER SCIENCE AND ENGINEERING
Academic year: 2019-20
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	Consult the teacher tutorials on: http://esiiab.uclm.es/tutorias.php

Lecturer: **VICTOR MANUEL LOPEZ JAQUERO** - Group(s): **10 11 12**

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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. Computer 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
BA4	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.
INS3	Ability to manage information and data.
INS5	Argumentative skills to logically justify and explain decisions and opinions.
SIS3	Autonomous learning.
UCLM2	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** Origin 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	R	Description
Class Attendance (theory) [ON-SITE]	Lectures	BA4 CO12 CO13	0.8	20	N	-	-	
Problem solving and/or case studies [ON-SITE]	Combination of methods	BA4 CO12 CO13 INS3 SIS3 UCLM2	0.56	14	Y	N	N	
Computer room practice [ON-SITE]	Practical or hands-on activities	BA4 CO12 CO13 INS3 UCLM2	0.76	19	Y	Y	N	
Progress test [ON-SITE]	Assessment tests	BA4 CO12 CO13	0.16	4	Y	N	N	
Writing of reports or projects [OFF-SITE]	Self-study	BA4 CO12 CO13 INS3 INS5 SIS3 UCLM2	0.8	20	Y	Y	N	
Study and Exam Preparation [OFF-SITE]	Self-study	BA4 CO12 CO13 INS3	2.8	70	Y	N	N	
Final test [ON-SITE]	Assessment tests	BA4 CO12 CO13	0.12	3	Y	Y	Y	
		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
R: Rescheduling training activity

8. Evaluation criteria and Grading System

	Grading System		
Evaluation System	**Face-to-Face**	**Self-Study Student**	**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	30.00%	0.00%	Deliverables in virtual campus (work). The last deliverable may be defended by the authors according to criteria of the teachers. 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%	0.00%	Final test of theory and problems. Key: ESC
Final test	20.00%	0.00%	Final test of laboratory. Key: LAB
Total:	**100.00%**	**0.00%**	

Evaluation criteria for the final exam:

The evaluation will be carried out continuously throughout the semester. In the continuous evaluation the following aspects will be taken into account:
* 4 points of the overall score will be obtained from the theory and problem assessment (Key ESC; progress and final tests).
* 3 points of the overall score for the evaluation of the practices carried out during the course (Key LAB; progress and final tests).
* 3 points of the overall score for the evaluation of the work

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 work).

Specifications for the resit/retake exam:

Failed students will obtain a maximum grade of 4. The grade of the suspension will be calculated proportionally to the percentages assigned to ESC, INF and LAB.

In the resit/retake exam the tests corresponding to theory / problems and practices will be made, so the work must have been delivered and passed in the school period (delivered on the scheduled date) to be able to pass the subject. The progress tests are not rescheduled.

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. On the other hand, evaluation activities or class recovery can be organized, exceptionally, in the afternoon. 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					