Universidad Zaragoza

Academic Year/course: 2023/24

30219 - Databases

Syllabus Information

Academic year: 2023/24
Subject: 30219 - Databases
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
326 - Escuela Universitaria Politécnica de Teruel
Degree: 439 - Bachelor's Degree in Informatics Engineering
443 - Bachelor's Degree in Informatics Engineering
ECTS: 6.0
Year: 2
Semester: Second semester
Subject type: Compulsory
Module:

1. General information

The objective of the subject is to become familiar with the most commonly used techniques for database design and management. The basic principles of conceptual database design and relational database design will be discussed. Also will address the administration and exploitation of databases, and will introduce some more advanced concepts that will be developed in depth in later subjects on this topic.

These approaches and objectives are aligned with SDG 9 of the United Nations 2030 Agenda in such a way that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to its achievement.

2. Learning results

The student, in order to pass this subject, must demonstrate the following results:

1.Know in depth the database technology (DB), especially the advantages it brings when it comes to storing and managing large volumes of data.

2. Learn about the mathematical foundations behind this technology.

3. Know the DB conceptual modeling techniques and the main data models.

4. Know the most common DB definition and manipulation languages.

5.Ability to design, create and manage a small-medium size DB, considering a multi-user access to it.

6. Learn basic DB techniques to prevent data loss in the event of all types of disasters.

7.Know the different ways of interacting by program with a DBMS (DBMS).

3. Syllabus

1. INTRODUCTION

1.1 Database Management Systems

1.2 Database design

2. CONCEPTUAL DESIGN

2.1 Entity/Relationship (E/R) Model. Notation

2.2 Conceptual design methodology. Practical examples

3. LOGICAL DESIGN

3.1 Data models. Relational model. Relational algebra

3.2 Standardization.

3.3 Relational languages: SQL

3.4 Case studies.

4. PHYSICAL DESIGN

4.1 Physical storage and organization of information

4.2 Physical design of relational databases

4.3 Tuning, monitoring and optimization. Adaptation to the available DBMS

5. EXPLORATION

5.1 Recovery and concurrency management

5.2 Interaction with a DBMS

5.3 DB Administration

4. Academic activities

The program offered to the student includes the following activities:

- The subject syllabus will be developed in the classes taught in the classroom.
- In the problem classes, problems of application of the concepts and techniques presented in the program will be solved.
- The practical sessions will consist of practical work related to the subject and mainly with the design, administration and/or exploitation of databases.

The student's dedication to achieve the learning results in this subject is estimated in 150 hours (60 classroom hours and 90 non face-to-face hours).

5. Assessment system

The student must demonstrate achievement of the intended learning results through the assessment activities:

1. Practical work in the laboratory and completion of assignments (50%). The ability to design, create and manage small-medium size DBs, considering a multi-user access to it and using adequately the conceptual modeling techniques, as well as the interaction from the program with the DB manager, will be evaluated.

The ability to identify the information needs in the problems posed and their use will be evaluated in the resolution of these problems. The critical capacity to select alternatives will also be assessed and the degree of justification of the solution reached.

2. Written test (50%) in which questions and/or problems of the subject area, of similar typology and level of complexity to those considered during the term, will be posed. This includes theoretical reasoning exercises, question formulation in relational algebra and application of normalization theory to logical database design , questions/exercises on different data models and languages, database design, and questions or exercises on any other aspect of database operation and management.