



Universidad
de Alcalá

Teaching Guide

DATABASES

**Bachelor's degree in
Computer Science
Computer Engineering
Information Systems Engineering**

Universidad de Alcalá

Academic year 2019/2020

2nd Year – 1st Term

Teaching Guide

Course name:	Data Structures
Código:	780016
Degree programs:	Degree in Computer Science Degree in Computer Engineering Degree in Information Systems Engineering
Department:	Computer Science
Type	Obligatory
ECTS Credits:	6
Year / term:	Second year / Term 1
Lecturers:	
Office hours:	
Classes offered in:	Spanish / English

1. PRESENTATION

This module aims to introduce students to databases and their design and implementation. Students will learn:

- To design databases using the Entity-Relational model, relational model and normalization theory.
- The Structured Query Language (SQL).

Prerequisites and recommendations:

Data structures and programming modules are recommended modules that should have been taken before this module.

2. SKILLS

General skills:

CG1 Ability to conceive, write, organize, plan, develop and sign projects in the field of computer engineering whose purpose, according to the knowledge acquired as provided in paragraph 5 of resolution BOE-A-2009-12977 the design, development or exploitation of systems, services and applications.

CG3 Ability to design, develop, evaluate and ensure the accessibility, ergonomics, usability and safety systems, services and applications, as well as the information they manage.

CG4 Ability to define, evaluate and select hardware and software platforms for the development and implementation of systems, services and applications, according to the knowledge acquired as provided in paragraph 5 of resolution BOE-A-2009-12977.

CG5 Ability to conceive, develop and maintain systems, services and applications using the methods of software engineering as a tool for quality assurance, according

to the knowledge acquired as provided in paragraph 5 of resolution BOE-A- 2009-12977.

CG6 Ability to design and develop systems or centralized or distributed architectures integrating hardware, software and networks according to the knowledge acquired as provided in paragraph 5 of resolution BOE-A-2009-12977

Specific skills:

CI1 Ability to design, develop, select and evaluate applications and systems, ensuring their reliability, safety and quality in accordance with ethical principles and legislation and regulations.

CI7 Knowledge, design and use efficiently the types and structures more suited to solving a problem data.

CI8 Ability to analyze, design, build and maintain applications in a robust, secure and efficient way, choosing the paradigm and programming languages most appropriate.

CI12 Knowledge and application of features, functionality and structure of databases that allow their proper use, and design and analysis and implementation of applications based on them.

CI13 Knowledge and application of the necessary tools for storage, processing and access to information systems, including web-based.

3. TABLE OF CONTENTS

1. Introduction to databases.
2. Database models
 - a. Entity-Relationship model and database design
3. Relational databases
 - a. Relational model
 - b. Tools: relational design tools and DBMS
 - c. Relational algebra and calculus
 - d. Structured Query Language (SQL)
4. Good practices:
 - a. Restrictions, referential integrity and triggers.
 - b. Normalisation theory

4. LEARNING METHODOLOGIES

Databases I is part of the second year and second semester and composed of 6 ECTS (150 hours).

Learning activities include:

- Theory classes.
- Practical classes: problem solving.
- Laboratory classes
- Tuitions : individual or collective

In addition, it is possible to carry out the following works:

- Practical classes: problem solving.
- Laboratory classes
- Individual or team assignments.
- Demonstrations of assignments
- Seminars.
- On-line activities using a learning management systems such as Blackboard

4.1 Credit Distribution

Theory and Exercise classes	28 hours
Laboratory classes	28 hours
Evaluation	4 hours
Tuitions and individual student hours	90 hours
Total	150 hours

4.2 Resources

- Database design software
- Database Management Systems
- Other programming languages
- Bibliography
- Learning Management Systems
- Projectors

5. EVALUATION

Evaluation is regulated by the official ETCS credit system (RD 1125/2003). Students also will comply with university regulation approved on 24 March 2011 (articles 9 and 10).

Evaluation of competences will consider student acquired competences and interest. Students can choose between a continuous evaluation composed of three tests that will be carried out during the term or a single final exam and assignment.

Evaluation criteria include:

- Use of concrete terminology
- Problem solving skills
- Responsibility to carry out assignments
- Attitude and teamwork
- Ability to design and implement databases as well as the extraction of information

- Handling of requirements, their evolution and information changes.

There are two possible evaluation paths:

- Students choosing continuous evaluation, there will be three tests (Continuous Assessment Tests –CATs-) which is the 60% of the final mark. Another three practical assignments (Continuous Assessment Laboratory –CALs-) will cover the remaining 40%. Students may have to demonstrate their practical assignment to the module convenor.
- Students opting for a single evaluation, a final exam is the 60% of the final mark and the remaining 40% will be evaluated through an assignment.
- Students that do not pass the continuous evaluation or final exam will have a resit with both parts (theory and practice) and the distribution of the marks is as the continuous evaluations (60 and 40% respectively).

6. BIBLIOGRAPHY

- Silberschatz, A., Korth, H, Sudarshan, S., Database System Concepts (6th Edt), McGraw-Hill (2011)
- Connolly, T.M., Begg, C., Database Systems: A Practical Approach to Design, Implementation and Management (5th Edition), Addison Wesley, 2005
- Date, C.J., An Introduction to Database Systems (8th Edition), Prentice Hall, 2003
- Elmasri, R., Navathe, S.B.. Fundamentals of Database Systems (7th Edition), Pearson, 2015