

COURSE GUIDE

2023/24

Faculty

363 - Faculty of Engineering - Bilbao

Cycle

.

Degree

GIIGSI30 - Bachelor's Degree in Computer Engineering in Management and In

Year

Third year

COURSE

27706 - Administration of Databases

Credits, ECTS: 6

COURSE DESCRIPTION

This module is a follow-up to the 2nd year "Databases" and 3rd year "Database Design" modules, where students have been presented with essential concepts about relational databases and the SQL language.

The main goal of Database Administration is to present a set of tools and techniques to manage users and data in modern databases. In order to take this module, students should have:

- • Solid foundations of the SQL language.
- • Knowledge about database design and the relational model.
- • Skills to use the Unix/Linux shell.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

- On completion of the module a student should be able to:
- • Install and configure a Database Management System (SI1).
 - • Create user accounts and manage permissions (SI2, SI5).
 - • Deploy database logging systems (SI2, SI5).
 - • Understand and use backup and recovery techniques (SI2, SI5).
 - • Understand concurrency control mechanisms (SI3).
 - • Optimise SQL queries (SI3, SI5).
 - • Understand the challenges of distributed data management (SI1, SI3).

CONTENIDOS TEÓRICO-PRÁCTICOS

- 1 - INTRODUCTION
The main duties of a DataBase Administrator. A DBMS is installed and configured.
- 2 - SECURITY
Access control mechanisms and risks.
- 3 - LOG
Logging as a tool for audit.
- 4 - BACKUP
Backup policies and the recovery process.
- 5 - CONCURRENCY-CONTROL
Different concurrency-control protocols: lock-based and time-stamp based.
- 6 - OPTIMISATION
Optimization of SQL queries based on relational algebra.
- 7 - DISTRIBUTED DATA MANAGEMENT
Main features and challenges of distributed database systems.

TEACHING METHODS

- Theory sessions (CLASES MAGISTRALES - M), where theoretical concepts and algorithms are described.
- Exercise sessions (GRUPOS DE AULA - GA), where exercises related to the theory are presented and solved.
- Practise sessions (GRUPOS DE ORDENADOR - GO), which happen in computer rooms. Practical use cases are presented, which have to be solved with computers.

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	30		15		15				
Horas de Actividad No Presencial del Alumno/a	45		22,5		22,5				

- Legend:**
- M: Lecture-based
- S: Seminar
- GA: Applied classroom-based groups
- GL: Applied laboratory-based groups
- GO: Applied computer-based groups
- GCL: Applied clinical-based groups
- TA: Workshop
- TI: Industrial workshop
- GCA: Applied fieldwork groups

Evaluation methods

- Continuous evaluation
- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 50%
- Exercises, cases or problem sets 50%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The criteria established in the current regulations are applied for the choice of assessment system (continuous or final), and also for changes to the assessment system (from continuous to final or vice versa).

===Continuous assessment===

This will consist of 3 mid-course exams and 6 practical work sessions.

The assessment of the subject is divided into 3 parts. The weight of each of the 3 parts in the final grade of the subject is as follows:

- Part I represents 25% of the final grade
- Part II represents 40% of the final grade
- Part III represents 35% of the final grade

Each of the parts consists of a mid-course exam and 2 practical sessions. All the test will be marked out of 10 points.

The mid-course exams will be done during lecture hours and the dates will be announced at the start of the term.

The practical sessions will be done during the computer work groups and attendance at these is **COMPULSORY**. Teamwork will be done in all the practical sessions (usually teams of 2 people) and students will not be allowed to work individually. Assessment of the practical sessions will be done during the computer work groups and the grade **PASSED/NOT PASSED** will be communicated to the student immediately. An unjustified absence from a work group will be graded as **NOT PASSED** for the corresponding practical work session. The grade for the practical session will be individual and will be made public after it has been completed. The calendar of practical sessions and the corresponding work groups will be announced at the start of the term.

In each of the 3 parts of the subject, it is **COMPULSORY** to pass the practical sessions to take the mid-course exam. Otherwise, the grading for that part will be 0 points. The deadline for passing the practical sessions will be announced at the start of the term.

It is also **COMPULSORY** to exceed the minimum grade in all the mid-course exams (3.5/10) and in the weighted average (5/10) of these to pass the subject. If these minimum marks are not reached, the maximum grade for the subject will be 4 points.

The grade for each part of the subject will be calculated using the weighted average between the grade for the mid-course exam (75%) and that of the practical sessions (25%) if the minimum grade is reached in the mid-course exam. Otherwise, the grade will be 0 points.

===Final assessment===

This will be made through a final written exam and a final practical exam.

The final exams (written and practical) will be done on the day and time officially set by the school, first the final written exam and then the final practical exam. The grade for both exams will be between 0 and 10 points.

Optionally, the final practical exam can be validated by passing the practical laboratory sessions proposed in the modality of continuous assessment.

To pass the subject, the student must pass both final exams, and the final grade will be obtained by calculating the weighted average between the mark for the written exam (75%) and the practical exam (25%). Otherwise, the final grade final may not be higher than 4 points.

===Presentation vs. Withdrawal===

- The grade obtained will be "Presented" if the student takes the third mid-course exam (in continuous assessment) or any of the final exams (in final assessment).
- The grade obtained will be "Not Presented" if the student does not take either the third mid-course exam (in continuous assessment) or any of the final exams (in final assessment).

===Code of misconduct===

The criteria stated in Article 67 of the current regulations will apply.

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The criteria established in the current regulations are applied for the choice of assessment system (continuous or final), and also for changes to the assessment system (from continuous to final or vice versa).

===Continuous assessment===

The assessment of the subject is divided into 3 parts (I, II and III). Each of the parts consists of a mid-course exam and 2 practical sessions. It is **COMPULSORY** to have passed all the practical sessions during the course. Otherwise, the grading of the corresponding mid-course exam will be 0 points. The weight of each of the 3 parts in the final grade of the subject is as follows:

- Part I represents 25% of the final grade
- Part II represents 40% of the final grade
- Part III represents 35% of the final grade

All the mid-course exams will be marked out of 10 points.

It is also **COMPULSORY** to exceed the minimum grade in all the mid-course exams (3.5/10) and in the weighted average (5/10) of these to pass the subject. If these minimum marks are not reached, the maximum grade for the subject will be 4 points.

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MANDATORY MATERIALS

All the necessary material will be available at the university's eGela platform.

BIBLIOGRAFÍA

Basic bibliography

- * Fundamentals of Database Systems (7th edition). R.A. Elmasri and S.B. Navathe. Addison-Wesley, 2015.
- * Database Systems: A Practical Approach to Design, Implementation, and Management (5th edition). T. Connolly and C. Begg. Addison-Wesley, 2009.
- * Database Systems: Design Implementation and Management (9th edition). P. Rob and C. Coronel. Cengage Learning, 2009.

Detailed bibliography

- * Database system concepts (6th edition). A. Silberschatz, H.F. Korth and S. Sudarshan. McGraw-Hill, 2011.

- * Database: Principles, Programming, and Performance (2nd edition). P. O'Neil and E. O'Neil. Elsevier Science, 2001.
- * Principles of Distributed Database Systems (3rd edition). M.T. Ozsu and P Valduriez. Springer, 2011.
- * Distributed Database Systems. D. Bell and J. Grimson. Addison-Wesley, 1992.
- * Managing Distributed Databases. Building bridges between database islands. D.K. Burleson. J. Wiley & sons, 199.
- * Database Administration. The Complete Guide to Practices and Procedures. C.S. Mullins. Addison-Wesley, 2002.
- * Database Tuning. Principles, Experiments and Troubleshooting Techniques. D. Shasha and P. Bonnet. Morgan-Kaufmann, 2002.
- * The Manga Guide to Databases. Mana Takahashi and Shoko Azuma, Trend-Pro Co. Ltd. No Starch Press, 2009.

Journals

Web sites of interest

- * MySQL web page: <http://www.mysql.com>

OBSERVATIONS