

Academic Year: ( 2023 / 2024 )

Review date: 19-05-2023

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: CALLE GOMEZ, FRANCISCO JAVIER

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 2

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

- Programming (1st year, 1st term)
- Algorithms and Data Structures (1st year, 2nd term)
- Discrete Mathematics (1st year, 2nd term)
- Computer Structure (2nd year, 1st term)
- Software Engineering (2nd year, 1st term)

**SKILLS AND LEARNING OUTCOMES**

- ¿ Know the different types of organization of data on secondary storage from a logical and physical point of view.
- ¿ Knowf database technologies for information storage.
- ¿ Know the relational model and be able to design and build a database.

**DESCRIPTION OF CONTENTS: PROGRAMME**

The descriptors associated with the subject are: File structures serial, sequential, hashed and indexed. Multidimensional access. Relational Data Model. Database Management Systems for Relational Databases. SQL database language: definition and manipulation.

The program features the following agenda:

**ITEM 1. Introduction to Data Bases**

Storage and Files: Physical vs. Logical focuses  
Definition of Database

**ITEM 2. The Relational Statics**

Elements of the Relational Model. Description and notation.  
Inherent vs. Semantic Constraints

**ITEM 3. The Relational Dynamics**

Relational Algebra  
Data Manipulation through SQL

**ITEM 4. Advanced Relational**

Views  
Triggers

**ITEM 5. Introduction and Basic Concepts**

File Design. Goals of Physical Design.  
File Processing: Selection vs. Location

**ITEM 6. Base Structures**

Basic structures: Serial and Sequential  
Direct Access and Hashing  
Clusters

**ITEM 7. Auxiliary Structures**

Indexed Organization  
B Tree-structured indexes  
Special Indexes: bitmap  
Index based Processes

ITEM 8. Data Base Management Systems  
Architecture and Fundamentals of the RDBMS Oracle  
Internal Schema in the RDBMS Oracle  
Processes and Execution Plans the RDBMS Oracle

#### LEARNING ACTIVITIES AND METHODOLOGY

AF1.THEORETICAL-PRACTICAL CLASSES (1.7 ECTS). Knowledge and concepts students must acquire. Student receive course notes and will have basic reference texts to facilitate following the classes and carrying out follow up work. Students partake in exercises to resolve practical problems and participate in workshops and an evaluation tests, all geared towards acquiring the necessary capabilities.

Temporization: 44 hours, 100% presential instruction

AF8.WORKSHOPS AND LABORATORY SESSIONS (0.3 ECTS). Temporization: 8 hours, 100% presential instruction

AF2.TUTORING SESSIONS (0.2 ECTS). Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher.

Temporization: 4 hours, 100% presential instruction.

AF3.STUDENT INDIVIDUAL WORK OR GROUP WORK (3.8 ECTS). Temporization: 98 hours, 0% presential instruction

MD1.THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning.

MD2.PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group.

MD3.TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor.

MD6.LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

#### ASSESSMENT SYSTEM

Assessment - REGULAR CALL:

There are two configurations to be assessed in regular call: Continuous Assessment or Single Exam.

To pass the course by any of these routes, it is necessary to obtain a minimum of 5 points.

CONTINUOUS ASSESSMENT:

It consists of five assessment elements (during the teaching period) worth one point each, and an end-of-term (final) examination worth five points.

Those five elements are a theoretical test, a laboratory exam, and three (home) assignments.

The laboratory elements are compulsory, and obtaining less than 20% of the score in any of them (three assignments and one laboratory exam) entails the exclusion of the student from the continuous assessment process.

SINGLE EXAM: it is an exam with a maximum value of 6 points, in which the knowledge, skills and abilities acquired throughout the course will be assessed globally. The date of this exam is the same scheduled for the end-of-term exam.

EXTRAORDINARY CALL

It consists of an exam with a maximum value of 10 points, and it is necessary to obtain a minimum of 5 points to pass the subject in this way.

**% end-of-term-examination:** 50

**% of continuous assessment (assignments, laboratory, practicals...):** 50

#### BASIC BIBLIOGRAPHY

- Cuadra D., Castro E., Iglesias A., Martínez P., Calle J., de Pablo C., Al'Jumaily H., Moreno L., García S., Martínez J.L., Rivero J., Segura I. Desarrollo de Bases de Datos: casos prácticos desde el análisis a la implementación. 2ª ed., Ra-Ma, 2013
- Elmasri, R. y Navathe, S. Fundamentals of Database Systems (7th ed.), Pearson Education, 2017

- Folk, M. J., Zoellick, B., y Riccardi, G. File Structures., Addison Wesley , 1998
- Oracle® SQL\*Plus. User's Guide and Reference, <http://docs.oracle.com/database/121/SQPUG/E18404-12.pdf>, 2013
- Oracle® Database SQL Language Reference, <http://docs.oracle.com/database/121/SQLRF/E41329-17.pdf>, 2015
- Silverschatz, A., Korth, H. F. & Sudarshan, S. Database System Concepts, 7th ed , Mc-Graw Hill, 2019

#### ADDITIONAL BIBLIOGRAPHY

- Date, C.J. An introduction to database systems (7th edition)., Pearson Education, 2001
- Frakes, W. y Baeza-Yates, R., Eds. Information retrieval. Data structures and algorithms., Prentice Hall. (c) 1992.
- Gaede, O. and Günther, V. (1998). Multidimensional Access Methods., ACM Computing Surveys, Vol. 30, No. 2. (c) 1998 ACM NY..
- Guttman, A. (1984). R-trees: A dynamic index structure for spatial searching, Procs. of the ACM SIGMOD '84, Int. Conference on Management of Data..
- Livadas, Panos E. File Structures: Theory and Practice., Ed. Prentice-Hall Int (c) 1990.
- Ramakrishnan, R.; Gehrke, J. Database management systems, WCB/McGraw Hill. , 3rd ed., 2012

#### BASIC ELECTRONIC RESOURCES

- Oracle Corp . SQL Language Quick Reference: <https://docs.oracle.com/en/database/oracle/oracle-database/12.2/sqlqr/index.html>
- Oracle Corp. . Oracle Database Express Edition 18c Release 18.4: <http://www.oracle.com/technetwork/products/express-edition/downloads/index.html>
- Oracle Corp. . Oracle Live SQL Repositories (scripts & tutorials): <a href="https://livesql.oracle.com/apex/f?p=590:49:::NO:RP::" target="\_blank">https://livesql.oracle.com/apex/f?p=590:49:::NO:RP::</a>
- Oracle Corp. . Oracle® Database PL/SQL Language Reference: <https://docs.oracle.com/en/database/oracle/oracle-database/12.2/lnpls/index.html>
- Oracle Corp. . Oracle SQL\*Plus Quick Reference: <https://docs.oracle.com/en/database/oracle/oracle-database/12.2/sqpqr/index.html#SQPQR101>
- Oracle Corp. . PL/SQL Language Reference: <https://docs.oracle.com/en/database/oracle/oracle-database/12.2/lnpls/index.html>
- Oracle Corp. . Database PL/SQL Packages and Types Reference: <https://docs.oracle.com/en/database/oracle/oracle-database/12.2/arpls/index.html>