Files and data bases

Academic Year: (2024 / 2025) **Review date: 29-05-2024**

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 facilitatefollowing the classes and carrying out follow up work.Students partake in exercises to resolve practical problems and participatein 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

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

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 evaluation items (during the learning period) totaling five points; and a Final exam worth five points more.
The five items are: theoretical test (1 point); laboratory exam (1.5 points); and three assignments (2.5 points).
To pass the continuous assessment it is necessary to achieve the following minimum grades:
- at least 40% of the maximum grade in the laboratory exam (4 points out of 10)
- at least 20% of the maximum grade in each of the assignments
Failure to comply with any of these conditions will imply exclusion from the continuous assessment.

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

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

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.

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): https://livesql.oracle.com/apex/f?p=590:49:::NO:RP::

- 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