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Academic Year: ( 2021 / 2022 )

Review date: 05-07-2021

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Department assigned to the subject: Department of Computer Science and Engineering

Coordinating teacher: CALLE GOMEZ, FRANCISCO JAVIER

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

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#### 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)

#### 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  
Normalization of RDBs

##### 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.  
Selection vs. Location

##### ITEM 6. Base Structures

Basic structures: Serial and Sequential  
Hashing  
Clusters  
Retrieval processes on base structures

##### ITEM 7. Auxiliary Structures

Indexed Organization  
B Tree-structured indexes  
Special Indexes  
Index supported Processes

##### ITEM 8. Data Base Management Systems

Architecture and Fundamentals of the RDBMS Oracle  
Database Administration, Control and Tuning  
DBMS Conectivity

## ITEM 9. Storage Paradigms

### LEARNING ACTIVITIES AND METHODOLOGY

THEORETICAL-PRACTICAL CLASSES. [44 hours with 100% classroom instruction, 1.67 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 evaluation tests, all geared towards acquiring the necessary capabilities.

TUTORING SESSIONS. [4 hours of tutoring with 100% on-site attendance, 0.15 ECTS]

Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher.

STUDENT INDIVIDUAL WORK OR GROUP WORK [98 hours with 0 % on-site, 3.72 ECTS]

WORKSHOPS AND LABORATORY SESSIONS [8 hours with 100% on site, 0.3 ECTS]

FINAL EXAM. [4 hours with 100% on site, 0.15 ECTS]

Global assessment of knowledge, skills and capacities acquired throughout the course.

### METHODOLOGIES

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.

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

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

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

### ASSESSMENT SYSTEM

SE1 - FINAL EXAM. [40 %]

Global assessment of knowledge, skills and capacities acquired throughout the course.

SE2 - CONTINUOUS EVALUATION. [60 %]

Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course.

**% end-of-term-examination:** 60

**% of continuous assessment (assignments, laboratory, practicals...):** 40

### BASIC BIBLIOGRAPHY

- Cuadra, D., Castro, E., Iglesias, A., Martínez, P., Calle, J., de Pablo, C., Al'Jumaily, H., Moreno, L. Desarrollo de Bases de Datos: casos prácticos desde el análisis a la implementación, Ra-Ma, 2ª ed. revisada y ampliada (2013)

- Elmasri, R. y Navathe, S. Fundamentals of Database Systems (7th ed.), Pearson Education, 2017

- 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

### ADDITIONAL BIBLIOGRAPHY

- Date, C.J. An introduction to database systems (7th edition)., Pearson Educación, 2001

- Frakes, W. y Baeza-Yates, R., Eds. Information retrieval. Data structures and algorithms., Prentice Hall., 1992

- Gaede, O. and Günther, V. (1998). Multidimensional Access Methods., ACM Computing Surveys, Vol.

30, No. 2. , (c) 1998 ACM NY.

- Guttman, A. R-trees: A dynamic index structure for spatial searching, Procs. of the ACM SIGMOD 84, Int. Conference on Management of Data., 1984
- Livadas, Panos E. File Structures: Theory and Practice., Ed. Prentice-Hall Int, 1990
- Ramakrishnan, R.; Gehrke, J. Database management systems, WCB/McGraw Hill. , 3rd ed., 2012