ERASMUS COURSE

Academic Year 2023 / 2024

Curricular Unit: Databases with MySQL

Contact Hours: 30 / ECTS: 3

Learning outcomes of the curricular unit (knowledge, skills and competences to be developed by the students)

Students will learn the importance of relational databases in organizations, and will learn to design and create relational databases.
Learning outcomes:
- Database analysis and design;
- Create databases in SQL and be able to securely evolve to other relational database management system.

On successful completion of this unit, students should be able to acquire the following knowledge and competences:
- Understand the fundamental concepts of relational databases;
- Apply database analysis and design principles;
- Execute a database project.

Syllabus

I. Fundamentals of Database Management Systems
    - Traditional databases
    - Data abstraction
    - Data Models
    - Tables
    - Primary Keys
    - Foreign Keys
II. Relational Database Design and Development Methodologies
    - Data integrity
    - Data redundancy
    - Functional dependency
    - Normalization
    - Entity-Relationship Diagram

III.   SQL (Structured Query Language)
      - Database creation
      - Tables
      - schema
      - Queries in SQLDatabase objects
      - Views
      - Indexes
      - Sequences
      - Synonyms
IV.   Security Mechanisms
V.   Transactions and Concurrency Control

Demonstration of the syllabus coherence with the curricular unit's learning objectives

The Syllabus of this unit is structured around, and looking for the achievement of, the set goals. The first four objectives are achieved at the end of the first topic of the Syllabus, with the introduction of simple concepts for the understanding of all the issues to be analyzed in sequence. The following six objectives are achieved by the second point on Syllabus, directing the study to the design phase of a relational database, since its characteristics are perceived and also the implications of working with this type of structure. As the Syllabus is being analyzed, the topics are more and mora practical, to allow greater consolidation of knowledge. Applying the concepts studied previously, in the handling of a database management system, will help to a better understanding of the subjects studied and the following.

Teaching methodologies (including evaluation)

The approach used in this unit lies on the -learning by doing" teaching methodology. The students will conclude a group project, where they will have to go through the various stages in analyzing, designing and creating a database (using SQL). This project will implement a database that aims to resolve a problem specified by the group of students. The theory about the databases will be explained in details throughout the semester.
The evaluation will be the following:
1 test - 50%
1 group project - 50%

Demonstration of the coherence between the teaching methodologies and the learning outcomes

The Syllabus of this unit is structured around, and looking for the achievement of, the set goals. The first four objectives are achieved at the end of the first topic of the Syllabus, with the introduction of simple concepts for the understanding of all the issues to be analyzed in sequence.
The following six objectives are achieved by the second point on Syllabus, directing the study to the design phase of a relational database, since its characteristics are perceived and also the

implications of working with this type of structure.

As the Syllabus is being analyzed, the topics are more practical, to allow greater consolidation of knowledge. Applying the concepts studied previously, in the handling of a database management system, will help to a better understanding of the subjects studied and the following. Starting with the application of knowledge for the creation of simple structures, passing through the use of these structures to perform various kinds of operations, thee usual tasks of a relational database administrator. Finally, the transactions and security goals are addressed at the end of the Syllabus.

Bibliography (Mandatory resources)

Date, C. J. - An Introduction to Database Systems, Volume I, Eighth Edition, U.S.A., Addison_wesley Publishing Company, Inc., 2003

Oracle (1992). Introdução ao PL/SQL para Desenvolvimento de Aplicações, Texto de Apoio do Curso Introdução ao ORACLE: SQL, SQL*Plus e PL/SQL, (Edição 3.0), U.K., Oracle Corporation

Pereira, José Luís - Tecnologia de Bases de Dados, 2ª Edição Actualizada e Aumentada, Lisboa, FCA- Editora de Informática, Lda., 1998

Rodrigues, António - Oracle 10g e 9i, Para Profissionais Fundamentos, Lisboa, FCA- Editora de Informática, Lda., 2005

Campos, Luís Moreno - Oracle 8i, Curso Completo, Lisboa, FCA- Editora de Informática, Lda., 1999

Damas, Luís - SQL 6º edição Actualizada e Aumentada, Lisboa, FCA- Editora de Informática, Lda., 2005

Portfolio, Tom e Russell, John (2001). PL/SQL User-s Guide and Reference, Release 9.0.1, Part No. A89856-01, Oracle Corporation,