

## **STORAGE AND DATA ACCESS**

Degree in Computer Systems

Degree in Computer Systems

Degree in Electrical and Computer Engineering

Degree in Engineering and Development of Digital Games

Degree in Medical Informatics

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Code: 10117

Main Scientific Area: Information Systems

Lecturer: Paulo Adriano Marques Sousa Teixeira

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 60h Total Workload: 100h

ECTS: 6,0

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### **Objectives**

Provide a set of technical and scientific knowledge related to data storage and prepare students for the development of databases applications and for the data analyst functions and database administrator.

### **Learning Outcomes**

- Analysis and data modeling;
- Interpretation of a data model and its conversion to a database schema;
- Management and data manipulation in a Database Management System (DBMS);
- Using a data manipulation language;
- Optimizing the performance of a DBMS;
- Application development with support of a DBMS.

### **Course Contents**

1. Introduction to Databases

1.1. Historical perspective

1.2. Fundamental concepts

2. Data Modeling

2.1. Entity-Relationship Model

2.2. Relational model

2.3. Data normalization and normal forms

2.4. Non-relational models

3. Data manipulation

3.1. Set theory and relational algebra

3.2. Data manipulation language - SQL

4. Design and Database Optimization

4.1. Triggers

4.2. Stored procedures

4.3. Stored functions

### **Recommended Bibliography**

Coronel, Carlos, Morris, Steven, Rob, Peter. (2018). Database systems: design, implementation, and management (13th ed.). Boston, Mass.: Course Technology/Cengage Learning

Ricardo, C. M., Urban, S. D. (2017). Databases Illuminated. BOOK, Jones Bartlett Publishers. 3rd Edition.

Gouveia, F. (2014). Fundamentos de Bases de Dados. FCA

### **Learning and Teaching Methods**

Point 1 of the program students contextualize the problems involved in the study area.

Section 2 will provide the theoretical basis for modeling and data analysis with emphasis on the relational schema without forgetting the non-relational models.

In point 3 beyond the theoretical aspects of relational algebra students will practice writing SQL code for data manipulation, in point 4 will be developed more complex applications with the introduction of other concepts for process optimization.

### **Assessment Methods**

Two written tests (WT1, WT2);

Work on modeling (WM);

A work with application development database (WD)

Online Exercises (OE)

Final classification

$$WT1*0,275 + WT2*0,275 + WM*0,10 + WD*0,15 + OE*0,20$$

Alternatively to the two written tests, students may be evaluated by a final exam;

The practical component is mandatory and will count towards the average in continuous assessment or by examination;

Both practical and theoretical components will have a minimum grade of 9;

It is not possible to make grade improvement of the practical component for the final exam.