

## **DECISION SUPPORT SYSTEMS**

Degree in Computer Systems

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Degree in Medical Informatics

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Code: 10702

Main Scientific Area: Information Systems

Lecturer: Joaquim Gonçalves Pereira da Silva

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 60h Total Workload: 100h

ECTS: 6,0

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### **Objectives**

This course aims to give students the fundamental concepts of decision support systems and providing them with knowledge of techniques, methodologies and tools needed to develop and operate those systems.

It will be presented the context of implementation of decision support systems, the various components that may integrate them and the kind of problems they can help to solve. In order to demonstrate the applicability of the decision support systems, the students will develop projects to support decision-making or to solve problems through the use of specific tools.

### **Learning Outcomes**

At the end of the course, students should be able to:

Explain the fundamental concepts and the use of decision support systems;

Prepare an analysis and modelling document for data mart;

Catalogue and understand the major data mining algorithms;

Develop a system for decision support using models, techniques and technologies of data warehousing, data integration, and business analytics.

### **Course Contents**

#### 1. Decision Support Systems (DSS)

The decision-making

DSS versus OLTP systems

DSS Architecture and components

#### 2. Data repository

Warehouse and data marts

Dimensional modelling

ETL process for data integration

#### 3. Development of DSS solutions

DSS development process

Agile methodology for dimensional modelling

On-line Analytical Processing (OLAP)  
Front-end applications

#### 4. Data Mining

Introduction to Data Mining  
Association, classification and segmentation  
Evaluation of results and preparation of data  
Methodologies of data mining process

#### **Recommended Bibliography**

Adamson, C. (2010). Star Schema The Complete Reference, McGraw-Hill  
Corr, L.(2011).Agile Data Warehouse Design - Collaborative Dimensional Modeling from Whiteboard to Star Schema. DecisionOne Press, Reino Unido  
Han, J., Kamber, M. (2006). Data Mining: Concepts and Techniques. 2nd Edition, Morgan Kaufmann Publishers.  
Kimball, R., Ross, M. (2013). The data warehouse toolkit: The definitive guide to dimensional modeling. John Wiley Sons

#### **Learning and Teaching Methods**

The program of the course introduces students to key concepts in understanding the scope and context of implementation and operation of Decision Support Systems (DSS). To develop competences in this field, students should fully understand the concepts of decision support systems, know the best practices of dimensional modeling, to understand the importance and characteristics of the ETL process within the DSS context, learn to develop business analytics (BA) solutions, and, finally, identify the situations in which data mining techniques should be applied.

#### **Assessment Methods**

Learning outcomes will be evaluated by theoretical and practical components. The students will execute multiple individual written tests. The practical component, consisting in the development of projects, will be carried out by student teams during the classes with lecturer guidance.

The theoretical component grade results from the arithmetic average of the two written tests grades. The final grade (FG) is a weighted average calculated according to the expression:

$$FG = \text{Theoretical Component} * 40\% + \text{Practical Component} * 60\%$$

Approval for the course is subject to obtaining a minimum grade of 9.0 values in the theoretical component. The scope of the exams for approval or grade improvement is restricted to the theoretical component.