

## **ESTRUTURAS DE DADOS AVANÇADAS**

Degree in Electrical and Computer Engineering

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Code: 10121

Main Scientific Area: Science and Technology Program

Lecturer: João Carlos Cardoso da Silva

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 60h Total Workload: 100h

ECTS: 6,0

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### **Objectives**

This curricular unit will consist of the fundamental concepts on programming with complex data structures. The students should be able to understand and analyze problems, and to plan and develop structured solutions using the C programming language.

### **Learning Outcomes**

Students should be able to analyze problems and propose an implementation in the C programming language. They should be able to define solutions using correctly dynamics data structures.

### **Course Contents**

1. AED Consolidation
2. Pointers
3. Dynamic Data Structures:
  - 3.1 Linked lists
  - 3.2 Hash Tables
  - 3.3 Binary trees
  - 3.4 Binary search trees
  - 3.5 Generalized trees
  - 3.6 Graphs

### **Recommended Bibliography**

- Kyle Loudon, Mastering Algorithms in C, O'Reilly, 1999.
- Kernighan e Ritchie, The C Programming Language (ANSI C), 2nd edition, Prentice Hall Software series, 1988.
- João B. de Vasconcelos e João V. de Carvalho. Algoritmia e Estruturas de Dados, Centro Atlântico, 2005.
- Pedro Guerreiro, Elementos de Programação com C, FCA, 2aEdição, 2001.

### **Learning and Teaching Methods**

The syllabus was defined with the aim to give to the students the ability of learning models for dynamic data representation and, subsequently, learning an imperative programming language (language C) to implement dynamics data structures.

### **Assessment Methods**

With this curricular unit we want to make students use imperative programming paradigm to solve concrete problems.

Students will be incited to actively participate namely in the individual resolution of programming exercises.

The evaluation consists of two practical components (CP1 and CP2), which are the development and/or analysis of a computer programs, coded in C language, in order to solve a particular problem.

Final Evaluation Calculation: The final evaluation note (NF) is given by the following formula:

$$NF = 50\% CP1 + 50\% CP2$$

Minimum score on any of the evaluations is 10 (ten) values.