



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Introduction to Algorithms and Data Structures

Academic Year 2023/2024

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Introduction to Algorithms and Data Structures (L9009)

5. Scientific Area

6. Curricular Year

1st

7. Type of Curricular Unit / Semester

2nd Semester



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8. Class type and workload (work time)

Theoretical classes:

Practical classes:

Theoretical-Practical Classes 30,00

Tutorial Guidance: 20,00

9. ECTS Credits

6,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutor BEREND WILLEM MARTIJN KUIPERS

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

Knowledge of data structures and algorithms suitable for the problems at hand.

15. Specific Objectives

Knowledge of algorithms and respective complexity analysis for handling different data structures.

16. Skills to be acquired

At the end of the curricular unit, the student:

- Recognize the importance of algorithmic complexity and the choice of data structures;
- Identify the main algorithmic techniques and data structures;
- Implement algorithms and respective data structures.

17. Teaching Methodology

The theoretical and practical classes will be given in an interactive way, presenting algorithms for different data structures, with students being asked to make changes to meet new requirements, as well as developing solutions from scratch.

There are weekly assignments with mandatory delivery that count towards assessment, as well as two knowledge assessment tests.



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18. Course Unit Program

1. Introduction
 - 1.1. Computer fundamentals
 - 1.2. Language fundamentals
 - 1.3. Algorithms and pseudocode
 - 1.4. flowcharts
2. Basic elements of algorithms
 - 2.1. Variables
 - 2.2. data types
 - 2.3. numeric expressions
 - 2.4. fundamentals of logic
 - 2.5. Selection
 - 2.6. Repetition
3. Subprograms
 - 3.1. Structuring of functions
 - 3.2. Arguments, parameters and variables
 - 3.3. Communication between functions
4. Composite Data Types
 - 4.1. lists
 - 4.2. tuples
 - 4.3. sets
 - 4.4. Dictionaries
5. Algorithms
 - 5.1. Text Processing Algorithms
 - 5.2. recursive algorithms
 - 5.3. search algorithms
 - 5.4. Complexity analysis of algorithms

19. Assessment Methods

The continuous assessment methodology is expressed in the Regulamento Geral de Avaliação Contínua in force.

20. Didactic Resources

Slides
CLion

21. Sustainability Objectives

4. Quality Education
5. Gender Equality
9. Industry, Innovation and Infrastructure



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22. Keywords

Algorithms
Data Structures
Linked Lists

23. Main Bibliography

Author(s): Richar E. Neapolitan
Title: Foundations of Algorithms
Edition: 5th Year: 2015
Local: Londres
Publisher: Jones and Bartlett Learning

Author(s): M. Goodrich, R. Ramassia, M Goldwasser
Title: Data Structures & Algorithms in Python
Edition: 1^a Year: 2013
Local: London
Publisher: Wiley

Author(s):
Title:
Edition: Year:
Local:
Publisher:

24. Complementary Bibliography

Author(s):
Title:
Edition: Year:
Local:
Publisher:

Author(s):
Title:
Edition: Year:
Local:
Publisher:



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Ficha técnica MIP / MIP Datasheet	
Título / Title	Course Unit Program 'INTRODUÇÃO AOS ALGORITMOS E ESTRUTURAS DE DADOS': Academic Year 2023/2024
Autor / Author	Prof. Doutor BEREND WILLEM MARTIJN KUIPERS
Classificação / Classification	-
Descritores / Descriptors	-
Colaborador(es) / Colaborator(s)	-
Data Hora / Date Time	
Formato de dados / Data Format	Texto / Text, PDF
Estatuto de utilização / Usage	Acesso público / Public Access
Relação / Relation	Version 2,0
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