UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Programming

Academic Year 2025/2026

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Programming (L9008)

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 RAUL EDUARDO CAPELA TELLO RATO

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

Consolidate fundamental knowledge of C programming, explore advanced concepts such as pointers, structs, and binary file handling, culminating in practical application through the development of graphical interfaces in C#.

15. Specific Objectives

Improve understanding of pointers and structs in C.
Enable students to create and use C libraries efficiently.
Develop skills in implementing interactive graphical interfaces.

16. Skills to be acquired

Improve knowledge of advanced data manipulation concepts in C.
To train in the creation of modular and reusable libraries in C.
Develop skills in implementing interactive graphical interfaces.
Integrate good design practices and collaborate effectively on practical projects.

17. Teaching Methodology

Theoretical classes to teach the fundamental concepts, followed by practical activities, tutorial classes, exercises, and group projects, providing hands-on learning and stimulating the application of the acquired knowledge in solving real problems.

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18. Course Unit Program

1. Review of fundamentals
   1.1 Review of the fundamental concepts of programming and algorithms.
   1.2 Review of control structures and data manipulation.
2. Review and deepening of the concepts of Pointers and Structs
   2.1 Concept of pointers
      - Explanation of pointers as variables that store memory addresses.
   2.2 Struct manipulation
      - Using structs to organize and manipulate heterogeneous data.
     - Allocating memory to manipulate structs
3. Binary files
   3.1 Introduction to manipulating binary files.
   3.2 Reading and writing structured data using binary files.
4. Creating Libraries
   4.1 Importance and procedures for creating and using libraries in projects.
   4.2 Practical examples of code modularization using libraries.
   4.3 Preprocessor directives #ifndef, #define and #endif
5. Standard and Other Utility Libraries
   5.1 Exploring standard libraries such as `string.h`, `ctype.h`.
6. C# Graphical Interface with Windows Forms or WPF
6.1 Introduction to creating a graphical interface using.
6.2 Implementing basic graphical interface elements: windows, buttons, text fields, etc., using Windows Forms or WPF.
6.3 Handling events and user interaction in the graphical interface.

19. Assessment Methods

Continuous evaluation based on practical projects, individual exercises, class participation.
Work to be done autonomously by the students in addition to the classes.
There will be two tests and a final project.

20. Didactic Resources

Lectures with the support of slides; Practical examples and exercises; Support material; Integrated development environment (IDE); Audiovisual resources; Computer lab; Online collaboration tools.

21. Sustainability Objectives

This course unit contributes to SDGs 4, 9, and 12 by promoting digital literacy, technological innovation, and good programming practices such as code reuse, modularization, and efficient resource use. The development of computational skills and problem-solving enhances students' preparedness to face digital challenges responsibly.

22. Keywords

1. C programming
2. Binary files
3. Graphical interfaces
4. Modularization

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23. Main Bibliography

Author(s): Deitel, Harvey M.; Deitel, P. J.
Title: The C programming language
Edition: Year: 1988
Local: New Jersey
Publisher: Prentice Hall
ISBN Code:

Author(s): Damas, Luís Manuel Dias
Title: Linguagem C
Edition: Year: 1999
Local: Lisboa
Publisher: FCA
ISBN Code:

Author(s): Brian W. Kernighan, Dennis M. Ritchie
Title: The C Programming Language
Edition: Year: 1988
Local: London
Publisher: Prentice Hall Software Series
ISBN Code:

24. Complementary Bibliography

Author(s): Henrique Loureiro
Title: C++
Edition: Year: 2019
Local: Lisboa
Publisher: FCA
ISBN Code:

Author(s): Stack Overflow on line community
Title: Stack Overflow - Where Developers Learn, Share, & Build Careers
Edition: Year:
Local: On-line
Publisher: https://stackoverflow.com/
ISBN Code:

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Autor / Author	Prof. Doutor RAUL EDUARDO CAPELA TELLO RATO
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