



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Introduction to Programming

Academic Year 2026/2027

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Introduction to Programming (L9004)

5. Scientific Area

6. Curricular Year

1st

7. Type of Curricular Unit / Semester

1st 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

1. Introduce the student to programming in the imperative model.
2. Learn to solve different problems with programming and to use iterative and recursive programming methods.
3. Begin practical use of the C language by practicing coding algorithms in this language.

15. Specific Objectives

- A. Characterize the imperative programming model and the control structures that are part of it.
- B. Study and practice iterative and recursive programming methods.
- C. Introduction to the C imperative programming language
 - C.1 Manipulation of a programming environment IDE (Integrated Development Environment)
 - C.2 Creation of a programming project (introductory level)

16. Skills to be acquired

Identify the characteristics of the imperative programming paradigm;
Develop solutions in the C language using control structures;
Apply modularization techniques through functions and procedures;
Use arrays, pointers, and basic data structures;
Create small programs and manipulate text files;
Solve computational problems with clarity, precision, and organization.



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17. Teaching Methodology

1. The theoretical-practical classes are based on practical examples and supported with notes and references.
2. The tutorial classes are dedicated to the practice of the C language and are supported by tutorial lessons.
3. Throughout the course, a challenge-based project will be proposed to integrate the topics covered, encouraging autonomy, problem-solving, and teamwork.

18. Course Unit Program



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1. Introduction

1.1. Computers and programming

- Introduction to basic computer fundamentals and their relationship to programming.

1.2. Programming languages

- Overview of programming languages and their characteristics.

1.3. Algorithm

- Definition of an algorithm as a logical sequence of steps to solve problems.

1.4. Program

- Structure and composition of computer programs.

1.5. Imperative model

- Explanation of the imperative paradigm and its application in problem-solving.

2. Algorithmics and Programming

2.1. Algorithm and algorithmic notations

- Discussion on the importance of clear and efficient algorithms. Use of notations like pseudocode and flowcharts.

2.2. Data types

2.2.1. Concept of variable

- Definition of a variable as a storage location with a name, type, and value.

2.3. Fundamental instructions in imperative programming

2.3.1. Assignment

- Use of assignment operators to store values in variables.

2.3.2. Input/output

- Methods for user interaction and data manipulation.

2.3.3. Control structures: Selection and loops

- Use of conditional structures (if-else) and loops (for, while) to control program flow.

2.4. Routines

2.4.1. Main program

- Organization and structuring of the main program.

2.4.2. Procedures and their input/output parameters

- Definition and use of procedures to modularize code.

2.4.3. Functions and their parameters: pass by value

- Implementation of functions to perform specific tasks, with examples of passing parameters by value.

2.7. Study and manipulation of arrays

- Exploration of one-dimensional structures to store and manipulate data sets.

2.8. Study and manipulation of matrices (bi or n-dimensional)

- Applications of multidimensional structures to represent complex data.

2.9. Introduction to pointers

2.9.1. Concept of pointers

- Explanation of pointers as variables that store memory addresses.

2.9.2. Strings



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- Manipulation of strings as arrays of characters in the programming language.
- 2.9.3. Records (structs)
- Use of structs to organize and manipulate heterogeneous data.
- 2.9.4. Functions and their parameters: pass by reference
- Use of pointers to pass parameters by reference in functions.
- 2.10. Introduction to Text files
- Manipulation of text files for reading and writing persistent data.

19. Assessment Methods

The current Supplementary Regulations on the Assessment of Knowledge and Competences will apply. Continuous assessment must include oral interventions distributed throughout the teaching period and a final written assessment, both with a weighting factor of 3. It may also include individual or group assignments, with a weighting factor of 2, as well as other assessment components, in accordance with the terms and weightings established by the applicable regulations.

- Regular exercises and ap

20. Didactic Resources

The following will be used: whiteboard and multimedia projection, computers with C language programming IDEs (e.g., CLion, Dev C++, Visual Studio), exercise sheets and tutorial projects, technical bibliography in both physical and digital formats, as well as the Moodle platform for material distribution and communication.

21. Sustainability Objectives

SDG 4 ? Quality Education:
by promoting digital and scientific skills essential for academic and professional success;
SDG 9 ? Industry, Innovation, and Infrastructure:
through the learning of programming fundamentals,
problem-solving, and the development of innovative digital solutions.

22. Keywords

Algorithms
Programming
C Language
Computing
Programming languages
Algorithm



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23. Main Bibliography

Author(s): Damas, Luís Manuel Dias
Title: Linguagem C
Edition: 25° Year: 2025
Local: Lisboa
Publisher: FCA/Edições LIDEL
ISBN Code:

Author(s): Rocha, António Manuel Adrego da
Title: Introdução à programação usando C
Edition: 1 Year: 2006
Local: Lisboa
Publisher: FCA
ISBN Code:

Author(s): Pereira Alexandre
Title: C e algoritmos
Edition: 1 Year: 2017
Local: Lisboa
Publisher: Sílabo
ISBN Code:

24. Complementary Bibliography

Author(s): Dennis M. Ritchie, Brian W. Kernighan
Title: C Programming Language
Edition: 3 Year: 2015
Local: New Jersey
Publisher: Pearson Education
ISBN Code:

Author(s): Deitel, Harvey M.; Deitel, P. J.
Title: C How to Program
Edition: 9th Year: 2022
Local: Boston, MA
Publisher: Pearson Education
ISBN Code:



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Ficha técnica MIP / MIP Datasheet	
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Autor / Author	Prof. Doutor RAUL EDUARDO CAPELA TELLO RATO
Classificação / Classification	-
Descritores / Descriptors	-
Colaborador(es) / Colaborator(s)	-
Data Hora / Date Time	
Formato de dados / Data Format	Texto / Text, PDF
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