UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Introduction to Programming

Academic Year 2025/2026

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

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

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.

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

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

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

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
      - Manipulation of strings as arrays of characters in the programming language.

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

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

Continuous assessment follows the current regulations of the University and includes the following components:
- Attendance and active participation (including content discussion and classroom engagement), recognising individual commitment and involvement;
- Practical assignments (individual or group), assessed according to clear criteria aligned with the intended learning outcomes, and submitted within the defined deadlines;
- Regular exercises and applied activities, aimed at monitoring stu

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

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

23. Main Bibliography

Author(s):	Damas, Luís Manuel Dias		
Title:	Linguagem C		
Edition:	25º	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:			

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt

UNIVERSIDADE LUSÍADA
LISBOA

Ficha técnica MIP / MIP Datasheet	
Título / Title	Course Unit Program 'INTRODUÇÃO À PROGRAMAÇÃO': Academic Year 2025/2026
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
Estatuto de utilização / Usage	Acesso público / Public Access
Relação / Relation	Version 1,0

(c) Universidade Lusíada, 2025

FUNDAÇÃO MINERVA CULTURA - ENSINO E INVESTIGAÇÃO CIENTÍFICA

Rua da Junqueira, 188 a 198 - 1349-001 LISBOA - Telefone 213 611 500 - Fax 213 638 307 - e-mail: info@lis.ulusiada.pt - https://www.lis.ulusiada.pt