UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Complements of Programming

Academic Year 2025/2026

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Computer Engineering

3. Cycle

1st

4. Course Unit

Complements of Programming (L9013)

5. Scientific Area

6. Curricular Year

2nd

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

To deepen students? knowledge of the Python programming language by consolidating fundamental concepts and introducing intermediate and advanced topics. This course aims to develop the ability to analyse and solve computational problems using control structures, functions, and composite data types (such as lists, dictionaries, tuples, and sets), as well as the manipulation of text files and the integration of standard and external libraries. It also promotes the understanding of key programming

15. Specific Objectives

- Apply control structures and composite data types to solve computational problems.
- Structure programs using functions and promote code reuse.
- Manipulate text files and use standard libraries for specific tasks.
- Integrate external libraries and consume Web APIs in practical contexts.
- Use generic types and programming best practices to produce clean and efficient code.

16. Skills to be acquired

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1. Understand the basic syntax of the Python language and its development environment.
2. Use control structures (conditionals and loops) to solve computational problems.
3. Manipulate various data types and structures such as lists, dictionaries, tuples, and sets.
4. Define and apply functions with different types of arguments and return values.
5. Read and write text files using appropriate modes and good practices such as automatic closure with with.
6. Import and use basic libraries (e.

17. Teaching Methodology

Teaching combines theoretical and practical sessions, designed to support both conceptual understanding and applied learning:

- Theoretical classes cover the fundamental concepts of the Python language, supported by structured notes, illustrative examples, and selected bibliographic references;
- Practical classes focus on solving computational problems, with an emphasis on implementing Python-based solutions and developing algorithmic thinking and programming skills.

18. Course Unit Program

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1. Introduction to Python Programming

Overview of the language and history

Development environments (IDLE, VS Code, Google Colab)

First programs: input, output, and script execution

2. Data Types and Operators

Integers, floats, booleans, and strings

Type conversions

Arithmetic, relational, and logical operators

3. Control Structures

Conditionals: if, elif, else

Loops: for, while

Loop control: break, continue

4. Functions

Defining and calling functions

Parameters and return values

Local and global variables

5. Data Structures

Lists: creation, access, methods, and iteration

Tuples and sets: differences and usage

Dictionaries: key-value pairs, methods, and traversal

6. File Handling

Reading and writing text files

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File modes (r, w, a)

Using with to ensure automatic file closure

7. Modules and Basic Libraries

Importing modules

math, random, and datetime libraries

Modular program structure

8. Problem Solving

Practical applications with real data

Simple projects (e.g., mini-games, converters, tools)

9. Introduction to Data Visualization (optional, if time allows)

matplotlib for simple plots

Graphical representation of lists and basic statistics

19. Assessment Methods

Continuous assessment is carried out in accordance with the evaluation regulations of Universidade Lusíada de Lisboa and includes the following mandatory components:

1 - Two practical assessment moments, aimed at evaluating students? understanding and application of the curricular content throughout the semester;
2 - Final project, which consolidates the acquired knowledge through the resolution of a problem with a level of complexity appropriate to the curricular unit.

The schedule and a

20. Didactic Resources

The course makes use of a variety of teaching resources, including:

- Computers with a Python development environment, such as Visual Studio Code and/or platforms like Google Colab, depending on the session;
- Whiteboard and multimedia projection, for presenting concepts, examples, and live problem-solving;
- Structured notes and visual presentations, organized by topic;
- Exercise sheets and guided projects, to consolidate the program's content;
- Technical bibliography, available in phy

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21. Sustainability Objectives

This unit contributes to the SDGs 4, 9, and 12, by promoting digital literacy, technological innovation, and sustainable programming practices, such as code reuse and efficient use of resources. Learning Python and problem solving prepares students for digital challenges responsibly.

22. Keywords

Generic types
Python
Web API
Structured programming
Problem solving

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23. Main Bibliography

Author(s): Slatkin, Brett.
Title: Effective Python: 90 Specific Ways to Write Better Python
Edition: 1th Year: 2019
Local:
Publisher: Addison-Wesley

Author(s): Nguyen, Quan
Title: Advanced Python Programming: Deep Dive into Python's Best Features
Edition: 2th Year: 2022
Local:
Publisher: Packt

Author(s): Allen B. Downey
Title: Think Python: How to Think Like a Computer Scientist
Edition: 2 Year: 2015
Local:
Publisher: Green Tea Press

24. Complementary Bibliography

Author(s): Zelle, John M.
Title: Introdução à Programação com Python
Edition: 3º Year: 2017
Local: On-line
Publisher: LTC

Author(s): Ramalho, Luciano
Title: Fluent Python: Clear, Concise, and Effective Programming
Edition: 2th Year: 2022
Local:
Publisher: O'Reilly Media

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