



UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Complements of Programming

Academic Year 2026/2027

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



UNIVERSIDADE LUSÍADA
LISBOA

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.

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

1. Understand basic Python syntax and its development environment.
2. Use control structures to solve problems.
3. Manipulate data types and structures such as lists, dictionaries, tuples and sets.
4. Define and use functions with arguments and return values.
5. Read and write text files safely.
6. Import and use libraries and modules.
7. Develop simple, structured and reusable programs.



UNIVERSIDADE LUSÍADA
LISBOA

17. Teaching Methodology

Teaching combines theoretical and practical sessions, linking conceptual understanding with application. Theoretical classes introduce the fundamentals of Python programming using examples, structured notes and selected references. Practical classes focus on problem solving and solution implementation, promoting computational thinking, autonomy and the progressive consolidation of acquired skills.

18. Course Unit Program



UNIVERSIDADE LUSÍADA
LISBOA

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



UNIVERSIDADE LUSÍADA
LISBOA

Reading and writing text files

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

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.

20. Didactic Resources

Classes use computers with a Python development environment, namely Conda, Visual Studio Code and/or Google Colab, as whiteboard and multimedia projection. Structured notes, topic-based presentations, worksheets and guided projects are also provided to support content understanding and the practical consolidation of acquired skills.

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.



UNIVERSIDADE LUSÍADA
LISBOA

22. Keywords

Generic types
Python
Web API
Structured programming
Problem solving



UNIVERSIDADE LUSÍADA
LISBOA

23. Main Bibliography

Author(s): Slatkin, Brett.
Title: Effective Python: 125 Specific Ways to Write Better Python
Edition: 3rd Year: 2025
Local:
Publisher: Addison-Wesley Professional
ISBN Code: 978-0-13-817218-3

Author(s): Nguyen, Quan
Title: Advanced Python Programming: Deep Dive into Python's Best Features
Edition: 2th Year: 2022
Local:
Publisher: Packt Publishing
ISBN Code: 978-1-80181-401-0

Author(s): Allen B. Downey
Title: Think Python: How to Think Like a Computer Scientist
Edition: 3rd Year: 2024
Local:
Publisher: O'Reilly Media
ISBN Code: 978-1-0981-5543-8

24. Complementary Bibliography

Author(s): Menezes, Nilo Ney Coutinho
Title: Introdução à Programação com Python: Algoritmos e Lógica de Programação para Iniciantes
Edition: 4.^a Year: 2024
Local: Novatec
Publisher: Novatec
ISBN Code: 978-85-7522-886-9

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



UNIVERSIDADE LUSÍADA
LISBOA

Ficha técnica MIP / MIP Datasheet	
Título / Title	Course Unit Program 'COMPLEMENTOS DE PROGRAMAÇÃO': Academic Year 2026/2027
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, 2026	