

|                  |                             |               |                |                                                        |      |
|------------------|-----------------------------|---------------|----------------|--------------------------------------------------------|------|
| Course Unit      | Introduction to Programming |               | Field of study | Computer Science                                       |      |
| Bachelor in      | Multimedia                  |               | School         | School of Public Management, Communication and Tourism |      |
| Academic Year    | 2022/2023                   | Year of study | 1              | Level                                                  | 1-1  |
| Type             | Semestral                   | Semester      | 1              | ECTS credits                                           | 6.0  |
| Code             | 9213-656-1104-00-22         |               |                |                                                        |      |
| Workload (hours) | 162                         | Contact hours | T -            | TP 60                                                  | PL - |
|                  |                             |               | TC -           | S -                                                    | E -  |
|                  |                             |               | OT -           | O -                                                    |      |

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Carlos Alberto Pereira, João Paulo Pereira de Sousa

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. develop algorithms that solve given problems efficiently; solve computing problems in effective ways.
2. translate algorithms into programs, using a programming language;
3. use good programming skills.

### Prerequisites

Before the course unit the learner is expected to be able to:

1. understand formal and mathematical notations;
2. solve simple linear equations.

### Course contents

- Algorithms and troubleshooting: strategies for solving problems; the role of algorithms in problem solving; strategies for implementation of algorithms, concepts and properties of algorithms. Variables, simple and structured data types, expressions and functions, structures, flow control selection and repetition; input/output methods, subprogramming and parameters passage. Python language.

### Course contents (extended version)

1. General concepts of problems decomposition and algorithms
  - Introduction to the concept of algorithm and structured programming;
  - Specification of an algorithmic language;
  - Types, operators and expressions, structures;
  - Sub-programming;
  - Recursivity;
  - Types of structured data.
2. Fundamentals of programming languages:
  - General concepts, preparation and execution of a program;
  - Basic Concepts in Python: identifiers, reserved words;
  - Structures of flow control: if () else, for, do while, while.
  - Function and structure of a program;
  - Recursivity;
  - Data structures: strings, lists, tuples, etc.
3. Objects Oriented Programming introduction.
  - Class, Object, attribute and operations.
  - Constructors.
  - Association simple, aggregation, composition and generalization.

### Recommended reading

1. Wentworth, P. , Elkner, J. , Downey, A. B. & Meyers, C. (2012). How to Think Like a Computer Scientist: Learning with Python 3. (2nd Edition).
2. Downey, A. B. (2016). Think Python. Sebastopol, CA: O'Reilly Media, Inc. ISBN: 9781491939369
3. Cunha, C. (2019). Programação em Python (textos de apoio). Mirandela: EsACT.
4. Ramalho, L. (2015). Fluent Python: Clear, Concise, and Effective Programming. Sebastopol, CA: O'Reilly Media, Inc. ISBN: 9781491946008

### Teaching and learning methods

Theoretical and practical: one part consisting of exposure to theoretical problems which arise and offer solutions followed by a part of problems and assignments to be held in class and in tutorial classes, which aims to consolidate the theoretical concepts discussed. Laboratory practice: lessons, which is shown through simulation and testing the concepts already developed.

### Assessment methods

1. Evaluation along the semester - (Regular, Student Worker) (Final)
  - Intermediate Written Test - 50% ((1st part of the UC content) Minimum grade: 7 points.)
  - Final Written Exam - 50% ((2st part of the UC content) Minimum grade: 7 points.)
2. Written exam - (Regular, Student Worker) (Final, Supplementary)
3. Written exam - (Regular, Student Worker) (Special)

### Language of instruction

Portuguese, with additional English support for foreign students.

### Electronic validation

|                                                     |                       |                                      |                              |
|-----------------------------------------------------|-----------------------|--------------------------------------|------------------------------|
| Carlos Alberto Pereira, João Paulo Pereira de Sousa | Ana Lucia Jesus Pinto | Elisabete da Anunciacao Paulo Morais | Luisa Margarida Barata Lopes |
| 03-10-2022                                          | 07-10-2022            | 07-10-2022                           | 13-10-2022                   |