Course Unit	Algorithm and Programming			Field of study	Informatics
Bachelor in	Mechanical Engineering			School	School of Technology and Management
Academic Year	2022/2023	Year of study	1	Level	1-1
ECTS credits	6.0				
Type	Semestral	Semester	2	Code	9123-759-1201-00-22

Workload (hours)	162	Contact hours	T	TP	PL	TC	S	E	OT	O
			-	60	-	-	-	-	-	-

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): Pedro João Soares Rodrigues, Sandra Luisa Pereira Goncalves

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. design a solution, build an algorithm and implement a Python program that meets the objectives sought to problems of small/medium complexity.
2. apply basic knowledge of imperative programming, in Python language, such as structure a program in functions, understand passing parameters and process data structures.

Prerequisites

Before the course unit the learner is expected to be able to:
Not applicable.

Course contents

Introductory concepts: computer languages; the programming process; basics of algorithms. The Python language: elementary data types, variables, constants, operations, statements and conversions of types; standard input and output; the If, If-else, the While, and For loops; definition and use of functions; function arguments; data structures.

Course contents (extended version)

1. Introductory concepts:
   - computer programming;
   - programming languages;
   - development of a program;
   - basics on algorithms;
   - the Python language.
2. Elementary data types:
   - data types, variables;
   - concept of constant;
   - arithmetic operations, statements, assignments, conversions of types;
   - statements to read and write in the console.
3. Testing and conditions:
   - conditions and logical values;
   - logical operators and relational operators;
   - conditional statements if and if-else.
4. Loops:
   - the while statement;
   - the For statement.
5. Functions:
   - concept of function and structure of a Python function;
   - parameters;
   - local/global variables.
6. Data structures:
   - lists;
   - dictionaries;
   - tuples;
   - sets.
7. Strings

Recommended reading

1. Charles Severance, Sue Blumenberg, et al. , " Python for Everybody: Exploring Data in Python 3", Independently published, 2020
2. Adelaide Carvalho, "PRÁTICAS DE PYTHON - ALGORITMIA E PROGRAMAÇÃO", FCA, 2021

Teaching and learning methods

The teaching method is semi-expository, which enables the transmission of the knowledge with continuity and with a minimum expenditure of time. Thus, the classes are more practical, and the most used method is the active one, thus provoking the students' activity through the resolution of practical exercises. The student is also expected to perform tasks during non-contact hours.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
   - Intermediate Written Test - 20%
   - Intermediate Written Test - 20%
   - Final Written Exam - 60%
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100%

Language of instruction

Portuguese

Electronic validation

Pedro João Soares Rodrigues	José Luís Padrão Exposto	João da Rocha e Silva	José Carlos Rufino Amaro
19-02-2023	23-02-2023	23-02-2023	04-03-2023