INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Programming 1			Field of study	Computer Science				
Bachelor in	Game Design			School	School of Public Management, Communication and Tourism				
Academic Year	2023/2024	Year of study	1	Level	1-1	ECTS credits	6.0		
Type	Semestral	Semester	1	Code	8309-801-1104-00-23				

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, Silvia de Castro Pereira

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, atribute 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. Final assessment - (Regular, Student Worker) (Final)
   - Intermediate Written Test - 50% ((1st part of the UC content) Minimum classification: 7 points.)
   - Final Written Exam - 50% (Minimum classification: 7 points.)
2. Written exam - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100% (Minimum classification: 7 points.)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Carlos Alberto Pereira, Silvia de Castro Pereira	Barbara Costa Vilas Boas Barroso	Anabela Neves Alves de Pinho	Luisa Margarida Barata Lopes
02-11-2023	13-11-2023	13-11-2023	11-12-2023