

Course Unit	Programming Languages I	Field of study	Computing Science
Bachelor in	Game Design	School	School of Public Management, Communication and Tourism
Academic Year	2017/2018	Year of study	1
Type	Semestral	Semester	1
Workload (hours)	162	Contact hours	T - , TP 15, PL 45, TC - , S - , E - , OT - , O -
		Level	1-1
		ECTS credits	6.0
		Code	8309-414-1104-00-17

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 Filipe Campos Rompante da Cunha, Elisabete da Anunciacao Paulo Morais

Learning outcomes and competences

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

1. Discuss the importance of algorithms in the problem-solving process;
2. Create algorithms for solving simple problems;
3. Describe strategies that are useful in debugging;
4. Analyze and explain the behavior of simple programs and modify and expand features of small programs;
5. Choose appropriate conditional and iteration constructs for a given programming task;
6. Apply the techniques of structured (functional) decomposition to break a program into smaller problems;
7. Describe the mechanics of parameter passing;
8. Describe the concept of recursion and give examples of its use.

Prerequisites

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

1. Understand formal and mathematical notations.
2. Have basic knowledge of simple mathematics equations.
3. Note: There is no need to have any experience with programming.

Course contents

- Algorithms and problem solving: strategies for solving problems; the role of algorithms to solve problems; strategies for algorithms implementation, concepts and properties of algorithms. - Fundamentals of Programming Languages: syntax and semantics of a programming language; variables, types of data, expressions and functions, flow control structures: selection and repetition; methods of input/output; sub programming and passage of parameters.

Course contents (extended version)

1. Algorithms and problem solving:
 - Introduction to algorithm concept and structured programming;
 - Specification of an algorithmic language: types, operators and expressions;
 - Flow control structures: selection and repetition;
 - Subprogramming; Recursion; Data structures;
 - Methodologies for Developing Algorithms: Progressive improvement.
2. Fundamentals of Programming Languages:
 - General concepts, Preparation and execution of a program:
 - Basic concepts in C: Identifiers; Reserved words; Data structures;
 - Basic concepts in C: Directives; Types, operators and expressions;
 - Flow-control structures: if () else; for; do while; while;
 - Functions and structure of a program;
 - Recursion;
 - Data structures: arrays, records / structs, strings;
 - Data representation in memory; Aointers, Dynamic memory allocation.

Recommended reading

1. Programação 1 (textos de apoio fornecidos pelo docente da unidade).
2. Damas, L. (2001). Linguagem C (3ª edição). Lisboa: FCA. [ISBN 9727221564]
3. Guerreiro, P. (2006). Elementos de Programação com C (3ª edição). Lisboa: FCA. [ISBN 9727225101]
4. Kernighan, B. W. e Ritchie, D. M. (1998). The C Programming Language (2ª edição). Prentice Hall [ISBN 0131103628]
5. Schildt, H. (1997). C Completo e Total. Makron Books. [ISBN 8534605955]

Teaching and learning methods

-Theoretical exposure where problems arise and solutions are found, followed by problem solving, to be held in class and during the monitored area of study. - Laboratory practice: where, through simulation, the concepts already developed are tested and validated.

Assessment methods

1. Distributed Evaluation I - (Regular, Student Worker) (Final)
 - Intermediate Written Test - 50% (Part 1- Evaluation of the chapter Algorithms and problem solving)
 - Final Written Exam - 50% (Part 2- Evaluation of the chapter Fundamentals of Programming Languages)
2. Distributed Evaluation II - (Regular, Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 50% (Part 1- Evaluation of the chapter Algorithms and problem solving)
 - Final Written Exam - 50% (Part 2- Evaluation of the chapter Fundamentals of Programming Languages)
3. Incoming students in mobility programs - (Regular, Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 50% (Part 1- Evaluation of the chapter Algorithms and problem solving)
 - Final Written Exam - 50% (Part 2- Evaluation of the chapter Fundamentals of Programming Languages)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Carlos Filipe Campos Rompante da Cunha, Elisabete da Anunciacao Paulo Morais	Daniel Ribas de Almeida	Vítor José Domingues Mendonça	Luisa Margarida Barata Lopes
13-10-2017	02-11-2017	04-11-2017	05-11-2017