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Course Unit	Programming Laboratory		Field of study	Computer Science
Bachelor in	Informatics 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	1	Code	9119-706-1103-00-22

| Workload (hours) | 162 | Contact hours | T | - | TP | - | PL | 60 | 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) | Luís Manuel Alves, Davide Emanuel da Silva Dias, Maria João Tinoco Varanda Pereira, Nelson Alexandre Perdigao Figueiredo |

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Implement algorithms and data structures in an imperative programming language;
2. Design, implement, test and debug programs written in C, using imperative programming techniques;
3. Analyze and explain the behavior of programs written in C;
4. Modify and optimize programs written in C;
5. Develop the skills to work as a team when solving small scale computational problems.

Prerequisites

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

Course contents

Installation and exploration of the Integrated Development Environment (IDE); declaration of variables of the different elementary data types; implementation of control structures; implementation of functions with and without arguments; use of the math.h and string.h library functions; declaration and use of vectors and multidimensional arrays; use of functions for manipulation of data files; declaration and implementation of structures; dynamic memory allocation.

Course contents (extended version)

1. Installation, presentation and exploration of the Integrated Development Environment (IDE).
2. Declaration of variables of the different elementary data types.
3. implementation of control structures.
4. implementation of functions with and without arguments.
5. use of the math.h and string.h library functions.
6. declaration and use of vectors and multidimensional arrays.
7. use of functions for manipulation of data files.
8. declaration and implementation of structures.
9. dynamic memory allocation.
10. Coding of a project based on modular programming.

Recommended reading

1. Luís Damas, "Linguagem C", Tecnologias de Informação, FCA, 1999.
2. Pedro Guerreiro, "Elementos de Programação com C", Tecnologias de Informação, FCA, 2006.
3. António Rocha, "Introdução à Programação Usando C", Tecnologias de Informação, FCA, 2006.
4. Brian W. Kernighan e Dennis M. Ritchie, "The C Programming Language", Prentice-Hall, 1988.
5. R. Johnsonbaugh, and M. Kalin, "C for Scientists and Engineers", Prentice-Hall, 1997.

Teaching and learning methods

Laboratory classes where students develop a team project throughout the semester. In line with this project, students solve small programming problems on the computer or perform longer programmer assignments with the help of a formal guideline. Students complete their training through individual or group work, done outside the classroom.

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final, Supplementary)
   - Projects - 60% (Final project)
   - Final Written Exam - 40% (component with a minimum score of 7 out of 20)
2. Alternative 2 - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100% (includes supplementary exercises designed to replace the final project classification)

Language of instruction

1. Portuguese
2. English

Electronic validation

Luís Manuel Alves	José Luís Padrão Exposto	Luísa Maria Garcia Jorge	Paulo Alexandre Vara Alves
31-10-2022	31-10-2022	31-10-2022	01-11-2022