INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Programming 2			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	2	Code	8309-801-1204-00-23

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)	António José Gonçalves Mourão, Pedro Filipe Fernandes Oliveira

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Identify the guiding principles of object oriented programming
2. Implement solutions based on problems descriptions and Class Diagrams.
3. Define classes, objects, attributes and method, identifying and defining the needed constructors to the correct instance initialization
4. Implement aggregation.
5. Identify and implement inheritance between classes and establish class hierarchies. Understand and implement interfaces.
6. Understand the concept of polymorphism and implement it.
7. Understand the concept of abstract.

Prerequisites

Before the course unit the learner is expected to be able to:
1. Elaborate logical reasoning for the resolution of problems
2. Create programs using the procedural paradigm

Course contents

Object-Oriented Programming definition; Introduction to the C # language; Principles of Object Oriented Programming; Definition of classes in C #; Object Oriented Modeling Concepts; Implementation of class aggregation, associations; Multiple inheritance

Course contents (extended version)

1. Object Oriented Programming definition
    - Motivation
    - Basic concepts
2. Introduction to the C # language
    - C # the language of . NET architecture
    - Declarations, constants, data types
    - Expressions and operators
    - Flow control structures
    - Subprogramming
    - Exceptions
    - Arrays
    - LinkedList and ArrayList Collections
    - Strings
    - Files (input/output)
3. Principles of Object Oriented Programming
    - Abstraction (class / object)
    - Encapsulation
    - Inheritance
    - Polymorphism
4. classes in C #
    - Attributes
    - Constructors
    - Properties
    - Methods
5. Object Oriented Modeling Concepts
    - Class diagrams in UML
    - Associations between classes: simple, aggregation and inheritance
    - Overrriding and adding features, Abstract Classes, Multiple Inheritance
6. Implementation of aggregation
7. Implementation of associations
    - 1-N associations
    - N-N associations
    - Associative classes
8. Multiple inheritance
    - Multiple ocorrence of the base class
    - Interfaces

Recommended reading

1. GRIFFITHS , I. (2019). Programming C# 8. 0: Build Windows, Web, and Desktop Applications, O'Reilly. [978-1492056812]
2. MARQUES, P. (2016). CURSO PRÁTICO DE C#. Editora FCA. [978-972-722-818-8]
3. Rumbaugh, J. (1991). Object-Oriented Modeling and Design. (3ª Edição). Prentice Hall. [ISBN 0-201-49834-0]
4. LOUREIRO, H. (2017). C# 7. 0 COM VISUAL STUDIO - CURSO COMPLETO. FCA. [ISBN: 978-972-722-868-3]
5. MOURAO, A (2020). Programação Orientada aos Objectos - Textos de Apoio. ESACT-IPB

Teaching and learning methods

Lecture classes of theoretical concepts followed by practical discussion of model examples. Concept application through small problem solving. Practical experience is developed with the resolution of a larger problem.

Assessment methods

- Final Evaluation - (Regular, Student Worker) (Final, Supplementary, Special)
  - Experimental Work - 10% (weekly practical labs)
  - Practical Work - 35% (minimal grade of 7 points out of 20.)
  - Final Written Exam - 50% (minimal grade of 7 points out of 20.)
  - Development Topics - 5% (Interdisciplinar Week work)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

António José Gonçalves Mourão, Pedro Filipe Fernandes Oliveira	Barbara Costa Vilas Boas Barroso	Anabela Neves Alves de Pinho	Luisa Margarida Barata Lopes
05-03-2024	14-03-2024	17-03-2024	26-03-2024