

OBJECT ORIENTED PROGRAMMING

Degree in Computer Systems

Degree in Computer Systems

Degree in Electrical and Computer Engineering

Degree in Engineering and Development of Digital Games

Code: 10122

Main Scientific Area: Computer Science

Lecturer: Luis Gonzaga Martins Ferreira

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 100h

ECTS: 6,0

Objectives

The course of Object Oriented Programming (OOP) follows the courses of Imperative Programming Languages and AdvancedData Structures, with the objective of starting the study of the paradigm of object-oriented programming(OOP).

It is intended that students:

address the problem of exploring Objects concepts;

solidify the development of applications according to this paradigm.

be enabled with the essential perception in the analysis and development of solutions to concrete problems of medium complexity.

The subject will be taught fundamentally through i) application of the paradigm directly on the computer; ii)practical exercises in class and iii) complemented with individual and group study.

Learning Outcomes

Students should be able to analyze problems of medium complexity, analyze them from an object-orientedparadigm perspective, and propose an implementation in a particular programming language.

They should be able to define and properly use classes, objects, different pillars of POO(polymorphism, inheritance, encapsulation) interfaces, exceptions, collections, generics, files, and streams.

Should be able for Writing qualityt code and generate good code documentation. as well as be ableto manage code versions.

Course Contents

1 - Programmer Responsibility

Personal computer | Virtual Machine
Backups | Anti-Virus
Expected effort

2 - Programming Environment

IDE
Version control
Structuring solutions
Compiling | Interpreting | Debugging
Quality code
UML

3 - Basic Concepts

Programming paradigms
Variables, Constants
Data types
Operators
Expressions and Instructions
Memory management

4 - Fundamentals of Object Orientation

Object Oriented Analysis
Classes and Objects
Inheritance
Abstraction and Encapsulation
Polymorphism

5 - Object Oriented Programming

Functions and Methods
Base Classes, Inheritance and Interfaces
Exception handling
Data Structures
Input/Output
File Manipulation

6 - Advanced Programming

Complementary Libraries
Code Documentation

7 - Design

Solution Design Patterns
Test-driven development

Recommended Bibliography

C#

Supporting Textbook: C# Essencial, Iufer et al. 2017
C# Succinctly, Joe Mayo, 2015
C# com Visual Studio – Curso Completo, Henrique Loureiro, FCA, Edição 2015

C++

Starting out with C++, From Control Structures through Objects, Eighth Edition, Tony Gaddis, 2015,
Pedro Guerreiro, Programação Com Classes em C++, FCA, Lisboa, 2000. ISBN=972-722-204-8
Koenig, Andrew Moo, Barbara E. – Accelerated C++: Practical Programming by Example. 1 ed. AddisonWesley,
2000. ISBN 978-020-170-353-5
Meyers, Scott – Effective C++: 55 Specific Ways to Improve Your Programs and Design. 3 ed. AddisonWesley,
2005. ISBN 978-032-133-487-9

Learning and Teaching Methods

The programmatic contents were defined in order to learn an object-oriented programming language.

Thus the revision, further exploration, and implementation of object-oriented programming techniques will be addressed in point 1 of the curriculum unit. The remaining points are dedicated to advanced studies of programming language and application in case studies.

Assessment Methods

The standard assessment combines two tests performed on the computer and two practical projects, at maximum.

The extraordinary evaluation is only composed of a written exam and represents only 40% of the final assessment. The remaining 60% corresponds to the practical component. All components are mandatory.

The final assessment for the standard evaluation is composed according to the following equation:

$$NF = 40\% \cdot CT + 60\% \cdot CP$$

CT: Theoretical Component = Max(Tests Exam)

CP: Practical Component = Practical work

Minimum grade: 10 for CT and CP - 10 for C and O

Remarks:

According to student evolution, the rules may need to be reoriented. All results obtained by the students in the intermediate assessments will only be made public at the end of the UC.

The evaluation by Exam will only correspond to the theoretical part of the discipline, i.e., the student must still do the practical part.

Only those students who have obtained a classification in the practical component equal to or superior to 10 values will be admitted to the resource exam (exam time, special season, or exceptional time).

It is not allowed to perform (or improve) the practical component in time of exams; special seasons or exceptional times.