

Course Unit	Programming Languages II	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	2
Workload (hours)	162	Contact hours	T - 15 TP 15 PL 45 TC - S - E - OT - O -
Level	1-1	ECTS credits	6.0
Code	8309-414-1204-00-17		

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

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. Principles of Object Oriented Programming. Concepts of object oriented modeling. Introduction to the JAVA language. Class definition in JAVA. Implementation of associations. Class and functions templates. Implementation of inheritance and class hierarchies. Dynamic memory management inside a class. Interfaces and multiple inheritance. Input and output.

Course contents (extended version)

1. Object Oriented Programming definition
 - Motivation
 - Basic concepts
2. Principles of Object Oriented Programming
 - Encapsulation
 - Inheritance
 - Polymorphism
3. Concepts of object oriented modeling
 - Class diagrams using UML
 - Associations between classes: simple, aggregation and inheritance
 - Overriding and adding new features. Abstract classes. Multiple inheritance.
4. Introduction to the JAVA language
 - Declarations
 - Constants
 - Data types
 - Expressions and operators
 - Flow control
 - Functions
5. Class definition in JAVA
 - Attributes
 - Constructors. Constructors categories.
 - Methods
6. Basic features of JAVA
 - Object arrays. Self reference
7. Implementation of aggregation
8. Function and class templates
9. JAVA Standard libraries
 - String class
 - ArrayList class
10. Implementation of associations
 - 1-N associations
 - N-N associations
 - Associative classes
11. Multiple inheritance
 - Multiple occurrence of the base class
 - Interfaces
12. Input and output data.

Recommended reading

1. ECKEL, B. (1997). Thinking in Java - 4th Edition, Addison-Wesley. [978-0131872486]
2. COELHO, P. (2016). Programação em JAVA - Curso Completo, 5ª Edição. Editora FCA. [978-972-722-840-9]
3. Rumbaugh, J. (1991). Object-Oriented Modeling and Design. (3ª Edição). Prentice Hall. [ISBN 0-201-49834-0]
4. SIERRA, K. (2005). Head First JAVA+ , 2nd Edition. O'Reilly Media. [ISBN: 978-0596009205]

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. Execution of a final project assignment.

Assessment methods

1. Distributed Evaluation - (Regular, Student Worker) (Final, Supplementary)
 - Practical Work - 50% (Minimum of 7 points in 20.)
 - Final Written Exam - 50% (Minimum of 7 points in 20.)
2. Final Exame Evaluation - (Regular, Student Worker) (Special)
 - Final Written Exam - 100%
3. Exchange students - (Regular, Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 50% (Minimum of 7 points in 20.)
 - Practical Work - 50% (Minimum of 7 points in 20.)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Carlos Filipe Campos Rompante da Cunha	João Paulo Pereira de Sousa	Vítor José Domingues Mendonça	Luisa Margarida Barata Lopes
28-02-2018	28-02-2018	07-03-2018	11-03-2018