Course Unit	Elective 1 - Creative programming		Field of study	Arts/Game Design/Computing/Social and Business Sciences/Informatics	
Master in	Digital Game Design and Development		School	School of Public Management, Communication and Tourism	
Academic Year	2023/2024	Year of study	1	Level	2-1	ECTS credits	3.0
Type	Semestral	Semester	1	Code	5074-802-1103-01-23	

| Workload (hours) | 81 | Contact hours | T | - | TP | 22 | 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) | 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. Introduce students to the universe of creative programming.
2. Understand the fundamentals of computer programming.
3. Develop the ability to identify problems and create solutions using programming.
4. Enable students to use Processing software to create creative projects, including animations, interactivity, sound and video.
5. Provide students with an overview of the universe of creative programming, showing the different areas in which programming can be applied.
6. Create simple and effective programs using Processing.
7. Debug computer programs.

Prerequisites

Not applicable

Course contents

1. Introduction to Creative Programming;
2. Fundamentals of programming using Processing;
3. Shapes and colors;
4. Introduction to interactivity;
5. Introduction to libraries;
6. Animations;
7. Project creation;
8. Debugging and Testing.

Course contents (extended version)

1. Introduction to Creative Programming:
   - Concepts
   - The programmer's role
   - Tools
2. Fundamentals of programming using Processing:
   - Variables and Data Types
   - Arithmetic Operators
   - Relational and Logical Operators
   - Flow control structures
   - Arrays and Collections
   - Functions and Methods
   - Object Orientation: Classes, Objects, Attributes, Methods, Encapsulation, Inheritance, Polymorphism
3. Shapes and colors:
   - Drawing and animation of geometric shapes, color manipulation
4. Introduction to interactivity:
   - Capture of mouse and keyboard events
5. Introduction to libraries:
   - Use of the Sound library and other relevant libraries
6. Animations:
   - 2D and 3D transformations
7. Project creation:
   - Creation of small projects
8. Debugging and Testing:
   - Debugging
   - Unitary tests

Recommended reading

1. Maeda, J. (2019). Creative code: Aesthetics + computation. Thames & Hudson.
2. Greenberg, I. (2019). Processing: Creative coding and computational art (2nd ed.). Routledge.
3. Barrero, A. (2021). Coding Art: The Four Steps to Creative Programming with the Processing Language (Design Thinking) (1st ed.). Independently published.
4. Greenberg, I., Xu, D., & Kumar, D. (2013). Processing: Creative Coding and Generative Art in Processing 2 (2nd ed.). Apress.
5. Reas, C. & Fry, B. (2014). Processing, Second Edition: A Programming Handbook for Visual Designers and Artists (The MIT Press) (2nd ed.). The MIT Press.

Teaching and learning methods

The teaching methodology is based on the exposure of materials and the development of activities by students. During classes, the learning of theoretical concepts is promoted using expository methodologies, in which students are invited to actively participate in the debate of cases, proposed problems, and/or situations for students to solve and group work is privileged.

Assessment methods

- Assessment - (Regular, Student Worker) (Final, Supplementary, Special)
   - Practical Work - 100% (Project development)

This document is only valid if stamped in all pages.

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Carlos Filipe Campos Rompante da Cunha	João Paulo Pereira de Sousa	Anabela Neves Alves de Pinho	Luisa Margarida Barata Lopes
05-11-2023	05-11-2023	06-11-2023	06-11-2023

Language of instruction

Portuguese, with additional English support for foreign students.