**LABORATÓRIOS INTEGRADOS - SISTEMAS INTELIGENTES E CRIATIVOS**

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Code: 27214

Main Scientific Area: Computer Graphics and Multimedia

Lecturer: Duarte Filipe Oliveira Duque

Language of Instruction: Portuguese

Regime: T1

Contact Hours: 24h Total Workload: 57h

ECTS: 3,0

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**Objectives**

Introduction to basic concepts in computer graphics and computer programming. These concepts can be used for the creation of digital applications, as well as their knowledge is necessary for planning, design, and communication within interdisciplinary projects.

**Learning Outcomes**

Introduction to basic concepts in computer graphics and computer programming. These concepts can be used for the creation of digital applications, as well as their knowledge is necessary for planning, design, and communication within interdisciplinary projects.

Knowledge and skills to be developed:

1. Basic notions of object-oriented programming;

2. Fundamentals of computer graphics: functions, colors, shapes, transformations, transparency, and image manipulation;

3. Elementary notions of computer graphics;

4. Use of Processing for the creation of interactive visual artifacts;

5. Have notions of the requirements and necessary investments of programming projects aimed at design; 6. Know how to explore autonomously "hands-on" tools such as Processing, including manuals and specifications.

**Course Contents**

1. Programming concepts in Processing: variables, control structures, and functions.

2. Creation and manipulation of elementary shapes; basic concepts of pixels and color.

3. Interacting with mouse and keyboard;

4. Manipulation, creation and playback of images and videos;

5. Animations (sprites);

6. Importing and controlling the playback of sound files;

7. Interaction with hardware platforms; 8. Basics of creative coding.

**Recommended Bibliography**

- Shiffman, Daniel. Learning Processing, Second Edition: A Beginner's Guide to Programming Images, Animation, and Interaction. Morgan Kaufmann, 2015.

- Yu Zhang, Mathias Funk. Coding Art: The Four Steps to Creative Programming with the Processing Language. Apress, 2021.

- Penny de Byl. Creating Procedural Artworks with Processing A Holistic Guide. CreateSpace Independent Publishing Platform, 2017.

- James R. Parker, Sara L. Diamond. Generative Art: Algorithms as Artistic Tool. UpRoute, 2019. - Joshua Noble. Programming Interactivity: A Designer's Guide to Processing, Arduino, and openFrameworks. O'Reilly Media, 2012.

**Learning and Teaching Methods**

The syllabus was defined considering the objectives of the course unit. Therefore, objectives 1 and 2 are addressed in points 1 and 2 of the syllabus. Objectives 3, 4 and 6 are covered in points 3, 4, 5, 6 and 8. The objective 5 is addressed by point 7.

**Assessment Methods**

The evaluation was designed to assess the degree of development of knowledge and skills acquired from their application in a project of appropriate size and complexity. In spite of this work could be developed in the group, as a way to also develop the ability of team cooperation, its evaluation will necessarily be differentiated in order to evaluate each student individually. The practical work will contribute 80% to the final grade, with the remaining 20% resulting from class participation.