INTEGRATED LABORATORIES – INTELLIGENT AND CREATIVE SYSTEMS (MASTED-01-11)				
DEGREE PROGRAM:		Master in integrated STEAM Education (MASTED)		
SEMESTER: First	**TYPE:** Basic	**CREDITS:** 3 ECTS	**WORKLOAD:** 75 hours	**MENTORING:** 5 hours/week
LANGUAGE: Portuguese/English				

OBJECTIVES	
General	• To understand the creation of digital applications, as well as the knowledge necessary for planning, design, and communication within interdisciplinary projects.
Specific	• To Use of Processing for the creation of interactive visual artifacts; • To have notions of the requirements and necessary investments of programming projects aimed at design; • To know how to explore autonomously "hands-on" tools such as Processing, including manuals and specifications.
SUBJECT MATTER	
This subject aims to train students to master a set of technologies that enable them to develop digital educational resources with a view to their inclusion in the teaching and learning processes. It will include: Creation and manipulation of elementary shapes; basic concepts of pixels and color; Manipulation, creation and playback of images and videos; Animations (sprites); Importing and controlling the playback of sound files; Interaction with hardware platforms; Basics of creative coding	
COMPETENCES	
• C1: Developing knowledge and understanding in intelligent and creative systems. • C2: Developing advanced cognitive and procedural skills associated with knowledge development and creation. • C5: Developing of assess in order to evidence learning and to improve the learning process and the teaching practices. • C6: Developing the ability to pay attention to diversity and equality so as to favour the inclusion of all students. • C9: Integrating the theoretical knowledge acquired throughout the course with field practice. • C10: Developing communication and cooperation skills with different stakeholders. • C14: Developing advanced digital competences. • C15: Developing digital pedagogy competences to use, plan and implement new technologies. • C16: Developing of professional commitment using digital technologies.	
LEARNING OUTCOMES	
Knowledge	• Understanding of the basic concepts of Programming and Computer Graphics. • Understanding of how interactive artifacts can be used as a tool to support the teaching of learning.
Skills	• Ability to apply the acquired knowledge in the construction of interactive artifacts. • Creative solution to problems. • To create or co-create new digital educational resources.
Attitudes/values	• Commitment for promoting the learning of all students. • Improvement of attitudes of research, innovation, collaboration, autonomous learning. • Coherent intervention according to the ethical values of the country and the school in which he/she teaches. • Disposition to flexibility and ongoing learning. • Disposition to being critical, self-critical and reflecting on the ethical and professional aspects of the profession, as well as on the own practice.

TEACHING METHODS	
Being a curricular unit with a strong practical component, it is intended to guide students in their learning through the realization of projects that involve the creation of interactive visual artifacts. In class will be used different media to expose the curricular unit programme. In particular, the use of tutorials that students can consult in class and during their extra-class study. After the introduction of theoretical concepts, it is intended to stimulate the research capacity and problem-solving through practical projects.	
EVALUATION	
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.	
PRECONDITIONS	
None	
DEPARTMENT	Computer Graphics and Multimedia
LECTURERS	Duarte Duque
LITERATURE	• 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.