INTEGRATED LABORATORIES - ROBOTICS (MASTED-01-15)				
DEGREE PROGRAM:		Master in integrated STEAM Education (MASTED)		
SEMESTER:	**TYPE:**	**CREDITS:**	**WORKLOAD:**	**MENTORING:**
First	Basic	3 ECTS	75 hours	5 hours/week
LANGUAGE: Portuguese/English				

OBJECTIVES	
General	To integrate and connect robotic materials to the education world.
Specific	- To Identify the main characteristics of robots. - To Analyze robotic projects in educational contexts. - To Select, build and programme robots in task. - To Specify, plan and implement a robotics project to solve a problem. - To Adapt the projects and objectives of its use to the age group of recipients of each project.

SUBJECT MATTER

Robotics is a pedagogical tool for the classroom that allows students to build their knowledge through robots and their programming. In this curricular unit, students will analyse different robots, identify their characteristics, and explore and discuss the potential of their use in educational contexts, verifying their suitability for the target age group of children and young people. Robotics projects in educational contexts emerge from developing logical reasoning and the ability to solve problems. Therefore, it is also pertinent to promote the ability to analyse existing robotics projects in educational, formal and non-formal contexts. Students should be able to select, build and programme robots to perform tasks and solve problems; therefore, it is essential to know the main characteristics of robots, their potential for use, as well as their programming using visual programming environments block based.

COMPETENCES

- C1: Developing knowledge and understanding in robotics.
- 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.
- C7: Developing the ability to establish effective relationships with families, to cooperate with colleagues and with other institutions from the community.
- 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.
- C17: Embracing complexity in sustainability.
- C18: Acting for sustainability.

LEARNING OUTCOMES	
Knowledge	- Curricular knowledge. - Knowledge of robotics educational and their use on formal and non-formal educational context.
Skills	Ability to design learning environments using robotics
Attitudes/values	- Commitment for promoting the learning of all students. - Disposition to examining, discussing, questioning one's own practices. - Improvement of attitudes of research, innovation, collaboration, autonomous learning. - Commitment to safeguard students' wellbeing according to the legal regulations.

	• Disposition to flexibility and ongoing learning.

TEACHING METHODS

This subject comprises a combination of theoretical and practical methodologies with laboratory practices. Student assessment includes:

a) Presentation of research results and problem analysis;
b) Carrying out and discussing tasks;
c) Programming robots in block-based visual programming environments;
d) Active collaboration methodologies for project-based learning.

EVALUATION

The evaluation in regular season considers two components: carrying out tasks proposed during laboratory classes (50%); robotic project to solve a problem in an educational context (50%). The UC also provides for the possibility of assessment by exam.

PRECONDITIONS

None

DEPARTMENT	Electronics and Instrumentation
LECTURERS	Nuno Dias
LITERATURE	• Myint Swe Khine (Ed.), Robotics in STEM Education (2017), Springer International Publishing, DOI: 10.1007/978-3-319-57786-9 • Loh Sau Cheong, Transforming Classroom Practice through Robotics Education (2018), Cambridge Scholars Publishing, ISBN: 1527515761 • Munir Merdan, Wilfried Lepuschitz, Gottfried Koppensteiner, Richard Balogh, David Obdržálek, Robotics in Education (RiE 2021), Springer International Publishing, DOI:10.1007/978-3-030-82544-7