**AUTOMATION LABORATORY**

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Code: 322057

Main Scientific Area: Automation, energy and cyber-physical systems

Lecturer: João Pedro Borges Araújo Oliveira Silva

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 108h

ECTS: 6,0

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**Objectives**

This course aims to provide students with fundamental knowledge of Programmable logic controllers usingstandardlanguages according to IEC 61121-3, as well as, make a general context of equipment involvingautomationtechniques in current industrial reality.

Students are expected to obtain the ability to conceive solutions forautomation problems considering the choices they have and the integration of existing equipment in the market.

**Learning Outcomes**

At the end of the course, students should acquire the following skills:

Know the internal structure and modeof operation of programmable logic controllers;

Develop programs for PLCs using standardized languagesaccording to IEC 61131-3 with Ladder diagrams, lists of instructions and GRAFCETs;

Learn to connectprogrammable automats to peripheral equipment such as industrial sensors and actuators;

Integrate programmableautomats inindustrial communication networks;

Know and develop controlling and monitoring systems forautomation systems;Automate production lines - MPS (Modular Production System);

Program mobile robots suchas the Robotino

**Course Contents**

Automating lines assembly/manufacture, in accordance with the following proposed works:

Development ofan operator for transport objects in an industrial environment.

Automation of a line of industrial manufacturing -MPS ;Programming and commissioning of a mobile robot autonomously guided - Robotino in conjunction with the

work 2.

Installation and programming of a system with temperature control, PLC, SCADA / HMI.

Installationand programming of a system with weight control, PLC, SCADA / HMI.

Installation and programming of a systemwith motor speed control with inverter, PLC, SCADA / HMI.

Automation of an automatic filling line.

Access control toa car park.

Control of mixing and filling containers.

**Recommended Bibliography**

João R. Caldas Pinto, técnicas de automação, 3ª ed. ETEP, 2010;

J. Norberto Pires, Automação Industrial, 4ªed.,ETEP, 2007;

António M. S. Francisco, Autómatos Programáveis, 4ª ed, ETEP;

Paulo Oliveira, Cursode Automação Industrial, 1ª ed, ETEP;

**Learning and Teaching Methods**

The syllabus of this course will enable the student to acquire a set of skills in the field of industrial automation.This course will enable students to know and understand the different methods of analysis and design of discreteeventsystems and supervisory control and monitoring in the field of automation. After this theoretical foray, thestudent will be faced with a set of real problems of automation systems specific to different types of industries, andwill beencouraged to search for solutions to solve them. Through the discussion of the same, elements(controllers,sensors and actuators), normally present in an industrial automation system, will be presented to thestudent, which will allow him to achieve a resolution. At the same time, the student will also be stimulated to beautonomous in thesearch for more advanced solutions.

**Assessment Methods**

The approval in this curricular unit is obtained with a grade equal to or higher than 10 values, on a scale of 10 to20,resulting from the evaluation will be obtained from two components: Practical projects supported by written reports(50%) and with individual oral defense ofeach of them (50%). Practical assignments are mandatory and have aminimum grade of 9.5 in each component; The student will be approved to the discipline when the final grade ofevaluation is greater than or equal to 9.5 values.In case of a negative grade during the continuous season, thestudent may submit to the Resource Season or Special Season to improve one of the practical assignments (theone with the lowest evaluation).