AUTOMATION LABORATORY

Code: 322057

Main Scientific Area: Tecnologic innovation

Lecturer: António Herculano de Jesus Moreira

Language of Instruction: Portuguese

Regime: S1

Contact Hours: 60h Total Workload: 108h

ECTS: 6,0

Objectives

This course aims to provide students with fundamental knowledge of Programmable logic controllers using standard languages according to IEC 61121-3, as well as, make a general context of equipment involving automation techniques in current industrial reality. Students are expected to obtain the ability to conceive solutions for automation 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 mode of operation of programmable logic controllers; Develop programs for PLCs using standardized languages according to IEC 61131-3 with Ladder diagrams, lists of instructions and GRAFCETs; Learn to connect programmable automats to peripheral equipment such as industrial sensors and actuators; Integrate programmable automats in industrial communication networks; Know and develop controlling and monitoring systems for automation systems; Automate production lines - MPS (Modular Production System); Program mobile robots such as the Robotino.

Course Contents

Automating lines assembly/manufacture, in accordance with the following proposed works: Development of an 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. Installation and programming of a system with weight control, PLC, SCADA / HMI. Installation and programming of a system with motor speed control with inverter, PLC, SCADA / HMI. Automation of an automatic filling line. Access control to a 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, 4ª ed., ETEP, 2007; António M. S. Francisco, Autómatos Programáveis, 4ª ed, ETEP; Paulo Oliveira, Curso de 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 discrete event systems and supervisory control and monitoring in the field of automation. After this theoretical foray, the student will be faced with a set of real problems of automation systems specific to different types of industries, and will be encouraged 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 the student, which will allow him to achieve a resolution. At the same time, the student will also be stimulated to be autonomous in the search for more advanced solutions.

Assessment Methods

The approval of this course is obtained with a score equal or greater than 10 points on a scale from 10 to 20, evaluation of the result will be obtained from two components: Practical projects supported by written reports (50%) and individual oral defense of each of them (50%). Practical work is required and has a minimum score of 9.5 in each component; The student will be approved discipline when the final assessment score is greater than or equal to 9.5. According to the equation of the normal time, the student will be approved to the course when the score reached is greater than or equal to 9.5. Otherwise, the student may submit to the special season of Appeal or season, if you have achieved the minimum score in practical work (oral exam). The practical work is also required before the exam or special season. If the note of the report is negative can do to discipline by making a written exam with the average grade of the practical component (oral). The appeal, special time, and grade improvement will be obtained through a written test covering all matter taught within this discipline to carry out the practical work. The grade of the practical component does not account for the improvement.