

<i>Course</i>	Mechanical and Industrial Informatics			<i>Academic year</i>	2021/2022		
<i>Subject</i>	Oil Hydraulic and Pneumatics in Industrial Automation			ECTS	5		
<i>Type of course</i>	Compulsory						
<i>Year</i>	2nd	<i>Semester</i>	1st	<i>Student Workload:</i>			
<i>Professor(s)</i>	Jorge Manuel Pereira Gregório			<i>Total</i>	135	<i>Contact</i>	60
<i>Area Coordinator</i>	Rui António Pitarma S. Cunha Ferreira						

Planned SD

1. LEARNING OBJECTIVES

Provide students with a knowledge base in hydraulic oil and pneumatic automation.

Acquire the knowledge needed for the theory and practice of hydraulic oil and pneumatic automation, especially hydraulic oil, pneumatic, and electric/electronic control equipment and circuits.

Application of acquired skills to the development and design of hydraulic oil, pneumatic, electro-hydraulic and electro-pneumatic circuits.

2. PROGRAMME

Fundamentals of automation.

Hydraulic Oil: Hydraulic Oil Basics; devices; pumps; motors; linear actuators and valves; symbology; hydraulic fluids; types and characteristics; construction and analysis of hydraulic oil circuits.

Pneumatics: Basic principles of pneumatics; production and treatment of compressed air; pneumatic devices; motors; actuators and valves; symbology; construction and analysis of pneumatic circuits.

Electro-pneumatic and electro-hydraulic: fundamentals of electrical control circuits; electro-pneumatic and electrohydraulic devices; contactors and relays; solenoid valves; sensors; limit switches; detectors; pressure switches and timers; construction and analysis of electro-pneumatic and electro-hydraulic circuits.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The syllabus aims to provide the students with knowledge in hydraulic oil and pneumatic automation to integrate them in the world of work in the field of industrial automation. In particular, the content aims to prepare students so that they become aware of the need to know how to do things instrumentally and operationally. The syllabus will also allow the students, autonomously, to be able to develop their activity productively applying the concepts learned about hydraulic oil, electro-hydraulic, pneumatic and electro-pneumatic automation in their future companies/organizations.

4. MAIN BIBLIOGRAPHY

Santos, A. M. de Almeida e Silva A. J. S. Ferreira; (2016). Automação Óleo-Hidráulica: Princípios de Funcionamento. Porto. PUBLINDUSTRIA.

Michael J. Pinches, John G. Ashby; (1989). Power hydraulics, Prentice Hall.

Novais, J.; (2014). Ar comprimido industrial: produção, tratamento e distribuição, Lisboa. Fundação Calouste Gulbenkian.

Silva A. J. S. Ferreira da e Santos, A. M. de Almeida; (2014). Automação Pneumática. Porto. PUBLINDUSTRIA.

FIALHO, Arivelto B.; (2011). Automação Hidráulica - Projetos, Dimensionamento e Análise de Circuitos. São Paulo. Érica,

Pires, J. Norberto; (2019). Automação e Controlo Industrial - Indústria 4.0. Lisboa. Lidel.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

The syllabus privileges the interconnection between theory and practice. The theoretical-practical aspects presented through lectures, demonstrations, and questions, using the whiteboard or datashow, will be explored in practice whenever possible.

During the semester students will carry out practical group work on projects to encourage practice so that learning develops towards future professional activities with group work and student demonstrations. These assignments will always be presented as reports that will be evaluated.

Classification: Final test (50%), practical work evaluation (50%).

Final grade equal to or higher than 10 values to obtain approval, with 20 being the highest grade possible.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

To achieve the proposed objectives, the methodology is based on principles of theoretical-practical training. The teaching methods and techniques to be applied during the sessions are interconnected amongst the lectures, questions, and demonstrations as well as group interaction, where the teacher is responsible for reinforcing learning and coordinating the various activities.

7. ATTENDANCE

N.A.

8. CONTACTS AND OFFICE HOURS

Professor: Jorge Manuel Pereira Gregório (Ph.D); jgregorio@ipg.pt; office n.º 5

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