

<i>Course</i>	Mechanical and Industrial Informatics			<i>Academic year</i>	2021/2022	
<i>Subject</i>	Industrial Electronics			ECTS	6,5	
<i>Type of course</i>	Compulsory					
<i>Year</i>	3rd	<i>Semester</i>	1st	<i>Student Workload:</i>		
<i>Professor(s)</i>	Adérito Neto Alcaso			<i>Total</i>	175,5	<i>Contact</i> 60
<i>Area Coordinator</i>	Rui António Pitarma S. Cunha Ferreira					

Planned SD

1. LEARNING OBJECTIVES

Know and understand the operating principles and applications of electronic systems based on electronic power converters, used in an industrial environment, to be able to intervene in the design, implementation and operation of these systems in the most common electromechanical applications of speed and torque variation. Thus after attending the course, the student should:

- O1 - Identify the need for and applications of electronics in electromechanical systems;
- O2 - Identify characteristics and operation of the most common power electronic devices;
- O3 - Identify characteristics and operation of the most common power electronic converters;
- O4 - Identify the most important requirements of the design, implementation and operation of electronic power systems and their electromechanical applications.

2. PROGRAMME

- C1 - Characteristics of power electronic devices
- C2 - Command and protection of power electronic devices;
- C3 - Rectifier type converters;
- C4 - AC grader and cycloconverter type converters;
- C5 - DC grader and transformer type converters;
- C6 - Inverter type converters;
- C7 - Command and control of power converters;
- C8 - Speed and torque variation systems;
- C9 - Simulation and adjustment of converters.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The objective O1 is transversal to all contents, while objective O2 is mostly related to content C2; the objective O3 to contents C4 through C5 and the objective O4 to contents C7 through C9.

4. MAIN BIBLIOGRAPHY

Cyril W. Lander, "Eletrónica Industrial", 1988, Mc Graw-Hill (ISBN: 8534604576).

Fernando J. Velez, Paulo Oliveira, Luís M. Borges, Ana Rodrigues, "Curso de Eletrónica Industrial", Lidel, 2010 (ISBN: 9789728480226).

Afonso Marques, "Eletrónica XXI", 2011, Publindustria, (ISBN: 9789728953881).

Muhammad Rashid, "Power Eletronics", Pearson, 2013 (ISBN: 9780273769088).

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Teaching methodologies:

- Lectures using video projection of teacher notes and online simulators.
- Experimental demonstrations and student laboratory work;

Evaluation:

Ongoing evaluation is based on a behavioral component of 10%, laboratory (40%) and a written test (50%), where the written test grade is greater than 6.5/20 and the laboratory practice grade is greater than 9.5/20. Students with student worker status are evaluated based on a simulation (10%), a research project (40%) and a written test (50%), where the written test grade is greater than 6.5/20 and the research project grade is greater than 9.5/20.

Final grade equal to or higher than 10 values to obtain approval.

Other evaluations:

The final exam can be taken when students do not pass via ongoing assessment.

Final evaluation: exam. Grade equal to or higher than 10 values to obtain approval.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

Lectures are transversal to all objectives O1 to O4 since students need to be introduced to the theory. Demonstrations and experiments will be used to meet objectives O2 and O3 for characterization and practical validation of different topologies and applications of power electronic converters.

7. ATTENDANCE

N.A.

8. CONTACTS AND OFFICE HOURS

Professor: Adérito Neto Alcaso (Ph.D); aderitona@ipg.pt; office n.º 11

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