POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	**SUBJECT DESCRIPTION**	**MODELO** PED.013.03

Course	Energy and Environment					
Subject	Fundamentals of Electricity and Electronics					
Academic year	2023-2024	*Curricular year*	2nd	*Study period*	1st semester	
Type of subject	Compulsory	*Student workload (H)*	Total: 126	Contact: 60	*ECTS*	4,5
Professor(s)	João Lobão Andrade					
☒ *Area/Group Coordinator* ☐ *Head of Department* *(select)*	Rui Pitarma Ferreira					

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

1 - Describe the basic principles of electricity and electronics and their importance in the context of production and consumption of energy;

2 - Describe the main basics electric and electronics operators, energy converters and their operation and applications;

3 – Understand and analyses the operation of basic electric circuits (DC and AC);

4 – Measure electrical quantities and interpret them correctly in an electrical system;

2. PROGRAMME

***Chapter 1** - Electricity and Electrical Circuits*

- History of electricity and electronics

- Mains electrical quantities

- DC and AC current

- Basic electrical elements and their effects

- Fundamentals analysis circuit laws

- Single phase and tri-phase AC systems

- Electrical measuring devices

***Chapter 2** - Magnetic circuits and Electrical Machines*

- Main magnetic quantities

- Magnetic materials

- Magnetic circuits

- Transformers

- Electrical motors and generators

***Chapter 3** - Semiconductors and electronics circuits*

- Semiconductors, diodes and transistors

- Integrated and printed circuits

- Electronic energy converters

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

- Chapter 1 is consistent with the objective of describing and understanding electrical principles, applications and circuits operation;

- Chapter 2 is consistent with the objective of describing and understanding the operation of electromechanical energy converters;

- Chapter 3 is consistent with the objective of describing and understanding electronic principles and applications in energy conversion.

4. MAIN BIBLIOGRAPHY

- Teacher's notes;

- Afonso Marques; Eletrónica XXI, PUBLINDUSTRIA, 2011, ISBN: 9789728953881

- Manuel de Medeiros Silva; Introdução aos Circuitos Eléctricos e Electrónicos, 6ª ed GULBENKIAN, 2014, ISBN:9789723106961

- J. A. Brandão Faria; Análise de Circuitos, IST PRESS,2013, ISBN: 9789898481207

- Acácio Manuel Raposo Amaral; Análise de Circuitos e Dispositivos Eletrónicos - 2ª edição, PUBLINDUSTRIA, ISBN:9789897230868

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Teaching methodologies:

- Lectures using presentations and Internet;

- Interactions with demonstrations and student work in laboratory;

Evaluation methodologies:

- Normal continuous evaluation is based on two items with different percentages: written test (60 %) and laboratory work (40%).

- Other evaluations:

Best grade between written test of exam evaluation alone and continuous evaluation.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

- Lectures are consistent with the objectives of providing the students with the fundamentals of electric and electronic technologies;

- Interaction with demonstrations and student work in laboratory are consistent with the objectives of identification and analysis of electric and electronics circuits in electrical systems;

DATE

18 de setembro de 2023

SIGNATURES

Area/Group Coordinator

(signature)

Professor

(signature)