

	SUBJECT DESCRIPTION	MODELO PED.013.02
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<i>Course</i>	Industrial Mechanics and Informatics	<i>Academic year</i>	2021/2022			
<i>Subject</i>	Installations and Electrical Machines	ECTS	6			
<i>Type of course</i>	Compulsory					
<i>Year</i>	2nd	<i>Semester</i>	2nd	<i>Student Workload:</i>		
<i>Professor(s)</i>	João António Lobão Andrade		<i>Total</i>	162	<i>Contact</i>	60
<i>Area/Group Coordinator</i>	Rui António Pitarma S. Cunha Ferreira					

Planned SD

1. LEARNING OBJECTIVES

- 1 - Know the fundamentals of Installations and Electrical Machines and their importance in the Industrial context;
- 2 - Know the components, operation and assembly of electrical installations and their applications;
- 3 - Know the components, operation and assembly of the main electrical machines and their applications;

2. PROGRAMME

Chapter 1 - ELECTRICAL INSTALLATIONS

–Characterization and classification of electrical installations; Rules and Regulations; Classification of the main conductors and insulators used in electrical installations; Design of electrical installations in areas of industrial use; Protection of persons against direct and indirect contacts; Selection of protection devices (overcurrent and overvoltage); Assembly and maintenance techniques according to the rules and state of the art of industrial installations.

Transformer Stations: Types of transformer stations and their use; protective equipment and control; Power factor correction; Transformer Stations maintenance rules and techniques.

Chapter 2 - ELECTRIC MACHINES

Transformers: Constitution and principle of operation; Losses, efficiency and cooling of transformers; Single-phase and three-phase transformers; Connection types; Autotransformer; Measurement transformers; Examples of application in Industry.

Synchronous and asynchronous machines: Constitution and principle of operation; Three-phase motors, torque and efficiency; Single phase motors; Linear motor. Synchronous generators and motors. Starting and speed regulation of synchronous and asynchronous motors; Examples of application in Industry.

Switching machines: Constitution and operating principle of DC mechanical and electronic switching machines; Step motors; Starting and speed regulation. Examples of application in Industry.

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

- Chapter 1 is consistent with the objective of describing and understanding electrical Installations, operation and assembly of electrical installations and their applications.
- Chapter 2 is consistent with the objective of describing and understanding operation and assembly of the main electrical machines and their applications.

4. MAIN BIBLIOGRAPHY

- A Gomes, Sérgio Ramos e André Sá, (2018) *Instalações Elétricas de Baixa Tensão – Aparelhagem de Proteção Comando e Seccionamento*, ENGEBOOK.
- António A Gomes e José B Carvalho, (2018) *Instalações Elétricas de Média Tensão – Postos de transformação e Seccionamento*, ENGEBOOK.
- Josué Lima Morais, (2006) *Guia técnico das Regras técnicas das instalações elétricas de baixa tensão*, CERTIEL.
- RTIEBT- (2006) *Regras técnicas das instalações elétricas de baixa tensão*, DGEG e CERTIEL,.
- Stephen J, (2013) *Fundamentos de Máquinas Elétricas 5 ed.* McGrawHill,
- Jose M. Molina, Francisco J. Cánovas, Francisco A. Ruz, (2011) *Motores y Máquinas Eléctricas*
- *Fundamentos de electrotecnia para ingenieros*, MARCOMBO.

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%) with minimum grade of 9.5 out of 20.
- 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 Installations and Electrical Machines;
- Interaction with demonstrations and student work in laboratory are consistent with the objectives of identification and analysis of Installations and Electrical Machines and their importance in the Industrial context.

7. ATTENDANCE

N.A.

8. CONTACTS AND OFFICE HOURS

Professor: João António Lobão Andrade (Ph.D); jlobão@ipg.pt; office n.º 5

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