

Curso	<b>Mechanical and Industrial Informatics</b>			Ano letivo	2021/2022		
Unidade Curricular	<b>Technology of Materials</b>			ECTS	6		
Regime	<b>Compulsory</b>						
Ano	1st	Semestre	2nd	Horas de trabalho globais			
Docente (s)	<b>José Reinas dos Santos André</b>			Total	162	Contacto	60
Coordenador da área disciplinar	<b>José Reinas dos Santos André</b>						

### Planned SD

## 1. LEARNING OBJECTIVES

- O1. Characterize materials based on their structure, properties and applications.
- O2. Selecting materials for different applications.
- O3. Analyze results of mechanical tests and characterize material properties.
- O4. Identify and characterize types of intra/intermolecular binding.
- O5. Classify solids and identify crystal structures.
- O6. Analyze balance diagrams.
- O7. Characterize heat treatments of Fe-C alloys.

## 2. CONTEÚDOS PROGRAMÁTICOS

- 1. Mechanical properties of materials and mechanical testing
- 2. Ferrous alloys
- 3. Aluminum and its alloys
- 4. Copper and its alloys
- 5. Heat treatments
- 6. Shape memory alloys (SMA).

## 3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

- 1. Mechanical properties of materials and mechanical tests (O1, O2, O3)
- 2. Ferrous alloys (O2, O4, O5, O6)
- 3. Aluminum and its alloys (O2, O4, O5, O6)
- 4. Copper and its alloys (O2, O4, O5, O6,)
- 5. Thermal treatments (O2, O7)
- 6. Shape memory alloys (SMA) (O2, O4, O5).

## 4. MAIN BIBLIOGRAPHY

Mandatory

- l) Textos de Apoio coligidos pelo Prof. Reinas André, Instituto Politécnico da Guarda, 2020.

II) Smith W. F., Princípios de Ciência e Engenharia de Materiais, 3ªed., McGraw-Hill International Editions, 1998, ISBN 9789728298685.

III) Chiaverini, V., Tecnologia Mecânica, Vol. I, 2ª ed., Pearson Universidades, 1995, ISBN 978-0074500897.

Recommended

IV) Carlos Moura Branco, Mecânica dos Materiais, 5ª ed., Fundação Calouste Gulbenkian: Lisboa, 2011, 9789723111477.

V) Pinto Soares, Aços Características e Tratamentos, 6ª ed., Publindústria, 2010, ISBN 9789892017976.

## **5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)**

Lectures; problem solving; debate; performing mechanical tests; laboratory classes.  
2 tests performed; exam with the entire matter; appeal exam with the entire matter. Students who obtain a grade equal to or greater than 9.5 are approved in the course.

## **6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES**

The lectures and problem solving will provide the student with the necessary knowledge regarding the structure, properties and transformation of materials in general. Debate, observation of experiences and problem solving with tutorial guidelines will allow better consolidation of knowledge.

### **1. ATTENDANCE**

N.A.

### **2. CONTACTS AND OFFICE HOURS**

Professor: José Reinas dos Santos André (Ph.D); [jandre@ipg.pt](mailto:jandre@ipg.pt); office n.º 13

Area Coordinator: José Reinas dos Santos André (Ph.D); [jandre@ipg.pt](mailto:jandre@ipg.pt); office n.º 13

Date: 30/06/2021

