

<i>Course</i>	Mechanical and Industrial Informatics			<i>Academic year</i>	2021/2022		
<i>Subject</i>	Chemistry and Materials			ECTS	6		
<i>Type of course</i>	Compulsory						
<i>Year</i>	1st	<i>Semester</i>	1st	<i>Student Workload:</i>			
<i>Professor(s)</i>	José Reinas dos Santos André			<i>Total</i>	162	<i>Contact</i>	60
<i>Area Coordinator</i>	José Reinas dos Santos André						

Planned SD

1. LEARNING OBJECTIVES

- O1. Interpret the material and its transformations using concepts from Chemistry.
- O2. Identify and characterize types of intra and intermolecular connections.
- O3. Justify properties of substances based on intra and intermolecular connections.
- O4. Characterize materials based on their structures, properties and applications.
- O5. Select materials for different applications.
- O6. Apply electrochemical and electrolyte processes for practical purposes.
- O7. Identify phenomena of corrosion and select methods for suitable anticorrosive protections.

2. PROGRAMME

1. Atomic and chemical alloy structure
2. Classification of polymers
3. Commercial thermoplastics
4. Elastomers
5. Composites
6. Electrochemistry
7. Corrosion of materials
8. Corrosion forms
9. Protection of materials from corrosion

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

1. Atomic and chemical alloy structure (O1, O2, O3)
2. Classification of polymers (O1, O2, O4, O5)
3. Commercial thermoplastics (O1, O2, O3, O4, O5)
4. Elastomers (O1, O2, O3, O4, O5)
5. Composites (O1, O2, O3, O4, O5)
6. Electrochemistry (O6)
7. Corrosion of materials (O6, O7)
8. Corrosion forms (O6, O7)
9. Protection of materials from corrosion (O6, O7)

4. MAIN BIBLIOGRAPHY

Mandatory

i) Textos de Apoio coligidos pelo Prof. Reinas André (2020), Química e Materiais, Guarda, Instituto Politécnico da Guarda;

ii) André, J. R.S., (2020), Guia de Laboratório de Química e Materiais, Guarda, Instituto Politécnico da Guarda;

Recommended

i) Chang, R. (2005), Química, New York, McGraw-Hill, ISBN 9789899717275

ii) Mahan, B.H. (2002), Química um Curso Universitário, São Paulo, Editora Blucher, ISBN: 9788521200369

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

IV) Fontana, M.G. & Green, N.D., (1986), Corrosion Engineering, Ed. Nace, ISBN: 9780072939736;

V) Gentil, V., (2003), Corrosão, 4ª ed., Livros Técnicos e Científicos, ISBN 9788521613411

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Lectures consist of exposure of the material addressed in the programme. Theoretical-practical classes are of decisive importance for the academic success of students in this subject, so student study hours should be considered as active. Laboratory classes take place in the Chemistry Lab.

There are two tests, one regular exam and another on appeal, both covering all the material. Final grade equal to or higher than 9.5 values to obtain approval, with 20 being the highest grade possible.

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The lectures and problem solving will equip the students with knowledge to characterize materials based on their structure, properties and transformation. Debate, observing experiments and problem solving in the tutorial sessions will help to consolidate their knowledge.

7. ATTENDANCE

N.A.

8. CONTACTS AND OFFICE HOURS

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

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

Date: 30/06/2021