



Teaching Guide				
Identifying Data				2021/22
<b>Subject (*)</b>	Applications to environmental protection	<b>Code</b>	730495006	
<b>Study programme</b>	Mestrado Universitario en Materiais Complexos: Análise Térmica e Reoloxía (plan 2012)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Obligatory	3
<b>Language</b>	English			
<b>Teaching method</b>	Face-to-face			
<b>Prerequisites</b>				
<b>Department</b>	Enxeñaría Naval e Industrial			
<b>Coordinador</b>	López Beceiro, Jorge José	<b>E-mail</b>	jorge.lopez.beceiro@udc.es	
<b>Lecturers</b>	Artiaga Diaz, Ramon Pedro López Beceiro, Jorge José	<b>E-mail</b>	ramon.artiaga@udc.es jorge.lopez.beceiro@udc.es	
<b>Web</b>	<a href="http://eps.udc.es/diderot">http://eps.udc.es/diderot</a>			
<b>General description</b>	Analysis using different experimental techniques gases emitted / absorbed in different processes. Substituting synthetic polymers biopolymers. Value the study of waste minimization / elimination.			
<b>Contingency plan</b>	<p>1. Modifications to the contents The contents are not modified</p> <p>2. Methodologies *Teaching methodologies that are maintained Guest lecture/keynote speech (via Teams) Supervised projects (tutored via Teams or email) Objective test (online) *Teaching methodologies that are modified Laboratory practice. It is replaced by the presentation of practical cases in the Keynote sessions and the reading and discussion of scientific articles (analysis of documentary sources).</p> <p>3. Mechanisms for personalized attention to students - Email: Daily. Used to make queries, request virtual meetings to resolve doubts and monitor the work being supervised. - Microsoft Teams: Personalized tutoring of students - Moodle: This will be used as a repository for documentation provided to students.</p> <p>4. Modifications in the evaluation Keynote Sessions 10% - Continuous evaluation by assessing active participation and achievement. Supervised projects 60% - Presentation of supervised works Objective test 20% - It will be performed orally after the presentations of the supervised projects Analysis of documentary sources 10% -Reading and discussion of articles from scientific journals related to the subject *Evaluation observations: -</p> <p>5. Modifications to the bibliography or webgraphy No change.</p>			

## Study programme competences / results

<b>Code</b>	<b>Study programme competences / results</b>
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A1	Set up and conduct tests using the techniques of thermal analysis and rheology most appropriate in each case, within the scope of complex materials
A6	Understanding the importance of the environment and of the research focused on the elimination/minimization of final or process wastes
B1	Knowledge and understanding to provide a basis or opportunity for originality in developing and / or applying ideas, often in a research context
B2	The students have the skill to apply their knowledge and their ability to solve problems in new or unfamiliar contexts within broader (or multidisciplinary) contexts related to their field of study
B4	That the students can communicate their conclusions and the knowledge and last reasons behind that conclusions to specialized and non specialized audience in a clear and unambiguous way
B7	Solving problems effectively
B8	Applying a critical, logical and creative way of thinking
B11	Behave with ethics and social responsibility as a citizen and as a professional
B14	Ability to find and manage the information
B21	To assess the importance of research, innovation and technological developments in the socio-economic and cultural progress of society
B22	Understand the importance of protecting the environment
C2	Have a good command of spoken and writing expression and understanding of a foreign language.
C4	Developing for the exercise of an open, educated, critical, committed, democratic and solidary citizenship, able to analyze reality, diagnose problems, formulate and implement solutions based on knowledge and oriented to the common good.
C7	To assume as a professional and citizen the importance of learning throughout life.
C9	Appreciate the importance of research in environmental protection

Learning outcomes			
Learning outcomes	Study programme competences / results		
Ability to analyze using different experimental techniques gases emitted / absorbed in different processes	AR1 AR6	BR1 BR2 BR4 BR7 BR8 BR11 BR14 BR21 BR22	CR2 CR4 CR7 CR9
Recognize the importance of replacing synthetic polymers for biopolymers	AR6	BR1 BR2 BR4 BR7 BR8 BR11 BR14 BR21 BR22	CR2 CR4 CR7 CR9



Appreciating the study of waste for minimization / elimination	AR6	BR1	CR2
		BR2	CR4
		BR4	CR7
		BR7	CR9
		BR8	
		BR11	
		BR14	
		BR21	
		BR22	

Contents	
Topic	Sub-topic
Analysis of the combustion gases by TG-FTIR	Degradation in oxidizing and inert atmosphere Products of combustion Component Identification by FTIR
Evaluation of the absorption of harmful gases by TG	Characteristics of absorbent substrates Influence of absorption temperature Influence of concentration and gas flow Setting up an experiment to evaluate the absorption of gases
Rheology of fuel marine waste	General characteristics of fuel marine waste Rheological properties of interest Thermal and rheological characterization
Substitution of synthetic polymers by biopolymers	Methods for obtaining biopolymers Main biopolymers Compared to synthetic polymers Possibilities and prospects of replacing synthetic polymers for biopolymers

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A6 B1 B11 B21 B22 C4 C9	10	15	25
Laboratory practice	A1 B2 B7 C7	8	12	20
Supervised projects	A1 B2 B4 B7 B8 B11 B14 B21 C2	2	18	20
Objective test	A6 B4 B8 C2 C9	2	2	4
Personalized attention		6	0	6

(\*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Presentation given by the professor, on a schematic basis, focusing on the main topics, covering both theoretical and practical issues.
Laboratory practice	Performance of practical activities such as demonstrations, exercises, experiments, etc..
Supervised projects	Activities whose purpose is that the students enlarge the study of the topics presented in the program and consolidate their acquired knowledge and capabilities. These activities should also help the students learn and improve their capabilities in literature survey.
Objective test	Exam that will help to evaluate the knowledge and competencies acquired by the students.

Personalized attention



Methodologies	Description
Objective test Guest lecture / keynote speech Laboratory practice Supervised projects	The personalized attention to students, understood as a support in the teaching-learning process, will take place in the hours of tutoring of the professor.  No academic dispensation is accepted.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Objective test	A6 B4 B8 C2 C9	Examination or objective test.	20
Guest lecture / keynote speech	A6 B1 B11 B21 B22 C4 C9	Continuous assessment through monitoring of student work in the classroom, laboratory and / or tutorials.	10
Laboratory practice	A1 B2 B7 C7	Continuous assessment through monitoring of student work in the classroom, laboratory and / or tutorials.	10
Supervised projects	A1 B2 B4 B7 B8 B11 B14 B21 C2	Presentation (oral and written) of the supervised work.	60

Assessment comments
No academic dispensation is accepted. The evaluation criteria for the second opportunity and the extraordinary opportunity are the same as for the first opportunity.

Sources of information	
<b>Basic</b>	Nesta materia trabállátese con distintos artigos científicos procedentes de revistas ou con teses doutorais como: Estudio térmico de maderas [Recurso electrónico] / autora, María Teresa Sebio Puñal ; directores, Ramón Pedro Artiaga Díaz [y] Salvador Naya Fernández. Sebio Puñal, María Teresa. Biblioteca central -- TE.UDC-433 CD-ROM --Journal of Thermal Analysis and CalorimetryEnergy Conversion and ManagementThermochemica ActaEnergy & FuelsEnvironmental Research LettersOs artigos estarán relacionados coas técnicas analíticas estudadas e o medio ambiente.
<b>Complementary</b>	

Recommendations
<b>Subjects that it is recommended to have taken before</b>
<b>Subjects that are recommended to be taken simultaneously</b>
Introduction to complex materials/730495001 Viscoelasticity of materials/730495002 Thermo-mechanical properties of materials. Fundamental Methods/730495003
<b>Subjects that continue the syllabus</b>
<b>Other comments</b>



The delivery of the documentary work carried out in this subject: They will be requested in virtual format and/or computer support. It will be done through Moodle, in digital format without the need to print them. If it is necessary to make them on paper: Plastics shall not be used. Double-sided printing shall be carried out. Recycled paper will be used. Printing of drafts shall be avoided. A sustainable use of resources and the prevention of negative impacts on the natural environment must be made.

(\*) The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.