UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2022/23
Subject (*)	Material Analysis and Characterization Lab		Code	730497232
Study programme	Mestrado Universitario en Enxeñaría Industrial (plan 2018)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	Second	Optional	3
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Naval e Industrial			
Coordinador	Tobar Vidal, María José		E-mail	maria.jose.tobar@udc.es
Lecturers	Amado Paz, José Manuel Artiaga Diaz, Ramon Pedro Garcia Diez, Ana Isabel López Beceiro, Jorge José Tobar Vidal, María José		E-mail	jose.amado.paz@udc.es ramon.artiaga@udc.es ana.gdiez@udc.es jorge.lopez.beceiro@udc.es maria.jose.tobar@udc.es
Web				
General description	Introduction to analysis tecniques and materials characterization. Mechanical, thermal and metallurgical evaluation. It has an eminently practical character and will be developed at EPS research laboratories related to analysis and processing of materials (CIM G000127, LAIL G000188, PROTERM G000660)			

Study programme competences / results	
Code	Study programme competences / results
B1	CB6 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.
B2	CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of ??study.
B3	CB8 - That students are able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
B4	CB9 - That the students know how to communicate their conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized audiences in a clear and unambiguous way.
B5	CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
B6	G1 - Have adequate knowledge of the scientific and technological aspects in Industrial Engineering.
B13	G8 - Apply the knowledge acquired and solve problems in new or unfamiliar environments within broader and multidisciplinary contexts.
B14	G9 - Be able to integrate knowledge and face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on social and ethical responsibilities linked to the application of their knowledge and judgments.
B15	G10 - Knowing how to communicate the conclusions -and the knowledge and ultimate reasons that sustain them- to specialized and non-specialized publics in a clear and unambiguous way.
B16	G11 - Possess the learning skills that allow to continue studying in a self-directed or autonomous way.
C1	ABET (a) - An ability to apply knowledge of mathematics, science, and engineering.
C2	ABET (b) - An ability to design and conduct experiments, as well as to analyze and interpret data.
C3	ABET (c) - An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
C6	ABET (f) - An understanding of professional and ethical responsibility.
C7	ABET (g) - An ability to communicate effectively.
C8	ABET (h) - The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
C9	ABET (i) - A recognition of the need for, and an ability to engage in life-long learning.

C11	ABET (k) - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Learning outcomes			
Learning outcomes		Study programme competences / results	
Knowledge of main analysis techniques for materials characterization and their application.		BJ1 BJ4 BJ5 BJ6 BJ13 BJ15 BJ16	CJ1 CJ3 CJ7 CJ9 CJ11
Adquisition of systematic and rigorous work capacity in the laboratory		BJ2 BJ3 BJ13 BJ14	CJ2 CJ3 CJ6 CJ9
Capacity to manage standards and existing facilities		BJ3 BJ4 BJ6 BJ14 BJ15	CJ3 CJ6 CJ7 CJ8 CJ11

Contents	
Topic	Sub-topic
The planned activities develop the contents established in the Memoria de Verificación, approached in an eminently practical way.	Sample preparation Composition and structural analysis. Thermal analysis Mechanical properties.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	B1 B2 B13 B6 C1 C2 C11	2	4	6
Laboratory practice	B1 B2 B3 B4 B15 B14 B6 C1 C2 C3 C6 C7 C11	16	24	40
Supervised projects	B3 B4 B5 B15 B14 B16 C1 C3 C6 C7 C8 C9	3	21	24
Personalized attention		5	0	5
(*)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	Description of the equipment and procedures mostly used to characterize the composition and physical properties of materials
Laboratory practice	Laboratory tasks in the facilities of the EPS research groups (CIM, LAIL and PROTERM). The activity may be related to ongoing research projects or result from an agreed proposal between the student and the teacher.

Supervised projects	Delivering of a report with the analysis of the results obtained in the laboratory work

Personalized attention	
Methodologies	**Description**
Supervised projects Laboratory practice	The activity with the laboratory equipment and the work development will be carried out with the help and supervision of the personnel of the research teams.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Supervised projects	B3 B4 B5 B15 B14 B16 C1 C3 C6 C7 C8 C9	Qualification will take into account several aspects related to the structure a of the report, the description of the measurement method, the analysis of results and its conclusions.	40
Laboratory practice	B1 B2 B3 B4 B15 B14 B6 C1 C2 C3 C6 C7 C11	Attendance to all appointed working sessions will be taken into account.	60

Assessment comments
Partial-time students will be evaluated in the same terms as those of full-time students. Evaluation criteria in second opportunity will be the same as in first oportunity.There is not academic exemption for class attendance in this subject

Sources of information	
Basic	- R.E. Whan, Ed. (1986). ASM Handbook Volume 10: Materials Characterization. ASM International - H. Kuhn and D. Medlin Ed. (2000). ASM Handbook Volume 8: Mechanical Testing and Evaluation. ASM International - D. Cramer and Bernard S. Covino, Jr. Ed. (2003). ASM Handbook Volume 13A: Corrosion: Fundamentals, Testing, and Protection. ASM International - J.D. Menczel, R.B. Prime, eds. (2009). Thermal analysis of polymers: fundamentals and applications. John Wiley, Hoboken, N.J - R. Artiaga Díaz (2005). Thermal analysis, fundamentals and applications to material characterization: proceedings of the international seminar?: thermal analysis and rheology, Ferrol, Spain, 30 Juny-4 July 2003 http://searc. Universidade da Coruña
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
1. The delivery of the documentary works for this subject: 1.1. Will be requested in virtual format and / or computer support. 1.2. Will be done through Moodle, in digital format avoiding the need of printing.1.3. If made on paper: -Do not use plastics. -Double sided printing will be made. -Recycled paper will be used. -The printing of drafts will be avoided.2. Sustainable use of resources and prevention of harm to the natural environment must be observed.

(*)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.