		Teaching Guide		
	Identifying D	ata		2015/16
Subject (*)	Fatiga termomecánica		Code	730495008
Study programme	Mestrado Universitario en Materiais O	Complexos: Análise Térmica	e Reoloxía (plan 2012)	
		Descriptors		
Cycle	Period	Year	Туре	Credits
Official Master's Degre	ee 2nd four-month period	First	Optativa	2
Language	English	-		
Teaching method	Face-to-face			
Prerequisites				
Department	Enerxía e Propulsión MariñaEnxeñar	ía Industrial 2Matemáticas		
Coordinador	Tarrio Saavedra, Javier E-mail javier.tarrio@udc.es		dc.es	
Lecturers	Tarrio Saavedra, Javier	E-mail	javier.tarrio@ud	dc.es
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Web		1	1	
General description				

	Study programme competences
Code	Study programme competences
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
A7	Knowing the different types of thermal thermo-mechanical behaviors in materials subjected to fatigue
A8	Understand and quantify the damage caused by thermomechanical fatigue in materials
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
B10	Working in a collaborative way
B13	Analysis-oriented attitude
C2	Have a good command of spoken and writing expression and understanding of a foreign language.
C6	Critically assessing the knowledge, technology and information available to solve the problems they face with.
C7	To assume as a professional and citizen the importance of learning throughout life.
C8	To assess the importance of research, innovation and technological development in the socio-economic and cultural progress of society.

Learning outcomes			
Learning outcomes	Stud	y progra	ımme
	CO	mpetend	ces
To know and evaluate the thermal / mechanical fatigue performance of materials	AR1	BR2	CR2
	AR7	BR4	CR6
	AR8	BR10	CR7
		BR13	CR8
Understand and quantify the damage caused by thermomechanical fatigue in materials	AR7	BR2	CR2
	AR8	BR4	CR6
		BR7	CR7
		BR10	CR8
		BR13	

Contents	
Topic	Sub-topic Sub-topic

1. Introduction to fracture mechanics	1.1. Fracture
	1.2. Fatigue
	1.2.1. S-N curves
	1.3. Creep
2. Fatigue	2.1. Fatigue parameters
	2.2. HCF
	2.3. LCF
	2.4. Paris equation
3. Thermal fatigue	3.1. Thermal stress and strain
	3.2. Crack growth and propagation
4. Fatigue of complex materials	4.1. Fatigue of complex materials
	4.2. Thermomechanical and dynamic mechanical analysis

	Planning			
Methodologies / tests	Competencies	Ordinary class	Student?s personal	Total hours
		hours	work hours	
Guest lecture / keynote speech	A1 A7 A8 B2 B4 B7	8	8	16
	B10 B13 C2 C6 C7			
	C8			
Supervised projects	A1 B4 B7 B10	4	12	16
Objective test	B2 B4 B7	1	2	3
Laboratory practice	A1 A7 A8 B7 B10 B13	7	7	14
	C6			
Personalized attention		1	0	1

	Methodologies	
Methodologies	Description	
Guest lecture / keynote speech	Presentation by the teacher of the concepts contained in the agenda of the subject.	
Supervised projects	You can choose one of the following options:	
	a) Performing a Bibliographical search in relation to recent research in the field related to the subject.	
	b) Research using laboratory equipment.	
	c) Simulation and modelization of fatigue processes by computer programs.	
Objective test	Evaluation test	
Laboratory practice	Practical activities such as computer practice, exercises, experiments, research, etc.	

	Personalized attention		
Methodologies	Methodologies Description		
Laboratory practice	Laboratory practice Resolution of questions regarding any aspect of the subject.		
Guest lecture /			
keynote speech			
Supervised projects			

		Assessment	
Methodologies	Competencies	Description	Qualification
Laboratory practice	A1 A7 A8 B7 B10 B13	Continuous assessment through monitoring of student work in the classroom,	30
	C6	laboratory and / or tutorials	

Guest lecture /	A1 A7 A8 B2 B4 B7	Continuous assessment through monitoring of student work in the classroom,	10
keynote speech	B10 B13 C2 C6 C7	laboratory and / or tutorials	
	C8		
Supervised projects	A1 B4 B7 B10	Report will be assessed in relation to the work suggested to the student	40
Objective test	B2 B4 B7	In this test will be a test to assess the assimilation by students of the fundamental	20
		concepts	

Assessment comments	

	Sources of information
Basic	- Weronski A., Hejwowski T. (1991). Thermal fatigue of metals.
	- Bresser J., Rémy L. (1995). Fatigue under thermal and mechanical loading.
	- Prime B., Menczel J. (2009). Thermal Analysis of Polymers, Fundamentals and Applications.
	- Strait, L. (1994). Thermo-mechanical fatigue of polymer matrix composites.
	- Callister, W.D. (2007). Materials Science and Engineering. John Wiley & Dons
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

(*)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.