

Teaching Guide						
	Identifying Data 2015/16					2015/16
Subject (*)	Análise estatística de datos				Code	730495005
Study programme	Mestrado Universitario en Materi	ais Complexos	: Análise Térmic	a e R	eoloxía (plan 2012)	
		Desc	riptors			
Cycle	Period	Ye	ear		Туре	Credits
Official Master's Degree	ee 2nd four-month period First			Obligatoria	3	
Language	English					
Teaching method	Face-to-face					
Prerequisites						
Department	Matemáticas					
Coordinador	Naya Fernandez, Salvador E-mail salvador.naya@udc.es			c.es		
Lecturers	Francisco Fernandez, Mario E-mail		nail mario.francisco@udc.es		dc.es	
	Naya Fernandez, Salvador		salvador.naya@udo	c.es		
Web	www.udc.es					
General description						

	Study programme competences / results
Code	Study programme competences / results
A4	Knowing and applying statistical methods to analyze data from complex material testing
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
B3	That students are able to integrate knowledge and handle complexity, and formulate judgments from an information that, being limited or
	not complete, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments
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
B6	Learning to learn
B7	Solving problems effectively
B9	To work autonomously with initiative
B12	Communicate effectively in the work environment
B13	Analysis-oriented attitude
B18	Ability for abstraction, understanding and simplification of complex problems
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 citicenship, able to analyze reality, diagnose
	problems, formulate and implement solutions based on knowledge and oriented to the common good.
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	Study	y progra	amme
	con	npetenc	es/
		results	
To train students in theoretical and methodological principles for quantitative research, in the sense of design of experiments		BR7	
and regression models			
Know the most common statistical techniques in the field of thermal analysis and rheology		BR2	
		BR6	
		BR7	
Coñecer e aplicar técnicas estatísticas á análise de datos procedentes de ensaios de materiais complexos	AR4		



Que os estudantes saiban aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en ámbitos	BR2	
novos ou pouco coñecidos dentro de contextos máis amplos (ou multidisciplinares) relacionados coa súa área de estudo		
Que os estudantes sexan capaces de integrar coñecementos e enfrontarse á complexidade de formular xuízos a partir dunha	BR3	
información que, sendo incompleta ou limitada, inclúa reflexións sobre as responsabilidades sociais e éticas vinculadas á		
aplicación dos seus coñecementos e xuízos		
Que os estudantes saiban comunicar as súas conclusións e os coñecementos e razóns últimas que as sustentan a públicos	BR4	
especializados e non especializados dun modo claro e sen ambigüidades		
Aprender a aprender	BR6	
Resolver problemas de forma efectiva	BR7	
Traballar de forma autónoma con iniciativa	BR9	
Comunicarse de xeito efectivo nun ámbito de traballo	BR12	
Actitude orientada á análise	BR13	
Capacidade de abstracción, comprensión e simplificación de problemas complexos	BR18	
Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.		CR2
Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de		CR4
analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben		
común.		
Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben		CR6
enfrontarse.		
Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.		CR7
Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e		CR8
cultural da sociedade.		

Contents		
Торіс	Sub-topic	
I. Exploratory data analysis	1.1. Introduction to statistical analysis	
	1.1.1 Summary numerical data: Measures characteristics: measurements of position,	
	dispersion and shape.	
	1.1.2. Vector statistics.	
	1.2. graphical representations	
II. Regression Models	2.1. Simple linear regression model.	
	2.2. Elements of a regression model.	
	2.2.1.The linear model.	
	2.2.2. Parameter estimation by least squares.	
	2.2.3. Properties of estimators.	
	2.2.4. Inference on the parameters.	
	2.3. Validation of a regression model.	
	2.4. Tools for the study of the regression.	
III. Design and Analysis of Experiments	3.1. Basic principles of design of experiments'.	
	3.2 Pplanning stages of an experiment.	
	3.3. Designs with a source of variation. The ANOVA model.	
	3.4. Designs with several factors. Factorial designs.	
	3.5. Factorial designs and response surfaces.	
	3.6. Experimental designs applications to complex materials.	

Planning				
Methodologies / tests	Competencies /	Teaching hours	Student?s personal	Total hours
	Results	(in-person & virtual)	work hours	
Guest lecture / keynote speech	A4 B2 B3 B4 B6	10	13	23



C2 C4 C6 C7 C8	5	20	25
B7 B12 B13	2	12	14
A4 B2 B9 B18	2	8	10
	3	0	3
	C2 C4 C6 C7 C8 B7 B12 B13 A4 B2 B9 B18	C2 C4 C6 C7 C8 5 B7 B12 B13 2 A4 B2 B9 B18 2 3 3	C2 C4 C6 C7 C8 5 20 B7 B12 B13 2 12 A4 B2 B9 B18 2 8 3 0 0

(*)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 /	The keynote address is a teaching method based on the theoretical exposition by the teacher as a means of transmission of
keynote speech	basic knowledge on the subject. These make an oral presentation complemented by the use of media and the introduction of
	some questions to students in order to impart knowledge and facilitate learning. The master class is also known as
	"conference" or "expository method" or "lecture". This last method is usually reserved for a
	special type of lesson taught by a teacher on special occasions, with a content which is an original production based on the
	almost exclusive use of the word as a means of transmitting information to the audience.
Supervised projects	Methodology designed to promote independent learning of students, based on the assumption by the students responsibility
	for their own learning under the tutelage of Professor and in various settings (academic and professional). It refers primarily to
	learning "how to do things." It is an option based on the assumption by the students responsibility for their own
	learning. The education system is based on two basic elements: the independent learning of students and monitoring of this
	learning by the class teacher
ICT practicals	Methodology that allows students to effectively learn through practical activities (demonstrations, simulations, data analysis
	using statistical packages, etc.) the theory of a field of knowledge, using information technology and communications . ICT
	brings excellent support and a channel for information processing and practical application of knowledge, facilitating learning
	and skills development by students.
Objective test	Multiple choice test of basic issues matter.

	Personalized attention			
Methodologies	Description			
Guest lecture /				
keynote speech	Resolution of doubts, clarifications, etc.			
Supervised projects				
	Analysis and critical evaluation of scientific literature.			
	Help your approach and follow up.			
	Personal monitoring of each stage of the course work set (individual or group).			
	Accompanying the students to explain what is going to visit and relevance.			
	Direct and continuous monitoring of student can be registered in a personalized way to give us any variable indices to evaluate			
	or verify their successful integration into the dynamics of the course. Guardianship and coordination of planned activities,			
	resolution of doubts, additional explanations, etc.			

Assessment			
Methodologies	Competencies /	Description	Qualification
	Results		
Guest lecture /	A4 B2 B3 B4 B6	Theoretical explanation of nuclear issues or basic notions of matter. Attendance by	20
keynote speech		students at these sessions is mandatory and compute the final grade.	



Supervised projects	C2 C4 C6 C7 C8	Methodology designed to promote independent learning and group of students, based on the assumption by the students responsibility for their own learning under the tutelage of Professor and in various settings (academic and professional). It refers	20
		primarily to learning "how to do things	
ICT practicals	B7 B12 B13	Including the provision that students do the various jobs protected. It deals with fundamental questions of art using ICT, particularly the use of statistical programs for data processing. Through small group or individual tutoring, the teacher will guide the process of doing work as non-contact method based on the practices during the course.	20
Objective test	A4 B2 B9 B18	review test	40
Others			

Assessment comments

The presentation by the student of the course work outlined in the course must be done at least on the official date of the examination of the subject for each of the calls to those present.

	Sources of information	
Basic	- Cao R., Franciso M, Naya S., Presedo M., Vázquez M., Vilar J.A. and Vilar J.M. (2001). Introducción a la Estadística	
	y sus aplicaciones Editorial Pirámide	
	- José Hernández Orallo, M.José Ramírez Quintana, Cèsar Ferri Ramírez. (2004). INTRODUCCIÓN A LA MINERÍA	
	DE DATOS. Editorial Pearson.	
	- Faraway, J.J. (2004). Linear models with R Chapman and Hall.	
	- Ugarte L. Militino A. and Arnholt A. (2007). Probability and Statistics with R. CRC Press	
- Draper, N.R. y Smith, H. (1998). Applied Regression Analysis Wiley. Greene, W.		
	- Peña, D. (2002). Regresión y diseño de experimentos Alianza Editoria	
	- Venables, W.N. y Ripley, B.D. (2002). Modern applied statistics with S Springer	
	- http://www.r-project.org/ ()	
	- Vikneswaran (2005). An R companion to ?Experimental Design?. URL	
	http://CRAN.R-project.org/doc/contrib/Vikneswaran-ED-companion.pdf.	
	- Gareth J., Witten, D., Hastie, T. and Tibshirani R. (2013). An Introduction to Statistical Learning. Springer	
Complementary	- Montgomery, D.C. (2009). Design and Analysis of Experiments. 7th Edition,. J. Wiley and Sons	
	- Box, G.E.P., Hunter, W.G. y Hunter J.S. (2005). Statistics for Experimenters: Design, Innovation, and Discovery. 2nd.	
	Edition, . Wiley, New York	

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.