Teaching Guide				
Identifying Data				2017/18
Subject (*)	Statistics		Code	614G01008
Study programme	Grao en Enxeñaría Informática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	First	FB	6
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Matemáticas			
Coordinador	Lorenzo Freire, Silvia	E-mail	silvia.lorenzo@udc.es	
Lecturers	Aneiros Perez, German	E-mail	german.aneiros@udc.es	
	Cao Abad, Ricardo		ricardo.cao@udc.es	
	Carpente Rodriguez, Maria Luisa		luisa.carpente@udc.es	
	Costa Bouzas, Julian		julian.costa@udc.es	
	Fernández Casal, Rubén		ruben.fcasal@udc.es	
	Francisco Fernandez, Mario		mario.francisco@udc.es	
	Lombardía Cortiña, María José		maria.jose.lombardia@udc.es	
	Lorenzo Freire, Silvia		silvia.lorenzo@udc.es	
	Montero Manso, Pablo		p.montero.manso@udc.es	
	Presedo Quindimil, Manuel Antonio		manuel.antonio.presedo.quindimil@udc.es	
	Quintela Del Rio, Alejandro		alejandro.quintela@udc.es	
Web				
General description	Descriptive statistics. Exploratory data analysis. Probability. Probability models. Statistical inference.			

Study programme competences / results	
Code	Study programme competences / results
A1	Capacidade para a resolución dos problemas matemáticos que se poden presentar na enxeñaría. Aptitude para aplicar os coñecementos sobre: álxebra linear; cálculo diferencial e integral; métodos numéricos; algorítmica numérica; estatística e optimización.
B3	Capacidade de análise e síntese
C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Knowing how to model in simple random contexts using probabilistic tools	A1	B3	C2
Knowing how to analyze data using descriptive techniques and how to perform inference of population features from partial information, collected by random sampling, using statistical techniques.	A1	B3	C2
Knowing how to use auxiliary computer tools for Statistics: statistical packages and programming languages with statistical orientation; and knowing how to critically interpret the results.	A1	B3	C2

Contents	
Topic	Sub-topic
Probability	Definition of probability. Properties
	Conditional probability. Bayes? theorem

Random variables	Discrete random variables Continuous random variables Central limit theorem Simulation
Descriptive statistics	Frequency distributions Graphical representations Location and dispersion measures
Statistical inference	Introduction Point estimation Confidence intervals Parametric hypothesis tests Nonparametric hypothesis tests
Simple regression	Simple linear regression Nonlinear regression

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 B3 C2	30	48	78
Laboratory practice	A1 B3 C2	20	16	36
Seminar	A1 B3 C2	10	10	20
Mixed objective/subjective test	A1 B3 C2	4	0	4
Personalized attention		12	0	12
(*)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	Students will receive lectures where the professor, with the help of relevant audiovisual media, will present the theoretical and practical contents of the subject. Participation and debate will be encouraged at all times.
Laboratory practice	Laboratory practices will be held in a computer lab. It will be learned how to use the free statistical software R, and its programming structures. Statistical studies using both real and simulated data will be performed.
Seminar	Seminars will reinforce both the applied nature of the subject and its interactivity. Students will be able to express their doubts and concerns regarding the subject, and they will have the opportunity to perform, with the professor supervision, similar questions to those proposed in the exams. Additionally, with a very individualized attention, they will be able to complete the lab practices.
Mixed objective/subjective test	Students will have to show proficiency in the theoretical aspects of the subject and their ability to solve problems in the field of probability and statistics.

Personalized attention	
Methodologies	Description
Guest lecture / keynote speech Laboratory practice Seminar	For problem solving, it will be important to personally help students with the questions that may arise. This attention will also serve, on the one hand, to the professor to detect potential problems in the methodology used to teach the subject and, on the other hand, to the students to strengthen theoretical knowledge and to express their concerns about the subject.

Assessment			
Methodologies	Competencies / Results	Description	Qualification

Laboratory practice	A1 B3 C2	Students will develop lab practice exercises specifically designed to assess their monitoring of the subject. The correct completion of these exercises will be supervised by the professor in the classroom. To evaluate the degree of understanding and learning of these practices, 2 or 3 assessment tests will be scheduled. They will be performed during the laboratory classes having a 20% of the final grade. For enrolled full-time students, the practice mark is not retrievable by performing another test. Enrolled part-time students, who have not been evaluated of laboratory practices, may perform a specific test to retrieve the 20% of the mark corresponding to that part.	20
Seminar	A1 B3 C2	During the course, students will prove their interest in the subject and his mastery of it by performing two written tests (controls), each with a maximum mark of 10%. These two tests will correspond to Chapters 1 and 2 of the course. Students who do not obtain the maximum of 20% of the mark corresponding to this part will be able to retrieve the remaining part when taking the final exam of the subject.	20
Mixed objective/subjective test	A1 B3 C2	The final exam, with a value between 60% and 80% (depending on Chapters 1 and 2 written control grades), will consist of a theoretical and a practical written test.	60

Assessment comments
Students will finish the class period with a maximum of 40% of the grade, achieved with the two written tests (10% each) and the two or three tests evaluating the laboratory practices (20%). On the date set by the Faculty in its annual program, students will perform, in writing, the final exam of the subject (60%), where they will have to answer theoretical questions, solve theoretical and practical issues, and calculate the solution of several problems. For this test, students will only bring the material expressly authorized (e.g. pen or calculator).The grade obtained in the final exam (60%) will be re-scaled so that students will have the opportunity to retrieve the 20% of the mark corresponding to the written controls (the 20% of the laboratory practice assessment mark cannot be retrieved). Thus, depending on the score obtained by the student in the two written controls, the highest score of the final exam will be between 6 and 8 points (out of 10). Thus, denoting by P the laboratory practice grade (between 0 and 2 points), denoting by C the written controls (Chapters 1 and 2) final grade (between 0 and 2 points) and denoting by F the final exam grade (between 0 and 10 points), the course final grade will be P+C+0'1*(8-C)*F.The day of the final exam, part-time students, who have not been previously evaluated for the laboratory practice part, will be able to perform a specific test to retrieve the 20% of the mark corresponding to that part.

Sources of information	
Basic	- Cao, R., Francisco, M., Naya, S., Presedo, M.A., Vázquez, M., Vilar, J.A. y Vilar, J.M. (2001). Introducción a la Estadística y sus aplicaciones. Ediciones Pirámide - Eguzkitza Arrizabalaga, J.M. (2014). Laboratorio de estadística y probabilidad con R. Gami Editorial
Complementary	- Blasco Lorenzo, A. y Pérez Díaz, S. (2015). Modelos aleatorios en ingeniería. Paraninfo - Devore, J.L. (2005). Probabilidad y Estadística para Ingeniería y Ciencias. Thomson - Gonick, L. y Smith, W. (2001). Á estatística ¡en caricaturas!. SGAPEIO - Hernández, V., Ramos, E. y Yáñez, I. (2007). Probabilidad y sus aplicaciones en Ingeniería Informática. Ediciones Académicas - Horgan, J.M. (2009). Probability with R. An Introduction with Computer Science Applications. Wiley - Montgomery, D.C. y Runger, G.C. (2004). Probabilidad y Estadística aplicadas a la Ingeniería. McGraw-Hill - Quintela del Río, A. (2013). El estadístico accidental. El autor - R Development Core Team (2000). Introducción a R. http://www.r-project.org/ - Ugarte, M.D., Militino, A.F., Arnholt, A.T. (2008). Probability and Statistics with R. Chapman and Hall/CRC

Recommendations
Subjects that it is recommended to have taken before
Calculus/614G01003
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Statistical Methods/614G01057
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.