



Teaching Guide

Teaching Guide				
Identifying Data				2019/20
Subject (*)	Fundamentals of Mathematics and Data Analysis Tools		Code	710G03014
Study programme	Grao en Xestión Industrial da Moda			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Basic training	6
Language	English			
Teaching method	Face-to-face			
Prerequisites				
Department	Matemáticas			
Coordinador	Tarrio Saavedra, Javier	E-mail	javier.tarrio@udc.es	
Lecturers	Tarrio Saavedra, Javier	E-mail	javier.tarrio@udc.es	
Web				
General description	This subject introduces the basic concepts of statistical data analysis, from descriptive statistics to statistical inference, through the introduction to probability, the concept of random variable, time series and the fundamental tools of statistical quality control, focusing its teaching in solving practical problems in the framework of industrial fashion management.			

Study programme competences

Code	Study programme competences
A13	Conocer el impacto de la tecnología en los distintos procesos de la industria textil.
A19	Capacidad para la recogida, selección y análisis de flujos de información, integración de los mismos en los sistemas y procesos de gestión de la información de la empresa, y aplicación a la toma de decisiones estratégicas y operativas, siempre desde una perspectiva ética.
B1	Que los estudiantes hayan demostrado poseer y comprender conocimientos en un área de estudio que parte de la base de la educación secundaria general, y se suele encontrar a un nivel que, si bien se apoya en libros de texto avanzados, incluye también algunos aspectos que implican conocimientos procedentes de la vanguardia de su campo de estudio
B2	Que los estudiantes sepan aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posean las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio
B3	Que los estudiantes tengan la capacidad de reunir e interpretar datos relevantes (normalmente dentro de su área de estudio) para emitir juicios que incluyan una reflexión sobre temas relevantes de índole social, científica o ética
B4	Que los estudiantes puedan transmitir información, ideas, problemas y soluciones a un público tanto especializado como no especializado
B5	Que los estudiantes hayan desarrollado aquellas habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía
B8	Capacidad de planificación, organización y gestión de recursos y operaciones
B9	Capacidad de análisis, diagnóstico y toma de decisiones
C3	Utilizar las herramientas básicas de las tecnologías de la información y las comunicaciones (TIC) necesarias para el ejercicio de su profesión y para el aprendizaje a lo largo de su vida
C7	Desarrollar la capacidad de trabajar en equipos interdisciplinares o transdisciplinares, para ofrecer propuestas que contribuyan a un desarrollo sostenible ambiental, económico, político y social
C8	Valorar la importancia que tiene la investigación, la innovación y el desarrollo tecnológico en el avance socioeconómico y cultural de la sociedad

Learning outcomes

Learning outcomes	Study programme competences		
Acquisition of skills for the statistical analysis of data as support in decision making in the company, industry and research.	A13 A19	B1 B2 B3 B9	C3



Knowledge of the basic concepts of statistics, as well as those more specific related to the industry, management and business analytics, that allow the correct definition of real problems, the adequate collection of data and the application of the appropriate techniques.		B1 B4 B5 B8 B9	
Acquisition of skills for data analysis and decision making using statistical software, as well as for group work in multidisciplinary projects.	A19	B2 B3 B4 B9	C3 C7 C8

Contents	
Topic	Sub-topic
Descriptive statistics of a variable and introduction to the use statistical software.	Basic concepts of descriptive statistics. Characteristics measures of position, dispersion and shape. Graphics. Introduction to R statistical software.
Descriptive statistics of more than one variable.	Measures of association and correlation. Graphics for two or more variables. Linear regression. Unsupervised classification (cluster).
Probability	Experiments and events. Probability definition and properties. Conditioned probability. Total probability and Bayes theorem.
Random variables.	Discrete random variables. Continuous random variables.
Main probability distributions.	Binomial distribution. Negative binomial distribution. Hypergeometric distribution. Poisson distribution. Uniform distribution Normal distribution. Exponential distribution Distributions associated with the normal.
Statistical inference.	Point estimates. Confidence intervals. Hypothesis testing. Inference in linear regression models.
Basic techniques of statistical quality control.	Basic concepts. Six Sigma Methodology Ishikawa's diagram. Pareto chart. Control charts Process capacity analysis.
Time series.	Definition. Components Estimation and prediction.

Planning



Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Guest lecture / keynote speech	B1 B3 B4 B5 B9 C8	67	0	67
Problem solving	B1 B2 B3 B4 B5 B8 B9	16.5	16.5	33
ICT practicals	A19 B2 B3 B4 B9 C3	21.5	21.5	43
Multiple-choice questions	B1 B2 B3 B4 B9	2	0	2
Supervised projects	A13 A19 B2 B3 B8 B9 C3 C7 C8	1	0	1
Events academic / information	A13 B1 C8	4	0	4
Personalized attention		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 / keynote speech	Keynote speech will be given in which the teacher will explain, with the help of appropriate audiovisual media, the main contents of the subject.
Problem solving	Seminars consisting of problem solving will be held in small groups, in order to set the concepts shown in the lectures and provide information about the methodologies for the practical resolution of problems through statistics.
ICT practicals	In the practical classes the student will be introduced to the handling of the statistical software R. Computational tools for the resolution of problems will be shown and applied through the statistical analysis of data, either from simulated or real data.
Multiple-choice questions	At the end of the course, there will be a test of 15 to 20 questions, both practical and theoretical.
Supervised projects	Students will be proposed to develop a group work (2 to 4 people) consisting of the application of statistical and computational tools shown in class to a particular case study, described by real or simulated data. You can also perform a work consisting of the description of a case study in the industry and the management, in which the resolution of a real problem is carried out based on the application of statistical techniques. Another alternative will be the use of statistical tools and data analysis, its usefulness and its application in industry and business management, in particular, those related to the fashion sector.
Events academic / information	Presentations, lectures, small courses or seminars from professionals in the fashion sector and/or data analysis will be presented to complement the teaching and providing a global perspective on the importance and usefulness of data analysis in this industry.

Personalized attention	
Methodologies	Description
Guest lecture / keynote speech	There will be keynote lectures in which the teacher will explain, with the help of appropriate audiovisual media, the main contents of the subject, promoting the debate in class. In the particular case of students with academic dispensation, you can perform face-to-face and virtual tutorials (email, video conference), which allow the student to satisfactorily follow the subject.

Assessment			
Methodologies	Competencies	Description	Qualification
Multiple-choice questions	B1 B2 B3 B4 B9	Constará de 15 a 20 preguntas tipo test con tres respostas posibles	60
Supervised projects	A13 A19 B2 B3 B8 B9 C3 C7 C8	Traballos a realizar en grupos de 2 a 4 persoas, de aplicación da estatística a datos reais ou simulados, de revisión dun tema da estatística ou análise de datos en xeral determinado ou mesmo referente a unha aplicación específica da estatística en xestión e industria.	20
Problem solving	B1 B2 B3 B4 B5 B8 B9	Avaliarase a asistencia e desempeño do alumno nas clases de problemas.	10



ICT practicals	A19 B2 B3 B4 B9 C3	Avaliarase a asistencia e desempeño do alumno nas clases de prácticas, do mesmo xeito que a entrega de traballos relacionados coa aplicación do software estatístico R.	10
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Assessment comments

Evaluation at the first opportunity

The multiple-choice test score will be weighted with the grade corresponding to the delivery of practical work related to the practices carried out with the statistical software R, with assistance to practical classes (ICT practices and exercises) and systematic observation of the performance of the student and with the delivery of supervised works.

Second chance evaluation

The evaluation will be done following the same procedure as in the first opportunity.

In the case of students with recognition of part-time dedication and academic exemption of attendance that decides not to attend classes, they will be evaluated in the two opportunities as the rest of the students who are in a similar situation.

Sources of information

Basic	- Cao R., Franciso M, Naya S., Presedo M., Vázquez M., Vilar J.A. y Vilar J.M. (2005). Introducción a la Estadística y sus aplicaciones. Pirámide - María Dolores Ugarte, Ana F. Militino, and Alan T. Arnholt (2015). Probability and Statistics with R. CRC Press - Umesh R Hodeghatta, Umesha Nayak (2016). Business Analytics Using R - A Practical Approach. Springer - Robert H. Shumway, David S. Stoffer (2011). Time Series Analysis and its Applications. Springer
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.