FICHA TÉCNICA DE LA ASIGNATURA

Datos de la asignatura

Subject name	Statistics and Probability
Subject code	E000008135
Mainprogram	Grado en Análisis de Negocios/Business Analytics
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	6,0 ECTS
Type	Obligatoria (Grado)
Department	Departamento de Métodos Cuantitativos
Coordinator	Mª Jesús Giménez Abad
Schedule	You will be in touch in the first days of school
Office hours	Pre-application
Course overview	The first part of the subject is dedicated to reviewing the concepts and techniques that allow to describe and summarize a dataset from a single-variant and bivariant point of view. Some of the topics covered are: frequency tables, charts, central trend measures, dispersion, position, concentration, contingency tables and measures of association and correlation, among others. The second part discusses the basic concepts about probability and modelling of random phenomena. Thus, they address among other aspects, the different conceptions of probability, the rectification of probability through the Bayes theorem, discrete and continuous random variables, and some frequently used probability models, such as Binomial law, Poisson's or Normal Law, among others.

Datos del profesorado

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DATOS ESPECÍFICOS DE LA ASIGNATURA

Contextualización de la asignatura
Aportación al perfil profesional de la titulación
Subject of an instrumental nature dedicated mainly to statistical techniques that allow to describe and summarize a data set from a single-variant and bivariant point of view. It develops topics necessary to address the information available, in such a way as to achieve a better understanding and knowledge of the behavior of the random and deterministic phenomena present in the making of business decisions in the different areas of the company (economy, finance, marketing, Human Resources), in which knowledge of reality and decisions on issues covered in them are characterized by the existence of uncertainty.
Prerequisitos

The use of previously studied mathematical concepts is required.

Competencias - Objetivos

Competencias

GENERALES

CG02		Capacidad de análisis de datos masivos procedentes de diversas fuentes: texto, audio, numérica e imagen
	RA1	Conocer las diferentes fuentes de datos tanto estructurados como no estructurados, internos o externos a la empresa, provenientes de fuentes digitales o no relevantes para el análisis y la gestión empresarial ¿basada en datos"(data driven)
	RA2	Conocer alguno de los procedimientos para integrar información procedente de diferentes fuentes de datos y de datos de diferente categoría (estructurados (datos numéricos) y no estructurados (texto, conversaciones, audio y video, datos de geolocalización, información de sensores¿).
CG03		Resolución de problemas y toma de decisiones en un entorno de datos masivos tanto cuantitativos como cualitativos
	RA1	Saber seleccionar para cada problema la técnica o técnicas de análisis de datos más adecuada para poder convertir los datos ¿en bruto¿ en información y ésta en conocimiento que ayude a la toma de decisiones y a mejorar la gestión.
CG04		Capacidad para elaborar proyectos e informes de manera oral y escrita, difundiendo estas ideas a través de canales digitales
	RA1	Ser capaz de resumir, sintetizar y comunicar de una forma atractiva y eficaz los resultados de la aplicación de las técnicas de análisis de datos, incluso de las más sofisticadas, de manera que resulten comprensibles a destinatarios no técnicos y ayuden de forma eficiente a la toma de decisiones empresariales.

ESPECÍFICAS

CE19		Conocer los fundamentos de las principales técnicas tanto de la estadística clásica (descriptiva e inferencial) como del data mining
	RA1	Conocer los fundamentos de las principales medidas y técnicas para describir un conjunto de datos desde un punto de vista univariante y bivariante.
CE20		Saber modelizar un problema empresarial real que precise análisis de datos y seleccionar críticamente la técnica o combinación de técnicas más adecuada

CE21	Saber interpretar, evaluar y comunicar resultados derivados de las técnicas de análisis de datos así como usarlos para la ayuda en la gestión y la toma de decisiones empresariales
CE22	Saber aplicar las técnicas de análisis de datos (tanto las de la estadística clásica como las técnicas de data mining) a un conjunto de datos reales, mediante el empleo de algún software apropiado para tal fin
RA1	Saber realizar un análisis descriptivo básico a un conjunto de datos reales usando software apropiado para tal fin

BLOQUES TEMÁTICOS Y CONTENIDOS

Contenidos – Bloques Temáticos
INTRODUCCIÓN
TEMA 1: BIG DATA
- Era BIG DATA
ESTADISTICA DESCRIPTIVA
TOPIC 2: INTRODUCTION TO CLASSIC STATISTICIQUE
- Key Definitions
TOPIC 3: DESCRIPTIVE ANALYSIS
- Observation units: Variables and Data - Presentation of the data: Frequency distributions and Graphical Representations. - Relations between two variables: Scatter Charts and Contingency Tables
TOPIC 4: MEASURES: STATISTICS
- Measures of Central Tendency: Fashion, Medium and Medium - Position Measures: Quartiles, Deciles and Percentiles - Variability Measures: Range, Variance, Typical Deviation, Variation Coefficient - Standardization - Measures of Form and Concentration: Gini and Lorenz Curve Index - Relationship between two variables: Dependency / Independence Analysis, Correlation

TOPIC 5: INDEX NUMBERS

- Simple and Compound Indices

- Indices of LASPEYRES, PAASCHE and FISHER

- Properties of index numbers

- Change of base

- Deflation

TEORÍA DE LA PROBABILIDAD

TOPIC 6: UNCERTAINTY AND ITS MEASUREMENT

- Random Phenomena: Concepts

- Operations with Events

- Probability: different conceptions

- Probability Rules

- Rectification of Probability: Bayes Theorem

TOPIC 7: RANDOM VARIABLE

- Random Variable Concept

- Discrete Random Variables: Quantum Function and Distribution Function

- Continuous Random Variables: Density Function and Distribution Function

- Hope, Variance and Typical Deviation: Properties

- Probability Distribution Models:

    Discreet: Binomial, Poisson, ...

    Continuous: Uniform, Normal, ...

METODOLOGÍA DOCENTE

Aspectos metodológicos generales de la asignatura	
Metodología Presencial: Actividades	
- Lessons of an expository nature. - Exercises and problem solving - Sessions dedicated to the management of the R Estudio and R Comander computer programs and their subsequent use for the resolution of business problems	CG02, CG03, CG04, CE19, CE20, CE21, CE22
Metodología No presencial: Actividades	
- Individual and / or group study, and organized reading. - Troubleshooting both using computer programs and not.	CG02, CG03, CG04, CE20, CE22

RESUMEN HORAS DE TRABAJO DEL ALUMNO

CLASSROOM HOURS	
Lecciones de Carácter expositivo	Ejercicios y resolución de casos y de problemas
35.00	25.00
NON-PRESENTIAL HOURS	
Ejercicios y resolución de casos y de problemas	Estudios individual y/o en grupo, y lectura organizada
50.00	60.00
	ECTS CREDITS: 6,0 (170,00 hours)

EVALUACIÓN Y CRITERIOS DE CALIFICACIÓN

Evaluation activities	Evaluation criteria	Weight
A final exam of the subject will be carried out, the content of which corresponds to the entire program.	- Understand the fundamentals of the main techniques of descriptive statistics and probability theory by applying them to problem solving and decision making in a massive data environment. - Knows how to apply the techniques of descriptive statistics to a set of real data	55 %

	by using the appropriate software for this purpose. - Interpret, evaluate and logically communicate the results obtained from the application of statistical techniques in data analysis.	
CONTINUOUS ASSESSMENT Continuous evaluation tests, type test, will be carried out throughout the semester. These tests will be based on case studies using real databases.	- Knows how to apply statistical techniques to a set of real data by using the appropriate software for this purpose. - Interpreta evaluates and logically communicates the results obtained from the application of statistical techniques in data analysis.	25 %
CONTINUOUS ASSESSMENT There will be several development tests based on case studies with databases throughout the semester.	- Understands the fundamentals of the main techniques of descriptive statistics and probability theory by applying them to problem solving and decision making in a massive data environment. - Interpret, evaluate and logically communicate the results obtained from the application of statistical techniques to data analysis.	20 %

Calificaciones

FINAL SCORE

CONVOCATORIA ORDINARIA

FINAL EXAM: 55%
WRITTEN TESTS: 20% of the average of the two tests
Test 1: on topics 1, 2, 3, and 4
2nd test: on topics 5, 6 and 7
TEST TYPE TESTS PERFORMED IN MOODLE: 25% of the average of the 5 best tests supposed to be performed 7.

FINAL CONSIDERATIONS:

To carry out the weighted average between the final grade and the tests, it is necessary to have achieved at least score 4,5 on the Final Exam.

In the final qualification, assistance and active participation will also be taken into account in the continuous evaluation.

CONVOCATORIA EXTRAORDINARIA

It will be considered the best of the following two options:

1. Use the same criteria as in the ordinary call.

2. Only consider 100% of the extraordinary exam exam grade.

REPEATER STUDENTS OF THE SUBJECT:

Student who repeats the course and has the pending subject: the final grade will be obtained following the above criteria.

Student who passes the course and has the pending subject: the final grade will correspond to that of the written exam.

PLAN DE TRABAJO Y CRONOGRAMA

Activities	Date of realization	Delivery date
1st Test Type Test: Topics 1 and 2	2nd week of the course	2nd week of the course
2nd Test Type Test: topic 3	3rd week of the course	3rd week of the course
3rd Test Type Test: topics 3 and 4	5th week of the course	5th week of the course
4th Test Type Test: topic 4	6th week of the course	6th week of the course
1st Written Test: topics and "R": topics 1, 2, 3 y 4	7th week of the course	7th week of the course
5th Test Type Test: topic 5	8th week of the course	8th week of the course
2nd Written Test: topics 5, 6 y 7	11th week of the course	11th week of the course

6th Test Type Test: topic 8	12th week of the course	12th week of the course
7th Test Type Test: topic 8	14th week of the course	14th week of the course

BIBLIOGRAFÍA Y RECURSOS

Bibliografía Básica
- Newbold, P., Carlson, W. L., Thorne, B. 2013. *Estadística para Administración y Economía*. Pearson Prentice Hall. Madrid   - Sarabia, J.M., Prieto, F., Jordá, V.2018. *Prácticas de estadística con R.*Pirámide. Madrid   - Borrás Pala, F., Martinez de Ibarreta Zorita, C., Escobar Torres, L. Estadística Empresarial en 101 ejemplos (volumen I) EV Services 2019.   - Borrás Pala, F., Martinez de Ibarreta Zorita, C., Escobar Torres, L. Estadística Empresarial en 101 ejemplos (volumen II) EV Services 2019.

Materiales dedicados a la preparación de la asignatura (Dpto. de Métodos Cuantitativos)
- Materials dedicated to the preparation of the subject (Moodle Rooms)

Bibliografía Complementaria
- Martín Pliego, J., Ruiz-Maya Pérez, L. 2001 *Estadística Descriptiva*. S.A. Alfa Centauro. Madrid   - Martín Pliego, J., Ruiz-Maya Pérez, L. 2001 *Estadística I: Teoría de la Probabilidad*. S.A. Alfa Centauro. Madrid   - Mª Josefa Peralta, Antonio Rua Vieites, Raquel Redondo Palomo. 2017. *Estadística: problemas resueltos.* Ediciones Pirámide.