TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Algebra
Subject code	E000006064
Mainprogram	Grado en Análisis de Negocios/Business Analytics
Involved programs	Grado en Análisis de Negocios/Business Analytics y Grado en Relaciones Internacionales [Primer Curso] Grado en Análisis de Negocios/Business Analytics y Grado en Derecho [Primer Curso] Grado en Administración y Dirección de Empresas y Grado en Análisis de Negocios/Business Analytics [Primer Curso] Grado en Administración y Dirección de Empresas y Grado en Análisis de Negocios/Business Analytics [Primer Curso]
Level	Reglada Grado Europeo
Quarter	Semestral
Credits	6,0 ECTS
Type	Básico
Department	Departamento de Métodos Cuantitativos
Coordinator	José Portela González

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SPECIFIC DATA OF THE SUBJECT

Contextualization of the subject
Contribution to the professional profile of the degree
A graduate in Business Analytics must use data and analytical techniques to improve business decision-making. Thus, it should be able to abstract the essence of each problem to use the most appropriate analytical method in its resolution. Algebra will provide the student with capacities that will help them in these tasks. It will promote the capacity for abstraction because it is at the base of many mathematical processes to be used in the future.
Prerequisites
Nothing

Competencies - Objectives		
Competences		
GENERALES		
CG02	Capacidad de análisis de datos masivos procedentes de diversas fuentes: texto, audio, numérica e imagen	
	RA1	Ser capaz de analizar y sintetizar la información recibida en lenguaje matemático
CG03	Resolución de problemas y toma de decisiones en un entorno de datos masivos tanto cuantitativos como cualitativos	
	RA1	Conocer las herramientas matemáticas básicas que les capacite para plantear y resolver los problemas reales planteados en el mundo de la empresa
	RA2	Adquirir la capacidad para la toma de decisiones con conocimiento, iniciativa y espíritu crítico.
CG09	Compromiso ético en la sociedad de la información	
	RA1	Persigue la excelencia en las actuaciones profesionales
CG11	Capacidad para aprender y trabajar autónomamente en la sociedad de la información	
	RA1	Ser capaz para aplicar los conocimientos obtenidos en contextos nuevos
	RA2	Ser capaz para aprender nuevos métodos y teorías de forma autónoma en su vida profesional
ESPECÍFICAS		
		Adquirir la capacidad para la resolución de los problemas planteados en el entorno empresarial utilizando las

CE17		Adquirir la capacidad para la resolución de los problemas planteados en el entorno empresarial utilizando las herramientas matemáticas
	RA1	Conocer las herramientas básicas de algebra lineal

THEMATIC BLOCKS AND CONTENTS

Contents - Thematic Blocks

Topic 0: Matrices

1. Matrices.
2. Basic types
3. Operations with matrices
4. Square matrices
5. Rank of a matrix

Topic 1: Lnear equation systems

1. Systems of linear equations
2. Types of systems according to posiible solutions
3. Rouche-Frobenius theorem
4. Solving systems of linear equations

Topic 2: Vector spaces

1. Definition of Vector Space (EV)
2. Linear combination of vectors
3. Linear span
4. Generating system of an EV
5. Linearly dependent / independent vectors
6. Base of an EV.
7. Dimension of an EV
8. Base change in an EV
9. Vector subspace (SEV).

Topic 3: Linear applications

1. Definition of linear mapping.
2. Matrix expression of a linear map
3. Change of base in a linear map

Topic 4: Diagonalization

1. Eigenvalues and eigenvectors.
2. Determination and important theorems
3. Diagonalization of an endomorphism.
4. Application of the diagonalization of endomorphisms

5. Diagonalization of symmetric matrices

Topic 5: Quadratic forms

1. Definition of a quadratic form. Matrix expression
2. Sign of a quadratic form
3. Study of the sign of a quadratic form through eigenvalues
4. Study of the sign of a quadratic form through major minors.
5. Restricted quadratic forms

TEACHING METHODOLOGY

General methodological aspects of the subject	
In-class Methodology: Activities	
Lecture sessions always combining theory and solving exercises as an application of that theory. Laboratories: There is only one session preset initially. As classes develop, they will incorporate laboratories and computer practices in the classroom. Therefore, students will be asked to bring the computer to class.	CG02, CG03, CG11, CE17
Non-Presential Methodology: Activities	
Exercises and group learning.	CG02, CG03, CG11, CE17

SUMMARY STUDENT WORKING HOURS

CLASSROOM HOURS	
Lecciones de Carácter expositivo	Seminarios y talleres
59.00	2.00
NON-PRESENTIAL HOURS	
Estudios individual y/o en grupo, y lectura organizada	
89.00	
ECTS CREDITS: 6,0 (150,00 hours)	

EVALUATION AND CRITERIA

Evaluation activities	Evaluation criteria	Weight
Midterm exams	Two intermediate tests throughout the course to motivate the student in his study and allow him to have awareness of their performance. Failure to attend the intermediate test will result in a zero in that section	20 %

Class engagement	The active participation in class and results obtained in short class tests will be taken into account. The goal is to motivate and to secure the concepts for the student	10 %
Final exam	Global evaluation of the student. It will contain two parts: 1. Multiple choice test 2. Long exercise to be solved with computer Note: To perform the weighted average between the note final and continuous evaluation, it is necessary to have achieved at least a score of 4 on the Exam	70 %

Ratings

Extraordinary exam

The best option between exam (100%) or exam (70%) + continuous evaluation grades (30%)

BIBLIOGRAPHY AND RESOURCES

Basic Bibliography

- Giménez Abad, MªJ., Martín Antón, G. y Serrano Rey, A.: Matemáticas para ADE: Teoría y Ejercicios. Editorial Pearson. 2014
- De la Villa, A. (2010) Problemas de álgebra. Ed. CLAGSA. Madrid
- Lay, D. C. (2007). *Álgebra lineal y sus aplicaciones*. Pearson educación.

Complementary Bibliography

- Presentations of the subject. It is essential that the student have them to go to class
- Topic Exercises
- Solved Exercises of the topic