SUBJECT TEACHING GUIDE

G320 - ALGEBRA

Degree in Chemical Engineering

First Degree in Chemical Engineering

Academic year 2024-2025

1. IDENTIFYING DATA					
Degree	Degree in Chemical Engineering First Degree in Chemical Engineering			Type and Year	Core. Year 1 Core. Year 1
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Mathematics Basic Training Module				
Course unit title and code	G320 - ALGEBRA				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Knowledge Field					
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION
Name of lecturer	RODRIGO GARCIA MANZANAS
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Office	E.T.S. de Ingenieros Industriales y de Telecomunicación. Planta: - 4. DESPACHO (S4015)
Other lecturers	VALVANUZ FERNÁNDEZ QUIRUELAS

4. OBJECTIVES

- Interpret and communicate the studied concepts with mathematical rigor.
- Critically argue opinions based on abstract logical reasoning.
- Apply correctly the theoretical knowledge acquired to solve problems in the field of Algebra , both by hand and by means of computer tools.
- Consolidate the minimum knowledge of Algebra that allows to face with guarantees the future study of other fundamental subjects of the degree.

6. SUBJECT PROGRAM	
CONTENTS	
1	BLOCK 1 Lesson 1: Matrices - Operations with matrices and determinants - Inverse matrix and elementary matrices - Echelon reduced form of a matrix - Matrix factorization Lesson 2: Systems of linear equations - Matrix form of a system - Classification of systems - Resolution of systems by different methods Lesson 3: Vector spaces - Vector space and subspace - Implicit and parametric forms - Intersection and sum - Linear dependence and independence - Bases and coordinates - Complement subspace
2	BLOCK 2 Lesson 4: Euclidean space - Scalar product - Distance and angle between vectors - Orthogonal subspace and orthogonal projections - Basis orthonormalization - Approximation of a transcendent function by a polynomial - Approximate solution of incompatible systems by least squares - Fit to a point cloud Lesson 5: Linear applications - Kernel and image - Classification of linear applications - Matrix of a linear application - Isometries: Rotations and reflections Lesson 6: Diagonalization of endomorphisms - Eigenvalues and eigenvectors - Eigenspaces - Diagonalization

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
EX-B1: Midterm exam (BLOCK 1)	Written exam	No	Yes	35,00
EX-B2: Midterm exam (BLOCK 2)	Written exam	No	Yes	45,00
EC: Other evaluable evidence	Others	No	No	20,00
TOTAL				100,00

Observations

The final grade for the subject will be the result of averaging, weighted:

• EX-B1, with a weight of 35%
• EX-B2, with a weight of 45%
• EC, with a weight of 20%

Obtaining a minimum grade of 3.0 in both EX-B1 and EX-B2 is essential to pass. Otherwise, the subject will be considered failed (even if the weighted average of EX-B1, EX-B2, and EC is higher than 5.0, in which case a grade of 4.9 will be awarded).

Note: In the extraordinary call, EX-B1 and EX-B2 can be recovered, but the grade obtained during the semester for the EC section will be kept.

Observations for part-time students

Part-time students who request it at the beginning of the semester will be evaluated based on a single exam, which will cover the entire syllabus and constitute 100% of the subject's grade. Those who do not pass the ordinary call can go to the extraordinary one.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- Apuntes proporcionados por los profesores
- J. de Burgos Román; Álgebra Lineal, Ed. McGraw-Hill: http://catalogo.unican.es/cgi-bin/abnetopac/?TITN=102714
- J. Arvesú y otros; Problemas Resueltos de Álgebra Lineal. Ed. Thomson: http://catalogo.unican.es/cgi-bin/abnetopac/?TITN=228756
- K. Donnelly; MATLAB manual: Computer Laboratory Exercises, Saunders College Publishing: http://catalogo.unican.es/cgi-bin/abnetopac/?TITN=123290