SUBJECT TEACHING GUIDE

G42 - Linear Algebra I

Double Degree in Physics and Mathematics
Degree in Mathematics

Academic year 2026 - 2027

1. IDENTIFYING DATA					
Degree	Double Degree in Physics and Mathematics Degree in Mathematics			Type and Year	Core. Year 1 Core. Year 1
Faculty	Faculty of Sciences				
Discipline	Subject Area: Basic Mathematics Basic Module				
Course unit title and code	G42 - Linear Algebra I				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Knowledge Field	Mathematics and statistics				
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	JESUS JAVIER JIMENEZ GARRIDO
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Other lecturers	MARIA MARTÍN VEGA

4. OBJECTIVES
To assimilate the abstract notion of a vector space and obtain the ability to recognize this structure in the most significant examples, in particular, vector spaces of functions, polynomials, sequences, over finite fields, etc. To understand the notion of linear dependence, basis, dimension, and coordinates, and the ability to perform and recognize changes of basis.
To understand the relationships between vector spaces via linear maps and their fundamental properties. To characterize special linear maps through their behavior regarding linear dependence and the kernel and image subspaces.
To know the notion of a determinant. To assimilate the properties of determinants and their different applications.
To understand the problem of the normal form of an endomorphism and some of its elementary applications.

6. SUBJECT PROGRAM	
CONTENTS	
3	ENDOMORPHISM THEORY. Eigenvalues and eigenvectors. Eigenspaces. Characteristic polynomial. Geometric and algebraic multiplicity of an eigenvalue. Canonical forms of an endomorphism.
1	VECTOR SPACES. The notion of a vector space. Vector subspaces. Linear combinations. Linear independence. Bases. Dimension. Sum and direct sum of subspaces.
2	LINEAR MAPS AND MATRICES. Definition. Kernel and image. Composition of linear maps. Isomorphisms. Matrices. Matrix representation. Rank. Determinants. Space of homomorphisms.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessment	%
A written exam will be held during the course, with the date to be set at the beginning of the semester. This written exam will consist of solving theoretical questions or problems on the material covered up to that point. The use of notes, calculators, o	Written exam	No	Yes	40,00
The exam will consist of an assessment of both the theoretical and practical content of the mathematics presented throughout the course. The use of notes, calculators, or any electronic media or devices will not be permitted. Grading will take into accoun	Written exam	Yes	Yes	60,00
TOTAL				100,00

Observations

(A) The final grade for the course, in both the ordinary and extraordinary exam sessions, will be the maximum between:
(1) The weighted average of the continuous assessment (CA) grade and the final exam (FE) grade (ordinary or extraordinary), according to the specified percentages.
(2) The final exam (FE) grade (ordinary or extraordinary) on its own, thereby giving it a 100% weight.

(B) To pass the course, the final grade obtained through the procedure described in section (A) must be at least 5 points, and the final exam (FE) grade (ordinary or extraordinary) must be at least 3 points out of 10.

(C) In accordance with current regulations:

If a student does not achieve the minimum required grade in the final exam, the final grade for the course will be the lower value between 4.9 and the grade calculated according to section (A).

When a student has not completed assessment activities that account for more than 50% of the course grade, their status on the official grade sheet will appear as "Absent" (No Presentado). When they have completed assessments representing 50% or more, the corresponding grade will be recorded on the grade sheet. The weighting of the various assessment methods is set so that anyone who does not sit the final exam will receive a grade of "Absent".

Any fraudulent activity during exams or assessment tasks will directly result in a failing grade of '0' for the course in the corresponding exam session, thereby invalidating any grades obtained in all assessment activities for the extraordinary exam session.

(D) To determine the final grade of the written exams, an oral defense of the same may be requested.

Observations for part-time students

Part-time students will follow the same assessment procedure as full-time students, which allows them, in particular, to opt for a single assessment process.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC

Apuntes de la asignatura: "Álgebra Lineal I" Javier Jiménez Garrido