

26902 - Algebra I

Syllabus Information

Academic year: 2024/25

Subject: 26902 - Algebra I

Faculty / School: 100 - Facultad de Ciencias

Degree: 447 - Degree in Physics

ECTS: 6.0

Year: 1

Semester: First semester

Subject type: Basic Education

Module:

1. General information

The objective of this subject is to learn Linear Algebra. Although the subject is self-contained, it is highly recommended to have studied Mathematics of the scientific branch in the Baccalaureate.

Goals 4, 5, 10 of the SDG 2030: quality education, gender equality, reduction of inequalities.

2. Learning results

Perform simple demonstrations using formal mathematical language. Verify the fundamental properties of algebraic operations. Perform basis changes in a vector space and its dual. Calculate the matrix of an application and use it to obtain the image of a vector. Transform the equation of simple geometric locations (planes, straight lines, conic) to different coordinate systems.

3. Syllabus

- Vector spaces, subspaces, generating sets, linear dependence, dimension, direct sum.
- Linear applications, kernel and image, basic properties, linear applications and matrices, changes of bases.
- Regular matrices, inverse matrix, elementary matrices, equivalence and similarity of matrices, rank.
- Determinant, trace.
- Eigenvalues and eigenvectors, characteristic polynomial, fundamental subspaces, diagonalization criterion.

The subject's notes can be downloaded from the web: <https://personal.unizar.es/rodrigo>

4. Academic activities

Theory classes and problems. It is very important that students keep the subject up to date. They should not wait for the teacher to send exercises, but have to learn to work the problem sheets autonomously. In class, we will comment on those exercises that have created the most difficulties among the students.

5. Assessment system

The continuous evaluation will consist of midterm written tests, with a value of 20% of the total grade in the ordinary call. The remaining 80% of the grade for the ordinary exam will be obtained through the final exam.

Alternatively, students may pass the subject by means of a single comprehensive test, which will be the final exam.

6. Sustainable Development Goals

4 - Quality Education

5 - Gender Equality

10 - Reduction of Inequalities