Universitat Autònoma de Barcelona

2018/2019

Linear Algebra

Code: 104381
ECTS Credits: 6

Degree	Type	Year	Semester
2503740 Computational Mathematics and Data Analytics	FB	1	1

Contact

Name: Albert Ruíz Cirera
Email: Albert.Ruiz@uab.cat

Use of languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Marc Masdeu Sabate

Prerequisites

Although the course will be essentially self-contained, the student will be required to know how to solve systems of linear equations, the basic arithmetic of numbers and polynomials, and the mastery of symbolic algebraic manipulations.

Objectives and Contextualisation

In order to acquire a proper mathematical training, it is essential to understand linear algebra in depth. One needs to learn how to manipulate the objects introduced in such a class and to interpret their meanings. The tools provided in this course are essential not only in all branches of Mathematics, but also in most Sciences and Engineering studies.

Among the goals we underline the following: to understand and correctly use mathematical language, to appreciate the need for proofs, and to develop a critical approach to mathematical statements.

As more specific goals: the student will learn to manipulate matrices as a basic tool to analyze systems of linear equations, to formalize the necessary language in order to understand the concepts of vector space and linear map, as well as to manipulate bilinear forms. All of this will be reinforced with the introduction of the appropriate software.

Content

The course is structured in 4 blocks: a first, more computational block, where the emphasis is put in the algebraic manipulation of matrices, introducing their basic operations. In the second block the concepts of abstract vector space and linear map are formalized, as well as their relation with the contents of the first block. The third and fourth blocks are devoted to more advanced concepts that build on the structure of vector space and linear map.

Blocks

1. Matrices and linear equations
2. Vector spaces and linear maps
3. Diagonalization
4. Orthogonality and quadratic forms