Universidad Zaragoza

Academic Year/course: 2024/25

39804 - Mathematics II

Syllabus Information

Academic year: 2024/25
Subject: 39804 - Mathematics II
Faculty / School: 326 - Escuela Universitaria Politécnica de Teruel
Degree: 634 - Joint Programme in Computer Engineering - Business Administration
ECTS: 6.0
Year: 1
Semester: First semester
Subject type: Basic Education
Module:

1. General information

The main objective is to acquire a solid foundation in Algebra and problem solving skills. Introduce the use of mathematical software and numerical problem solving. To work on mathematical rigor, logical and deductive capacity, to select efficient techniques and strategies, and to promote critical and abstract reasoning. To enable students to study other subjects of the curriculum.

Prerequisites: solid knowledge of high school mathematics such as properties and operations of and with matrices and determinants, solution existence analysis of linear systems, Gaussian elimination.

2. Learning results

To know the elementary algebraic structures.

Know and understand the basic concepts of linear algebra: systems of linear equations, vectors, linear dependence and independence, eigenvalues.

Know the approximate solution of linear equations, pivoting strategies, computational cost and various factorizations of matrices.

To know the iterative methods of approximate resolution of linear equations.

To know the approximate calculation of the eigenvalues of a matrix.

3. Syllabus

- Matrix algebra.
- Systems of linear equations.
- Algebraic structures.
- Vector spaces.
- Linear applications.
- Eigenvalues and eigenvectors.
- Orthogonality: approximate solution of systems of linear equations.

4. Academic activities

- **Theory lessons**: The explanations and examples will guide the students in understanding and application of mathematics.
- **Problem sessions**: The students will solve questions and problems, analyzing the different possible options.
- **Practical classes with computer**: Mathematical algorithms are analyzed and programmed by means of symbolic and numerical programming software installed in the center's computer laboratories.
- **Carrying out of proposed activities.**
- **Study and personal work.**
- **Assessment tests.**

5. Assessment system

The following will be assessed: the correct use of efficient strategies and procedures, clear and detailed explanations, the absence of mathematical errors, the correct use of terminology and and notation, the orderly, clear and organized exposition, the knowledge of the software used.

Students will be able to take a continuous assessment, but they will also have the opportunity to pass the subject by means of a global test in the two official exams.

Continuous assessment:

- Computer practice (20%): Work developed during the practical sessions and final exam.

- Theory and problems:
     1) Activities proposed throughout the semester (10%).
     2) Partial written test (20%, minimum mark 4.5): Written test on theoretical-practical contents and problems in the middle of the semester.
     3) Final Exam (50%, minimum mark 4.5): Written test (only in 1st call) on theoretical-practical contents and problems of part of the subject.
     In the 2nd call, students will conduct the complete Theory and problems part.

Global assessment (official calls):

- Computer practice (20%).
- Theory and problems (80%).

6. Sustainable Development Goals

4 - Quality Education