Universidad Zaragoza

Academic Year/course: 2024/25

29801 - Mathematics II

Syllabus Information

Academic year: 2024/25
Subject: 29801 - Mathematics II
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
326 - Escuela Universitaria Politécnica de Teruel
Degree: 440 - Bachelor's Degree in Electronic and Automatic Engineering
      444 - Bachelor's Degree in Electronic and Automatic Engineering
ECTS: 6.0
Year: 1
Semester: 440-First semester o Second semester
107-First semester
444-First semester
Subject type: Basic Education
Module:

1. General information

The main objective is to acquire a solid foundation in Algebra and Geometry and problem solving skills. Introduce the use of mathematical software (giving priority to reflection and analysis over calculation) and numerical problem solving. Work mathematical rigor, logical-deductive capacity, select efficient techniques and strategies and enhance critical and abstract reasoning. To enable students to study other subjects in the curriculum.

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

The assessable contents do not provide direct capabilities for the achievement of the 2030 Agenda; however, they are essential to base subsequent knowledge that is related to the SDGs.

2. Learning results

- Solve mathematical problems that may arise in engineering.
- Have the aptitude to apply the acquired knowledge of Linear Algebra, Geometry, Differential Geometry, Related Numerical Methods and Numerical Algorithms.
- To know how to use numerical methods in the solution of some mathematical problems. Know the reflective use of symbolic and numerical computation tools.
- Possess scientific-mathematical thinking skills that allow them to ask and answer certain mathematical questions.
- Have the ability to handle mathematical language; in particular, symbolic and formal language.

3. Syllabus

- Matrix algebra.
- Systems of linear equations.
- Vector spaces.
- Linear applications.
- Diagonalization of matrices.
- Spaces with scalar product.
- Differential geometry.

4. Academic activities

- **Theory lessons.** Explanations and examples will guide students in understanding and applying mathematics.
- **Problem sessions.** Students will solve questions and problems, analyzing the different possible options.
- **Practical classes with computer.** Mathematical algorithms are analyzed and programmed using symbolic and numerical programmingsoftware installed in the center's computer laboratories.
- **Performance of proposed activities.**
- **Personal study and work.**
- **Assessment tests.**

At EUPT this subject is taught in two different modalities: face-to-face (the above applies) and blended learning. In the blended mode the students will be guided by the teacher with the help of telematic tutorials and will have at their disposal the materials necessary for the realization of the practices. These materials will be available on the website (http://moodle.unizar.es/).

5. Assessment system

A global assessment system is proposed. However, in order to promote continuous work and the gradual overcoming of some of the parts of the subject, students may carry out a continuous assessment. In both cases, each test is graded out of 10 points. The final grade is calculated applying the corresponding percentages and/or minimum grade requirements in different parts.

Assessment criteria: correct use of efficient strategies and procedures, clear and detailed explanations, absence of mathematical errors, proper use of terminology and notation, orderly, clear and organized exposition (both orally and in writing) and knowledge of the software used.

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Continuous assessment

- Practical block (20%): Moodle quizzes and final test with problems similar to the practical ones.
- Theory and problems block (80%, minimum grade 4):
    1. Continuous activity, PAC (30%): Activities proposed throughout the semester (15%) and written test in the middle of the semester (15%).
    2. Reduced written test of theory and problems (50%): only valid in the 1st call and if the PAC grade has been equal to or greater than 5 (out of 10). This test will deal with a part of the subject. In the 2nd call, students will take the entire theoretical block.

Global assessment (official calls): Written test with two parts on the contents worked on in the following blocks:

- Theory and problems block (80%, minimum grade 4).
- Practical block (20%).

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Continuous assessment in face-to-face mode:

- 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.

Continuous assessment in blended mode:

- Non-attendance academic work (30%).
- Final on-site exam (70%, minimum mark 4.5).

Global assessment (official calls):

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

6. Sustainable Development Goals

4 - Quality Education