30001 - Mathematics II

Syllabus Information

Academic Year: 2021/22

Subject: 30001 - Matemáticas II

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 436 - Bachelor's Degree in Industrial Engineering Technology

ECTS: 6.0

Year: 1

Semester: First semester o Second semester

Subject Type: Basic Education

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process designed for this course is based on the following:

- Continued study and work from the first day of class.
- Transmission of content through the lectures, encouraging the participation of students.
- Implementation of such content to problem solving in small groups. Oral presentation of such problems.
- Laboratory sessions. The computer as a tool for better assimilation of certain terms. Resolution of practical work, also in small groups.
- Personal attention.

4.2. Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1.68 ECTS): 42 hours.

- Guided assignments (0.8 ECTS): 20 hours.

- Laboratory sessions (0.48 ECTS): 12 hours.

- Autonomous work (2.92 ECTS): 73 hours.

- Assessment (0.12 ECTS): 3 hours.

- Tutorials

Notes:

Lectures: the teacher will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided at the beginning of the semester. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Guided assignments: Students will work together in groups and they will complete assignments, problems and exercises related to concepts seen in laboratory sessions and lectures.

Laboratory sessions: sessions will take place every 2 weeks (6 sessions in total) and last 2 hours each. Students will use mathematical software to work the contents of the course.

Autonomous work: students are expected to spend about 73 hours to study theory, solve problems, and prepare lab sessions.

Assessment: a final written exam will be done at the end of the semester. In order to pass the course, the students have to obtain at least 4/10 in this written exam and 5/10 in the final mark which includes laboratory session exams and guided assignments evaluation. See section 4 for more information.

Tutorials: the teacher's office hours will be posted on Moodle to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

4.3. Syllabus

The course will address the following topics:

Theory sessions
- Introduction (1 hour)
- Matrices (5 hours)
- Systems of linear equations (6 hours)
- Vector spaces (9 hours)
- Linear applications (6 hours)
- Matrix diagonalization (4 hours)
- Quadratic forms (3 hours)
- Inner product spaces (4 hours)
- Differential geometry of curves (4 hours)

Laboratory sessions
- Introduction and resolution of triangular systems and in echelon form.
- Direct Methods. LU factorization.
- Condition number. Iterative methods.
- Vector spaces. Linear applications.
- Eigenvalues and eigenvectors.

4.4. Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course, please refer to the Escuela de Ingeniería y Arquitectura de la Universidad de Zaragoza (EINA), website, https://eina.unizar.es/ .

4.5. Bibliography and recommended resources

Link:
http://biblos.unizar.es/br/br_citas.php?codigo=30001&year=2019