

## 29705 - Mathematics II

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 29705 - Mathematics II

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 434 - Bachelor's Degree in Mechanical Engineering

**ECTS:** 6.0

**Year:** 1

**Semester:** 434-First semester o Second semester

107-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 methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, autonomous work, and tutorials.

Further information regarding the course will be provided on the first day of class.

#### 4.2. Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1.6 ECTS): 40 hours.
- Laboratory sessions (0.48 ECTS): 12 hours.
- Problem-solving sessions (0.32 ECTS): 8 hours.
- Guided assignments (0.96 ECTS): 24 hours.
- Autonomous work (2.4 ECTS): 60 hours.
- Tutorials (0.24 ECTS): 6 hours.

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

**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 on the contents of the course.

**Problem solving sessions:** 8 one-hour sessions that will complement the lectures in which students will have a leading role in problem solving. During these sessions students will work individually or in groups with a series of problems proposed by the teacher.

**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.

Autonomous work: students are expected to spend about 60 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorials: the professor's office hours will be posted on Moodle and the degree website 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:**

#### **Section 1. Linear Algebra**

1. Matrices, determinants and ranks.
2. Linear systems and numerical methods.
3. Vector spaces.
4. Linear applications.
5. Diagonalization.

#### **Section 2. Geometry**

1. Euclidean geometry. Inner product. Orthogonalization and applications.
2. Differential geometry: curves, Frenet frame, representation of plane curves.

### **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 " website (<https://eina.unizar.es/>)

### **4.5. Bibliography and recommended resources**

[BR de la BUZ](#)