

## 26405 - Mathematics

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 26405 - Mathematics

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 296 - Degree in Geology  
588 - Degree in Geology

**ECTS:** 8.0

**Year:** 1

**Semester:** Annual

**Subject Type:** Basic Education

**Module:**

## 1. General information

### 1.3. Recommendations to take this course

## 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. A wide range of teaching and learning tasks are implemented, such as lectures, problem-solving sessions, laboratory sessions and tutorials.

### 4.2. Learning tasks

This course is organized as follows:

- **Lectures.** Twice a week. Participatory lectures in order to acquire the basic knowledge of mathematics.
- **Problem-solving sessions.** Twice a week. Problems will be solved and case studies analyzed in groups or individually.
- **Laboratory sessions.** One/two hours classes in small groups. It involves the use of scientific calculation programs (Octave, Sage).
- **Tutorials.** Teacher will attend students in small groups or individually.

Teaching and assessment activities will be carried out on site for as long and as much as possible. This scenario could change if safety regulations related to the covid19 crisis recommended online activities.

### 4.3. Syllabus

This course will address the following topics:

- **Topic 1.** Elementary functions. Graphs.
- **Topic 2.** Limits of functions. Continuity. Bisection method.
- **Topic 3.** Derivatives. Calculation and geometric and physical interpretation. Application of derivatives: maximum and minimum. Newton method. Interpolation.
- **Topic 4.** Indefinite integrals. Change of variable, integration by parts, integrals of rational and trigonometric functions.
- **Topic 5.** Definite integral. Barrow's rule. Applications: Areas, volumes and lengths. Numerical integration.
- **Topic 6.** Matrices. Operations. Properties.
- **Topic 7.** Determinants. Cramer's rule.
- **Topic 8.** Linear systems. Gauss' method. Least squares method.
- **Topic 9.** Eigenvalues and eigenvectors.

#### 4.4. Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website (<https://ciencias.unizar.es>) and Moodle.

#### 4.5. Bibliography and recommended resources

[http://biblos.unizar.es/br/br\\_citas.php?codigo=26405&year=2020](http://biblos.unizar.es/br/br_citas.php?codigo=26405&year=2020)