

Academic Year/course: 2021/22

29600 - Mathematics I

Syllabus Information

Academic Year: 2021/22

Subject: 29600 - Matemáticas I

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 430 - Bachelor's Degree in Electrical Engineering

ECTS: 6.0

Year: 1

Semester: 107-First semester

430-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 tasks for the course are the following:

- Lectures (theory and problems) (42 hours)
- Computer lab sessions (12 hours)
- Tutorials and group work exhibitions (6 hours)
- Elaboration of group works (14 hours)
- Autonomous work (73 hours)
- Realization of examinations and tests (3 hours)

In order to achieve the learning objectives, lectures will be interconnected with computer lab sessions, for which appropriate mathematical software will be used. Group works will be supervised by professors.

Problems, documents and auxiliary material will be available on the virtual course.

4.2. Learning tasks

Lectures

There will be 3 lecture hours a week, for a total of 42 hours. These lectures will deal with the theoretical contents of the course and illustrative examples.

The contents of the course are divided into two main blocks: differential and integral calculus in one and several variables.

Computer lab sessions

There will be 6 computer lab sessions, each one with a duration of 2 hours. Mathematical software will be used to resolve the proposed problems, via both symbolic and numerical computation, as well as graphical display.

Students will have in advance a manual for each session that will contain the objectives, the theoretical contents and an explanation of the mathematical software commands needed to solve the proposed problems.

Group works

Projects will be made in groups of 3 to 5 people and will be guided with interviews/seminars with the professor.

4.3. Syllabus

The course will address the following topics:

1. **Differential calculus in one variable:**
 1. Real and complex numbers.
 2. Differentiable functions.
 3. Polynomial approximation.
 4. Numerical methods.
2. **Integral calculus in one variable:**
 1. Techniques of integration.
 2. The definite integral.
 3. Applications of the integral.
 4. Numerical integration.
3. **Differential calculus in several variables:**
 1. Scalar and vector fields.
 2. The gradient vector.
 3. Tangent planes and linear approximation.
 4. Maximum and minimum of two variables functions.
4. **Multiple integrals:**
 1. Double integrals.
 2. Line integrals.

4.4. Course planning and calendar

Group work exhibitions will be held before the start of the first semester exams. The dates of the meetings with the Professor will be detailed in class. This information will be available on the virtual course.

The planning of the computer lab sessions will be published at the beginning of the course.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29600>