Universidad Zaragoza

Academic Year/course: 2024/25

29910 - Mathematics III

Syllabus Information

Academic year: 2024/25
Subject: 29910 - Mathematics III
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 435 - Bachelor's Degree in Chemical Engineering
ECTS: 6.0
Year: 1
Semester: 435-First semester o Second semester
107-Second semester
Subject type: Basic Education
Module:

1. General information

The main goal of the subject is to introduce students to the techniques for solving problems associated with differential equations, presenting the most appropriate analytical and numerical methods. It is also the purpose of the subject that the students know and handle some mathematical software that facilitates the resolution of the problemsposed.

The knowledge and skills acquired in the subjects Mathematics I and Mathematics II taught in the first year of the degree are required.

These approaches and goals are aligned with the Sustainable Development Goals (SDGs) of the 2030 Agenda of United Nations (https://www.un.org/sustainabledevelopment/es/).

2. Learning results

- Mathematically formulate, solve and interpret engineering problems.
- Apply the knowledge acquired about Ordinary Differential Equations and Partial Differential Equations.
- Use numerical methods in solving some mathematical problems.
- Knowledge of symbolic and numerical calculation tools.
- Possess scientific-mathematical thinking skills that allow them to ask and answer certain mathematical questions .
- Correct use of mathematical language, in particular, symbolic and formal language.

3. Syllabus

- Block 1: Ordinary Differential Equations (ODE's):

First order equations.

Higher order linear equations.

Linear systems. System stability.

Laplace transform.

Numerical resolution of ODEs: Runge-Kutta methods.

- Block 2. Partial Differential Equations (PDE's):

Fourier series.

Solving boundary problems by the method of separation of variables: heat equation, wave equation and Laplace equation and Laplace's equation.

4. Academic activities

- Theory classes (T1): 42 h. (3 h./week), and problem classes (T2) in small groups: 6 h.

Theoretical contents will be presented and will be completed with problem solving.

- Laboratory practices: 12 h. (6 sessions of 2 hours).

In this practice, mathematical algorithms are programmed and implemented using programming software symbolic and numerical systems installed in EINA's computer laboratories. Students will be divided into groups and will use the free MAXIMA software. Some of the topics indicated in the subject syllabus can be developed specifically in the practical classes.

5. Assessment system

The subject will be assessed in the global modality, by means of a written test of open answer carried out in the dates that the Center establishes for each one of the official calls. It will consist of two parts:

1. -A first part in which the theoretical and practical contents developed in the master classes will be assessed. Your grade will account for 80% of the total grade.

2. -A second part in which the work done in the laboratory practices will be assessed. Your rating will be the 20% of the total grade.

Optionally, students may take the test of the second part on a date prior to the global assessment.

The teachers may choose to carry out an intermediate test in order to encourage students to follow the course and to facilitate their facilitate the passing of the suject.

The grade of the laboratory practices obtained during the term will be kept in the second call, if the student so wishes.

6. Sustainable Development Goals

4 - Quality Education
5 - Gender Equality