Academic Year/course: 2023/24

25203 - Basic mathematics for environmental studies

Syllabus Information

Academic year: 2023/24
Subject: 25203 - Basic mathematics for environmental studies
Faculty / School: 201 - Escuela Politécnica Superior
Degree: 571 - Degree in Environmental Sciences
ECTS: 6.0
Year: 1
Semester: First Four-month period
Subject type: Basic Education
Module:

1. General information

The aim of this subject is to provide mathematical tools that serve as a basis for building and/or studying certain mathematical models related to environmental phenomena.

These approaches and objectives are aligned with the Sustainable Development Goals, SDGs, of the 2030 agenda (https://www.un.org/sustainabledevelopment/es/) and certain specific goals, contributing to some extent to their achievement.

Specifically:

- Goal 4: Quality Education.
- Objective 4.4 By 2030, significantly increase the number of youth and adults who have the necessary skills, particularly technical and vocational, to access employment, decent work and entrepreneurship

2. Learning results

-Acquire basic knowledge of Calculus, Linear Algebra and Geometry, Differential Equations and Numerical Methods

- Interpret quantitatively and qualitatively the results obtained in the satisfactory resolution of certain problems based on phenomena and processes related to the environment

- Properly use some basic mathematical tools in solving problems related to the environment

- These learning results are aligned with Sustainable Development Goal 4,Objective 4.4, indicated in the subject objectives. With the achievement of these, students will have acquired the theoretical and practical knowledge necessary to address the resolution of certain environmental problems that require the use of mathematical techniques.

3. Syllabus

TOPIC 1. MATRIX AND VECTOR SPACE THEORY

TOPIC 2. SYSTEMS OF LINEAR EQUATIONS. NUMERICAL APPLICATIONS

TOPIC 3. LEAST SQUARES AND INTERPOLATION

TOPIC 4. EIGENVALUES AND EIGENVECTORS. APPLICATIONS

TOPIC 5. DIFFERENTIAL CALCULUS

TOPIC 6. INTEGRAL CALCULUS

TOPIC 7. DIFFERENTIAL EQUATIONS

TOPIC 8. SYSTEMS OF DIFFERENTIAL EQUATIONS

4. Academic activities

Master class: 30 hours

The topics of the program will be presented in class with the support of varied examples to facilitate the understanding of the subject.

Problem solving in the classroom: 30 hours

Application problems will be proposed based on the theoretical presentations. Some of them will be solved in the classroom leaving the rest for the student's non-classroom work.

Works: 27 hours

Several application problems related to the totality of the subject studied will be worked on. Such problems will be similar to those that will later be required in the written exams.

Study: 60 hours

Evaluation: 3 hours

5. Assessment system

-Students may choose the continuous assessment method to pass the subject. In this case, students must take two mid-term exams, from which a grade of 90% of the final grade will be obtained. On the other hand, , several exam-type problems will be solved and a grade $n2$ will be obtained, which will represent 10% of the final grade.

With both midterms the grade $n1$ will be calculated as follows:

a) The average grade of the mid-term exams if a minimum of 3 points out of 10 has been obtained in each one of them.

b) The minimum between the average grade of the midterm exams and 4.9 if a minimum of 3 points out of 10 has not been obtained in any of them or if the average grade of the midterm exams does not reach 5.

Thus, the final grade, *cf,* of the continuous assessment will be obtained by the formula *cf* = 90% $n1$ + 10% $n2$

-In addition, the students will have the corresponding *global exams* in the official call, on the dates set by the Escuela Politécnica Superior de Huesca (EPSH). Each comprehensive exam will consist of a single written test of the entire subject.

-In the last three years the success rates have been 55.32%, 53.85% and 67.27%