

30000 - Mathematics I

Syllabus Information

Academic year: 2024/25

Subject: 30000 - Mathematics I

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 436 - Bachelor's Degree in Industrial Engineering Technology

ECTS: 6.0

Year: 1

Semester: 436-First semester o Second semester

107-First semester

Subject type: Basic Education

Module:

1. General information

The purpose of this subject is for students to acquire a solid foundation in the fundamentals of **Differential and Integral Calculus of functions of one and several variables** and in the **numerical solution of problems** in these disciplines; learn to solve a problem in a rigorous way, selecting the most efficient techniques and strategies; and to be able to use a mathematical software for its solution.

The assessable contents do not provide direct capabilities for the achievement of the 2030 Agenda; however, they are essential to base subsequent knowledge that is related to the SDGs.

It is recommended to master the knowledge and skills acquired in Mathematics of the Bachelor of Science, such as:

- Complex numbers
- Trigonometry.
- Analysis of elementary functions.
- Derivation and integration of functions of one variable.
- Affine geometry.

2. Learning results

- Solve mathematical problems of differential and integral calculus of functions of one and several variables that may arise in Industrial Technologies.
- Apply numerical methods in the resolution of the corresponding mathematical problems.
- To use symbolic and numerical calculation tools in a reflexive way.
- Possess scientific-mathematical thinking skills that allow them to ask and answer certain mathematical questions.
- To handle mathematical language proficiently, in particular the language of basic mathematical applications.

3. Syllabus

In this subject the following topics will be covered:

- Real and complex numbers.
- Differential and integral calculus with one and several variables.
- Numerical and function series.
- Numerical solution of non linear equations, interpolation and numerical integration.

4. Academic activities

Theoretical and practical classes (40 h)

Presentation of theoretical contents accompanied by illustrative examples and problem solving.

Problem sessions (8 h)

Problem solving by students organized in subgroups and guided by the teacher.

Computer practices (12 h)

Analysis and programming of mathematical algorithms using symbolic and numerical programming software installed in the computer laboratories of EINA. The chosen software will allow working with symbolic, numerical and graphical calculations, facilitating the understanding of the proposed learning outcomes. Each practice will consist of an exposition of the contents and the resolution of problems related to them.

Personal study

Assessment tests.

5. Assessment system

A global assessment system composed of the following tests is proposed:

- Test on the theoretical and practical contents of the subject. Its score will represent 80% of the final grade of the subject. The exam will be mainly practical, although it may contain theoretical or theoretical-practical questions. It will be evaluated:
 - understanding of the mathematical concepts used to solve the problems, the use of efficient strategies and procedures in their resolution,
 - clear and detailed explanations,
 - the absence of mathematical errors in the solutions,
 - correct use of terminology and notation,
 - organised and clear presentation.
- Test on the topics developed in the practical sessions. Its score will represent 20% of the final grade. Consideration will be given to:
 - knowledge of the mathematical software commands needed to solve the problems, the correct interpretation of the results obtained,
 - the ability to select the most appropriate method,
 - clear and detailed explanations and/or reasoning to the questions asked.

The grade for the first call will be determined by the percentages indicated. In addition to the global assessment system, a continued evaluation system will also be proposed with tests throughout the semester to facilitate the gradual completion of parts of the course.

The assessment in the second call will be carried out by means of a global test similar to the exam mentioned above.

6. Sustainable Development Goals

4 - Quality Education