30000 - Mathematics I

Syllabus Information

Academic Year: 2020/21
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

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on participation and the active role of the student favors the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, computer sessions, autonomous work, and tutorials.

Students are expected to participate actively throughout the semester.

Course materials will be available via Moodle. These include a repository of the lecture notes, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day.

4.2.Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1.68 ECTS): 42 hours.

- Computer sessions (0.48 ECTS): 12 hours.

- Group work (0.6 ECTS): 15 hours.

- Autonomous work (3 ECTS): 75 hours.

- Tutorials (0.24 ECTS): 6 hours.

Notes:

Lectures: the professor will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided at the beginning of the semester. Lectures run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Computer sessions: sessions will take place every 2 weeks (6 sessions in total) and last 2 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, calculations, and the use of graphical and analytical methods.

Group work: students will complete assignments, problems and exercises related to concepts seen in computer sessions and lectures.

Autonomous work: students are expected to spend about 75 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorials: professor's office hours will be posted on Moodle and the degree website to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

4.3.Syllabus

The course will address the following topics:

Theory sessions

Topic 1. Basic concepts of calculus: real numbers, sequences and series.

Topic 2. Functions. Differentiable Functions of One Variable. Taylor's Theorem.

Topic 3. Integral Calculus of Functions of One Variable. Numerical Integration.

Topic 4. Differentiability and integrability of Functions of Several Variables.

Laboratory sessions

Session 1. Introduction to *Maxima*. Review of mathematical topics.

Session 2. Series. Numerical approximation.

Session 3. Numerical methods for solving nonlinear equations.

Session 4. Polynomial approximation: Taylor polynomial. Interpolation.

Session 5. Numerical integration. Applications of the definite integral.

Session 6. Higher derivatives of functions of several variables. Maximum and minimum values.

4.4.Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course, please refer to the Escuela de Ingeniería y Arquitectura de la Universidad de Zaragoza (EINA), website, https://eina.unizar.es/.

4.5.Bibliography and recommended resources

Link:
http://biblos.unizar.es/br/br_citas.php?codigo=30000&year=2019