29905 - Mathematics II

<u>**Información del Plan Docente**</u>

Academic Year	2018/19
Subject	29905 - Mathematics II
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	435 - Bachelor's Degree in Chemical Engineering
ECTS	6.0
Year	1
Semester	Half-yearly
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

Large group sessions combine theory sessions and cooperative problem solving. Theoretical and practical material are available for students before the sessions, to increase their effectiveness.

The midterm exam is the first contact of students with assessment tests. It allows them to check their level of knowledge and also to get part of the final grade for the course.

Tutored activities contribute to facilitate and improve students' learning, individually and in groups. These activities may be of the following types: cooperative solving of specific problems, completion of questionnaires and tasks offered in the Anillo Digital Docente (ADD) and developing of complementary topics. Students receive feedback and mentoring of

teachers and peers, in person and through cooperative activities of ADD.

Lab sessions are held in computer room to delve into specific aspects of the subject by solving problems. Mathematical software and numerical methods are used where appropriate. Students have previously scripts of each session to encourage use during sessions.

The importance of studying and performing continuous work from the first day of the course will be highlighted, as well as the convenience of using tutoring and cooperation sessions during the course.

4.2. Learning tasks

Theory sessions: large group sessions, for 3 hours a week, combining standard lectures and active methodologies for problem solving. There is no explicit separation between exposure of theoretical contents and problem solving.
Lab sessions: 6 small group sessions of 2 hours each, in computer laboratory. Mathematical software allows students to work with symbolic, numerical and graphical calculation, to facilitate understanding of the proposed learning results. Students of each academic group are divided into 3 subgroups at the beginning of the course.
Mid-term exam, in November, contains theory and problems of the topics taught so far.
Tutored activities are developed individually (questionnaires/ tasks) and through groups (teamwork/ forums), in face to face sessions and through the ADD. Teachers also perform the supervision and monitoring by these two ways.

4.3. Syllabus

LINEAR ALGEBRA

- Matrices and Linear Systems : Properties of matrices and linear systems. Elementary matrices . Solving linear systems.
- Vector Spaces: Vector spaces . Vector subspaces. Direct sum. Linear dependence, generating systems and bases. Coordinates. Change of basis.
- Linear Maps: Maps and linear maps. Linear maps and matrices. Kernel and Image. Equivalent matrices and similar matrices.
- Diagonalization: Eigenvalues ​​and eigenvectors. Characteristic polynomial. Algebraic multiplicity. Eigenspaces. Geometric multiplicity. Diagonalization of endomorphisms and matrices.

GEOMETRY

- Euclidean geometry : Scalar product. Euclidean space. Norm, distance, angle. Orthogonality and orthonormality. Gram -Schmidt method. Orthogonal subspace. Orthogonal projection. Applications.
- Differential geometry: Curves in the plane and space. Frenet frame.

4.4. Course planning and calendar

The calendar and schedule of theory sessions and lab sessions are set by the center.
The calendar and schedule of the mid-term exam and the tutored activities is communicated to students through the ADD at the beginning of the course.

4.5. Bibliography and recommended resources