29705 - Mathematics II

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	434 - Bachelor's Degree in Mechanical Engineering
ECTS	6.0
Year	1
Semester	Half-yearly
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

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

5.Methodology, learning tasks, syllabus and resources

5.1.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, laboratory sessions, autonomous work, and tutorials.

Students are expected to participate actively in the class throughout the semester.

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

5.2.Learning tasks

The course includes 6 ECTS organized according to:

- Lectures (1.68 ECTS): 42 hours.

- Laboratory sessions (0.48 ECTS): 12 hours.

- Guided assignments (0.24 ECTS): 6 hours.

- Autonomous work (3 ECTS): 75 hours.

- Tutorials (0.6 ECTS): 15 hours.

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.

Laboratory sessions: sessions will take place every 2 weeks (6 sessions in total) and last 2 hours each. Students will use mathematical software to work the contents of the course.

Guided assignments: Students will work together in groups and they will complete assignments, problems and exercises related to concepts seen in laboratory 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: the 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.

5.3.Syllabus

Section 1. Linear Algebra

1. Matrices, determinants and ranks.
2. Linear systems and numerical methods.
3. Vector spaces.
4. Linear applications.
5. Diagonalization.

Section 2. Geometry

1. Euclidean geometry. Inner product. Orthogonalization and applications.
2. Differential geometry: curves, Frenet frame, representation of plane curves.

5.4.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 " website (https://eina.unizar.es/)

5.5.Bibliography and recommended resources

[BB: Basic Bibliography / BC: Additional Bibliography]

- [BB] Álvarez de Morales Mercado, María. Matemáticas empresariales / María Álvarez de Morales Mercado, Miguel Ángel Fortes Escalona . - 2ª ed. rev. Granada : Departamento de Matemática Aplicada, Universidad de Granada, 2004
- [BB] Arvesú Carballo, Jorge. Problemas resueltos de álgebra lineal / Jorge Arvesú Carballo, Francisco Marcellán Español, Jorge Sánchez Ruiz . - 1ª ed., 2ª reimp. Madrid : Thomson-Paraninfo, imp. 2006
- [BB] Burgos Román, Juan de. Álgebra lineal y numérica : definiciones, teoremas y resultados / Juan de Burgos Román, Carlos Vázquez Espí . - Ed. Estudiante Madrid : García Maroto, D.L. 2011
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- [BB] Villa, Agustín de la. Problemas de álgebra / Agustín de la Villa . - [4ª ed.] Madrid : CLAGSA, D.L. 2010
- [BC] Burden, Richard L.. Análisis numérico / Richard L. Burden, J. Douglas Faires . - 7ª ed., [reimp.] México [etc.] : International Thomson, imp. 2004
- [BC] Lay, David C.. Álgebra lineal y sus aplicaciones / David C. Lay ; traducción Jesús Elmer Murrieta Murrieta ; revisión técnica Javier Alfaro Pastor . - 3ª ed. act. [en español] México : Pearson Educación, 2007
- [BC] Rojo, Jesús. Ejercicios y problemas de algebra lineal / Jesús Rojo, Isabel Martín . - 2ª ed. Madrid [etc.] : McGraw-Hill, D.L. 2004
- [BC] Strang, Gilbert. Algebra lineal y sus aplicaciones / Gilbert Strang ; revisión técnica, Edmundo Palacios Pastrana . - 4ª ed. México D. F. : International Thomson, cop. 2007