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Versión en español
(https://aplicaciones.uc3m.es
est=362&anio=2019&plan=43

Course: 2019/2020

Linear Algebra (18253)

Study: Bachelor in Applied Mathematics and Computing (362)

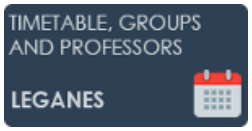
Coordinating teacher: MARTINEZ DOPICO, FROILAN CESAR

Department assigned to the subject: Department of Mathematics

Type: Basic Core **ECTS Credits:** 6.0 ECTS

Course: 1º **Semester:** 1º

Branch of knowledge: Engineering and Architecture



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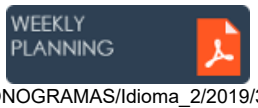

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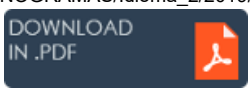

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ano=2019&plan=433&asignatura=18253&idioma=2)

Students are expected to have completed

It is not expected to have completed any subject since this is a first term/first year subject.

Competences and skills that will be acquired and learning results. Further information on this link (http://portal.uc3m.es/portal/page/portal/titulaciones_grado/correlacion_materias)

1. Students have shown that they know and understand the mathematical language and the abstract-rigorous reasoning, as well as to apply them to state and prove precise results in several areas of mathematics.
2. Students have shown that they understand the fundamental results of linear algebra and matrix theory concerning vector spaces, inner product spaces, solving systems of linear equations and linear least squares problems.
3. Students have shown that they understand the basic arithmetic operations between complex numbers, that they are able to compute with them and to interpret geometrically such computations.
4. Students are able to use techniques from linear algebra and matrix theory to construct mathematical models of processes that appear in real world applications.
5. Students are able to communicate, in a precise and clear manner, ideas, problems and solutions related to linear algebra and matrix theory to any kind of audience (specialist or not).

Description of contents: programme

1. Complex numbers
2. Systems of linear equations
3. Matrix algebra and the LU factorization
4. Determinants
5. Vector spaces in applied settings
6. Linear transformations
7. Inner product spaces: norms and orthogonality

8. Orthogonal and unitary matrices
9. Least squares problems and the QR factorization

Learning activities and methodology

1. THEORETICAL-PRACTICAL CLASSES, where the knowledge that the students must acquire is explained and developed. Students will have basic reference texts to facilitate the understanding of the classes and the development of follow up work. The teacher and the students will solve exercises and practical problems, previously suggested by the teacher. There will be mid term tests for evaluating the competences and skills acquired by the students and for helping the students to improve their learning strategies.

2. TUTORING SESSIONS. Individualized attendance for students with a teacher for at least two hours a week.

3. STUDENT INDIVIDUAL OR GROUP WORK. Each student's individualized study, understanding of results and proofs, and exercise and problem solving is fundamental in mathematics, both for learning and for self-evaluation of acquired competences and skills. Solving exercises and problems and discussing theoretical results inside small groups of students is an excellent complementary activity for improving the learning.

Assessment System

- Continuous evaluation: It corresponds to 40% of the final mark. It consists of two mid-term exams held along the course to assess the student's progression. Continuous evaluation also allows students themselves to modify their learning strategies, in case it is necessary.

- Final end-of-term exam: It corresponds to 60% of the final mark. It allows to assess the student's general understanding of the subject.

- % end-of-term-examination 60
- % of continuous assessment (assigments, laboratory, practicals...) 40

Basic Bibliography

- C.D. Meyer. Matrix Analysis and Applied Linear Algebra. SIAM. 2000
- D.C. Lay, S.R. Lay and J.J. McDonald. Linear Algebra and its Applications, 5th edition. Pearson. 2016
- G. Strang. Introduction to Linear Algebra. Wellesley-Cambridge Press. 2016
- S.R. García and R.A. Horn. A Second Course in Linear Algebra. Cambridge University Press. 2017

Additional Bibliography

- B. Noble and J.W. Daniel. Applied Linear Algebra. Prentice-Hall Int.. 1988
- P. Lancaster and M. Tismenetsky. The Theory of Matrices with Applications, 2nd edition. Academic Press, Inc.. 1985
- R.A. Horn and C.R. Johnson. Matrix Analysis, 2nd edition. Cambridge University Press. 2013

The course syllabus and the academic weekly planning may change due academic events or other reasons.