Linear Algebra

Academic Year: (2021 / 2022) **Review date: 28-06-2021**

Department assigned to the subject: Mathematics Department

Coordinating teacher: MARTINEZ DOPICO, FROILAN CESAR

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

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

DESCRIPTION OF CONTENTS: PROGRAMME

1. Complex numbers
2. Systems of linear equations
3. Matrix algebra
4. Determinants
5. Vector spaces in applied settings
6. Linear transformations
7. Inner product spaces: norms and orthogonality
8. Orthogonal and unitary matrices
9. QR factorization

LEARNING ACTIVITIES AND METHODOLOGY

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THEORETICAL-PRACTICAL CLASSES. [44 hours with 100% classroom instruction, 1.76 ECTS]
Knowledge and concepts students must acquire. Students receive course notes and will have basic reference texts to facilitate following the classes and carrying out follow up work. Students partake in exercises to resolve practical problems and participate in workshops and evaluation tests, all geared towards acquiring the necessary capabilities.

TUTORING SESSIONS. [4 hours of tutoring with 100% on-site attendance, 0.16 ECTS]
Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher.

STUDENT INDIVIDUAL WORK OR GROUP WORK [98 hours with 0 % on-site, 3.92 ECTS]

FINAL EXAM. [4 hours with 100% on site, 0.16 ECTS]
Global assessment of knowledge, skills and capacities acquired throughout the course.

METHODOLOGIES

THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject`s main concepts are developed, while providing material and bibliography to complement student learning.

PRACTICAL CLASS. Resolution of practical cases and problems, posed by the teacher, and carried out individually or in a group.

TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with a teacher as tutor.

ASSESSMENT SYSTEM

EVALUATION SYSTEMS

SE1 - FINAL EXAM. [50 %]

Global assessment of knowledge, skills and capacities acquired throughout the course.

SE2 - CONTINUOUS EVALUATION. [50 %]
Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course. Six short tests (each 20-30 minutes long) will be 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.

% end-of-term-examination:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

BASIC BIBLIOGRAPHY

- B. Noble, J.W. Daniel Applied Linear Algebra, Prentice-Hall, 1988
- 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

- 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