

Degree programme	Type	Course
Aeronautical Management	FB	1

Contact lecturer

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Prerequisites

There is no specific prerequisite but a certain mastery of elementary mathematics is recommended: arithmetic operations, numbering systems, polynomials etc.

Group languages

You can consult this information at the [end](#) of the document.

Objectives

This is a basic subject. The initial objective is to equip the students with the ability to work with complex numbers, to operate with vectors and arrays and to solve linear systems. But mainly is to retain the main concepts on Vector Spaces and linear morphism, in particular the problem when a linear morphism from one vector space to itself has nice properties as diagonalizable, which has different applications in engineering.

Learning outcomes

- KM01 (Identify the mathematical concepts necessary in the processes of systems in the aeronautical sector.) Identify the mathematical concepts necessary in the processes of systems in the aeronautical sector.
- SM01 (Use basic mathematical language to interpret those texts that use it to convey ideas and methods.) Use basic mathematical language to interpret those texts that use it to convey ideas and methods.
- SM02 (Work with matrices, calculating ranges and determinants.) Work with matrices, calculating ranges and determinants.

Contents

1. Complex numbers and zeros of polynomials
2. Systems of linear equations, matrices and determinants
3. Vector spaces
4. Linear transformations
5. Eigenvectors and eigenvalues. Diagonalization. Applications.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes

Theory	30	1.2
Exercises	20	0.8
Problem solving	15	0.6
Problem solving	75	3

The central part of the learning process is the work of the student. The teacher's mission is to help the student in this task by providing information, showing the sources and directing, as far as possible, the steps so that the learning process can be carried out efficiently. In line with these ideas, and in accordance with the objectives of the subject, the development of the course will be based on the following activities:

1. Theory lectures: The scientific and technical knowledge of the subject necessary for the resolution of problems will be presented in the form of master classes.
2. Problem lectures / Seminars / Supervised activities: These classes will work on the scientific and technical knowledge exposed in the theory classes. These are practical classes where the basic techniques mentioned in the abilities will be developed, mainly based on the resolution of practical exercises.

The students interested can work on some proposed problems, individually or in groups, in an autonomous way and with the support of the teachers of the subject.

In some sessions the written delivery of the proposed problems will be requested, perhaps using Virtual Campus tools. This delivery will be evaluated and will contribute to the final grade of the course.

The use of SageMath will be proposed as a means of solving some problems or concepts developed.

Communication with students will be carried out through the Virtual Campus, where all the subject materials will be available.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Second partial exam	40%	2	0.08	KM01, SM01, SM02
Recovery exam	70%	4	0.16	KM01, SM01, SM02
First partial exam	30%	2	0.08	KM01, SM01, SM02
Exercise delivery and interview	30%	2	0.08	KM01, SM01, SM02

Continuous evaluation through the delivery of hand manuscripted exercises and manuscripted quizzes (30%) with an interview with respect the results presented in the quizzes and exercises, two partial exams carried out during the lectures (30% + 40%) with a final exam (70%) for students who do not pass the continuous evaluation. To be able to apply the continuous evaluation it will be necessary that in each partial test the note on ten is superior or equal to three. The review of grades will be done at the request of each student via email.

To participate in the recovery, students must have been previously evaluated in a set of activities the weight of which equals a minimum of two thirds of the total grade of the subject or module. Therefore, the students will

obtain the "Not Evaluable" qualification when the evaluation activities carried out have a weight lower than 67% in the final grade.

The delivery of exercises is mandatory. The students will obtain the grade of "Not Evaluable" when the number of deliveries is less than 80% of the scheduled deliveries.

The personal interview is the key in order to give a real mark for the delivery exercises and quizzes, the students that do not realize the interview and they delivery more than 80% of exercises they can go to the exams but they will have 0 as a mark in the part corresponding to exercises and quizzes. Moreover the interview is the key to decide the mark of all delivery exercises and quizzes.

In the final exam, only the grades from the two partial exams are recovered. The student who passes the final exam (with the grade from the exercises and quizzes) will receive a grade of 5 (passed).

Without prejudice to other disciplinary measures deemed appropriate, and in accordance with current academic regulations, any irregularities committed by the student that could lead to a variation of the grade of an evaluation act will be scored with a zero. Therefore, copying or allowing to copy a practice or any other evaluation activity will involve suspending with a zero, and if it is necessary to pass it to pass, the whole subject will be suspended. The evaluation activities qualified in this way and by this procedure will not be recoverable, and therefore the subject will be suspended directly without the opportunity to recover it in the same academic year.

Repeating students must do the same assessment activities as new students.

Honors may only be awarded to students who have obtained a final grade equal to or greater than 9,5. A maximum of 5% of students enrolled may be granted.

This subject does not provide for the single assessment system.

Bibliography

- David C. Lay. *Álgebra Lineal y sus aplicaciones*, tercera edición, Pearson Educación, Mexico, 2007, ISBN: 978-970-26-0906-3
- Enric Nart, Xavier Xarles. *Notes d'àlgebra lineal*, segona edició, Materials 130, UAB, Bellaterra, 2003, ISBN: 84-490-2325-4
- Francesc Bars: Uns apunts de números complexos. DDD UAB: <https://ddd.uab.cat/pub/recdoc/2011/73655/complexos.pdf>

Software

- Sagemath: <https://www.sagemath.org>

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	11	Catalan	first semester	afternoon
(PAUL) Classroom practices	11	Unknown	first semester	afternoon

(TE) Theory	12	Unknown	second semester	afternoon
(PAUL) Classroom practices	12	Unknown	first semester	afternoon
(PAUL) Classroom practices	13	Unknown	second semester	afternoon
(PAUL) Classroom practices	14	Unknown	second semester	afternoon
(SEM) Seminars	51	Unknown	first semester	afternoon
(SEM) Seminars	52	Unknown	first semester	afternoon
(SEM) Seminars	53	Unknown	first semester	afternoon
(SEM) Seminars	54	Unknown	second semester	afternoon
(SEM) Seminars	55	Unknown	second semester	afternoon
(SEM) Seminars	56	Unknown	second semester	afternoon