Course guide
220080 - AL - Algebra

Last modified: 19/04/2023

Unit in charge:	Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	749 - MAT - Department of Mathematics.

Degree:	BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023   **ECTS Credits:** 6.0   **Languages:** Catalan

LECTURER

Coordinating lecturer:	Amer Ramon, Rafel
Others:	Amer Ramon, Rafael Monsó, Enric Pfeifle, Julian

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE01-INDUS. Ability to solve mathematical problems that may arise in engineering. Aptitude to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimization. (Basic training module)

Transversal:
CT06 N1. Self-directed learning - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

TEACHING METHODOLOGY

The teacher will introduce different concepts of the subject and their fundamental results into the classes about the theoretical contents, as well as examples which facilitate their understanding. The students will propose doubts that they have during the explanation to the teacher. The student will complete his learning through the personal study and the realization of the exercises according to the practical contents.

Precisely, regarding the practical contents the students will have to solve a collection of 120 exercises (15 for chapter), that they will help them to understand the studied concepts and to acquire the skill of expressing oneself correctly. The student has got another collection of already solved exercises which he has to use as a reference book and guide for its resolution. After attempting to do the proposed exercises the students will propose to the teacher in class doubts which they have had during their realization. The teacher will orientate them and then they can solve the exercises.

The classes of consolidation are thought so that the students can obtain a vision of whole of the different parts of the program. At the same time, they constitute another opportunity for the students to ask the last doubts that they can still have before the realization of the controls and the partial and final exams.

Finally, each teacher has some fixed consultation hours in his office where the students can go to solve in an individual way all doubts about concepts, the resolution of exercises or the realization of the works that the teacher has proposed them.

LEARNING OBJECTIVES OF THE SUBJECT

Attending to the basic character of the Linear Algebra in the studies plan of the Engineering in Industrial Technologies Degree, the fundamental objective of the subject is to provide the students the concepts and basic tools of the Linear Algebra and of its immediate application, the Geometry, which is necessary in other disciplines.

This knowledge has to be useful to the students for initiating themselves into the process of model and solve problems. As well as the interpretation of the solutions obtained about different situations that they can find in the next years of the career and in the exercise of profession.

It considers a great importance prepare students in the attainment of a suitable level of autonomy which it allows them to cope with success the challenge of the continuous formation.

STUDY LOAD

Type	Hours	Percentage
Hours large group	32,0	21.33
Hours medium group	28,0	18.67
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

1. Matrix calculation

Full-or-part-time: 37h 30m
Theory classes: 8h
Practical classes: 7h
Self study : 22h 30m

2. Vectorial spaces

Full-or-part-time: 37h 30m
Theory classes: 8h
Practical classes: 7h
Self study : 22h 30m

3. Endomorphisms

Full-or-part-time: 37h 30m
Theory classes: 8h
Practical classes: 7h
Self study : 22h 30m

4. Geometry

Full-or-part-time: 37h 30m
Theory classes: 8h
Practical classes: 7h
Self study : 22h 30m

ACTIVITIES

PRACTICAL CONTENTS

Full-or-part-time: 48h
Theory classes: 24h
Self study: 24h

THEORETICAL CONTENTS

Full-or-part-time: 72h
Practical classes: 24h
Self study: 48h

APPLIED CONTENTS

Full-or-part-time: 2h
Theory classes: 2h

CONSOLIDATION CLASSES

Full-or-part-time: 22h
Practical classes: 4h
Self study: 18h

FIRST CONTROL

Full-or-part-time: 1h
Theory classes: 1h

SECOND CONTROL

Full-or-part-time: 1h
Theory classes: 1h

PARTIAL EXAM

Full-or-part-time: 2h
Theory classes: 2h

FINAL EXAM

Full-or-part-time: 2h
Theory classes: 2h

GRADING SYSTEM

The Final mark of the subject will be obtained from the following ponderation:
Mark of de final exam: 50 %
Mark of the partial exam: 25%
First mark of class: 12.5%
Second mark of class: 12.5%
Mark of the Final Exam is obtained in the corresponding examination.
Initially, mark of the Partial Exam is obtained in the corresponding examination.
In case of Partial Examination is failed but the final exam is passed, Partial Examination will be considered passed with a mark of 5.
The First and Second marks of Class are obtained from the marks of the First and Second Control and of the rest of aspects related with modules 1 and 2 and modules 3 and 4, respectively, which the teacher considers appropriate (participation in clas, delivery of exercises, etc).

EXAMINATION RULES.

Use of any kind of calculator, mobile or similar telephone, computer, is not allowed in the exams and controls.
The irregular actions (for example to copy, to let copy) it will mean the qualification of fail with 0 in the act of evaluation.

BIBLIOGRAPHY

Basic:
- Strang, Gilbert. Introduction to linear algebra. 4th ed. Wellesley: Wellesley-Cambridge Press, 2009. ISBN 9780980232714.
- Burgos Román, Juan de. Álgebra lineal y geometría cartesiana [on line]. 3a ed. Madrid: McGraw-Hill, 2006 [Consultation: 10/06/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=4141. ISBN 8448149009.

RESOURCES

Hyperlink:
- http://atenea.upc.edu- http://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2005/