# COURSE DATA

## DATA SUBJECT

**Code:** 34665
**Name:** Mathematics I
**Cycle:** Undergraduate Studies
**ECTS Credits:** 6
**Academic year:** 2026-27

## STUDY (S)

| Degree | Center | Acad. year | Period |
|---|---|---|---|
| 1400 - Degree in Computer Engineering | Escola Tècnica Superior d'Enginyeria | 1 | First quarter |

## SUBJECT-MATTER

| Degree | Subject-matter | Character |
|---|---|---|
| 1400 - Degree in Computer Engineering | Mathematics | BASIC |

## COORDINATION

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# SUMMARY

The course Mathematics I is part of the scientific background to be acquired by all students of engineering before entering fully into the specifics of the degree.

Given the extent of the subject and the very limited number of hours, the course will be mainly practical: the aim is that the students will be able to apply the methods discussed to solve problems.

The course contents are: Sequences and Series, Linear Algebra, Geometry, which are divided into thematic units as listed in Section 6.

The general objectives of the course are:

- To manage with ease the elementary techniques of matrix algebra. In particular, to solve systems of linear equations and to know how to reduce a problem to a system of linear equations.
- To understand the concepts of sequence and series, and to study their convergence.

- To use geometric intuition to enrich mathematical knowledge, and vice versa, to take advantage of the vocabulary of mathematics to raise geometric vision.
- To understand the concept of linear map and to represent linear maps by matrices.
- To perform some simple applications of interest in engineering, building on the basic content of the course.

## PREVIOUS KNOWLEDGE

### RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

### OTHER REQUIREMENTS

We assume that the student has mastered a mathematical content equivalent to the Mathematics I of the Spanish Bachillerato. While completion of the Mathematics in second year would be desirable, it is not strictly necessary. All units start with the indicated level on Linear Algebra and Geometry, and cover the skills of the second year before proceeding any further. Nevertheless, the pace is strong; the student who has not completed second year high school mathematics must make a sustained daily effort to a

## COMPETENCES / LEARNING OUTCOMES

### 1400 - Degree in Computer Engineering

B1 - Ability to solve the mathematical problems that may arise in engineering. Ability to apply knowledge of linear algebra, differential and integral calculus, numerical methods, numerical algorithms, statistics and optimisation.

G8 - Knowledge of basic subject areas and technologies that serve as a basis for learning and developing new methods and technologies, and of those which provide versatility to adapt to new situations.

G9 - Ability to solve problems with initiative, decision making, autonomy and creativity. Ability to communicate and transmit the knowledge, skills and abilities of a computer engineer.

## DESCRIPTION OF CONTENTS

### 1. Sequences and series

Complex numbers. Sequences and series of real or complex numbers. Convergence of sequences and series.

## 2. Matrices and linear equations

Sets of Linear Equations. Matrices. Gauss-Jordan Elimination. Determinants.

## 3. Basic Geometry

Vectors. Linear dependence and linear independence. Bases. Scalar product, norm and angle between vectors. Gram-Schmidt process.

## 4. Matrix decomposition

LU decomposition. QR decomposition.

## 5. Linear maps

Introduction to linear maps. Eigenvalues and Eigenvectors. Matrix Diagonalization.

# WORKLOAD

### PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Theory | 30,00 |
| Classroom practices | 30,00 |
| **Total hours** | **60,00** |

### NON PRESENCIAL ACTIVITIES

| Activity | Hours |
|---|---|
| Attendance at other activities | 0,00 |
| Individual or group project | 0,00 |
| Independent study and work | 20,00 |
| Preparation of lessons | 55,00 |
| Preparation for assessment activities | 15,00 |
| Resolution of case studies | 0,00 |
| **Total hours** | **90,00** |

# TEACHING METHODOLOGY

In the theoretical classes, the lecturer will gradually introduce mathematical concepts and their use mainly through examples. They will also explain the standard procedures for solving problems related to the topic.

Practical classes will be aimed at the student, through his work, internalize explained in lectures. The way to achieve the active participation of students may vary according to the size of groups, ranging from exercises in small groups, when the number permitted, the execution of periodic inspections, when the number is excessive.

## EVALUATION

The evaluation will take place following the "adapted traditional" model:

The final exam will be mainly practical and will count 50 %.

The remaining 50 % will be obtained by ongoing evaluation. At least two tests will be made and the ongoing work of the student will be assessed through the active participation in the classroom. Students who have taken the continuous assessment activities and all controls proposed by the teachers and have achieved in each of these tests the minimum grade 4 and at the end of the course have obtained in the continuous assessment part a note greater than or equal to 5 have the option not to take the final exam and use this note as a final grade for the course.

If for some cause, the continued evaluation of a student has not been able to taken complete, the weight given will decrease by increasing the weight of the exam, respecting the 75% maximum agreed by the School. In the case where the grade of the final exam is greater than the grade obtained by continuous assessment, the weight of the final exam will be 75% in the grade for the course.

The continuous assessment will be assessed again in the second call for examination and will form part of this exam, so the grade obtained in the exam in the second call will be the final grade of the course.

Copying or plagiarism of any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA (ACGUV 123/2020).

## REFERENCES

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- Anthony Croft, Robert Davison, Mathematics for engineers: a modern interactive approach, Addison- Wesley, 1999

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