

Degree programme	Type	Course
Chemical Engineering	FB	1

Contact lecturer

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Prerequisites

None.

A good knowledge of mathematics (secondary school level) is assumed.

Group languages

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

Objectives

1. Be able to fluently use the language of Infinitesimal Calculus and basic Algebra, mainly linear.
2. Achieve theoretical knowledge of Calculus and Algebra, and the most immediate geometric implications.
3. Know how to apply Calculus methods to Science and Technology problems, emphasizing equations and their

Learning outcomes

1. Apply the basic concepts of algebra to problem solving.
2. Apply the methods and basic concepts of differential and integral calculus of a variable to the description and calculation of magnitudes.
3. Apply the methods for solving differential equations to the analysis of deterministic phenomena.
4. Develop scientific thinking.
5. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.

Contents

1- Real numbers.

2- Functions of one real variable. Graphs. Limits and continuity.

3- Polinomic equations. The complex numbers.

4- Derivatives and their properties. Optimization. Taylor's formula. Applications.

5- Integration. Primitives. Basic differential relations (Equations). Parametric integrals. Applications.

6- The $\mathbb{R}^n$ space. Linear transformations and symmetries. Matrices. Determinants. Matrices. Determinants. Systems of linear equations. Applications.

7- Vector spaces.

8- Matrix diagonalization. Applications.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Preparation of the evaluations	27	1.08	4
Study of theoretical concepts	68	2.72	1, 5
Seminars	8	0.32	1, 2, 3, 4, 5
Solving the proposed problems	45	1.8	1, 2, 3
Theoretical sessions	45	1.8	1, 2, 3, 4, 5
Problems session	23	0.92	1, 2, 3

Theory classes. The scientific and technical knowledge of the subject will be presented in these classes.

Practical classes (of problems). The scientific and technical knowledge presented in the theory classes will be worked on in Seminars. Students must work independently in the classroom, in groups and assisted by the teacher when necessary.

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
Seminar exams S	20%	3	0.12	1, 2, 3, 4, 5
Second Partial Exam P2	40%	3	0.12	1, 4, 5
First Partial Exam P1	40%	3	0.12	2, 3

You get your current qualification from formula: $Q=0,2 \cdot S+ 0,40 \cdot (P1+P2)$.

If Q is greater or equal than 5 (and P1 and P2 are greater or equal than 3.5), you succeeded. Otherwise, you have the possibility of a second try consisting in two exams with qualifications R1 and R2. The final qualification is given by the formula $Q'=0,2 \cdot S+ \max\{0,40 \cdot (P1+P2), 0,4(R1+R2)\}$.

Bibliography

See the CATALAN version

Software

No software used.

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	21	Catalan	annual	morning-mixed
(PAUL) Classroom practices	211	Catalan	annual	morning-mixed
(SEM) Seminars	211	Catalan	annual	morning-mixed
(PAUL) Classroom practices	212	Catalan	annual	morning-mixed
(SEM) Seminars	212	Catalan	annual	morning-mixed