# UAB
## Universitat Autònoma de Barcelona

**Calculus of One Variable**

Code: 107596
ECTS Credits: 6

**2025/2026**

| Degree | Type | Year |
|--------|------|------|
| Physics | FB | 1 |

## Contact

Name: Francisco Javier Bafaluy Bafaluy

Email: javier.bafaluy@uab.cat

## Teachers

Alvaro Corral Cano

## Teaching groups languages

You can view this information at the end of this document.

## Prerequisites

There are no requirements.

## Objectives and Contextualisation

The basic concepts of real variable calculus are introduced: limits, continuity, derivative, integration and power series.

The student will learn the practcal techniques of calculus.

## Learning Outcomes

1. CM09 (Competence) Justify the use of calculus in one and several variables and differential equations in the resolution of general problems.
2. CM10 (Competence) Adapt the basic mathematical strategy when approaching a given problem from an analytical point of view.
3. KM09 (Knowledge) Identify the basic concepts of limits, continuity, derivatives and integrals, vector and subspace space, linear and scalar product and the methodology of matrix diagonalisation.
4. KM09 (Knowledge) Identify the basic concepts of limits, continuity, derivatives and integrals, vector and subspace space, linear and scalar product and the methodology of matrix diagonalisation.

5. SM07 (Skill) Apply the mathematical knowledge acquired to the resolution of mathematical and physical problems with mathematical representation.

## Content

1. Real numbers, induction.
2. Elementary functions and inverse function.
3. Number sequences and límits.
4. Límits and continuity of functions.
5. Derivatives and applications.
6. Riemann integral.
7. Integration and applications.
8. Improper integrals.
9. Number series.
10. Power series.

## Activities and Methodology

| Title | Hours | ECTS | Learning Outcomes |
|---|---|---|---|
| Type: Directed | | | |
| Practical classes | 13 | 0.52 | CM10, SM07, CM10 |
| Theory classes | 28 | 1.12 | CM09, KM09, CM09 |
| Type: Supervised | | | |
| Seminars | 8 | 0.32 | CM09, CM10, SM07, CM09 |
| Type: Autonomous | | | |
| Personal study | 42 | 1.68 | KM09, SM07, KM09 |
| Problem solving | 50 | 2 | CM10, SM07, CM10 |

Theory classes: exposition of the theoretical body of the subject.

Practical Classes: explanation of the resolution of some problems of the list previously accessible to the students and guidance for the resolution of the rest.

Seminars: the students work in small groups under the supervision of a theacher.

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

## Continous Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
| --- | --- | --- | --- | --- |
| Delivery of exercises | 20% | 0 | 0 | CM09, CM10, SM07 |
| Final term exam | 40% | 3 | 0.12 | CM10, KM09, SM07 |
| First term exam | 40% | 3 | 0.12 | CM10, KM09, SM07 |
| Re-evaluation | 80% (only the partial exams can be re-evaluated) | 3 | 0.12 | CM10, KM09, SM07 |

The evaluation is based on two tests with a global weight of 80% and on the assessment of the student work (take-home exercices) with a global weight of 20%.

The re-evaluation allows only to improve the qualification of the tests, the qualification of the continuous work is not recoverable.

In order to qualify for the re-evaluation it will be necessary to have completed at least the two partial exams.

Single Assessment:

The students following the single evaluation modality must:

- Present the same take-home exercicess as the rest of the students, with the same deadline if possible or, if not possible, the same day as the final test (20%).
- Take a final test that will be similar to the two partial tests (80%). This exam will take place at the same day, hour and location as the corresponding exam of the continuous evaluation.
- If necessary they could take the re-evaluation, that will be the same as fot the rest of the students.

## Bibliography

Teoria:
* Spivak, M. Calculus, Reverté (2013)
* Brokate, N.; Manchanda, P.; Siddiqi, A.H.; Calculus for Scientists and Engineers, Springer (2019)
* Salas, S. L; Hille, E.; Etgen, G. J. Calculus. Una y Varias Variables. Volumen I. Reverté (2018)
* Méndez, A.,Càlcul en una variable real, UAB (2024)

Exercicis (llibres amb exercicis resolts i per resoldre):
* Aryes, F. y Mendelson, E. Cálculo diferencial e integral, McGraw-Hill (colecció Schaum)
* Demidovich, B.P., 5000 problemas de análisis matemático, Paraninfo (2000)

## Software

No specific software will be used.

## Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

| Name | Group | Language | Semester | Turn |
| --- | --- | --- | --- | --- |
| (PAUL) Classroom practices | 1 | Catalan | first semester | morning-mixed |
| (PAUL) Classroom practices | 2 | Catalan/Spanish | first semester | morning-mixed |
| (SEM) Seminars | 11 | Catalan | first semester | morning-mixed |
| (SEM) Seminars | 12 | Catalan | first semester | morning-mixed |
| (SEM) Seminars | 21 | Catalan/Spanish | first semester | morning-mixed |
| (SEM) Seminars | 22 | Catalan/Spanish | first semester | morning-mixed |
| (TE) Theory | 1 | Catalan | first semester | morning-mixed |
| (TE) Theory | 2 | Catalan/Spanish | first semester | morning-mixed |