

## 26903 - Calculus

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 26903 - Calculus

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 447 - Degree in Physics

**ECTS:** 6.0

**Year:** 1

**Semester:** First semester

**Subject type:** Basic Education

**Module:**

### 1. General information

The object of study in this course is the differential and integral calculus of one real variable function, paying attention both to the theoretical and practical part: real numbers, complex numbers, sequences of real numbers, continuous and differentiable functions, computation of antiderivatives and the Riemann integral, number series and Taylor series.

### 2. Learning results

- Understand and know how to apply the mathematical induction principle; understand the basic aspects of the concept of one variable real function and knows well enough the elementary functions, handle inequalities properly.
- Perform easily operations with complex numbers such as the product, roots and exponential, using different representations.
- Compute limits of sequences and functions correctly. Understand and applies the concept of continuity.
- Compute derivatives of elementary functions and understand and apply the theory of differentiation.
- Compute antiderivatives and integrals of elementary functions using the different integration methods (change of variable, partial fraction decomposition, integration by parts and several specific methods).
- Understand numerical series and their sums. Learn how to manage power series and their convergence.

### 3. Syllabus

- Positive integer numbers and induction principle. Integer and rational numbers.
- Real numbers
- Complex numbers.
- Elementary functions
- Sequences and limits. Cauchy sequences.
- Limits of functions. Continuity.
- Differentiation. Geometric interpretation and basic rules.
- Riemann integral.
- Antiderivatives. Integration methods.
- Series. Convergence criteria.
- Taylor series.

### 4. Academic activities

- Master classes: 30 hours.
- Problem solving: 30 hours.
- Study: 83 hours.
- Assessment tests: 7 hours.

### 5. Assessment system

The assessment will be made by means of continuous evaluation and a final exam. The final mark will be computed weighting the continuous evaluation by 20% and the final exam by 80%.

The continuous evaluation consists in short tests taken in class or exercises proposed during the course. The final exam, in dates determined by the Faculty, includes theoretical questions and problems.

Nevertheless, during the course, students who will prefer so may leave out the continuous evaluation; in such case, the mark in the course will be the mark in the final exam.

## **6. Sustainable Development Goals**

4 - Quality Education

5 - Gender Equality

8 - Decent Work and Economic Growth