Degree competences to which the subject contributes

General:
12 CPE N1. They will be able to identify, formulate and solve engineering problems in the ICC field and will know how to develop a method for analysing and solving problems that is systematic, critical and creative.

Learning objectives of the subject

To begin with, the concepts introduced in Càlcul 1 about functions of one real variable are generalized to several variables. More concretely, the differentiability of functions, the integration of functions and their applications as, for example, to the optimization problems.

The basic concepts of differential geometry of curves and surfaces, in the plane and in the space, are introduced with the aim to study the fundamental theorems of vectorial integration: Green’s, Stokes and Gauss theorems, basics in the study of electromagnetic fields.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>65h</th>
<th>43.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study:</td>
<td>85h</td>
<td>56.67%</td>
</tr>
</tbody>
</table>

Teaching staff

Coordinator: Martin De La Torre, Pablo

Others: Martin De La Torre, Pablo
         Gracia Rivas, Ignacio
# 230083 - CAVEC - Vector Calculus

## Content

| **Topology of the n-dimensional real space** | **Learning time:** 16h  
Theory classes: 7h  
Self study: 9h |
| **Description:**  

| **Functions of several variables** | **Learning time:** 14h  
Theory classes: 6h  
Self study: 8h |
| **Description:**  

| **Differentiability and local extrema** | **Learning time:** 35h  
Theory classes: 15h  
Self study: 20h |
| **Description:**  

| **Curves and surfaces** | **Learning time:** 24h  
Theory classes: 10h  
Self study: 14h |
| **Description:**  
**Multiple integration**

**Learning time:** 24h  
 Theory classes: 10h  
 Self study: 14h

**Description:**  

**Line and surface integrals**

**Learning time:** 35h  
 Theory classes: 15h  
 Self study: 20h

**Description:**  

**Qualification system**

Evaluation: continuous, along the term, with a 40% weight, and a final test, with a 60% weight.

**Bibliography**

**Basic:**


**Complementary:**


