230083 - CAVEC - Vector Calculus

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 749 - MAT - Department of Mathematics
Academic year: 2018
Degree: BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Compulsory)
ECTS credits: 6  Teaching languages: Catalan

Teaching staff

Coordinator: Martin De La Torre, Pablo
Others: Martin De La Torre, Pablo
Gracia Rivas, Ignacio

Degree competences to which the subject contributes

Generical:
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: 65h</th>
<th>43.33%</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Self study: 85h</td>
<td>56.67%</td>
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## Content

<table>
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<tr>
<th>Section</th>
<th>Learning time:</th>
<th>Theory classes:</th>
<th>Self study:</th>
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<tbody>
<tr>
<td>Topology of the n-dimensional real space</td>
<td>16h</td>
<td>7h</td>
<td>9h</td>
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<tr>
<td>Description:</td>
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| Functions of several variables                    | 14h            | 6h              | 8h         |
| Description:                                     |                |                 |            |

| Differentiability and local extrema               | 35h            | 15h             | 20h        |
| Description:                                     |                |                 |            |

| Curves and surfaces                               | 24h            | 10h             | 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: