Course guide
230087 - PIE - Probability and Statistics

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 749 - MAT - Department of Mathematics.
Degree: BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Compulsory subject).

Academic year: 2022  ECTS Credits: 6.0  Languages: Catalan

LECTURER

Coordinating lecturer: Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/responsables-assignatura

Others: Consultar aquí / See here: https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/professorat-assignat-idioma

PRIOR SKILLS

Calculus of one and several variables. Linear algebra.

REQUIREMENTS

VECTOR CALCULUS - Precorequisite

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Transversal:
07 AAT N2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

TEACHING METHODOLOGY

- Lectures.
- Application classes.
- Exercises.

LEARNING OBJECTIVES OF THE SUBJECT


STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>65,0</td>
<td>43.33</td>
</tr>
<tr>
<td>Self study</td>
<td>85,0</td>
<td>56.67</td>
</tr>
</tbody>
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Total learning time: 150 h
# CONTENTS

## 1. Basic probability theory

**Description:**

*Full-or-part-time:* 15h  
*Theory classes:* 15h

## 2. Random variable

**Description:**

*Full-or-part-time:* 15h  
*Theory classes:* 15h

## 3. Several random variables

**Description:**

*Full-or-part-time:* 17h  
*Theory classes:* 17h

## 4. Statistics

**Description:**
Relevant random variables in statistics: \( n \)-dimensional Gaussian, Khi square, Student's \( t \), Fisher's F. Central Limit Theorem. Populations and samples. Descriptive statistics (histograms, boxplots, scatterplots). Statistical samples: distribution and parameters. Estimation of parameters: method of the moments and method of maximum likelihood. Confidence intervals (for the mean, for the variance, for proportions, for comparing populations). Test of statistical hypotheses. P-Values. Fitting lines. Regression in one and several variables. Statistical properties of the correlation coefficients. ANOVA.

*Full-or-part-time:* 18h  
*Theory classes:* 18h

## GRADING SYSTEM

Midterm exams: 40%  
Final exam: 60%
BIBLIOGRAPHY

Basic:

Complementary: