



Universitat de Lleida

DEGREE CURRICULUM  
**STATISTICAL METHODS**

Academic year 2013-14

## Subject's general information

<b>Subject name</b>	Statistical Methods
<b>Code</b>	102103
<b>Semester</b>	2n Q Avaluació Continuada
<b>Typology</b>	Troncal
<b>ECTS credits</b>	6
<b>Theoretical credits</b>	0
<b>Practical credits</b>	0
<b>Department</b>	Matemàtica
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.
<b>Language</b>	Catalan
<b>Distribution of credits</b>	Nacho Lopez Lorenzo 2.4 Francisco Sebé Feixas 4.8 Josep Conde Colom 9.6
<b>Office and hour of attention</b>	Arrange a meeting via e-mail

Nacho Lopez Lorenzo  
Francisco Sebé Feixas  
Josep Conde Colom

## Subject's extra information

We recommend a continuous work during the whole semester so as to get the objectives of the subject. We also recommend to visit regularly the virtual campus since the relevant information is announced there. The personal e-mail of the lecturers is the preferred way of contacting them (avoid using the virtual campus messaging tool).

## Competences

### Degree-specific competences

- Ability to resolve logical problems that can arise in engineering. Aptitude to apply knowledge about lineal algebra; geometry; differential geometry; differential and integral calculus; differential equations and partial derivatives; numeric methods, numeric algorithms; statistics and optimization.

### Degree-transversal competences

- Ability for abstraction and critical, logical and logical reasoning.
- Ability to resolve problems and elaborate and defend arguments inside their field of study
- Ability to analyse and synthesize.

## Subject contents

Chapter 1. Combinatorics and probability computation.

- Introduction to combinatorics: variations, permutations and combinations. Newton binomial.
- Experiences and random events. Incompatible and independent events.
- Probability computation. Properties.
- Conditional probability.
- Total and Bayes probabilities.

Chapter 2. Exploratory data analysis. Basic tools for quality enhancement.

- Basic concepts on statistical studies: population, variable, sample.
- Qualitative and quantitative variables.
- Data collecting and tabulation.
- Methods for data representation: bars and pareto diagrams, histograms.
- Bivariate diagrams.
- Results interpretation.
- Parameters related to a random variable distribution: mean and standard deviation. Properties.

Chapter 3. Random variables. General aspects.

- From the histogram to the density function of a continuous random variable.
- Discrete variables. Probability function.
- Expectation and variance of a random variable. Properties.
- The distribution function and the cumulative probability function.

## Chapter 4. Probability distribution models.

- Discrete models: Binomial and Poisson.
- The normal model. Central limit theorem.
- Tabulation of a probability distribution function.

## Chapter 5. Relevant distributions in sampling.

- From sample to population.
- Statistics. The sample average and sample variance.
- Distribution of sample average and variance, difference between averages and variances quotient.
- Relevant distributions in sampling. khi-square, T of Student and F of Fisher.

## Chapter 6. Parameter estimation.

- Punctual estimation. The moments method.
- Estimation by means of intervals. Confidence intervals.
- Interval confidence level.
- Confidence level for mean and variance of a normal population.
- Confidence level for the difference between averages and variances quotient.

## Chapter 7. Hypothesis testing.

- Problem statement.
- Null hypothesis and relevance level.
- Tests for mean and variance.
- Comparing means and variances.
- Type I and II errors.
- Power of a test.

## Evaluation

Without translate-

L'avaluació es basarà en els següents ítems:

\* prova escrita dels temes: 1, 2, 3 i part del 4 (4 punts)

\* prova escrita dels temes: part del 4, 5, 6 i 7 (4 punts)

\* activitat de control (1 punt)

\* prova pràctica (1 punt)

En cadascuna de les proves de 4 punts cal treure com a mínim un 1 punt.

## Bibliography

ESTEBAN GARCÍA, J. i alt. (2011) "Inferencia Estadística". IbergarcetaEdiciones.

FORCADA,S.; RUBIÓ, J. (2007) "Elements d'Estadística". Edicions de laUPC. Barcelona

GRIMA,P. i alt. (1996) "Estadística. Problemas". Edicions de la UPC.Barcelona

PEÑA,D. (1994) "Estadística. Modelos y Métodos" Vol. 1 i 2. AlianzaEditorial

PRAT,A. i alt. (1997) "Métodos Estadísticos. Control y Mejora de laCalidad". Edicions de la UPC. Barcelona

RUIZ-MAYA,L.; MARTIN PLIEGO, F.J. "Estadística" Vol 1 i 2. AC