| MODULE | AREA | YEAR | SEMESTER | ETCS CREDITS | COURSE |
|--------|------|------|----------|--------------|--------|
| Basic | Mathenatics | 1rd | 2th | 6 | Basic |

| PROFESORES[1] | ADDRESS |
|---------------|---------|
| • María Jesús García-Ligero Ramírez | Dpto. Estadística e I.O., despacho 22, Facultad de Ciencias.<br>Correo electrónico: mjgarrcia@ugr.es |
| | **TUTORIAL ASSISTANCE)** |
| | www.ugr.es/~estadis/tutorias17-18/ |

| GRADE | OTHER MASTER |
|-------|--------------|
| Industrial Electronics Engineering Grade | |

| RECOMMENDIATIONS |
|------------------|
| Since this course is the second semester, it is recommended to have passed the subjects of mathematics of the first semester. |

## BRIEF DESCRIPTION OF CONTENTS

-Exploring data
-Probability and Random variables. Probability distribution.
-Estimation
-Optimization Techniques in Operations Research

## GOALS

The student should be able:

- • Understand and manage with ease the basic concepts of Dimensional Descriptive Statistics: Population, characters, modes.
- • Define and manage statistical variables and the corresponding tables and graphical representations.

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[1] Consulte posible actualización en Acceso Identificado > Aplicaciones > Ordenación Docente
(∞) Esta guía docente debe ser cumplimentada siguiendo la "Normativa de Evaluación y de Calificación de los estudiantes de la Universidad de Granada" (http://secretariageneral.ugr.es/pages/normativa/fichasugr/ncg7121/!)

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• Establish, know their properties and manage measures to numerically synthesize a statistical variable. Measures of position, dispersion and shape.
• Establish and manage virtually justify the variables two-dimensional statistics, knowing the basics of marginal and conditional distributions.
• Establishment, justification and practical handling of regression and correlation statistics variables.
• Know and apply results of combinatorial analysis of likely interest.
• Establish and manage with ease the basic concepts of probability: deterministic and random phenomena, algebra of events, axiomatic definition of probability.
• Understand and manage with ease the basic results of probability: conditional probability, independence, Bayes theorem.
• Understand and manage with ease some basic models of one-dimensional distributions of discrete and continuous type, in particular: Binomial, Poisson and Normal distributions for basic statistics.
• Understand and skillfully manage the basics of population, random statistical sample and sampling distribution. Study of the main results of sampling distributions in normal populations.
• Understand the basic concepts and develop practical applications on the problem of estimating the parameters of a distribution.
• Understand and manage with ease in practice the basic results on the point estimate and confidence intervals in univariate normal populations.
• Develop the basics of hypothesis testing and immediate results in the case of normal populations, with one and two samples. Freely develop practical exercises with real data.
• Ask, learn and apply basic results fluently goodness-of-fit based on the Chi-square test.
• Use the software "R".
• Know the concepts and methods of linear programming and develop specific applications supported by appropriate software.

## SYLLABUS

UNIT 1. Exploring data.  Univariate data
UNIT 2. Bivariate data
UNIT 3. Probability theory. The law of total probability and Bayes's rule. Independent events
UNIT 4. Random variables. Discrete and continuous random variables
UNIT 5. Discrete and continuous probability distributions
UNIT 6. Introduction to statistical inference. Sampling distributions
UNIT 7. Point estimation. Confidence intervals
UNIT 8. Hypothesis Testing
UNIT 9. Lineal optimization

**LABORATORY PRACTICE:**
Practise of statistics using the free software "R".

## REFERENCES

MAIN BIBLIOGRAPHY:
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- Gutiérrez, R., Martínez, A., Rodríguez, C. (1993) Curso básico de Probabilidad. Pirámide, Madrid.
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- Milton, J.S., Arnold, J.C. (2004) Probabilidad y Estadística (con aplicaciones para Ingeniería y Ciencias Computacionales). McGraw-Hill Interamericana, México.
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- Cuadras, C.M. (2000) Problemas de Probabilidades y Estadística. Vol 2: Inferencia Estadística. EUB, Barcelona.
- De la Horra Navarro, J. (2003) Estadística Aplicada. Díaz de Santos.
- Evans, M.J. y Rosenthal J. S. (2005) Probabilidad y Estadísitca. La ciencia de la incertidumbre. Editorial Reverté.
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## LINKS

http://www.ugr.es/~mjgarcia/

## EVALUATION SYSTEM

In order to assess the acquisition of contents and skills, the following evaluation system will be used:
- Final exams will be carried out with a percentage of final qualification: 70%.
- Midterm exams and/or presentation of some practical exercises will be carried out. Percentage of final qualification: 30%.

The overall rating corresponds to the weighted score of the different aspects and activities that make up the evaluation system.

For students qualifying for the final single assessment. This type of assessment will consist of all the evidence to prove that the student has acquired all of the general and specific skills described in the corresponding section of this Course Guide, including at least a theory and a practical laboratory test. The final numerical grade will be obtained by the weighted sum of the ratings corresponding to a theoretical, the practical test.

All matters relating to the assessment will be governed by the Student Evaluation and Qualification Policy at the

University of Granada, which is available at this WEB URL. All matters relating to the assessment will be governed by the rules on teacher planning and organization of existing tests at the University of Granada.

The grading system is expressed by numerical rating according to the provisions of art. 5 of R.D. 1125/2003 of 5 September, establishing the European credit system and grading system of official university degrees and valid national territory is established.

ADITIONAL INFORMATION

**Firma (1): RAMÓN GUTIÉRREZ SÁNCHEZ**
En calidad de: **Secretario/a de Departamento**

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