

SUBJECT TEACHING GUIDE

G93 - Probability

Double Degree in Physics and Mathematics
Degree in Mathematics

Academic year 2020-2021

| 1. IDENTIFYING DATA | | | | | |
|----------------------------------|---|------------------|--------------------|------------------|--|
| Degree | Double Degree in Physics and Mathematics Degree in Mathematics | | | Type and Year | Compulsory. Year 3 Compulsory. Year 2 |
| Faculty | Faculty of Sciences | | | | |
| Discipline | Subject Area: Probability and Statistics Module: Compulsory Subjects | | | | |
| Course unit title and code | G93 - Probability | | | | |
| Number of ECTS credits allocated | 6 | Term | Semester based (1) | | |
| Web | | | | | |
| Language of instruction | Spanish | English Friendly | No | Mode of delivery | Face-to-face |

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|------------------|---|--|--|--|--|
| Department | DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION | | | | |
| Name of lecturer | ALICIA NIETO REYES | | | | |
| E-mail | alicia.nieto@unican.es | | | | |
| Office | Facultad de Ciencias. Planta: + 1. DESPACHO ALICIA NIETO REYES (1031) | | | | |
| Other lecturers | | | | | |

3.1 LEARNING OUTCOMES

- Knowledge and use of the basic concepts of probability.
- It aims an advanced manipulation of the fundamental tools of probability

4. OBJECTIVES

It is intended to give a correct formalization of the basic concepts of probability and study sequences of independent random variables and associated limit theorems.

| 6. COURSE ORGANIZATION | |
|------------------------|---|
| CONTENTS | |
| 1 | PROBABILITY SPACES. General probability spaces. Probability measures on the real line. |
| 2 | RANDOM VARIABLES. Random variable. Distribution functions of random variables. |
| 3 | RANDOM VECTORS. INDEPENDENCE. Random Vectors. Marginal probability. Conditional probability. Independence. |
| 4 | MEAN AND MOMENTS OF HIGHER ORDER. Expected value of a random variable. Moments of higher order. Inequalities |
| 5 | SEQUENCES OF RANDOM VARIABLES. CONVERGENCE. Almost sure convergence, convergence in probability and convergence in law. |
| 6 | LIMIT THEOREMS. An introduction to the Law of Large Numbers, Borel-Cantelli Theorems and Central Limit Theorem. |
| 7 | Final exam |
| 8 | Tutorial |

| 7. ASSESSMENT METHODS AND CRITERIA | | | | |
|---|--------------|-------------|-----------|--------|
| Description | Type | Final Eval. | Reassessn | % |
| Continuous evaluation | Others | No | Yes | 40,00 |
| Final evaluation | Written exam | Yes | Yes | 60,00 |
| TOTAL | | | | 100,00 |
| Observations | | | | |
| Taking part in any of the activities of evaluation implies that the student has undergone the evaluation process. | | | | |
| Observations for part-time students | | | | |
| The assessment of part-time students follow the same rules as the assessment of full-time students. Taking part in any of the two activities of evaluation implies that the student has done the evaluation | | | | |

| 8. BIBLIOGRAPHY AND TEACHING MATERIALS |
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| BASIC |
| CUESTA ALBERTOS (2006). Apuntes de Cálculo de Probabilidades |
| VELEZ IBARROLA, R. (2004) Cálculo de Probabilidades 2. Ediciones Académicas. Madrid |
| WILLIAMS, D. (2001). Weighing the odds: A course in probability and statistics. Cambridge University Press. Cambridge |