

## SUBJECT TEACHING GUIDE

M1497 - Probability and Statistics

Master's Degree in Mathematics and Computing

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Master's Degree in Mathematics and Computing			Type and Year	Compulsory. Year 1
Faculty	Faculty of Sciences				
Discipline					
Course unit title and code	M1497 - Probability and Statistics				
Number of ECTS credits allocated	3	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

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

- To know, comprehend and be able to apply advance techniques of Probability and Statistics in professional situations and in doing research in Mathematics and Computation.

### 4. OBJECTIVES

Provide the students with the proficiency and techniques required for the professional environment and the research in probability and statistics.

## 6. COURSE ORGANIZATION

CONTENTS	
1	Advance probability (inequalities of Hoeffding, Jensen and Tchevichev, strong law of large numbers, Kullback-Leibler divergence)
2	Estimation with noise and statistical data depth.
3	Nonparametric hypothesis testing (permutation methods and bootstrap)
4	Combination of hypothesis tests (FDR and FDR with dependency).
5	Sequential analysis.
6	Stochastic processes (goodness of fit, Markov models and hidden Markov models).
7	Monte Carlo methods.

## 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Continuous evaluation	Work	Yes	Yes	100,00
TOTAL				100,00
Observations				
Each student will write a paper related to the topic studied in class; it can be either of bibliographic or research nature.				
Observations for part-time students				
The evaluation of students at part time follows the same criteria than of students at full time.				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC
Probability and Statistics (4th Edition) 2011. Morris H. DeGroot , Mark J. Schervish