

## SUBJECT TEACHING GUIDE

M1513 - Simulation Techniques and Sampling Algorithms

Master's Degree in Mathematics and Computing

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Master's Degree in Mathematics and Computing			Type and Year	Optional. Year 1
Faculty	Faculty of Sciences				
Discipline					
Course unit title and code	M1513 - Simulation Techniques and Sampling Algorithms				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION				
Name of lecturer	MARCOS CRUZ RODRIGUEZ				
E-mail	marcos.cruz@unican.es				
Office	Facultad de Ciencias. Planta: + 1. DESPACHO (1053)				
Other lecturers	ANA ISABEL GOMEZ PEREZ				

3.1 LEARNING OUTCOMES
- Know how to use random number generator methods
- Learn how to apply Monte-Carlo techniques
- Learn how to apply Markov chains
- Learn how to use Bayesian model selection techniques

#### 4. OBJECTIVES

Understand the random number generation techniques

Understand Monte-Carlo techniques

Know the basics of Markov chains

Learn the basic concepts of Bayesian inference

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	Random number generation
2	Monte Carlo techniques
3	Bayesian inference
4	Bayesian model selection
5	Markov chains

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Exercises	Work	No	Yes	40,00
Exam	Laboratory evaluation	Yes	Yes	60,00
<b>TOTAL</b>				<b>100,00</b>

##### Observations

Exercises will be delivered through the Moodle.

##### Observations for part-time students

Part time students will be evaluated as the others.

#### 8. BIBLIOGRAPHY AND TEACHING MATERIALS

##### BASIC

- 1.) M. Cruz: "Apuntes y Ejercicios de clase", 2012.
- 2.) Eric A. Suess, Bruce E. Trumbo: "Introduction to Probability Simulation and Gibbs Sampling with R", Springer 2010.
- 3.) Brian D. Ripley: "Stochastic Simulation", Wiley, 1987.
- 4.) Wendy L. Martinez, Angel R. Martinez: "Computational Statistics Handbook With Matlab", Chapman & Hall/CRC Press, 2002.
- 5.) William H. Press, Brian P. Flannery, Saul A. Teukolsky, William T. Vetterling: "Numerical Recipes in Fortran", Cambridge University Press, 2010.