SUBJECT TEACHING GUIDE

335 - Functional Data Statistical Analysis

Master's Degree in Mathematics and Computing

Academic year 2026 - 2027

1. IDENTIFYING DATA					
Degree	Master's Degree in Mathematics and Computing			Type and Year	Optional. Year 1
Faculty	Faculty of Sciences				
Discipline	STATISTICS				
Course unit title and code	335 - Functional Data Statistical Analysis				
Number of ECTS credits allocated	3	Term		Semester based (2)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION
Name of lecturer	LUIS GONZALEZ DE LA FUENTE
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Other lecturers	

3.1 LEARNING OUTCOMES

To understand the usefulness of treating certain data as functions and learn how to adapt the different techniques for general data analysis to be applied to this kind of data

4. OBJECTIVES

Nowadays, there are many data that are acquired on a continuous basis (evolution of stock market prices, vital signs of patients, data from manufacturing processes, etc.) and which are therefore realisations of functions measured over time intervals. The aim is to understand the basic problems involved in handling this type of functions and to learn the statistical techniques available for their analysis.

6. COURSE ORGANIZATION

CONTENTS

1	Description and basic techniques to handle functional data
2	Parameter estimation
3	Supervised and un-supervised learning with functional data
4	Regression problems with functional data Functional linear model and associated tests of hypotheses.
5	Complements

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessment	%
It would be realized along the course.	Others	No	No	40,00
It would consist on a project.	Work	Yes	Yes	60,00
TOTAL				100,00
Observations				
Observations for part-time students				
The evaluation of part-time students will follow the same rules as that of regular students.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Nonparametric functional data analysis : theory and practice / Frédéric Ferraty, Philippe Vieu. Editorial: New York : Springer, cop. 2006. ISBN: 978-0-387-30369-7
Applied functional data analysis : methods and case studies / J. O. Ramsay, B. W. Silverman. Editorial: New York : Springer, cop. 2002. ISBN: 0-387-95414-7
Functional data analysis / J. O. Ramsay, B. W. Silverman. Editorial: New York : Springer, cop. 2005. ISBN: 978-0387-40080-8
Functional data analysis with R and MATLAB / J. O. Ramsay, Giles Hooker, Spencer Graves. Editorial: London : Springer, cop. 2009. ISBN: 978-0-387-98184-0
A partial overview of the theory of statistics with functional data / Antonio Cuevas Journal of Statistical Planning and Inference Vol. 147 (2014); pags. 1–23