

## SUBJECT TEACHING GUIDE

M1519 - Neural Networks

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	Optional. Year 1
Faculty	Faculty of Sciences				
Discipline					
Course unit title and code	M1519 - Neural Networks				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web	<a href="https://personales.unican.es/crespoj/redes/Cursoredes.html">https://personales.unican.es/crespoj/redes/Cursoredes.html</a>				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION				
Name of lecturer	JOSE LUIS CRESPO FIDALGO				
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Other lecturers					

### 3.1 LEARNING OUTCOMES

- Neural networks basics: modelling and learning; links with standard statistical and optimization techniques
- Informed algorithm choice
- Real life problem solving with neural networks
- Choice of neural network type

#### 4. OBJECTIVES

Real life problem solving  
Context-based method choice  
Introduction to modeling and learning with neural networks; including statistics and optimization considerations  
Neural networks algorithms understanding

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	Practical usage of neural networks. Classification. Regression
1.1	Neural network definition.
1.2	Feedforward multilayer perceptron
1.3	Deep networks
1.4	Competitive networks
2	Applications with particular challenges
2.1	Time series analysis. Feedback networks.
2.2	Feature selection
2.3	Model selection

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Description Implementation of a neural network for a particular problem	Work	Yes	Yes	100,00
TOTAL				100,00
Observations				
<p>The teacher will provide each student with a problem to be solved with neural networks. There is a single final deadline. Students present their solution whenever they have it ready before that deadline. If their solution is not valid, they will be told how to improve it, and will be able to present it whenever it is improved, again, before the final deadline. Top (honor) grades are limited. Students deserving those grades will be acknowledged following presentation order. When the top limit is hit, no further maximum grades can be awarded. Should any prevailing requirements forbid face-to-face evaluation, number, weights, conditions and exercise types would vary.</p>				
Observations for part-time students				
Since dates for developing the application and presenting it are chosen individually by agreement between the teacher and each student, no further considerations are needed for half-time students.				

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

Aggarwal, Charu C  
Neural Networks and Deep Learning A Textbook  
Springer International Publishing AG  
ISBN: 3-319-94462-2, 978-3-319-94462-3