SUBJECT TEACHING GUIDE

364 - Neural Networks

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					
Course unit title and code	364 - Neural Networks				
Number of ECTS credits allocated	3	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION
Name of lecturer	ANDRES IGLESIAS PRIETO
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Other lecturers	ROBERTO SUAREZ MORENO

3.1 LEARNING OUTCOMES

- Basic knowledge of neural network modeling and learning techniques, and their connections to other fields (artificial intelligence, machine learning, optimization, etc.).
- Selection of the most efficient algorithms for implementing these models .
- Application of these techniques to both academic examples and real-world problems.
- Critically decision-making regarding the most appropriate type of network for each potential real-world problem they may encounter in the future.

4. OBJECTIVES

- To illustrate the application of these techniques in both academic examples and real-world problems.
- To provide students with experience regarding the suitability and efficiency of different methods in various applications.
- To describe the algorithms for implementing neural network models.

6. COURSE ORGANIZATION	
CONTENTS	
1	ntroduction to artificial neural networks. Concept of a neural network. Elements of a neural network: architecture, activation functions, connections, weights. History of neural networks. Main neural network architectures. Supervised and unsupervised learning. Neural networks and machine learning. Recent developments in neural networks. Deep learning. Convolutional neural networks. Attention mechanisms. Examples of use.

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessment	%
Neural networks tests.	Laboratory evaluation	No	No	25,00
Class exercises.	Others	No	Yes	25,00
Final project.	Work	Yes	Yes	50,00
TOTAL				100,00
Observations				
Should any prevailing requirements forbid face-to-face evaluation, number, weights, conditions and exercise types would vary.				
Observations for part-time students				
Those who cannot carry out the face-to-face assessment activities for a duly justified reason, may receive 100% of the score by completing a course assignment.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Charu C. Aggarwal: "Neural Networks and Deep Learning". Springer Nature, Cham, Switzerland 2023. ISBN: 978-3-031-29641-3
Simon Haykin: "Neural Networks and Learning Machines (3er edition)". Pearson Education, 2009. ISBN 978-0-13-147139-9.
Documentación de la asignatura.