[MRB102] DEEP LEARNING

GENERAL INFORMATION

Studies	Master's Degree in ROBOTICS AND CONTROL SYSTEMS			**Subject**	?
Semester	2	**Course**	1	**Mention / Field of specialisation**	AUTONOMOUS SYSTEMS - EIT
Character	OPTIONAL				
Plan	2023	**Modality**	Face-to-face	**Language**	CASTELLANO/EUSKARA
Credits	6	**Hours/week**	0	**Total hours**	58 class hours + 92 non-class hours = **150 total hours**

PROFESSORS

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REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
DATA ANALYTICS	*(No previous knowledge required)*

LEARNING RESULTS

LEARNING RESULTS	KC	SK	AB	ECTS
M1R209 - [!] *Diseñar e implementar el modelo de la representación de los datos según su naturaleza e interpretar las mismas para extraer conocimiento*		x		4,8
M1R223 - [!] *Capacidad de trabajar en equipos multidisciplinares y en un entorno multilingüe y de comunicar, tanto de forma oral como escrita, conocimientos, procedimientos, resultados e ideas relacionadas con los temas afines al máster*		x		0,4
M1R227 - [!] *Demostrar capacidad para integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre los ODS, los derechos humanos y derechos fundamentales, y sobre la*		x		0,8
			Total:	6

KC: Knowledge or Content / SK: Skills / AB: Abilities

SECONDARY LEARNING RESULTS

RA101 **[!]** ***Identifica los conceptos del preprocesamiento y análisis de datos avanzado***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	28 h.	32 h.	60 h.

Comments: Reinforcement Learning

EVALUATION SYSTEM	W
Individual written and/or oral tests or individual coding/programming tests	100%

Comments: Reinforcement Learning

MAKE-UP MECHANISMS

Individual written and/or oral tests or individual coding/programming tests

CH - Class hours: 28 h.
NCH - Non-class hours: 32 h.
TH - Total hours: 60 h.

RA102 **[!]** ***Propone y desarrolla soluciones cuya base sea el análisis de datos utilizando los conceptos del aprendizaje automático avanzado comunicando sus conclusiones de manera argumentada en un segundo idioma***

LEARNING ACTIVITIES	CH	NCH	TH
Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams	16 h.	30 h.	46 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams	14 h.	30 h.	44 h.

Comments: Reinforcement Learning

EVALUATION SYSTEM	W	MAKE-UP MECHANISMS
Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems	50%	Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems
Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems	50%	

Comments: Reinforcement Learning

CH - Class hours: 30 h.
NCH - Non-class hours: 60 h.
TH - Total hours: 90 h.

CONTENTS

Deep Learning

1. Introduction

2. Deep Neural Networks (DNN)

3. DNNs building and tuning

4. Applications of DNNs

Reinforcement Learning

1. Value function
2. Function Approximation
3. Policy Gradient
4. Actor-Critic

The Carbon Footprint of Artificial Intelligence

LEARNING RESOURCES AND BIBLIOGRAPHY

Learning resources

Moodle Platform
Virtual Laboratory (Google Colab)
Subject notes

Bibliography

Richard S. Sutton and Andrew G. Barto "Reinforcement Learning: An Introduction"

Géron, A. (2022). Hands-on machine learning with Scikit-Learn, Keras, and TensorFlow. " O'Reilly Media, Inc.".

Bengio, Y., Goodfellow, I., & Courville, A. (2017). Deep learning (Vol. 1). Cambridge, MA, USA: MIT press.