POLI ESCOLA SUPERIOR TECNOLOGIA GESTÃO TÉCNICO GUARDA	**SUBJECT DESCRIPTION**	**MODELO** PED.013.03

Course	**Data Science and Artificial Intelligence**					
Subject	**Machine Learning I**					
Academic year	2023/2024	*Curricular year*	2nd	*Study period*	1st semester	
Type of subject	Compulsory	*Student workload (H)*	Total: 168	Contact: 60	*ECTS*	6
Professor(s)	Prof. Dr. Noel Lopes					
☒ *Area/Group Coordinator* ☐ *Head of Department* *(select)*	Prof. Dr. José Fonseca					

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

1. *Understand the different paradigms of machine learning.*
2. *Develop classification, prediction, and regression models using machine learning algorithms.*
3. *Build supervised learning systems to address real and concrete problems.*
4. *Familiarize oneself with the most important metrics for evaluating machine learning models.*

2. PROGRAMME

1. *Introduction to machine learning.*
2. *Machine learning paradigms.*
3. *Data preprocessing.*
4. *Machine learning supervised algorithms and tools.*
5. *Performance metrics and machine learning models evaluation.*
6. *Real-world applications and use cases*

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

Topics 1 and 2 are consistent with objective 1.

Topics 3, 4, and 5 are consistent with objectives 2 and 3.

Topic 6 is consistent with objectives 2, 3, and 4.

4. MAIN BIBLIOGRAPHY

- *Lecture notes*
- *Noel Lopes, Bernardete Ribeiro, 2015, "Machine Learning for Adaptive Many-Core Machines - A Practical Approach", Studies in Big Data, vol. 7, Springer International Publishing. ISBN 978-3-319-06937-1*
- *JOÃO GAMA, ANDRÉ PONCE DE LEON CARVALHO, KATTI FACELI, ANA CAROLINA LORENA, MÁRCIA OLIVEIRA, 2017, "Extração de Conhecimento de Dados". 3ª Edição ISBN: 978-972-618-914-5.*
- *https://scikit-learn.org/stable/ [Out 2021]*
- *Christopher M. Bishop. Pattern Recognition and Machine Learning. Springer, 2006.*
- *Trevor Hastie, Robert Tibshirani, Jerome Friedman, 2009, " The elements of statistical learning: Data mining, inference, and prediction", Springer Series in Statistics, ISBN: 0387848576, 9780387848570, 9780387848587*

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Teaching methodologies: *Lecture, interactive lesson, Project*

Evaluation methodologies:

100%*: Practical assignments with the preparation of reports and/or articles and mandatory presentations.*

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

Theoretical classes are dedicated to elucidating the theory underpinning supervised learning, including architecture and training algorithms.

During the theoretical-practical sessions, we delve into the practical application of supervised training, encompassing data preprocessing, model training, and subsequent validation and model evaluation.

7. CONTACTS AND OFFICE HOURS

Noel Lopes (noel@ipg.pt), office 27

Office days: Wednesday from 9:00 to 12:00

8. OTHERS

DATE

20 September 2023

SIGNATURES

Professor(s), Area/Group Coordinator or Head of Department signatures

Professor

(signature)

Area/Group Coordinator

(signature)