School of Technology and Management
Course Unit Syllabus

Level of qualification:
Second Cycle (EQF level 7) - Master
Study cycle:
Internet of Things

Course Unit: – **Big Data**

Year 1 **Semester 1** **ISCED Code: 481** **ECTS: 6**

Type of Course Unit: Compulsory **Delivery Mode:** Face-to-face / Distance Learning **Language of Instruction:** Portuguese

COURSE COORDINATOR: Isabel Sofia Sousa Brito

HOURS OF WORK

TOTAL HOURS	Contact Hours								Hours in autonomous work
	Theory	Theory and practice	Practical and laboratory work	Field work	Seminar	Internship	Tutorial guidance	Other	
150		**29**							**121**

Prerequisites (if applicable): n.a.

LEARNING OUTCOMES (knowledge, skills and competence)

On successful completion of this course unit, the student should be able to:

LO 1. Explain the principles and basic concepts of storage, query and processing / analysis of data (Big Data).

LO 2. Identify and solve practical problems by applying the concepts and storage techniques, query and processing / analysis of data (Big Data).

LO 3. Select and use open source tools and cloud, for storage, query and processing / data analysis, particularly large volume of data (Big Data), appropriate to each problem.

LO 4. Use platforms/tools for management and analysis of data (Big Data).

CONTENTS

C 1. NoSQL. Introduction, storage models (document store, column store, key-value store and graph-oriented) and tools (examples: MongoDB, HBase and Cassandra).

C 2. Big Data. Introduction, features and architectures.

C 3. Big Data. Storage architectures and tools (example: Hadoop Distributed File System (HDFS)).

C 4. Big Data. Queries and tools (examples: Hive and Google BigQuery).

C 5. Big Data. Types of analysis / processing (batch, real-time) and tools (examples: Hadoop / MapReduce, Pig).

DEMONSTRATION OF THE CONTENTS COHERENCE WITH THE COURSE UNIT'S LEARNING OUTCOMES

LO 1. Explain the principles and basic concepts of storage, query and processing / analysis of data (Big Data) (C 1- 5).

LO 2. Identify and solve practical problems by applying the concepts and storage techniques, query and processing / analysis of data (Big Data) (C 1-5).

LO 3. Select and use open source tools (open source) and cloud (cloud), for storage, query and processing / data analysis, particularly large volume of data (Big Data), appropriate to each problem (C 1, 3, 4, and 5).

LO 4. Use platforms for management and analysis of data (Big Data) (C 2-5).

TEACHING METHODOLOGIES

Large class:

M 1. Explanation of theoretical and practical contents.

Outside class activity:

M 2. Exercises based on practical guides.

Computer laboratory:

M 3. Exercises based on practical guides.

DEMONSTRATION OF THE COHERENCE BETWEEN THE TEACHING METHODOLOGIES AND THE LEARNING OUTCOMES

M 1. The principles and concepts will be presented in the classroom for the whole class (LO 1) .

M 2. Activities outside the classroom strengthen students' autonomy in identifying solutions more appropriate to the context of the Internet of Things (LO 2 - 4).

M 3. Solving practical exercises in the classroom and in the lab gives a significant competence to the students in terms of using different types of tools, and the application of concepts and storage techniques, query and processing / data analysis, according to the problem to solve. The laboratory classes also enable them to find answers that simulate the professional context (LO 2 - 4).

EVALUATION METHODS

Evaluation:

• Practical case development (group work);

• Individual quiz;

• Final exam.

MAIN BIBLIOGRAPHY

Big Data: Concepts, Technology, and Architecture. Balamurugan Balusamy, Nandhini Abirami R, Seifedine Kadry, Amir H. Gandomi. ISBN-13: 978-1119701828. ISBN-10: 1119701821. Wiley 1st Edition. 2021.

NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence. Pramod J. Sadalage, Martin Fowler. Addison-Wesley 2012. ISBN-13: 978-0321826626. ISBN-10: 0321826620.

Big Data Science & Analytics: A Hands-On Approach. Arshdeep Bahga , Vijay Madisetti. Published by: Arshdeep Bahga , Vijay Madisetti, 2016.

Hadoop: The Definitive Guide, Storage and Analysis at Internet Scale. Tom White. O'Reilly, 4th Edition, 2015. ISBN: 978-1-49190-163-2.

MongoDB: The Definitive Guide: Powerful and Scalable Data Storage. Shannon Bradshaw, Eoin Brazil, Kristina Chodorow. O'Reilly, 3rd Edition. 2019. ISBN-13: 978-1491954461 ISBN-10: 1491954469.

Year of implementation: 2021/2022 | Date of approval by the Technical-Scientific Board: 2021-06-23