Syllabus
2025 - 2026

TECHNICAL SHEET OF THE SUBJECT

Data of the subject	
Subject name	Big Data and Data Governance
Subject code	DTC-MBD-512
Mainprogram	Official Master's Degree in Big Data
Involved programs	Máster Universitario en Big Data [First year] Máster Universitario en Ingeniería de Telecomunicación + Máster Universitario en Big Data [Second year]
Quarter	Semestral
Credits	3,0 ECTS
Type	Obligatoria
Department	Department of Telematics and Computer Sciencies
Coordinator	Carlos Morrás Ruiz-Falcó
Office hours	Concertar por email

Teacher Information	
Teacher	
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SPECIFIC DATA OF THE SUBJECT

Contextualization of the subject

Contribution to the professional profile of the degree

Big data is a new technology that plays a leading role in all processes where there is a large volume of data or where artificial intelligence, or machine learning algorithms are required. It is allowing to highly increase efficiency and effectiveness and enabling new business models that were previously impossible or unimaginable. Is a challenging to process and analyze in order to support decision-making.
It is necessary to understand the impact that this technology has and on what concepts it is based. Not only in the technical detail - which will be seen in other subjects - but also to understand in global terms its main characteristics, but also the ethical and legal connotations that using this technology implies and how to take care of the new valuable asset that is, and how to manage it with data governance principles.

During the course, students will learn the most relevant aspects of big data technology,

The objective of this course is for students to understand the power of Big Data, its transformative and disruptive value and the value of data and how to manage them in a company properly, from the ethical, legal and data governance aspects.
By the end of the course, students will:

- Understand what Big Data is in a global way. How and why it arises and its main characteristics.
- Understand the value of the data and know how to organize a data governance to maximize its value, and company's value
- Know the ethical and legal aspects (GDPR, DMA, Others) that Big Data and Advanced Analytics systems must comply, and who to design in this mode. By the end of the course, students should have enough knowledge of big data technology to understand its potential, and have developed an informed criterion to determine when and how to use it in a professional context.

Prerequisites

There are not special prerequisites for this course

Competencies - Objectives

Competences

Results of the training and learning process

Knowledge or content

CO1 Understand the fundamentals of data analytics and its application in various areas of artificial intelligence, highlighting the integration in complex and multidisciplinary solutions for the advanced analysis of massive data, taking into account the diversity of specific problems in each area.
CO4 Know and understand the legal and ethical principles of artificial intelligence and massive data processing and the tools and techniques to guarantee compliance in their professional work.

Competencies

CP1 Integrate architectures, artificial intelligence techniques, advanced data and visualization analysis and legal compliance to offer the global solution
optimal.
CP5 Apply the ethical principles related to the collection, storage, and analysis of data, taking into account possible direct or indirect discrimination derived from decision-making.
CP6 Be able to effectively determine the objectives, priorities, methods and controls to perform tasks related to the planning of data exploitation and artificial intelligence projects, by organizing activities with the deadlines and available means.

Skills or abilities

HA1 Communicate orally and in writing with technical rigor, expository clarity and argumentative coherence to all types of interlocutors, technical and non-technical.
HA2 Work in multidisciplinary and/or international teams and adequately organize and lead group dynamics.
HA3 Develop the interpersonal skills required by current professional environments (empathy, tolerance, respect, ability to combine conflicting interests).
HA4 Manage, organize and adequately plan work and time, meeting objectives and quality standards.
HA5 Maintain continuous training and learning and adaptation to technological and scientific changes.

THEMATIC BLOCKS AND CONTENTS

Contents - Thematic Blocks

short description of the contents of the assignature

1. Introduction big data and artificial intelligence.

2.Ethical aspects of data, big data, artificial intelligence and its use. Legislation and recommendations.

3. Legislation related to Artificial Intelligence and big data: Constitution, RPGD, EU AI Regulation and others related to the right to privacy. Mechanisms and techniques for compliance

4. Other regulations and legislation related to big data and AI

5. Methodology and techniques of data governance and data management.

TEACHING METHODOLOGY

General methodological aspects of the subject

Para garantizar un aprendizaje útil y práctico, se combinarán clases teóricas con clases magistrales que reflejen la realidad del mercado. También se estudiarán casos reales desde el punto de vista empresarial y técnico, algunos de los cuales se utilizarán en sesiones prácticas.

To ensure useful and practical learning, theoretical classes will be combined with master classes that reflect the reality of the market. Real case examples with also be studied from business and technical perspectives, some of which will be used in practical sessions.

In-class Methodology: Activities

in-class activities
▪ Lectures: The lecturer will introduce the fundamental concepts of each unit, along with some practical recommendations, and will go through worked examples to support the explanation. and by proposing quizzes and short application exercises to be solved in class.

▪ Active participation and class discussion: will be encouraged by raising open questions to foster discussion., With the teacher as moderator, discussion in class and in electronic media will be encouraged by the students of topics and readings delivered in advance so that the student faces real situations

Non-Presential Methodology: Activities

Personal study of the course material. (20H)

▪ Preparation of work at home. 10h

SUMMARY STUDENT WORKING HOURS

SActividades formativas y metodologías docentes

Formation activities		
Training Activity	Hours	**In-person**
Expository and participatory master classes	**20**	100
Practical exercises and problem solving	40	100
Practical sessions		
Personal study	**20**	0
Essays	**10**	0

EVALUATION AND CRITERIA

Assessment

Written exams I: 60%

Evaluation practical sessions 20%

Individual practical work: 20%

Ratings

GRADING AND COURSE RULES

Grading

Regular assessment

• Eassys and class participation: 40%

• Final exam: 40% Quizzes+Mid term exam 20%

In order to pass the course, the weighted average mark must be greater or equal to 5 out of 10 points, the mark of the final exam must be greater or equal to 4 out of 10 points, Otherwise, the final grade will be the lower of the three marks.

Additionally, there may be an optional GDPR and privacy work that gives a maximum of 1 point on the final grade (only in case it is approved)

Retake

Case the part of quizzes and participation in class

• is greater than or equal to 7, then: It will be kept and will make a weighted average (40% / 60%) with a new final exam.

• is less than 7,then The grade will be that of the final exam (100%), having to obtain at least a 5 in it

Course rules

▪ Class attendance is mandatory according to Article 93 of the General Regulations (Reglamento General) of Comillas Pontifical University and Article 6 of the Academic Rules (Normas Académicas) of the ICAI School of Engineering. Not complying with this requirement may have the following consequences:

- Students who fail to attend more than 15% of the lectures may be denied the right to take the final exam during the regular assessment period.
- Regarding practice, absence to more than 15% of the sessions can result in losing the right to take the final exam of the regular assessment period and the retake. Missed sessions must be made up for credit.

▪ Students who commit an irregularity in any graded activity will receive a mark of zero in the activity and disciplinary procedure will follow (cf. Article 168 of the General Regulations (Reglamento General) of Comillas Pontifical University).

BIBLIOGRAPHY AND RESOURCES

Basic Bibliography

Slides prepared by the lecturer (available in Moodlerooms)

• Big Data: A Revolution That Will Transform How We Live, Work, and Think. Viktor Mayer-Schonberger (Autor), Kenneth Cukier (Autor)

• Creating Value with Big Data Analytics (Inglés) Tapa blanda – 14 ene 2016 de Peter Verhoef (Autor), Edwin Kooge (Colaborador) https://www.amazon.es/Creating-Value-Big-Data-Analytics/dp/1138837970

• GDPR: REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016. https://www.boe.es/doue/2016/119/L00001-00088.pdf y http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R0679

• Una ética para Big data. Introducción a la gestión ética de datos masivos. 2018 Rosa Colmenarejo Fernández.

• Data Stewardship: An Actionable Guide to Effective Data Management and Data Governance . ISBN:978-0124103894. David Plotkin.

• Manual de ética aplicada en inteligencia artificial , Javier Camacho Ibánez Mónica Villas Olmeda. Editorial Anaya

Complementary Bibliography

- George Orwell. 1984 . ISBN: 9788499890944
- Michael Lewis. Moneyball: The Art of Winning an Unfair Game Paperback – March 17, 2004. ISBN: 978-0393324815 or the film 'Moneyball (2011)'. Sony Pictures Director: Bennett Miller (Netflix, Movistar, otras)
- Facebooksitan: (varias plataformas, Movistar+, Netflix, Dirección: Jakob Gottschau Duración: 58 min
- El gran Hackeo. (The Great Hack 2019). Netflix. Dirección Karim Amer, Jehane Noujaim. 135 min.