Course title	Big Data and Analytics
Course code	DIS508
Course type	Compulsory
Level	Postgraduate
Year / Semester	1st / 2nd

ECTS	7.5	**Lectures / week**	1	**Laboratories / week**	1

Course purpose and objectives	In today's world, the ability to collect, analyze, and interpret Big Data is vital for any organization seeking to remain competitive. With the explosive rate that data becomes readily available and the evolution of analytics technologies, businesses can make better informed decisions and forecast market prices more accurately. The Big Data and Analytics course provides students with the necessary knowledge and skills to harness relevant enterprise data and extract actionable business value, making them valuable professionals in any market sector, with one eye on adaptation, survival, and competence.
	The Big Data and Analytics course is designed to provide students with a comprehensive understanding of Business Intelligence (BI) systems, analytics and data science. Students will consider managing big data and applying analytical techniques to make strategic decisions in the field based on historical records. The course will focus on the practical applications of these techniques in business environments, offering both theoretical knowledge and practical skills.
	Learning Objectives include developing the ability to identify and evaluate the role of BI systems in an organization, as well as apply predictive and prescriptive analytics techniques to real business scenarios. Students will also learn how to query relevant data from enterprise systems for analysis purposes, use data visualization, summarization, and storytelling platforms, as well as critically evaluate the range of business intelligence tools available on the market.
	Upon successful completion of the course students should be able to:
	• Identify and consider the role of modern enterprise systems in an organization.
	• Discuss and apply a range of analytical techniques to business scenarios.
	• Identify and extract relevant patterns from an enterprise system for analysis purposes.
	• Critically evaluate the range of relevant business intelligence tools available in the market.

Learning outcomes	Course Learning Outcomes (CLOs) include:

Course Learning Outcomes (CLOs) include:

[CLO1] Analyze and thoroughly understand the processes, methods, practices and techniques involved in the analysis and management of big data.

[CLO2] Critically evaluate issues of data quality, accuracy and security and their implications for decision-making in the field.

[CLO3] Discuss the practices and challenges/benefits of traditional data analysis techniques and more modernized methods such as Machine Learning (ML) and Artificial Intelligence (AI).

[CLO4] Exhibit basic knowledge and ability to use tools and techniques to visualize data and effectively present relevant findings in business contexts.

[CLO5] Understand and apply predictive and prescriptive analytical techniques to solve business problems and provide data-driven support for strategic decisions.

[CLO6] Demonstrate ability to work collaboratively in teams to collect, analyze and interpret big data, leveraging knowledge to achieve organizational goals.

The individual objectives of the course are as follows:

1. Knowledge	1.1 **Understand** what Big Data is and its business implications.
	1.2 **Identify** the major ethical and legal issues in the application of analytics.
	1.3 **Distinguish** between the importance of data, information and knowledge, and their acquisition in decision support.
2. Skills	2.1 **Apply** analytical forecasting in Big Data.
	2.2 **Manage** procedures required to develop, report and analyse data.
	2.3 **Develop** solutions using specialized tools.
	2.4 **Apply** machine learning techniques integrating open-source Code (e.g. R or Python)
	2.5 **Combine** processing and utilization of data to improve the quality of operational/strategic decision making

3. Competencies	3.1 **Develop** specialist knowledge and analytical skills in current and developing areas of statistical analysis and ML. 3.2 **Propose** scalable solutions to the challenges faced by applications dealing with very large volumes of data. 3.3. **Act** to create business value through real-time analytics.	

Prerequisites	-	**Required**	-

Course content

Week	Topic	CLOs
1	Overview of Data Science, Analytics and Business Intelligence	[CLO1], [CLO3]
2	Foundations and Technologies of Decision Making	[CLO1], [CLO3], [CLO5]
3	Descriptive Analytics	[CLO1], [CLO4], [CLO5]
4	Data Warehouses	[CLO2], [CLO5]
5	Predictive Analytics - Data Mining	[CLO3], [CLO4], [CLO5]
6	Data Mining Techniques and Algorithms	[CLO3], [CLO4], [CLO5]
7	Text Analytics, Text Mining, and Sentiment Analysis	[CLO3], [CLO4], [CLO5]
8	Prescriptive Analytics	[CLO3], [CLO5], [CLO6]
9	Knowledge management	[CLO2], [CLO5], [CLO6]
10	Data Mining Techniques and Algorithms – Correlation Rules and Clustering	[CLO3], [CLO4], [CLO5]
11	Big Data Concepts and Tools	[CLO1], [CLO2], [CLO4]
12	Future Trends and Privacy of Analytics	[CLO2], [CLO3], [CLO6]
13	Recap	[CLO1], [CLO2], [CLO3], [CLO4], [CLO5], [CLO6]

Teaching methodology	The teaching of the course "Big Data and Analytics" follows a combination of lectures, laboratory exercises, graded interactive activities, as well as a series of formative and comprehensive assignments, to ensure a thorough understanding

and practical application of key concepts of analytics and data science, while including group activities and discussions.

The methodology includes the following elements:

Interactive Lectures: Provide a theoretical foundation of the course with examples and case studies to enhance student understanding.

Group activities/discussions: Facilitate collaboration and exchange of ideas among students through group projects and discussions.

Workshop Activities: Hands-on exercises and workshops to apply knowledge using tools and programming languages such as Python and Tableau.

Formative and summative assignments: Assessment of student progress through assignments throughout the course, including the final assignment.

Case studies and self-assessment exercises: Analysis of real cases and self-assessment to improve critical skills.

Web Links and Video Tutorials: Use online resources and videos to supplement learning and reinforce concepts.

Online Quizzes: Continuous assessment of student understanding through online quizzes.

Final Assignment: The final assignment is specifically designed to encapsulate the knowledge and skills acquired throughout the course. The general purpose of the work is the development of an interactive application (dashboard) that allows the efficient transmission of information and the execution of basic Online Analytical Processing (OLAP) functions in real time. Students are asked to perform descriptive and predictive analyses of historical data and engage in writing a short but comprehensive business report, summarizing and explaining their findings, as well as presenting it to interested parties (e.g., c-level suite).

| Bibliography | Required Reading:

• Ramesh Sharda, Dursun Delen, Efraim Turban, Business Intelligence, Analytics, and Data Science: A Managerial Perspective, 4th Edition, 2018, Pearson
• Ramesh Sharda, Dursun Delen, Efraim Turban, Business Intelligence and Analytics: Systems for Decision Support, 10th Edition, 2015, Pearson

Additional (Optional) Reading:

• Tan Pang - Ning, Steinbach Michael, Kumar Vipin, Karpatne Anuj, 2018. Introduction to Data Mining, Addison Wesley, ISBN-13: 978- |

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Assessment	**Assessment Type**	**Weight (%)**		**CLO1**	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
	Interactive Activity 1	5%	20%	√	√			√	
	Interactive Activity 2	5%		√	√	√			√
	Interactive Activity 3	5%		√		√	√	√	
	Interactive Activity 4	5%		√	√	√	√		√
	Final Assignment	20%			√	√	√	√	√
	Final Exam	60%			√	√	√	√	√
	Total	**100%**							
Language	English								