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.				

<table>
<tr><td rowspan="3">Learning outcomes</td><td colspan="2">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:</td></tr>
<tr><td>1. Knowledge</td><td>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.</td></tr>
<tr><td>2. Skills</td><td>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</td></tr>
</table>

	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

Mix of lectures, active learning techniques and activities. More precisely:

- Interactive face-to-face lectures
- Notes and PowerPoint Presentations in digital format through the electronic platform

	• Basic textbook(s) and additional bibliography • Assignments • Meetings with the instructor(s) • Discussions of real word case studies • Web links • Critical reflection on research article • Peer review on group working and discussion in forum • Educational videos on real world case studies and critical discussion in forum
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: 978-0133128901
Assessment	
Language	English

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%**							