

NIRMA UNIVERSITY

Institute:	Institute of Technology, School of Technology
Name of Programme:	MTech CSE (Data Science)
Course Code:	6CS369ME25
Course Title:	Data and Knowledge Security
Course Type:	Department Elective-II
Year of Introduction:	2025-26

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Course Learning Outcomes (CLO):

At the end of the course, the students will be able to:

1. summarize the security requirements of data and knowledge (BL2)
2. analyse the security requirements of the big data systems (BL3)
3. suggest security solutions for big data systems (BL4)
4. propose the regulations and policies for secured governance and risk mitigation techniques. (BL6)

Unit	Contents	Teaching Hours (Total 30)
Unit-I	Big Data Security Rationales: Finding threats faster vs. trusting the tool, Architecture of Business and IT, Requirement of Security in Big Data	03
Unit-II	Big Data Security, Challenges and Failures: Frameworks and distributions, scope and CIA Model, Data Privacy	04
Unit-III	Introduction to Data Security: Threat Model, Automation and Scale, Introduction to Network and System Security	04
Unit-IV	Elements of Big Data Security: Data Protection, Vulnerability Types and its Management, Access Control	04
Unit-V	Security Governance: Duty of Care, Resilience, Security Culture, Governance Frameworks, Incident Management and Reporting	05
Unit-VI	Security Risk Management: Regulations and Policies, Training and Implementation, Asset Areas, Privacy Preservation Methods, Related Case Studies.	10

Self-Study:

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study contents

Suggested Readings/ References:

1. Talbot, Julian, and Miles Jakeman. Security risk management body of knowledge, Wiley
2. Fei Hu, Big Data: Storage, Sharing, and Security, CRC Pres



3. Onur Savas, Julia Deng, Big Data Analytics in Cybersecurity (Data Analytics Applications), CRC Press
4. Big Data Security: <https://mapr.com/big-data-security-6-elements/assets/big-data-security-6-elements.pdf>

Suggested List of Experiments:

Sr. No.	Name of Experiments/Exercises	Hours
1	Implementing Kerberos Authentication in Hadoop	04
2	Data Encryption in Big Data Using AES	04
3	Intrusion Detection in Big Data Networks Using Snort	06
4	Access Control Management in Apache Ranger	06
5	Simulating a Big Data Security Attack and Analyzing Logs	04
6	Privacy-Preserving Data Masking in Big Data.	06