

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	BTech All (Other than CSE)
Course Code:	4CS212IE25
Course Title:	Financial Data Security and Management
Course Type:	Interdisciplinary Minor-Elective
Year of Introduction:	2025-26

L	T	Practical Component				C
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Course Learning Outcomes (CLO):

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

1. identify the different data security technologies and their management (BL3)
2. compare cryptographic techniques for data security (BL4)
3. evaluate cybersecurity threats and vulnerabilities for financial data security (BL5)
4. design the applications based on blockchain technology for the financial sector. (BL6)

Unit	Contents	Teaching Hours (Total 45)
Unit-I	Introduction to Data Security: Data Security, data breach, data remanence, data theft, wireless identity theft, information security, risk management, types of controls – administrative, logical, physical, firewall and its types, data privacy vs. data security, the evolution of phishing attacks, data security rules, example - HIPAA security rule, protecting and securing information through software – DBAN, Disk Utility, Shred, DHDease, etc.	06
Unit-II	Basic Cryptography Concepts: Impact of cryptography on security investigations, cryptography concepts, hashing mechanisms and algorithms, encryption usage and features, cryptanalysis, symmetric encryption, asymmetric cryptographic algorithms, Diffie-Hellman (DH) key agreement and DH groups, SSH protocol, digital signatures, PKI components and PKI operations, use case for SSL/TLS, cipher suite concepts, key management for the secure generation, verification, exchange, storage, and destruction of keys	12
Unit-III	Cybersecurity for Finance and FinTech: Introduction to FinTech and cybersecurity, CIA principle, CIA Triad, Types of cyber crimes – phishing scams, cyberbullying, hacking, logic bombs, DDoS attack, salami attack, email bombing, piracy, malware, cybersecurity components – OSI layer, zero-day attacks, types of network attacks, application security, endpoint security, cybersecurity threats in FinTech, cybersecurity vulnerabilities in FinTech, secure financial market infrastructure	10
Unit-IV	Blockchain for Financial Data Security: Introduction to blockchain, classifying blockchain technologies, identities on the blockchain, blockchain data, blockchain network and data processing, cryptocurrency, blockchain consensus, permissioned and	11

	permissionless blockchain, smart contracts, use cases of blockchain for financial data security	
Unit-V	Financial Data Management: The Changing Financial Services Landscape, Taxonomy of Financial Data, Challenges and Trends in the Financial Data Management Agenda, Data Management Tools and Techniques, Data Management Processes and Quality Management	06

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. Adam J. Elbirt, Understanding and Applying Cryptography and Data Security, Auerbach Publications
2. Martijn Groot, A Primer in Financial Data Management, Academic Press
3. Gurdip Kaur, Ziba Habibi Lashkari, Arash Habibi Lashkari, Understanding Cybersecurity Management in FinTech, Challenges, Strategies, and Trends, Springer
4. Anand Shinde, Introduction to Cyber Security, Guide to the World of Cyber Security, NotionPress
5. Gulshan Shrivastava, Dac-Nhuong Le, Kavita Sharma, Cryptocurrencies and Blockchain Technology Applications, Wiley

Suggested List of Experiments:

Sr. No.	Title	Hours
1	To explore tools for protecting and securing information through software such as DBAN, Disk Utility, Shred, DHDerase, etc.	02
2	To implement digital signatures to sign and verify authenticated users. Also, show a message when tampering is detected.	02
3	Explore different cryptographic algorithms for securing data, such as RSA, DSA, Diffie-Hellman, etc.	04
4	Implement a DDoS attack on financial market infrastructure.	02
5	Perform different types of testing, such as penetration testing for cyber security and assessment.	04
6	To create a blockchain and implement replay attacks on the blockchain.	02
7	To perform a thorough study and installation of Anaconda 5.0.1 and Python 3.6 and perform proof of work (POW) consensus mechanism. Also, notice the changes in mining rewards and nonce requirements.	04
8	To perform thorough study and installation of Remix IDE and Truffle IDE for deploying smart contracts and decentralized applications (DApps) and create and deploy a smart contract for finance applications.	04
9	Deploy a smart contract for a Decentralized Bank System by using Solidity. In this contract, the owner can add money (in the form of ETH, etc.), and he has certain functionalities like checking their balance and transferring to another account, and after performing the transaction, the owner can see the balance.	04
10	Explore any two financial data management tools and perform their features.	02