



M.TECH DEGREE EXAMINATIONS: NOV/ DEC 2024

(Regulation 2024)

First Semester

DATA SCIENCE

24DSI505: Data Security and Privacy

COURSE OUTCOMES

- CO1:** Apply encryption algorithms to ensure confidentiality and integrity in the data using a mathematical approach.
- CO2:** Analyze network security protocols used for secure client-server data communication.
- CO3:** Examine the threats of data repositories and the security policies for secure data management.
- CO4:** Identify the mitigation steps for the vulnerabilities in data breach.
- CO5:** Relate the security breach with legal regulation to analyze the impact of minimal data security.

Time: Three Hours

Maximum Marks: 100

PART A (4*20 = 80 Marks)

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| 1. a) | Encrypt the following using play fair cipher with the keyword MONARCHY. 'SWARAJ IS MY BIRTH RIGHT'. Use X for blank spaces. | 4 | CO1 | [K ₃] |
| b) | Perform encryption and decryption using the RSA algorithm for the following: p=7, q=11; e=17; m=8. | 8 | CO1 | [K ₃] |
| c) | Summarize the steps involved in the SHA algorithm for encrypting a message with a maximum length of less than 2^{128} bits and producing as output a 512-bit message digest. | 8 | CO1 | [K ₃] |
| 2. a) | Draw the IP security authentication header and describe the functions of each field. | 5 | CO2 | [K ₂] |
| b) | Generalize the methodology involved in computing the keys in SSL / TLS protocol. | 5 | CO2 | [K ₂] |
| c) | Discuss the major challenges in ensuring data privacy and data protection in a cloud environment. Identify the strategies to mitigate these challenges. | 10 | CO2 | [K ₂] |

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| 3. | a) | Compare and contrast the significance of logical segregation and physical segregation in protecting sensitive data. | 7 | CO3 | [K ₄] |
| | b) | Explain the importance of role-based access control in managing data access and reducing the risk of data breaches in an organization. | 7 | CO3 | [K ₂] |
| | c) | Discuss the significance of secure data storage and transmission in safeguarding sensitive information. | 6 | CO3 | [K ₂] |
| 4. | a) | Examine the impact of cyberattacks on organizations and the strategies to mitigate them. | 6 | CO4 | [K ₄] |
| | b) | Explain how firewalls help establish a security framework for an organization. | 6 | CO4 | [K ₂] |
| | c) | Describe the key components of a disaster recovery plan. How does a disaster recovery plan differ from a business continuity plan? | 8 | CO4 | [K ₂] |

Answer any ONE Question
PART B (20 x 1 = 20 Marks)

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| 5. | a) | Analyze the ethical dilemmas faced by organizations in disclosing security breaches to the public. | 10 | CO5 | [K ₄] |
| | b) | Discuss the scope of the CCPA and identify the criteria that determine its applicability to businesses. | 10 | CO5 | [K ₃] |

OR

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|----|----|--|----|-----|-------------------|
| 6. | a) | Examine the effectiveness of international cooperation in addressing cybercrimes. | 10 | CO5 | [K ₄] |
| | b) | Explain the key obligations of organizations under the PDPA in handling personal data. | 10 | CO5 | [K ₂] |
