| ITE2009 | Storage Technologies | L | T | P | J | C |
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| | | 3 | 0 | 0 | 4 | 4 |
| **Pre-requisite** | **ITE1003** | **Syllabus version** | | | | |
| | | 1.0 | | | | |

**Course Objectives:**

- To provide better understanding of guidelines, principles, and architecture used in storage technology
- To provide an insight into the technologies in storage management
- To impart the knowledge in designing secure storage system

**Expected Course Outcome:**

1) Comprehend the various concepts of information storage systems.
2) Describe various mechanisms involved in storage systems for different environments.
3) Understand the logic in usage of RAID for data protection for effective storage management.
4) Learn and apply the concepts of intelligent storage in real time information systems
5) Comprehend the direct attached storage for SCSI systems.
6) Analyze the usage of storage area network for effective storage.
7) Use the network storage concepts and apply for effective information storage.
8) Understand the characteristics of various storage technologies.

| **Student Learning Outcomes (SLO):** | **2, 5, 12** |
|---|---|
| [2] | Having a clear understanding of the subject related concepts and of contemporary issues |
| [5] | Having design thinking capability |
| [12] | Having adaptive thinking and adaptability |

| **Module:1** | **Introduction to Information Storage and Management** | **6 hours** |
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Information storage, Evolution of storage technology and architecture, Data center infrastructure, Key challenges in managing information, Information lifecycle

| **Module:2** | **Storage System Environment** | **6 hours** |
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Components of a storage system environment, Disk drive components, Disk drive performance and fundamental laws of governing disk performance, Logical components of the Host, Application requirements and disk performance

| **Module:3** | **Data Protection using RAID** | **6 hours** |
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RAID and its implementation aspects, RAID array components, RAID levels and comparison, RAIP impact of disk performance, Hot spares

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| **Module:4** | **Intelligent Storage System** | **6 hours** |
| Components of an intelligent storage system, intelligent storage array, Concepts in practice | | |
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| **Module:5** | **Direct-attached storage and introduction to SCSI** | **6 hours** |
| Benefits, limitations and types of direct-attached storage (DAS), Disk drive interfaces, Introduction to SCSI and its command model. | | |
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| **Module:6** | **Storage Area Networks** | **6 hours** |
| Fiber channel, Evolution and components of SAN, Fiber channel (FC), connectivity, FC ports and architecture, Zoning, FC login types, FC topologies. | | |
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| **Module:7** | **Network-attached storage** | **6 hours** |
| General purpose servers versus network attached storage (NAS) devices, NAS file I/O, NAS components and implementation, NAS file-sharing protocols and I/O operations, Factors affecting NAS performance and availability | | |
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| **Module:8** | **Contemporary issues:** | **3 hours** |
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| | **Total Lecture hours:** | **45 hours** |

**Text Book(s)**

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|---|---|
| 1. | Somasundaram Gnanasundaram, Alok Shrivastava, Information Storage and Management, Wiley Publishing Inc, 2nd Edition, 2012. |

**Reference Books**

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|---|---|
| 1. | Data Storage Networking: Real World Skills for the CompTIA Storage+ Certification and Beyond Nigel Poulton John Wiley & Sons, 2014. |
| 2. | Storage Networks Explained Ulf Troppens, Rainer Erkens, Wolfgang Muller-Friedt, Rainer Wolafka, Nils HausteinJohn Wiley & Sons, 24-Aug-2011 |
| 3. | Securing Storage: A Practical Guide to SAN and NAS Security Himanshu Dwivedi, Prentice Hall, 2012. |

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| Recommended by Board of Studies | 05-03-2016 | | |
| Approved by Academic Council | No. 40 | Date | 18-03-2016 |