INFORMATION STORAGE SYSTEMS
(ELECTIVE-I)

Course Code: 13IT2108

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Pre requisites:

1. Database Management Systems.
2. Computer Organization.
3. Operating Systems.

Course Outcomes:

At the end of the course, a student will be able to:

CO 1: Summarize storage requirements.
CO 2: Compute disk performance.
CO 3: Classify storage solutions.
CO 4: Apply storage connectivity technologies.
CO 5: Differentiate network-attached and object-based storage.

Unit-I

Introduction to Information Storage: Information Storage, Evolution of Storage Architecture, Data Center Infrastructure, Virtualization and Cloud Computing.

Data Center Environment: Application, Database Management System (DBMS), Host (Compute), Connectivity, Storage, Disk Drive Components, Disk Drive Performance, Host Access to Data, Direct-Attached Storage , Storage Design Based on Application Requirements and Disk Performance, Disk Native Command Queuing , Introduction to Flash Drives, Concept in Practice: VMware ESXi.

Unit-II

Data Protection: RAID: RAID Implementation Methods, RAID Array Components, RAID Techniques, RAID Levels, RAID Impact on Disk Performance, RAID Comparison, Hot Spares.

Intelligent Storage Systems: I Components of an Intelligent Storage System, Storage Provisioning, Types of Intelligent Storage Systems, Concepts in Practice: EMC Symmetrix and VNX.

Unit-III

Fibre Channel Storage Area Networks: Fibre Channel: Overview, The SAN and Its Evolution, Components of FC SAN , FC Connectivity, Switched Fabric Ports, Fibre Channel Architecture, Fabric Services, Switched Fabric Login Types, Zoning, FC SAN Topologies, Virtualization in SAN, Concepts in Practice: EMC Connectrix and EMC VPLEX .

Unit-IV

IP SAN and FCoE : FCIP, FCoE.

Network-Attached Storage : General-Purpose Servers versus NAS Devices, Benefits of NAS, File Systems and Network File Sharing, Components of NAS, NAS I/O Operation, NAS Implementations, NAS File-Sharing Protocols, Factors Affecting NAS Performance, File-Level Virtualization, Concepts in Practice: EMC Isilon and EMC VNX Gateway.

Unit-V

Object-Based and Unified Storage : Object-Based Storage Devices, Content-Addressed Storage, CAS Use Cases, Unified Storage, Concepts in Practice: EMC Atmos, EMC VNX, and EMC Centera.

Text Books:

1. G.Somasundaram, A.Shrivastava, *Information Storage and Management: Storing, Managing and Protecting Digital Information in Classic, Virtualized and Cloud Environment*, 2nd Edition, Wiley publication, 2012.
2. Robert Spalding, *Storage Networks, the Complete Reference*, 1st Edition, Tata McGraw Hill/Osborne, 2003.

References:

1. Marc Farley, *Building Storage Networks*, 2nd Edition, Tata McGraw Hill/Osborne, 2001.
2. Meeta Gupta, *Storage Area Network Fundamentals*, 1st Edition, Pearson Education, 2002.

Web references:

www.education.emc.com