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 Educational Objectives:

The main objective of the course is to introduce the students to different storage requirements, Data Center Environment, Data Protection Policies, Intelligent Storage Systems, and Storage Technologies. Upon completion of this course, the student should be able to:

1. Describe storage technology solutions.
2. Describe common storage management and roles.
3. Understand the concept of information availability and its measurement.
4. Understand various data protection policies
5. Understand intelligent storage systems and storage technologies.

Course Outcomes:

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

1. Identify different storage requirements and Components of Data Center.
2. Understand various Data Protection Policies, Intelligent Systems and storage technologies.
3. Describe about fiber channel, its evolution and components.
4. Get the idea about network attached storage, network file sharing and components.
5. Understand Object-Based Unified Storage and storage devices.

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