

Course Name	Advanced Storage Systems		
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Course No.:	-	Credits:	3	Program:	Graduate
Prerequisite:	-	Co-requisite:	-		
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Course Syllabus

1. Introduction to Data Storage Systems
 - a. Storage History
 - b. Performance trend of disk drives and microprocessors
 - c. Amdahl Law and its implication to storage systems
 - d. Architecture of server-centric storage
2. Architecture of Storage-Centric IT Infrastructure
3. I/O Architecture & Configuration in Disk Subsystem
4. Qualitative & Quantitative Metrics in Storage Systems
 - a. Throughput, response time, availability, serviceability, and scalability
5. Disk Configuration in Storage Systems
 - a. RAID1, RAID10, RAID5, RAID6
 - b. Read performance, write performance, and availability
6. Design of an Advanced Storage System
 - a. Backend design
 - b. Front-end design
 - c. Memory system design
7. I/O Flow in Storage Systems
 - a. Read, write, and copy
8. Advanced Features of Data Storage Systems
 - a. Remote Mirroring
 - b. Instant Copies
 - c. Data Migration
 - d. LUN Masking
9. Cache Memory in Storage Systems
 - a. Structure of cache memory in storage systems
 - b. Comparison of cache memory in storage systems and microprocessors
 - c. Cache replacement algorithms used in storage systems
10. Architecture of Off-The-Shelf Storage Systems
 - a. IBM, HP, and EMC
11. Design & Implementation of SAN & NAS
 - a. Storage Area Network (SAN) and Network Attached Storage (NAS)
12. I/O Techniques in Storage Systems
 - a. SCSI, iSCSI, Fibre Channel, SAS
13. Design & Architecture of Emerging Technologies used in Storage Systems
 - a. Architecture of NAND & NOR chips
 - b. Design & architecture of Solid-State Disk Drives (SSDs)

References

1. Storage Networks Explained: Basics and Application of Fibre Channel SAN, NAS, iSCSI, InfiniBand and FCoE, U. Troppens, R. Erkens, W. Mueller-Friedt, and R. Wolafka, 2nd Edition, John Wiley & Sons Inc., 2009.
2. Storage Area Networks Essentials, R. Barker and P. Massiglia, John Wiley & Sons Inc., 2002.
3. Storage Technologies and Systems, IBM Journal of Research & Development, Special issue, November 2008.
4. Introduction to Storage Area Networks, J. Tate, F. Lucchese, and R. Moore, IBM Redbooks (eBook), July 2006.
5. Computer Architecture: A Quantitative Approach, Third Edition. John L. Hennessy and David A. Patterson. Morgan Kaufmann Publishers, 2003.
6. Holy Grail of Data Storage Management, The. Jon William Toigo, Prentice-Hall, 2000.