

Nirma University
Institute of Technology, School of Technology
M Tech Computer Science and Engineering (Data Science)
Semester – II

L	T	P	C
2	0	2	3

Course Code	3CS42D202
Course Title	Advanced Storage Systems

Course Learning Outcomes (CLOs):

At the end of the course, students will be able to

1. comprehend modern architecture for storage systems
2. identify appropriate storage approach applicable for the given application
3. analyse different distributed and parallel file system performance

Syllabus:

Teaching Hours:

Unit I

Design and architecture of storage systems, Local and distributed storage systems

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Unit II

Solid-state disk drives, Architecture of NAND and NOR Flash chips, NVM File System: PMFS, SCMFS, BPFS, LFS, Managed Data Structures for NVM, Memory driven computing with NVM

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Unit III

Storage networking and network storage protocols, Network-Attached Storage, SAN/NAS Convergence, High-Performance Parallel File Systems, Disk array systems, Large Storage Systems, Extremely scalable storage, Content addressable storage

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Unit IV

Data integrity, reliability and fault tolerance in storage systems, Cache management in storage systems, software defined storage, Deduplication for storage systems, Storage security, Replication, consistency and online data migration in storage systems

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Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 5 experiments to be incorporated.

Suggested Readings[^]:

1. U. Troppens, R. Erkens, W. Mueller-Friedt, and R. Wolafka, Storage Networks Explained: Basics and Application of Fibre Channel SAN, NAS, iSCSI, InfiniBand and FOCE, John Wiley & Sons Inc.
2. Robert Spalding, Storage Networks: The Complete Reference, McGraw Hill Education
3. R. Barker and P. Massiglia, Storage Area Networks Essentials, John Wiley & Sons Inc.
4. David J Sacks, Enterprise Storage Systems, CreateSpace
5. J. Tate, F. Lucchese, and R. Moore, Introduction to Storage Area Networks, IBM Redbooks (eBook)
6. Jon William Toigo, Holy Grail of Data Storage Management, Prentice-Hall
7. Special issue on Storage Technologies and Systems, IBM Journal of Research & Development
8. Relevant research papers for the topics

L=Lecture, T=Tutorial, P=Practical, C=Credit

[^]this is not an exhaustive list