

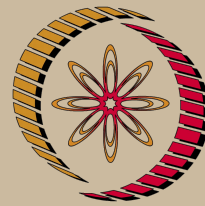
Storage Systems - Video course

COURSE OUTLINE

The objective of this course is to discuss storage systems, their design and analysis from both hardware (architectural features) and system software (operating systems, networking, run-time systems) point of view.

COURSE DETAIL

Sl.No.	Topics	No. of Hours
1	Introduction: <ul style="list-style-type: none"> • History: computing, networking, storage • Need for storage networking • SAN, NAS, SAN/NAS Convergence • Distributed Storage Systems • Mainframe/proprietary vs. open storage • Storage Industry Organizations and Major Vendors Market • Storage networking strategy (SAN/NAS or Distr storage) • Impact of Regulations: existing and new 	4
2	Technology <ul style="list-style-type: none"> • Storage components • Data organization: File vs. Block, Object; Data store; Searchable models • Storage Devices (including fixed content storage devices) • File Systems • Volume Managers • RAID systems • Caches, Prefetching 	6
3	Network components <ul style="list-style-type: none"> • Connectivity: switches, directors, highly available systems • Fibre Channel • 1GE/10GE, Metro-ethernet • Aggregation • Infiniband 	4



NP-TEL

NPTEL

<http://nptel.iitm.ac.in>

Computer Science and Engineering

Pre-requisites:

Operating systems.

Additional Reading:

SNIA tutorials.

Hyperlinks:

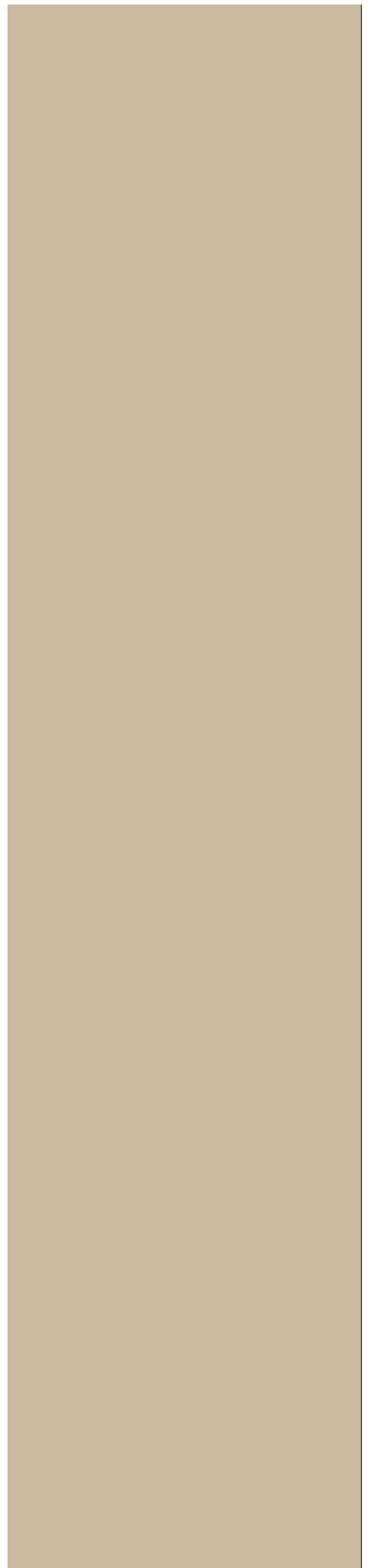
Uptodate articles in Wikipedia.

Coordinators:

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Automation IISc Bangalore

4	<p>Error Management</p> <ul style="list-style-type: none"> • Disk Error Mgmt • RAID Error Mgmt • Distr Systems Error Mgmt 	4
5	<p>Highly available and Disaster-tolerant designs</p> <ul style="list-style-type: none"> • Ordered writes, Soft updates and Transactions • 2 phase, 3 phase, Paxos commit protocols • Impossibility Results from Distributed Systems • Choose 2 of 3: Availability, Consistency and Partition Tolerance 	6
6	<p>Layering and Interfaces in Storage Protocols:</p> <ul style="list-style-type: none"> • eg. SCSI 1/2/3SNIA model 	2
7	<p>SAN Components</p> <ul style="list-style-type: none"> • Fibre Channel • IP-based Storage (iSCSI, FCIP, etc.) • Examples <p>NAS</p> <ul style="list-style-type: none"> • NFS • CIFS • DAFS 	4
8	<p>Large Storage Systems</p> <ul style="list-style-type: none"> • Google FS/BigTable • Cloud/Web-based systems (Amazon S3) • FS+DB convergence • Programming models: Hadoop 	4
9	<p>Archival Systems</p> <ul style="list-style-type: none"> • Content addressable storage • Backup: serverless, LAN free, LAN Replication issues • Storage Security • Storage Management • Device Management • NAS Management 	6



<ul style="list-style-type: none"> • Virtualization <ul style="list-style-type: none"> • Virtualization solutions • SAN Management <ul style="list-style-type: none"> • Storage Provisioning • Storage Migration • SRM • Summary 	
Total	40

