# Program kursa:

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| **Introduction** | * SAN definition, benefits and goals
* High-speed backup and high availability
* Server and storage consolidation
* DAS, NAS, and SAN concepts and comparisons
* SAN considerations
 | * Tier storage
* SAN components
* Host, target and interconnect device characteristics
* SAN portfolio overview
* Power-on sequence
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| **Fibre Channel (FC) Basics** | * Addressing
 | * FC terminology, WWNs, port types, and topologies
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| **Switch Installation and Configuration** | * In the box
* Steps overview
* Environmental issues
* Configuration parameters
* Initial CLI and serial connection
* Default passwords
* IP settings
* CLI settings
 | * Time settings
* Licensing management
* Login banner
* Switch, chassis, fabric and port names
* Syslog
* Checkin switch and ports status
* Configuration file backup
* Rebooting
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| **SAN Hosts** | * Host role within SAN
* Converged network adapters
* Host installation checklist and bus connections
* Boot from SAN
* Multi-path SAN and load balancing
 | * Multi-path I/O (MPIO) components within OS
* NPIV overview, benefits, scalability and management
* HPE Virtual Connect overview
* Finding WWNs
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| **Disk Targets** | * SATA interface
* SAS interface
* SSD technologies
* Disk enclosures
* Storage presentation
* Storage Virtualization
* Connecting disks to controllers
 | * Storage Deduplication
* Provisioning types
* Data encryption
* VVOLs
* Portfolio overview
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| **Fibre Channel Basic Services** | * SNS/name server
* SNS in Web Tools
* SNS related commands
* Zoning overview
* Zoning building blocks
 | * Basic zoning configuration
* Basic zoning configuration via CLI and GUI
* Fabric segmentation
* Zoning best practices
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| **SAN Management** | * SAN management choices and considerations
* Technologies driving SAN management
* HPE SAN management today
* SNMP
 | * REST API
* OneView
* Web Tools
* SAN Network Advisor
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| **iSCSI** | * IP storage overview
* iSCSI stack, packet construction and name convention
 | * iSCSI initiator options
* iSCSI discovery methods and security
* HPE Nimble array as an iSCSI product example
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management

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| **SAN Extension** | * Basics and overview
* Cables and SFPs
 | * Fabric virtualization overview
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| **FCoE/CEE** | * FCoE and CEE standards
 | * Enhanced Transmission Selection (ETS)
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|  | * FCoE I/O consolidation and terminology
 | * Congestion Notification (CN)
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|  | * FCoE stack and encapsulation
 | * Data Center Bridging Capabilities Exchange (DCBX)
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|  | * Lossless Ethernet
 | * FCIP, iSCSI and FCoE basic comparison
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|  | * Priority-based Flow Control (PFC)
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| **SAN Security** | * Basic storage security model and access points
 | * RBAC
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|  | * Planning security in a SAN environment
 | * Roles management
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|  | * Core components for securing SAN data
* Data and management security models
 | * Password rules and local/remote authentication
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| **Data Protection** | * Reasons for data protection
 | * RMC
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|  | * Data protection challenges
 | * RPO and RTO
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|  | * Data classification
 | * Tape libraries overview
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|  | * Protection and recovery methods
 | * StoreOnce overview and introduction
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|  | * Backup types and their differences
 | * CloudBank Storage
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|  | * Backup topologies
 | * Local and remote replication
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|  |  | * Deduplication
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| **Performance** | * Factors affecting SAN performance
* SAN performance planning and considerations
* Latencies and congestion
 | * Performance monitoring
* Performance guidelines within the SAN
* Recommendations for switch ISL connectivity
* Determining the required bandwidth
* Storage performance (drive and RAID selection)
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| **SAN Design** | * Architecture choices and design considerations
* HPE standard SAN topologies and topology design rules
* Advantages, disadvantages and scalability of different topologies
* Data locality
 | * Topology data access usage
* SAN infrastructure performance factors
* Levels of high availability in SAN architecture
* SAN planning and documentation utilities
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# Lab plan:

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| --- | --- | --- |
| * B-Series Switch Exploration and Basic operations (Web Tools and CLI)
* Basic switch configuration
* Working with QConverge for QLogic HBA.
* 3PAR volume provisioning and presentation
* Working with MPIO
 | * Configuring zoning (Web Tools and CLI)
* Working with Nimble iSCSI array (provisioning and NCM)
* Working with B-Series switches user accounts and password rules
* 3PAR Snapshot management
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