# 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 |  |
| **Fibre Channel (FC) Basics** | * Addressing | * FC terminology, WWNs, port types, and topologies |  |
| **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 |  |
| **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 |  |
| **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 |  |
| **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 |  |
| **SAN Management** | * SAN management choices and considerations * Technologies driving SAN management * HPE SAN management today * SNMP | * REST API * OneView * Web Tools * SAN Network Advisor |  |
| **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 |  |

management

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| **SAN Extension** | * Basics and overview * Cables and SFPs | * Fabric virtualization overview |
| **FCoE/CEE** | * FCoE and CEE standards | * Enhanced Transmission Selection (ETS) |
|  | * FCoE I/O consolidation and terminology | * Congestion Notification (CN) |
|  | * FCoE stack and encapsulation | * Data Center Bridging Capabilities Exchange (DCBX) |
|  | * Lossless Ethernet | * FCIP, iSCSI and FCoE basic comparison |
|  | * Priority-based Flow Control (PFC) |  |
| **SAN Security** | * Basic storage security model and access points | * RBAC |
|  | * Planning security in a SAN environment | * Roles management |
|  | * Core components for securing SAN data * Data and management security models | * Password rules and local/remote authentication |
| **Data Protection** | * Reasons for data protection | * RMC |
|  | * Data protection challenges | * RPO and RTO |
|  | * Data classification | * Tape libraries overview |
|  | * Protection and recovery methods | * StoreOnce overview and introduction |
|  | * Backup types and their differences | * CloudBank Storage |
|  | * Backup topologies | * Local and remote replication |
|  |  | * 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) |
| **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 |

# 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 |  |