1. **Computer Network and Administration**

Sr. No.	Course Contents	Number of Hours
1	**Module 1: Basics of Networks** ~~Introduction to networking~~ - Network terminologies - ~~Requirements of Building a network~~ - ~~Networking devices - Network topologies~~ - ~~OSI model - Transmission media~~ - - ~~Repeaters - Bridges - Routers - Switches - Modem~~ - CSU/DU - NIC - ~~Physical address - Logical address.~~	4 Hrs
2	**Module 2:IP Addressing and Subnetting** ~~Versions of IP addresses~~ - Understanding ipv4 and ipv6 - ~~Binary representation of ip address~~ - ~~Classes of ip addresses (ipv4)~~ - Addressing modes of ip address - Assigning ip address to machine - VLSM - ~~CIDR - Subnetting - Need of subnetting~~ - Subnet mask for respective classes of ip.	7 Hrs
3	**Module 3:LAN Switching** ~~Types of switching - CSMA/ CD - Configuring and verifying L2 switch - Verify the network status and basic switch operations - VLAN configuration - Switch port security - Password setup for switch~~ - Password reset for L2 switch.	5 Hrs
4	**Module 4: Routing** Routers - Boot process of Cisco router - Configure and verify utilizing the CLI to set basic Router configuration - Configure and verify operation status of a device interface - both serial and Ethernet - Verify router configuration and network connectivity - ~~Configure and verify routing configuration for a static or default route given specific routing~~ - IP Routing Technologies requirements - Differentiate methods of routing and routing protocols - Configuring NAT.	7 Hrs
5	**Module 5: IP SERVICES and Security** ~~Classful vs. Classless Routing~~ - Administrative distance - ~~Static and dynamic routing~~ - ~~Load balancing~~ - ~~Configuration of DHCP in router~~ - ~~Configure and verify ACL - RIP~~ - Configure and verify OSPF (single area) - ~~Configure and verify EIGRP (single AS)~~ - ~~VPN~~ - ~~SNMP~~ - PGP - ~~Firewall~~ .	7 Hrs

2. Python Programming

Sr. No.	Course Contents	Number of Hours
1	**Module 1:Getting Started With Python** ~~Introduction to Python – Installation – Python Interpreter – Interpreter and its environment.~~	4 Hrs
2	**Module 2:Language and its Built-ins** ~~The Python Language – Object Oriented Python – Exceptions – Modules – Core Built-Ins - String and Regular Expression – Levels of Abstraction – Software Development Process.~~	7 Hrs
3	**Module 3:Libraries and Modules** ~~Files and Text Operations~~ – Persistent and Databases – ~~Time Operations~~ – Controlling Executions - ~~Threads and Processing~~ – Numeric Processing – ~~Testing, Debugging and Optimizing.~~ int(), float() and complex() -> are numeric processing	7 Hrs
4	**Module 4: Network and web Programming** Client side Network Protocol Modules – Socket and Server side Network Protocol Modules – CGI Scripting and Alternatives – MIME and Network Encodings.	6 Hrs
5	**Module 5: Extending and Embedding** Extending and Embedding Classic Python – Extending and Embedding Jython – Distributing Extensions and Programs – Tkinter GUI Programming.	6 Hrs

3. Cloud Computing and IT Service Management

Sr. No.	Course Contents	Number of Hours
1	**Module 1:Introduction to Cloud Computing** Definition of Cloud computing by NIST - Evolutions of cloud computing - Technologies involved in cloud computing - Requirements of cloud computing - Characteristics of Cloud computing by NIST - ~~Facts and myths of cloud computing -~~ ~~Virtualization vs Cloud computing~~ - ~~Difference between traditional infrastructure server and cloud computing~~ - ~~Service models of cloud computing - IAAS - PAAS - SAAS - XAAS - Deployment modes of Cloud computing - Public cloud - Private cloud - Hybrid cloud~~ - Community cloud - Architecture of Cloud computing by NIST - ~~Advantages and disadvantages of cloud computing.~~	12 Hrs
2	**Module 2:Governance in Cloud and CSP** ~~Understanding governance in cloud~~ - stack holders in cloud - cloud service management - ~~Service level agreement - SLA penalty and exclusion~~ - ~~cloud services downtime and lasting impact~~ - ~~issues in cloud computing: legal issues - technical issues - business issues~~ - QOS in cloud,.	8 Hrs
3	**Module 3:ITIL Overview and Service Strategy** ITIL History - Components of the ITIL Library - IT Service Management - Organizing for IT Service Management - Technology and Architecture - ~~Service Strategy: Service Strategy Lifecycle Stage - Service Portfolio Management - the Demand Management Process - the IT Financial Management Process~~ - Introduction to ISO 20000 Standards.	10 Hrs
4	**Module 4: Service Design** ~~Service Design Lifecycle Stage~~ - ~~The Service Catalog Management Process - The Service Level Management Process - The Availability Management Process - The Capacity Management Process~~ - ~~The Information Security - Management Process - The IT Service Continuity - Management Process~~ - ~~The Supplier Management Process~~	8 Hrs
5	**Module 5: Service Transition** ~~Service Transition Lifecycle Stage~~ - ~~the Change Management Process~~ - ~~the Release and Deployment Management Process - the Service Asset and Configuration Management Process - Knowledge Management.~~	7 Hrs

4. **Linux Administration**

1	**Module 1:Introduction to Linux** ~~Introduction to Operating system - Types of Operating system - Multi user operating system~~ - Open source licensing - History of Linux - ~~Unix Vs Linux - Flavors of Linux - Benefits and characteristics of Linux~~ - Installation of Linux - ~~Linux booting process~~ - Log in and switch users in multiuser run levels - Shell and bash features - ~~Linux kernel - sudo vs su - Date and time configuration - Linux run levels.~~ **Directories and files:** ~~Directory structure - System directory - Absolute path and relative path -Creating and removing directory - Changing directory path - Creating removing copying and moving files - File Permissions - Links hard link and soft link - Input and output redirection - Filters and pipes - Locate read and use system documentation including man page~~	7 Hrs
2	**Module 2:Package, User and group Management** RPM - YUM - ~~Archive - Compress unpack and uncompress files using tar - star - gzip and bzip2 - Create delete and modify local user accounts - Change passwords for local user accounts - Create delete and modify local groups and group memberships - Changing owner and modes~~.	7 Hrs
3	**Module 3:Configuring local storage and filesystem** ~~List create delete and partition type for primary extended and logical partitions - Create and remove physical volumes assign physical volumes to volume groups - Create and delete logical Volumes. - Create mount unmount ext2 ext3 and ext4 file systems.~~ - Mount - unmount - and LUKS-encrypted file systems - ~~Access control list~~.	4 Hrs
4	**Module 4: Managing system and infrastructure services:** Managing system services - Shutting down - suspending and hibernating the system - Controlling systemd on remote machine - Creating and modifying systemd unit files – ~~DHCP Configuration~~ - HTTP server Configuration - ~~FTP server Configuration~~ - Mail server Configuration - ~~Samba server Configuration~~ - NTP server Configuration - ~~NFS server Configuration~~	7 Hrs
5	**Module 5: OpenSSH and Linux security:** ~~OPENSSH - The SSH Protocol - Configuring OpenSSH and Starting an OpenSSH Server Key-Based Authentication in OpenSSH~~ - OpenSSH Clients - Using the ssh Utility - scp Utility and sftp Utility - ~~Configure firewall settings using system-config-firewall or iptables~~ - Set enforcing and permissive modes for SELinux - List and identify SELinux file and process context.	5 Hrs

5. **Principles of Virtualization**

Sr. No.	Course Contents	Number of Hours
1	**Module 1:Introduction** ~~Introduction to Virtualization - Types of virtualization - Difference between cloud and virtualization - Physical infrastructure and virtual infrastructure~~ - Virtualization approaches - Partitioning - Hosting - Isolation - Hardware independence - ~~Virtual machine - Hypervisor - Types of hypervisor~~ - Virtual machine manager - ~~Types of hypervisor - Introduction to datacenter virtualization Esxi~~ - Difference between Esxi and Esx - Versions of Esxi - Installation and configuration of Esxi 6.0 - vSphere 6.0	6 Hrs
2	**Module 2:Components of vSphere 6.0** Components of VMware vSphere - ~~vSphere 6.0: Overview and Architecture~~ - Topology of vSphere 6.0 Data Center - vSphere 6.0 Configuration MaximumsvCenter Server - vCenter Server Features - <u>Certificate Management - Alarms and Alerts</u> - Monitoring Features - Template Management - Linked Mode Deployment - Storage Features in vSphere - ~~Shared Storage~~ - Storage Protocols - <u>Datastores - Virtual SAN - Virtual Volumes -</u> Networking Features in vSphere - Virtual Networking - ~~Virtual Switches and its types~~.	14 Hrs
3	**Module 3:Features of vSphere and NSX** ~~vSphere Resource Management Features - vMotion - Distributed Resource Scheduler (DRS) - - Distributed Power Management (DPM)~~ - ~~Storage vMotion~~ - Storage DRS - ~~Storage I/O Control - Network I/O Control~~ - ~~vSphere Availability Features~~ - vSphere Data Protection - ~~High Availability~~ - Fault Tolerance - vSphere Replication - Introduction to NSX.	10 Hrs
4	**Module 4: VSphere Solutions to Data Center Challenges and vSphere Security** Challenges - Availability Challenges - Scalability Challenges - Management Challenges - Optimization Challenges - Application Upgrade Challenges - Cloud Challenges - Security - Describe the features and benefits of VMware Platform Services Controller - Configure ESXi host access and authorization - Secure ESXi - vCenter Server - and virtual machines - Upgrade ESXi and vCenter Server instances.	7 Hrs

5	**Module 5: Resource optimization and resource management** **Network Optimization -** Configure and manage vSphere distributed switches - Migrate virtual machines from standard switches to distributed switches - Explain distributed switch features such as port mirroring - LACP - QoS tagging - and NetFlow - **CPU Optimization -** Explain the CPU scheduler operation - NUMA support - and other features that affect CPU performance - Monitor key CPU performance metrics - **Memory Optimization -** Explain ballooning - memory compression - and host swapping techniques for memory reclamation when memory is overcommitted - Monitor key memory performance metrics - **Storage Optimization -** Diagnose storage access problems - Configure VMware vSphere Flash Read Cache - Monitor key storage performance metrics.	8 Hrs