**9.Red Hat Linux Syllabus**

**(Name : V.Praveen Kumar, Duration : 10weeks – 100 Hours, lessons - 18)**

Here’s a **general employability-focused syllabus for Red Hat Linux**, designed to help you acquire practical skills and knowledge needed for Linux system administration roles, particularly with a focus on Red Hat-based distributions (like RHEL, CentOS, and Fedora). This syllabus aligns with real-world job requirements and certifications like **RHCSA (Red Hat Certified System Administrator)** and **RHCE (Red Hat Certified Engineer)**.

**Topics Covered:**

**1. Introduction to Linux and Red Hat**

* Understanding Linux Distributions
* Overview of Red Hat Enterprise Linux (RHEL)
* Installing and Configuring RHEL
* Navigating the Linux Filesystem
* Basic Command Line Operations

**2. Linux Command Line and Shell Scripting**

**Basic Commands**

* File and Directory Management:
* ls, cd, cp, mv, rm, mkdir, rmdir
* Viewing File Content:
* cat, less, more, tail, head
* Searching and Finding Files:
* find, locate, grep
* File Permissions and Ownership:
* chmod, chown, chgrp

**Shell Scripting**

* Writing Basic Bash Scripts
* Variables and Environment Variables
* Conditional Statements (if, else, elif)
* Loops (for, while, until)
* Functions and Script Debugging
* Scheduling Jobs with cron and at

**3. User and Group Management**

* Creating and Managing Users:
* useradd, usermod, userdel
* Group Management:
* groupadd, groupmod, groupdel
* User Password and Expiry Management
* Access Control and Sudo Configuration
* Managing User Profiles and Permissions

**4. File System and Storage Management**

* Disk Partitioning and Formatting:
* fdisk, gdisk, parted
* Managing File Systems:
* **ext4**, **xfs**, **btrfs**
* Mounting and Unmounting File Systems
* Automating Mounts with /etc/fstab
* Logical Volume Management (LVM):
* Creating Physical Volumes, Volume Groups, and Logical Volumes
* Resizing and Removing Volumes
* Managing Disk Quotas

**5. Package Management**

* Working with RPM Packages:
* rpm commands (-i, -e, -q, -U)
* Using YUM/DNF Package Managers:
* Installing, Updating, and Removing Packages
* Working with Repositories
* Handling Dependencies and Conflicts
* Building and Managing Custom Repositories

**6. Network Configuration and Management**

* Network Interface Configuration:
* Configuring IP Addresses (static and dynamic)
* Configuring Hostnames and DNS
* Managing Network Services:
* Starting, Stopping, and Restarting Services (systemctl)
* Troubleshooting Network Issues:
* ping, traceroute, netstat, ss, tcpdump
* Network Configuration Files:
* /etc/hostname, /etc/hosts, /etc/sysconfig/network-scripts/

**7. Service and Process Management**

* Managing System Services with **systemd**
* Service Files and Units
* Enabling and Disabling Services
* Monitoring System Performance:
* CPU and Memory Usage: top, htop, vmstat
* Process Management: ps, kill, killall, nice, renice
* Job Scheduling with **cron** and **systemd timers**

**8. System Monitoring and Logging**

* Analyzing System Logs:
* Log Files in /var/log/
* Using journalctl for system logs
* Log Management with **rsyslog**
* System Monitoring Tools:
* **sar**, **iostat**, **mpstat**, **dstat**
* **netstat**, **iftop** for network monitoring
* Configuring System Auditing

**9. Security and SELinux**

* Configuring Firewall with **firewalld**
* Understanding SELinux Concepts:
* Enforcing, Permissive, and Disabled Modes
* SELinux Contexts and Policies
* Troubleshooting SELinux Issues
* SSH Configuration and Hardening:
* Key-based Authentication
* Disabling Root Login
* Implementing User and Group Permissions

**10. Backup and Recovery**

* Data Backup Strategies:
* Full, Incremental, and Differential Backups
* Backup Tools:
* **rsync**, **tar**, **dd**
* Disaster Recovery Planning
* Data Restoration and Recovery

**11. Web and Database Servers**

* Web Server Configuration:
* **Apache HTTP Server** (httpd)
* **Nginx** for High-Performance Hosting
* Database Server Management:
* Installing and Configuring **MySQL/MariaDB**
* Basic Database Administration
* Backup and Restore Operations

**12. Virtualization and Containers**

* Setting Up and Managing VMs using **KVM/QEMU**
* Introduction to Containers with **Docker**
* Building and Running Containers
* Managing Container Storage and Networking
* Introduction to Container Orchestration:
* **Kubernetes** Basics
* Deploying Containers on Red Hat OpenShift

**13. Red Hat Enterprise Linux System Administration**

* Configuring System Boot:
* GRUB2 Boot Loader Configuration
* Kernel Tuning and Module Management
* System Performance Tuning
* Troubleshooting Boot and Kernel Issues

**14. Automation with Ansible**

* Configuration Management with Ansible
* Writing Playbooks and Roles
* Automating System Updates and Configuration
* Integrating Ansible with Red Hat Systems

**15. Cloud and Hybrid Environment Integration**

* Deploying RHEL on AWS, Azure, or GCP
* Managing Hybrid Cloud Workloads
* Configuring RHEL with Red Hat Satellite

**16. Real-World Projects and Capstone**

* Project 1: Setting Up a Web Server with Apache and SELinux
* Project 2: Building an LVM-Based Storage Solution
* Project 3: Automating User and Group Management with Ansible
* Project 4: Deploying a Dockerized Application on OpenShift
* Project 5: Configuring a Secure SSH and SFTP Server

**17. Certification Preparation**

* **RHCSA (Red Hat Certified System Administrator)**
* **RHCE (Red Hat Certified Engineer)**
* Practice Exams and Mock Tests
* Real-World Scenarios and Troubleshooting Labs

**18. Soft Skills and Interview Preparation**

* Communicating System Administration Concepts
* Writing Technical Documentation
* Resume Building for Red Hat/Linux Admin Roles
* Mock Interviews and Hands-On Challenges

**Educational Background**

* **Bachelor’s Degree in:**
* **BE / B.Tech / B.Sc / BCA in CS, IT, or Networking**
* **Master’s Degree**
* **MCA / M.Tech in Systems, Networking, Cloud**