Linux Course Content

1. Introduction to Linux

- What is Linux? History and Evolution
- Linux Distributions (Ubuntu, CentOS, Fedora, Debian, Red Hat)
- Open Source Philosophy
- Linux Architecture (Kernel, Shell, Applications)

2. Getting Started with Linux

- Installing Linux (VirtualBox, Dual Boot, Cloud VM)
- Linux Command Line Basics
- Understanding the Shell (bash, zsh)
- Linux Filesystem Hierarchy (/, /home, /etc, /var, /usr, /tmp)

3. Basic Linux Commands

- Navigation: `pwd`, `cd`, `ls`
- File Operations: `cat`, `cp`, `mv`, `rm`, `touch`, `mkdir`
- Viewing File Contents: `less`, `more`, `head`, `tail`
- Searching: `find`, `grep`
- Text Processing: `cut`, `sort`, `uniq`, `wc`, `diff`

4. Users and Permissions

- User and Group Management: `useradd`, `usermod`, `groupadd`
- File Permissions and Ownership: `chmod`, `chown`, `chgrp`
- Understanding `rwx` (Read, Write, Execute) permissions
- Sudo and Root Privileges

5. Working with Processes

- Viewing Processes: `ps`, `top`, `htop`
- Managing Processes: `kill`, `killall`, `nice`, `renice`
- Understanding Systemd and Services: `systemctl`

6. Networking Basics

- Checking Network Configuration: `ip`, `ifconfig`, `ping`, `traceroute`, `netstat`
- Managing Firewall: `ufw`, `firewalld`
- SSH Basics: Connecting to remote servers
- SCP, SFTP for file transfer

7. Package Management

- Debian-based: `apt`, `dpkg`
- Red Hat-based: `yum`, `dnf`, `rpm`
- Installing, Updating, and Removing Software
- Adding Repositories

8. Disk and Storage Management

- Disk Layout Overview
- Mounting and Unmounting: `mount`, `umount`
- Partitioning: `fdisk`, `parted`
- Filesystem Types: ext4, xfs, btrfs
- Managing Disk Space: `df`, `du`

9. Shell Scripting Basics

- Writing Simple Bash Scripts

- Variables, Conditionals, Loops
- Executing Scripts and Setting Permissions
- Crontab Basics (Scheduling tasks)

10. System Monitoring and Performance

- CPU, Memory, Disk Usage Monitoring: `vmstat`, `iostat`
- Log Files and System Logs: `/var/log/`
- `journalctl` for systemd logs

11. Security Essentials

- Basics of Linux Security
- SSH Hardening
- Firewalls (iptables, ufw)
- Updating Packages for Security

12. Backup and Recovery

- Simple Backup Techniques (tar, rsync)
- Basic Disaster Recovery Concepts
- Restoring Files and System

13. Real-world Projects and Labs

- Setting up a basic web server (Apache or Nginx)
- Create a User Management Bash Script
- Configure a cron job to backup important files
- Monitor server health and set up basic alerts