

INSTALL AND CONFIGURE LINUX

ISCED UNIT CODE: 0612554 05A

TVET CDACC UNIT CODE: SEC/CU/CS/CR/05/5/MA

Relationship to Occupational Standards

This unit addresses the core competency required to: Install and Configure Linux operating system

Duration of Unit: 150 hours

Unit description

This unit covers the competencies required for installing, configuring, and administering a Linux operating system. It entails mastering the Linux command line, managing file systems and storage, and handling software package management. Additionally, it includes managing system services, users, and groups to ensure efficient system operation. Trainees will also gain expertise in network management, configuring critical server roles, and implementing security measures to safeguard the Linux operating while reinforcing best practices in system administration.

Summary of Learning Outcomes

Learning Outcomes	Durations (Hours)
1. Install and configure Linux Operating system	20
2. Execute Linux Commands in the terminal	30
3. Manage File systems and storage	20
4. Administer users and Groups	10
5. Manage system services and software packages	20
6. Configure Network settings and Server Roles	20
7. Implement Linux Security Measures	20
8. Apply Best Practices in Linux System Administration	10
Total Hours	150

Learning Outcomes, Content and Methods of Assessment

Learning Outcome	Content	Methods of Assessment
1. Install and configure a Linux Operating System	1.1 Linux Distributions: 1.1.1 Ubuntu 1.1.2 CentOS 1.1.3 Debian 1.1.4 Other Distros 1.2 Installing Linux on VMware, VirtualBox, and/or Bare Metal 1.3 Partitioning disks. 1.4 Setting up users, system updates, and basic customization 1.5 Troubleshooting installation issues.	• Practical • Observation • Oral • Written
2.1 Execute Linux commands in the terminal.	2.1 Understanding the Linux Shell 2.1.1 Basic syntax and command structure 2.2 File and Directory Management 2.2.1 Navigating the file system 2.2.2 Creating, moving, copying, and deleting files 2.3 User and Permission Management 2.3.1 Understanding user roles and groups 2.3.2 Managing file permissions 2.4 Process and System Monitoring 2.4.1 Checking running processes 2.4.2 Monitoring system resources 2.5 Package Management 2.5.1 Installing and updating software 2.5.2 Searching and removing packages 2.6 Networking Commands 2.6.1 Checking connectivity 2.6.2 Viewing network configuration	• Practical • Observation • Written • Oral

	2.7 Redirection and Piping 2.7.1 Combining commands with pipes 2.7.2 Redirecting input and output	
3. Manage File Systems and Storage	3.1 Understanding Linux file system hierarchy 3.1.1 Key directories and their functions 3.2 Disk partitioning and formatting 3.2.1 Fdisk Commands 3.2.2 Mkfs commands 3.2.3 Lsblk commands 3.3 Mounting and unmounting file systems 3.3.1 Manual and Persistent Mounts 3.4 Logical volume manager (LVM) 3.4.1 Creating and managing logical volumes 3.4.2 RAID Configuration	• Written • Oral • Observation • Practical
4. Administer Users and Groups	4.1 Administer users and groups 4.1.1 User Management 4.1.2 Creating, Modifying, and Deleting Users 4.2 Group Management 4.2.1 Assigning Users to Groups and Setting Group Permissions 4.3 User Authentication 4.3.1 Configuring SSH Key-Based Authentication 4.4 Password policies. 4.4.1 Enforcing strong passwords and expiry policies	• Written • Oral • Observation • Practical

	4.5 Restricting access 4.5.1 Using Pseudo and /etc sudoers for privileged access	
5. Manage System Services and Software Packages	5.1 Service Management 5.1.1 Starting, stopping, enabling, and disabling services. 5.2 Package Management 5.2.1 Using APT, YUM, and DNF to Install and update software 5.3 Compiling software from source 5.3.1 Understanding GCC (GNU Compiler collection 5.4 Automating updates 5.4.1 Setting up unattended upgrades in Linux 5.5 Monitoring Services 5.5.1 Checking logs and diagnosing failures	• Written • Oral • Observation • Practical
6. Configure Network Settings and Server Roles	6.1 Configuring IP Addresses and DNS 6.1.1 Using netplan, nmcli, and resolv.conf 6.2 Setting Up a Linux DHCP and DNS Server 6.3 Webserver configuration 6.3.1 Setting up Apache and Nginx with virtual host 6.4 Firewall and port management 6.4.1 Using Iptables,UFW and firewalld 6.5 SSH Configuration 6.5.1 Hardening and Managing Remote Access	• Written • Oral • Observation • Practical

7. Implement Linux Security Measures	7.1 Firewall Rules 7.1.1 Configuring iptables, UFW and SELinux/AppArmor 7.2 Intrusion Detection and Prevention 7.2.1 Installing and Configuring Fail2Ban and Snort 7.3 File integrity monitoring Using AIDE and Auditd for security logging 7.4 System Hardening 7.4.1 Disabling Unused Services, Enforcing Strong SSH Policies 7.5 Security Updates and Patch Management 7.4.1 Keeping Linux Secure with Automatic Updates	• Written • Oral • Observation • Practical
8 Apply Best Practices in Linux System Administration	8.1 Backup and Recovery Strategies 8.1.1 Using rsync, tar, and cron for Automated Backups 8.1.2 Log Management and Monitoring 8.1.3 Using journalctl, syslog, and logrotate 8.2 Performance tuning 8.3 Optimising system performance with Sysctl and top 8.4 Disaster Recovery Planning 8.4.1 Preparing for System Failures and Restoring from Backups 8.5 Documentation and Compliance 8.5.1 Maintaining Proper Documentation and Meeting Security Standards	• Written • Oral • Observation • Practical

Suggested Methods of Instruction

- In Instructor led facilitation of theory
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions

Recommended Resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	Learning Materials			
1.	Textbooks		13 pcs	13:1
2.	Installation manuals		5pcs	5:1
3.	Charts			
4.	PowerPoint presentations	For trainer's use		
B	Learning Facilities & infrastructure			
5.	Lecture/theory room		1	25:1
6.	Computer Laboratory		1	25:1
7.	Internet Connection			
C	Consumable materials			
8.	Printing papers		1 ream	1:20
9.	Toners		2 pcs	13:1
10.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
11.	Computers/smartphones		25 pcs	1:1
12.	Projector		1 pc	25:1
13.	VMware/Oracle virtual box		25 pc	1:1
14.	Linux distribution		25 pc	1:1