

AC-11-03-25

Item No. -03

Approved by the Bos in Bachelor of Science (Information of Technology) on 13-11-2024 Item No.03

As Per NEP 2020

**Tolani College of
Commerce
(Autonomous)**



Title of the Course: Linux Administration

Programme: B.Sc(Information Technology) Semester V

Syllabus for 4 credits

From the academic year- 2025-2026

Name of the Course: Linux Administration

Sr. No.	Heading	Particulars
1	Description of the course :	A Linux administrator is a back-end IT specialist who installs, configures and maintains Linux operating systems in the following ways: Installs and configures Linux systems including back-end databases and scripts. Performs system maintenance by reviewing error logs
2	Vertical:	Major Electives
3	Type:	Theory and Practical
4	Credit:	4 credits
5	Hours Allotted:	60 Hours
6	Marks Allotted:	100 Marks Practical Evaluation: 40 Marks Semester-End: 60 Marks
7	Course Objectives: 1. To familiarize with the Linux operating system working environment. 2. To enable the accomplishment of several Linux system administration tasks. 3. To comprehend the configuration of Linux systems from an administration point of view. 4. To highlight the network and server configuration with Linux.	
8	Course Outcomes: 1. Explain the working environment of the Linux operating system. 2. Discuss role of an Linux System administrator in an organization. 3. Perform administrative operations in the Linux operating system using CLI and GUI. 4. Configure various servers on Linux operating systems like DHCP server, DNS server, Mail server.	

9	Module1: Introduction to Red Hat Enterprise Linux, Command Line, System Administration Tasks (15 hours)
	<ul style="list-style-type: none"> • Linux, Open Source and Red Hat, Origins of Linux, Distributions, Duties of Linux System Administrator. • Working with the Bash Shell, Getting the Best of Bash, Useful Bash Key Sequences, Working with Bash History, Performing Basic File System Management Tasks, Working with Directories, Piping and Redirection, Finding Files • Performing Job Management Tasks, System and Process Monitoring and Management, Managing Processes with ps, Sending Signals to Processes with the kill Command, Using top to Show Current System Activity, Managing Process Niceness, Scheduling Jobs, Mounting Devices, Working with Links, Creating Backups, Managing Printers, Setting Up System Logging, Setting Up Rsyslog, Common Log Files, Setting Up Logrotate
	Module2: Configuring and Managing Storage , Connecting to the Network , Working with Users, Groups, and Permissions (15 hours) <ul style="list-style-type: none"> • Understanding Partitions and Logical Volumes, Creating Partitions, Creating File Systems, File Systems Overview, Creating File Systems, Changing File System Properties, Checking the File System Integrity, Mounting File Systems Automatically Through fstab, Working with Logical Volumes, Creating Logical Volumes, Resizing Logical Volumes, Working with Snapshots, Replacing Failing Storage Devices, Creating Swap Space, Working with Encrypted Volumes • Understanding Network Manager, Working with Services and Runlevels, Configuring the Network with Network Manager, Working with system-config-network, Network Manager Configuration Files, Network Service Scripts, Networking from the Command Line, Troubleshooting Networking, Setting Up IPv6, Configuring SSH, Enabling the SSH Server, Using the SSH Client, Using PuTTY on Windows Machines, Configuring Key-Based SSH Authentication, Using Graphical Applications with SSH, Using SSH Port Forwarding, Configuring VNC Server Access • Managing Users and Groups, Commands for User Management, Managing Passwords, Modifying and Deleting User Accounts, Configuration Files, Creating Groups, Using Graphical Tools for User, and Group Management, Using External Authentication Sources, the Authentication Process, sssd, nsswitch, Pluggable Authentication Modules, Managing Permissions, the Role of Ownership, Basic Permissions: Read, Write, and Execute, Advanced Permissions, Working with Access Control Lists, Setting Default Permissions with umask, Working with Attributes.

	Module3: Securing Server with iptables, Setting Up Cryptographic Services, Configuring Server for File Sharing (15 hours)
	<ul style="list-style-type: none">• Understanding Firewalls, Setting Up a Firewall with system-config-firewall, Allowing Services, Trusted Interfaces, Masquerading, Configuration Files, Setting Up a Firewall with iptables, Tables, Chains, and Rules, Composition of Rule, Configuration Example, Advanced iptables Configuration, Configuring Logging, The Limit Module, Configuring NAT• Introducing SSL, Proof of Authenticity: the Certificate Authority, Managing Certificates with openssl, Creating a Signing Request, Working with GNU Privacy Guard, Creating GPG Keys, Key Transfer, Managing GPG Keys, Encrypting Files with GPG, GPG Signing, Signing RPM Files• What is NFS? Advantages and Disadvantages of NFS, Configuring NFS4, Setting Up NFSv4, Mounting an NFS Share, Making NFS Mounts Persistent, Configuring Automount, Configuring Samba, Setting Up a Samba File Server, Samba Advanced Authentication Options, Accessing Samba Shares,
	Module4: Configuring DNS and DHCP, Set Introducing Bash Shell Scripting, Configuring Apache on Red Hat Enterprise Linux (15 hours)
	<ul style="list-style-type: none">• Introduction to DNS, The DNS Hierarchy, DNS Server Types, The DNS Lookup Process, DNS Zone Types, Setting Up a DNS Server, Setting Up a Cache-Only Name Server, Setting Up a Primary Name Server, Setting Up a Secondary Name Server, Understanding DHCP, Setting Up a DHCP Server• Introduction, Elements of a Good Shell Script, Executing the Script, Working with Variables and Input, Understanding Variables, Variables, Subshells, and Sourcing, Working with Script Arguments, Asking for Input, Using Command Substitution, Substitution Operators, Changing Variable Content with Pattern Matching, Performing Calculations, Using Control Structures, Using if...then...else, Using case, Using while, Using until, Using for, Configuring booting with GRUB.• Configuring the Apache Web Server, Creating a Basic Website, Understanding the Apache Configuration Files, Apache Log Files, Working with Virtual Hosts, Securing the Web Server with TLS Certificates, Configuring Authentication, Setting Up Authentication with .htpasswd,

- 10 Reference Books:**
 1) **Author:** Sander van Vugt **Title :** Red Hat Enterprise Linux6 Administration, **Publisher :** John Wiley and Sons, **Edition :** 3rd, **Year :** 2013.
 2) **Author/Wale Soyinka, Title :** Linux Administration: A Beginner's Guide, **Publisher :** TMH, **Edition :** 5th.

11 Practical Assessment: 40% Semester End Examination: 60%

12 Format of Question Paper:

Scheme of Evaluation Pattern
Table 1A: Scheme of Continuous Evaluation (CE)
Scheme of Evaluation Patter

Sub-components	Maximum Marks	Conditions for passing
1) Practical exam	30	A learner must be present for each of the sub- components
2) Journal and Viva	10	
Total	40	

Table 1B: Scheme of Semester End Examination (SEE) Evaluation
Question Paper Pattern for Semester End Examination (SEE)
Maximum Marks: 60 Duration: 2 Hrs.

Note: All questions are compulsory. Each question has an internal choice.

Question Number	Nature of Questions	Maximum Marks
1)	Attempt any three	15
a)		
b)		
c)		
d)		
e)		
2)	Attempt any three	15
a)		
b)		
c)		
d)		
e)		
3)	Attempt any three	15
a)		
b)		
c)		
d)		
e)		

		4)	Attempt any three	15	
		a)			
		b)			
		c)			
		d)			
		e)			

Course Name: Linux Administration Practical			
Periods per week (1 Period is 60 minutes)		4	
Credits		2	
		Hours	Marks
Evaluation System	Practical Examination	2	40

Practical No	Details
0	Installation of RHEL 6.X
1	Graphical User Interface and Command Line Interface and Processes
a	Exploring the Graphical Desktop
b	The Command Line Interface
2	Storage Devices and Links, Backup and Repository
a	Working with Storage Devices and Links
b	Making a Backup
c	Creating a Repository
3	Working with RPMsm Storage and Networking
a	Using Query Options
b	Extracting Files From RPMs
c	Configuring and Managing Storage
d	Connecting to the Network
4	Working with Users, Groups, and Permissions
5	Firewall and Cryptographic services
a	Securing Server with iptables
b	Setting Up Cryptographic Services
6	Configuring Server for File Sharing
a	Configuring NFS Server and Client
b	Configuring Samba
c	Configuring FTP

7	DNS, DHCP
a	Configuring DNS

b	Configuring DHCP
8	Web Server and Shell Scripts
a	Configuring Apache on Red Hat Enterprise Linux
b	Writing Shell Scripts
c	Configuring Booting with GRUB

1	Q.1	15
2	Q.2	15
3	Viva	5
4	Journal	5
5	Total	40