

## L-120 Linux Fundamentals

**Duration:** 5 Days (8 Hrs/Day)

**Prerequisites:** Basic knowledge of Computers

**Course Objective:** Embark on a comprehensive Linux journey, starting with the basics like "What is Linux?" and Multi-User Concepts. Gain proficiency in The Linux Filesystem, File Management, Text Processing, and Shell Basics. Explore Regular Expressions, Archiving, Compression, and Text Editing. Master various Command Shells, delve into Shell Scripting, and understand Process Management. Learn about Messaging, Secure Shell (SSH), and software management to enhance your Linux expertise. Join us in simplifying complex concepts and acquiring practical Linux skills.

**Operating System:** CentOS 7

**Lab Requirement:** Koenig-DC

### Module 1 - What is Linux?

UNIX Origins, Design Principles and Timeline

FSF, GNU, and GPL - General Public License

The Linux Kernel and Linux Features

What is a Distribution?

SLS, Slackware, Mandriva, and Debian

SUSE Linux Products

Role Specific Distro

Standardisation

### Module 2 - Multi-User Concepts

Multi-User Concepts

Root user

Switching User Contexts

Gathering Login Session Info

Getting Help

**Lab:** Login to the workstation using a virtual console and GUI interface.

**Lab:** Use commands to gather information about the current login and the other users on the system.

**Lab:** Use a variety of help tools to discover more information about the commands.

**Lab:** Use and explore the use of the su command.

**Lab:** Observe the operation differences between su and su -.

### **Module 3 - The Linux Filesystem**

LINUX Filesystem Features

Filesystem Hierarchy Standard

Navigating the Filesystem

Displaying Directory Contents

Determining Disk Usage

Disk Usage with Quotas

File Ownership

File and Directory Permissions

File Creation Permissions

Changing File Permissions

SUID and SGID on files

SGID and Sticky Bit - Directories

User Private Group Scheme

**Lab:** Use the various commands to navigate the directories on the workstation

**Lab:** Display the characteristics of some files and directories.

**Lab:** Use df to see how much hard drive space is being used by the filesystem(s)

**Lab:** Use du to show disk usage of all files in a certain directory

**Lab:** Display, then change , the ownership of some of the files and directories on the workstation

**Lab:** Use commands to display, change, and set permissions for the different files and directories on the workstation

### **Module 4 - Manipulating Files**

Directory Manipulation

File Manipulation

File Creation and Removal

Physical Unix File Structure

Filesystem Links

File extensions and content

Displaying Files

Previewing Files

Searching the filesystem

Alternate Search Method

Producing File Statistics

**Lab:** Explore commands that are useful when doing file and directory management.

**Lab:** Use commands to display the contents of text files

**Lab:** Use find and locate to search for files.

## **Module 5 - Text Processing**

Searching Inside Files

The Streaming Editor

Text Processing with Awk

Replacing Text characters

Text Sorting

Duplicate Removal Utility

Extracting Columns of Text

Merging Multiple Files

**Lab:** Using standard UNIX filters to modify and sort text

## **Module 6 - Shell Basics**

Role of Command Shell

Communication Channels

File Redirection

Piping Commands Together

Filename Matching

Wildcard Patterns/Globbing

Brace Expansion

Shell/Environment Variables

Environment Variables

General Quoting Rules

Nesting Commands

**Lab:** Use I/O redirection commands

**Lab:** Use | (pipe) to chain commands

**Lab:** Glob using wildcard patterns

**Lab:** Configure a shell variable

**Lab:** Use the export command to create an environment variable

**Lab:** Escaping shell meta-characters

**Lab:** Command substitution using backquotes and the \$(command) form

## **Module 7 - Regular Expressions**

Regular Expression Overview

**Lab:** Use regular expressions with grep to search for character patterns

**Lab:** Practice some advanced RegEx's with egrep

**Lab:** Use sed to perform text editing on a file using regular expressions

## **Module 8 - Archiving and Compression**

Directory Archive with tar and cpio

The compress utility

The gzip and bzip2 compression utilities

**Lab:** Use archiving and compression commands

## **Module 9 - Text Editing**

Text editing

Pico/GNU Nano

Pico/Nano Interface and Commands

Vi: Basic and Advanced Vi

Advanced Vi Commands

Emacs and Emacs Interface

Basic and Advanced Emacs Commands

**Lab:** Use the pico or nano editor to create and efficiently modify text files

**Lab:** Use the vim editor: motion, editing

**Lab:** Use the Emacs editor: motions, kill, yank, undo, search and search-query commands

## **Module 10 - Command Shells**

Shells

Identifying and Changing the Shell

sh: Configuration Files

sh: Script Execution

sh: Prompts

bash: Bourne Again Shell

bash: Configuration Files

bash: Command Line History, Editing and Completion

Bash: "shortcuts"

bash: prompt

**Lab:** Identify the current shell

**Lab:** Examine symbolic links of listed shells

**Lab:** Invoke shell directly and change login shell

**Lab:** Explore the functions available through command line history

**Lab:** Display all aliases, create a new alias, and remove an alias

**Lab:** Add aliases to .bashrc file to make aliases persistent across login shells and system reboots

**Lab:** Customise the bash shell

**Lab:** Run the Z shell

**Lab:** Explore prompt options including a right hand prompt

## **Module 11 - Shell Scripting**

Shell Scripting

Example Shell Script

Positional Parameters

Input & Output

Doing Math

Comparisons with test

Conditional Statements

The for Loop

The while Loop

**Lab:** Create a shell script to permit "safe" deletion of files

**Lab:** Install new shell script

## **Module 12 - Process Management and Job Control**

What is a Process?

Process Creation and States

Viewing Processes

Signals

Tools to Send Signals

Job Control Basics

Jobs

Screen

Using screen

Advanced Screen

**Lab:** Create several jobs to multi-task at the shell prompt

**Lab:** Job control

**Lab:** Use a "fork bomb" to create additional processes

**Lab:** Use process management tools to examine the current state of the system

**Lab:** Clean up using kill, killall, pgrep and pkill on the command line and KDE System Guard and the Gnome System Monitor GUI programs

**Lab:** Create a screen session

**Lab:** Detach from your session and re-attach to your neighbour's screen session

**Lab:** Create a split screen session

## **Module 13 - Messaging**

Command Line Messaging

write, talk, and ytalk

The mesg utility

Internet Relay Chat

Instant Messenger Clients

Electronic Mail

Sending Mail with sendmail

Sending Email with mail

Overview of PINE

Sending Email with Pine

Evolution

**Lab:** Use mesg, write, and talk to communicate between users.

**Lab:** Send mail using mail and pine.

## **Module 14 - The Secure Shell (SSH)**

Secure Shell

Accessing Remote Shells

Transferring Files

Alternative sftp Clients

SSH Key Management

ssh-agent

**Lab:** Establish a secure session to a remote host using ssh

**Lab:** Copy files securely from one host to another using scp

**Lab:** Generate and use RSA and DSA user keys

**Lab:** Use ssh-agent to cache the decrypted private key

## **Module 15 - Managing Software**

Downloading Software

FTP, NcFTP, and lftp

wget, lynx, and links



Installing Software

Installing Binary Packages - rpm

Querying and Verifying with rpm

Installing Debian Packages

Compiling / Installing from Source

Installing Source RPM Packages

Lab: Practice using the ftp, ncftp, and wget commands to download software