

CSE105:CREATIVE ENGINEERING WORKSHOP

L:0 T:0 P:3 Credits:2

Course Outcomes: Through this course students should be able to

CO1 :: demonstrate the installation and configuration of Linux environments using different deployment methods and perform basic system operations

CO2 :: apply Linux commands for file system navigation, file management, system utilities, and permission handling

CO3 :: analyze information using Linux filters, regular expressions, redirection, and pipes

CO4 :: apply user, group, password, ownership, and file permission management techniques in Linux systems

CO5 :: employ shell scripts using conditional statements, loops, functions, arrays, and command-line arguments for automation

CO6 :: apply Linux development tools, manual page creation techniques, and version control systems in software development tasks

List of Practicals / Experiments:

Linux Basics and Installation

- Introduction to Linux and UNIX
- UNIX Architecture
- Ubuntu Installation
- Dual Boot Installation
- Virtual Machine Installation (VirtualBox/VMware)
- Live USB/CD Installation
- Windows Subsystem for Linux (WSL)
- Linux Desktop Environments (GNOME, KDE)

System Utilities and Basic Commands

- Command Structure
- cal, date, echo, printf, bc, expr, script
- passwd, who, whoami, uname, uname -a, uptime, tty, stty
- man command and manual page navigation

Linux File System and File Management

- Linux File System Hierarchy
- Root Directory Structure
- Important Linux Directories (/bin, /sbin, /home, /etc, /usr, /var, /tmp, /opt, /lib)
- Absolute and Relative Paths
- pwd, cd, ls, mkdir, rmdir, touch, cat, cp, mv, rm, read, su, clear
- File Searching using find
- Directory Visualization using tree
- history command
- Disk Management Commands (du, df)

File Permissions and Ownership

- Linux Permission Model

- Read, Write and Execute Permissions
- chmod (Symbolic and Numeric Modes)
- chown Command
- umask Command
- File Ownership and Group Ownership
- Permission Security Concepts

Shell Features

- Pattern Matching using Wildcards
- Input/Output Redirection
- Pipes and Pipe Chaining

Filters and Regular Expressions

- grep and Extended grep
- cut
- head
- tail
- sort
- wc
- tr
- uniq
- Filters with Pipes
- Regular Expression Fundamentals

User and Group Administration

- User Accounts and Groups
- useradd, userdel, usermod
- groupadd, groupdel, groupmod
- Password Management
- Important Files: /etc/passwd and /etc/group

Process Management

- Concept of Processes
- Process ID (PID)
- ps
- top
- jobs
- bg
- fg
- kill
- pkill

vi editor

- starting vi
- Navigation Commands
- Scrolling Commands
- Insert and Edit Commands

- Delete Commands
- Copy-Paste Operations
- Save and Exit Operations

Shell programming

- while loop
- for loop
- functions
- arrays
- Structure of Shell Scripts
- Creating and Executing Scripts
- Interactive Shell Scripts
- Command-Line Arguments
- Operators in Shell Scripting
- if, if-else, nested if
- test command and []
- case Statement

Development Tools

- Version Control Concepts
- Git Fundamentals
- git init, git add, git commit, git status, git log
- Git & GitHub Fundamentals (Repository, Clone, Push, Pull, Branching, Merge, Pull Requests)
- AI-Assisted CLI Tools

Text Books:

1. UNIX PROGRAMMING by DR. VINEETA KHEMCHANDANI, DR. DARPAN ANAND, DR. K.K. MISHRA, DR. SANDEEP HARIT, BPB PUBLICATIONS

References:

1. UNIX CONCEPTS AND APPLICATIONS by SUMITABHA DAS, MCGRAW HILL EDUCATION